Proceedings
Of
WORKSHOP
on

"REAPPRAISAL OF MINING & ENVIRONMENTAL ISSUES"

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Editor:
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BANGALORE UNIVERSITY
Department of Geology, Jnana Bharathi, Bangalore - 560056
One day workshop on


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Introduction to the Seminar

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The Earth is a unique planet in the Solar system because of the components like Hydroshpere, Atmosphere and Bioshpere. The resources both living and non-living of the planet earth reflect a history of 4.6 billion years. Earth's present day topography and resources are products of changing tectonic and climatic parameters that prevailed and changed from time to time in the past.

Though the resources are being exploited from stone age, the industrial revolution, two world wars fought and significant developments in science and technology in the last century have changed the scenario of exploitation. The quantum of resources explored and exploited in the last 50 years is alarming.

The continents of southern hemisphere i.e. Australia, South America, Asia are known for extensive and and diverse natural resources. In the last two to three decades, the export market has increased for metalliferous deposits particularly Iron which has lead to large scale indiscriminate mining.

The large scale mining without restoration measures has contributed to the increased quantum of waste land, desertification, pollution of air, soil and water, loss of habitat for fauna and flora, displacement of settlements etc. Thus the unethical mining activity has lead to many socio economic problems apart from environmental hazards.

The natural resource is a gift of nature to be shared by one and all, and for many generations. For this, the resources have to be conserved for sustainable development.

In this context a one day workshop on September, 01, 2006 to discuss the following issues related to mining.

- Enviromental degradation and mining.
- Industrial pollution.
- Natural disaster mitigation and management.
- Role of regulatory agencies.
- Socio-economic problems in relation to mining.
- Over exploitation of natural resources and conservation strategies.
- Effects of mining on livelihood.
- Political interference on mining.
- Role of media in creating environmental awareness.
- Mining and Culture
- Restoration and up gradation of environment.

Inaugural address

ENVIRONMENTAL POLLUTION AND MINING .

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MD, FAAP (USA), FIAP, FIAMS, FIAA, FICAAI
Director, Lakeside Hospital, Bangalore

- Chairman: T.A.C.Pollution Control Board
  : Founder Chairman- Environment and Child Health group, Indian **Academy of Pediatrics**
  : National Past Chairman- IAP Respiratory Chapter
  : Environment Health Sector, World Bank Study; State of Environment and action plan (Karnataka)
- Facilitator for UNICEF and Commission of Macroeconomics and Health, Govt of India
- Advisor, WHO study of Birth Cohort Study of Asthma in South East Asia.
- Permanent Member Env. Monitoring Committee, Bangalore Metro Rail.

Introduction:

Most of the diseases are attributed to genetics, poor hygiene and environmental pollution. However environmental pollution has taken an edge over genetics. After 59 years of independence to India the longevity of life has doubled and disease patterns are changing. Communicable diseases are decreasing, and the reasons are improved health care, diagnostic facilities, newer antibiotics and immunization. On the contrary the immunologic and allergic diseases have increased significantly. The causative factors for this changing pattern is rapid urbanization, western life style, change in our traditional food habits and outdoor and indoor air pollution. The focus in this article is more on preventive measures of air pollution so that we can all try to do our best for the community and prevent related diseases.

The Magnitude and burden of the problem:

The Chronic Obstructive Pulmonary Disease (COPD) is nearly four times more common than angina pectoris (chest pain due to heart attack). The recent data from the Commission of Macroeconomics, Govt of India shows that Chronic Asthma cases will increase from 247.4 lakhs to 350.7 lakhs. Chronic COPD cases from 149.35 lakhs to 222.16 lakhs from the year 2001 to 2016. The economic burden will increase from 3108 crores to 13,525 crores of rupees.

Studies show that the prevalence of respiratory diseases like Asthma, Allergic Rhinitis, and their comorbidities like sinusitis and middle ear problems and chronic obstructive lung disease (COPD) have increased significantly; Nearly half of Out Patient visits, and ICU visits one third of inpatients are due to these respiratory problems.

The lung being the organ with a large surface area takes the brunt of air pollution, later other systems also get affected like cardiovascular, genito urinary system, neuromuscular system, central nervous system etc.
Even though earlier societies polluted the environment, the magnitude of the problem was small and the society excused them as they were innocent in their actions. Now a days the greed of human beings caused unabated deterioration of our environment causing every one of us paying thru our nose, lungs and later heart, kidneys and Central Nervous system.

Air Pollution Causes:

Air pollution is both outdoor and indoor. The outdoor pollution is mainly due to automobile exhaust (CO, NO_2, SO_4, respirable particles and O_3) industrial emission, construction activity – tobacco smoke, dust from traffic from poorly maintained roads, dust from mines, pollens, fungi. Indoor pollution can be classified into two varieties (1) Aerobiologicals – dust mites and their fecal matter, cockroach droppings, pets saliva and danders (skin not hair), pollens, fungi, bacteria, viruses etc. (2) Irritants – cooking fuel, smoke, cigarette smoke, mosquito coil burning smoke, formaldehyde, radon, volatile organic compounds, asbestos.

Environmental Pollutants and Impact on Health

ENVIRONMENTAL POLLUTION	
CO	• 50% of all air pollutant, motor vehicles, Hypoxic ill effects. No change in PFT
SO2	• 75% from fossil fuel power plant. Major component of haze. Sulphate particles constitute 105 of pm2.5 (no regular working) • Increases Air way inflammation, resistance, nucosals ciliary activity • Increases sensitivity for asthma by 10 fold. • 50 microgram/m3 → 3% rise in total mortality
NOX	• 60% from motor vehicles. Component of haze. • Increases airway resistance, irritability, often permanent damage • Increases asthma by 60% and sensitivity of dust • 50 micro gm/m3 24pr increases asthma by 2.6%
O3	• Major component of Smog formed by NOX, VOCS and O2 in sunlight, heat. • Motor vehicles major generators of NOX and VOCS • Increases respiratory track irritation and infection • Increases Asthma by 43% • 50 micro gm/m3 M 8hrs increases asthma adm by 3-4%
SPM (pm 10 & 2.5 microns)	• From combustion process (more from Diesel) • Direct or reflex airways spasm and carried to alveoli to other systems (Pm 2.5) • Potentiates other pollutants, increases allergy, asthma, IgE level.

Mining Activities and Impact on Environment and Health

MINING ACTIVITIES, ENVIRONMENT AND HEALTH IMPACT		
ACTIVITIES	**ENVIRONMENT**	**HEALTH IMPACT**
• High level of dust - SPM from mining and transport of ores • Mineral benefiction with emission of flume gases.	Air pollution	- Acute respiratory problems Rhinitis, Wheeze, Cough, Asthma - Eye irritation, sore throat. - Interstitial fibrosis, lack of oxygen and its ill effects - COPD, Tuberculosis.
• Mine water, spent water, effluents leachetes/wash off from waste/ tailings dumps.	Water pollution	- Water born diseases - Flurosis, gastroenteritis, Typhoid, Hepatitis, malaria etc
• Over burden and mine waste/ Tailing of dump sites.	Land pollution	- Water pollution and related diseases.
• Fragmentation of forest land diminished green cover.	Loss of Bio- diversity	- Arid land with high temperature, heat strokes, etc.Increase dust related respiratory problems
• Blasting, drilling, underground mining, heavy earth movers, crushing etc.	Noise pollution	- Deafness Paramesh H.

Air Pollution Facts

- Urban people suffer more from allergic respiratory diseases.
- The rural population suffer more from respiratory infections.
- Traffic police suffer twice as much as non-traffic police from asthma, chronic cough, bronchitis, headache, tiredness, sneezing and wheezing.
- Children going to schools in heavy traffic zones suffer more from respiratory allergy and asthma than children from low traffic zone schools.
- People living 20 Km away from the polluted centers of the city of Bangalore, suffer 50% less from asthma.
- The rural women and children suffer more than urban non-slum people but urban slum people suffer more than rural people.
- Urban women (club goers) smoke cigarettes more than others.
- Studies show that our children smoked their first beedi or cigarette at the age of 10 years. Urban children smoke more than rural children, but after 18 years rural children take over the urban children.

- Indoor air pollution is caused by using agricultural waste and cow dung cakes as fuel, in ill ventilated huts and this has changed the gender prevelance of asthma resulting in girls suffering more than boys.
- People with ill ventilated houses will suffer more with respiratory infections and allergies.

Annexure

Annexure 1: Output of important Minerals in Karnataka (units….)

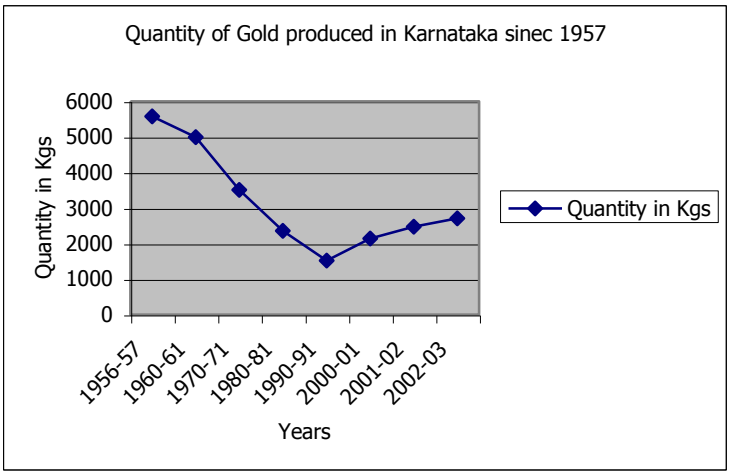
Minerals	1960-61	1970-71	1980-81	1990-91	2000-01	2002-03
Bauxite	38	1077	1851	5496	5481	3425
Gold	56756	77974	258930	544003	1004425	1232303
Iron Ore	7424	18948	96057	1742142	6308458	7641457
Manganese Ore	11339	13671	52037	208999	173537	164462
Silver	71	122	407	744	1654	2145
Dolomite	68	17	414	882	12431	22593
Kaoline	155	505	914	864	6603	10655
Limestone	4771	16527	30631	257183	723437	868858
Magnatite	287	288	3068	20898	27370	17447
Quartz and Silica Sand	256	501	2295	10039	7049	7070
Total Major Minerals	81372	131023	459556	2860677	8380319	10059404
Total Minor Minerals	502	4290	79517	127211	929762	1369002
Total Minerals	81874	135313	539073	29987888	9310081	11428406

Source: ***ISEC, 2004.***

Annexure 2: Quantity of Gold produced and value

Year	Quantity in Kgs	Value (in Ru.000)
1956-57	5574	51377
1960-61	4995	56756
1970-71	3511	77974
1980-81	2355	258930
1990-91	1521	544003
2000-01	2140	1004425
2001-02	2475	1133448
2002-03	2705	1232303

Source: ***ISEC, 2004.***



Annexure 3: Important Minor Minerals produced in Karnataka

Mineral	Quantity Mined
Building Stone (Tones)	**1847698**
Ordinary Sand (Tones)	**127053**
Shabad Stones (Sq. Ft)	**3810177**
Brick Earth	**3769218**
Granite (M Cu Mt)	**127053**

Source: ISEC, 2004.

Type of pollution	Activity causing the problem	Unwanted by-products	Parameters	Impact on					
				Environmental	Social	Economic	Health	Psychological	Aesthetic
Air pollution	Mining	Over burden	SPM, CO, CH4		Rehabilitation requirement	Loss of livelihoods	Respiratory - Decreased lung capacity, Possible TB	Anxiety	Barren soils
			Primary Pollutants (Sox, Nox, CO, SPM)	Stunted Plant growth	Loss of traditional livelihoods	Health deterioration	Sleep disturbances		Over burden dumping
				Reduced diversity	Disruption of traditional society & Norms	Loss of soil fertility and subsequent yeilds			
	Processing		Primary Pollutants	Elimination of sensitive species	Out-migration	Loss of crop yeild			
	Transportation		Primary Pollutants , SPM)	Replacement of 'K' with 'r' species	Loss of TIK				
	Final use		Primary Pollutants		Shift in occupation				
Water pollution	Mining		Surface/ sub water	Drying of water sources	Shifting occupation patterns	More time in fetching water	Water borne health disorders	Water shortage induced anxiety	Coloration of natural stream
				Shift of stream course		Shift in cropping pattern			
				Degradation of surface and sub surface water					
	Transportation			Contamination of surface waters					
	Processing			Contamination of water resources	Tensions due to water shortage	Change in the water allocation pattern and decrease in productivity	Water induced health disorders		
	Final use			Water contamination					
Noise Pollution	Mining			Disturbances to avian community and local fauna etc	Loss of work efficiency and loss of pay	Auditory disorders (in case of extreme conditions)	Results in psychological problems, ill temper, mental disorientation, neurosis, anxiety, nausea, giddiness and fatigue		
	Transporation			Excessive noise levels from vehicles	Sleep disorders	Reduced functional efficiency			
	Processing					High noise levels			
	Final use								
Land degradation				Loss of fertile land, soil erosion		Increase in the cost of agriculture and also low yields	Reduced nutritional value of food		Barren landscape

Deforestation	Diminished forest cover.			Loss of green cover, biodiversity loss (floras and fauna)	Destruction of TKS	Loss of livelihood, particularly of marginal sections and ecosystem refugees			Loss of green cover
Rehabitation problems	Displacement of communities	Migration and law & order aspects	Unemployment, social insecurity		Weakening of social fabric	loss of overall functional efficiency	Socio economic problems.		Development of slums etc

Annexure

Environmental clearance Process

(a) Applicability of the EIA notification:

Environmental clearance is mandatory for new mining projects (major minerals) with mining lease area greater than 5 ha. or expansion / modernization of existing operations irrespective of the quantum of increase in size of mining lease area / production or investment involved, besides other 29 development projects. The EIA notification provides for two-stage clearance for the mining projects. Site clearance is also mandatory for proposals for prospecting and exploration of major minerals when area is more than 500 ha. However, for carrying out test drilling on a scale not exceeding 10 bore holes per 100 sq km for prospecting and exploration purpose no site clearance is required. The site clearance is given in the first stage and environmental clearance in the second stage. Besides the environmental clearance, forestry clearance under the provisions of the Forest (Conservation) Act, 1980 is also mandatory for all the mining proposals involving diversion of forest land for non-forest purpose. The forestry clearance is again accorded in two-stages. In the first stage, the proposal is agreed "in principle" subject to certain conditions. The second stage approval is given after receipt of compliance report from the concerned State Government regarding transfer and mutation of non-forest area identified for compensatory afforestation etc.

(b) Stakeholders participation:

The opening of mines besides impacting the physical environmental in general, has social and economic consequences at local level including displacement of people from the project site in some cases affecting their environment, health and culture. Learning from the experience of other counties, public hearing procedure was introduced in the decision-making process in India from 10th April, 1997. Public hearing has been made mandatory for all the development projects attracting the provisions of the EIA Notification. This has helped in the consideration of concerns of the affected local communities. The large mines, which are generally in organized sector, address the communities concerns in much better manner than small mining companies owners. However, exception are always there, a few small mining companies have also responded better with regard to environment and their relationship with the local people setting a working model for others to follow.

The project proponents seeking site / environmental clearance first apply to the concerned State Pollution Control Board (SPCB) for arranging public hearing. As per procedure laid down in the EIA notification, SPCB constitute public hearing panel for the project and publishes a notice indicating date, time and place for the public hearing in at least two local newspapers widely circulated in the region around the project, one of which in the vernacular language. Public hearing is to be conducted not less than 30 days after the publication of the notice. During this period, all relevant documents are made available for public inspection at a designated place. The public can send suggestions, views and objections to the Board within thirty days from the date of the public notice. All the persons including bonafied residents, environmental groups and others located at the project site(s) / site(s) of displacement / sites likely to be affected can participate in the hearing. They can also give oral suggestions to the State Pollution Control Board. The project proponent is invited to give presentation at the public hearing on salient features of the project, associated environmental issues, environmental protection measures, social welfare programme for the local community and provide clarifications / answer to queries. Commitments to comply with certain suggestions are made by the project authorities. Thereafter, the State Pollution Control Board sends detailed report of the public hearing panel to MoEF.

A time frame of 60 days for completion of public hearing has been set. The public hearing procedure is not applicable to site clearance and prospecting and exploration proposals.

(c) Documentation requirement:

The proposal requiring site clearance or environmental clearance under the EIA notification are to be forwarded to the Ministry of Environment & Forests for consideration by the State Government Department dealing with the mining subject. In case of Public Sector Undertakings, proposals are to be forwarded by the respective Administrative Ministry/Department in the Central Government. The following documents are required for environmental appraisal of the projects:

Environmental appraisal procedure:

The proposals for site and / or environmental clearance, when received in the Ministry are scrutinized initially to check whether all the requisite documents have been furnished by the proponent or not and whether proposal has been forwarded by the concerned Government Department or not. The proposal is returned or kept in abeyance if the application has not been routed through proper channel. Further, if any of the following documents are not submitted, environmental scrutiny is not carried out unless the required reports / documents are made available by the project authority:

* Public hearing report

- "Consent to Establish" from the State Pollution Control Board
- Rapid EIA / EMP report
- Information in relevant questionnaire
- Mining plan approval

(i) Site clearance:

The Impact Assessment Division of the Ministry examines the proposals for prospecting and exploration or site clearance internally without any reference to the Expert Committee. Discrepancies, gaps in information and issues requiring clarifications, if any, are communicated to the project authorities. After receipt of information, decision regarding suitability or otherwise of the project site is communicated to the proponent. In case the requisite details are not received in the Ministry in a reasonable time period inspite of reminders, the files of such cases are closed. Such files are reopened as and when the information and justification for delay in submitting the details are received.

(ii) Environmental clearance:

The proposals for environment clearance are first subjected to internal screening in the Impact Assessment Division. Discrepancies, gaps in information and issues requiring clarifications, if any, are conveyed to the project authorities. After receipt of information, the proposals are referred to the Expert Committee (Mining) of MoEF. The Committee is chaired by a non-official and comprises experts in various fields and representative(s) of non-government organization(s). The terms of reference of the Committee are - (i) Scrutinise the environmental impact of mining projects and environmental management plan prepared and submitted by the project authorities; (ii) Suggest safeguards including installation of pollution control devices and choice of appropriate technologies to mitigate adverse environmental impacts in respect of projects recommended for approval; (iii) Recommend clearance or rejection of the project from environmental angle with specific safeguards, if any. The Committee meets normally every month to consider the matured proposals. The project proponents and their consultants are invited to make a detailed presentation before the Committee on salient features of the project, associated environmental and social issues, public opinion and their potential concerns, commitments made by the company, environmental management plan, estimate for environmental protection measures and post-project monitoring. After hearing the proponent, the Committee may ask for additional information or studies and also may decide to visit the site for on-the-spot assessment of the issues. Based on such examination, the Committee makes recommendation for approval or rejection of the project after usually not more than two sittings. On receipt of the recommendations of the Expert Committee and

any further clarifications from the project proponent, the cases are processed for obtaining approval of the Minister-in charge of the Ministry.

(e) Time limit for decision - making

The EIA notification prescribes ninety days time limit to complete assessment of the project after receipt of requisite data and documents from the proponent and decision is to be communicated within thirty days thereafter.

(ii) Site clearance

Decision regarding suitability or other-wise of the proposed site is to be taken within a period of thirty days provided requisite information has been furnished.

Key Note Address

Mining and Environmental Issues[1]

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1. Introduction

Importance of mines for the welfare of humans was recognized ages ago and they have played a very important role in the metamorophing of hunter-gatherer human to be come civilized. Accordingly, even in the ancient knowledge regarding the mining has been promoted to a very high level of sophistication, as manifested in the Ashokan Pillar in Delhi. In addition, mineral resources contribute significant share in revenue generation in the form of exports, employment to thousands in direct and indirect manner (see Table 1). Minerals, however valuable they are, but finite in nature and are vital raw materials for many basic industries and essential ingredients for development.

India is endowed with significant mineral resources. India produces 89 minerals out of which four are fuel minerals, 11 metallic, 52 non-metallic and 22 minor minerals. The total value of mineral production was Rs. 568,070 million in 2000-2001, of which the value of minerals other than petroleum and natural gas was Rs. 306,751 million. The metallic production is accounted for by iron-ore, copper-ore, chromite and/or zinc concentrates, gold, manganese ore, bauxite, lead concentrates. Amongst the non-metallic minerals, more than 90 percent of the aggregate value is shared by limestone, magnesite, dolomite, barytes, kaolin, gypsum, apatite & phosphorite, steatite and fluorite. In terms of the value of production, fuel minerals far exceed all others combined. Among the fuels, petroleum ranks first in value, followed by coal (including lignite). India produces less than half of its petroleum needs but produces a slight exportable surplus of coal. Virtually all of India's petroleum comes from the offshore Bombay High Field, and from Gujarat and Assam, while coal comes from some 500 mines, both surface and deep-pit, distributed over a number of states. By far the most important coal-producing region is along the Damodar River, including the Jharia and Raniganj fields in Bihar and West Bengal, which account for about half the nation's output and virtually all the coal of coking quality. Natural gas is of little importance. Uranium is produced in modest quantities in Bihar.

[1] Key note address delivered in the one day workshop on Reappraisal of Mining and Environmental Issues on 1st September, 2006, at the Department of Geology, Bangalore University, Bangalore. Author is highly thankful to Sri A.N.Yellappa Reddy, Dr. Lenin Babu, Dr. S.Puttaswamaiah, Latha Nagesh, and Harish Babu, for their suggestions and help in preparing this paper. Comments and suggestions are most welcome on the current version of the paper.

1.1 Economic Reforms and the National Mineral Policy

The Government of India made the Mineral Development Policy statement in 1993 to achieve business excellence in the mineral sector opening up exploration and mining for minerals. This was followed by further liberalization process through amendments in the mining law and the Foreign Direct Investment Policy. Today, the State Governments are fully empowered to grant mineral concessions for most non-fuel and non-atomic minerals and can also review, transfer or amalgamate minerals concessions without reference to the Central Government. Time frames have been fixed for conveying decision on mineral concessions applications and proposals for approval of mining plans. Foreign Direct Investment is possible in all sectors of non-fuel and non-atomic minerals through the automatic route. While the cap for automatic approval is 74% for diamond and other precious stones, even 100% approval is available for all other non-fuel and non-atomic minerals including gold and silver. Reconnaissance surveys have been identified as a distinct activity prior to prospecting and provisions has been made in the law for granting of reconnaissance permit. Considering the economic significance of the mineral explotitation, GoI has initiated several FDI program in mining sector. Ever since, economic reforms, GoI has opened the mining sector for private ventures and some of them in Table 2.

Table 1. Average Daily Employment in Major Non Coal Mines in India (1951 and 2002)

Mineral	Year	No. of Mines Submitting Returns	Average Daily Employment				Output (in ' 000 tonnes)	Value of Output (in million Rs.)
			Below Ground	Opencast Workings	Above Ground	Total		
Bauxite	1951	11	-	760	250	1010	56	1
	2002	88	-	3748	793	4541	8967	1563
Copper	1951	4	2264	-	1446	3710	375	19
	2002	8	2712	252	919	3343	3197	1898
Galena & Sphalarite	1951	1	73	-	391	464	15	N.A
	2002	12	2017	283	2196	4496	3183	3564
Gold Ore	1951 $	6	13022	-	8850	21672	5420	68
	2002	6	1727	89	1526	3342	622083	1489
Granite	1994	106	-	3392	470	3862	-	-
	2002	166	28	4519	1445	5992	339	2543
Iron Ore	1951	34	2	13308	6408	20223	3714	21
	2002	207	-	20491	13166	33657	99813	27841
Limestone	1951	59	-	13169	2811	15980	2965	10
	2002	413	-	18897	6294	25191	158592	12268
Manganese Ore	1951	234	800	44459	10272	55531	1180	66
	2002	114	2550	7451	3728	13729	1914	2214
Mica	1951	1106	24370	16802	11024	52196	11822	27
	2002	30	433	30	161	624	2077	36
Stone	1951	57	-	3606	1502	5108	715	3
	2002	209	-	4837	2964	7801	14863	1066
Total Metalliferous	1951	1180	42138	107466	47469	197073	-	235
	2002	1870	10266	83183	43489	136938	-	64964

	1971	13	-	-	13573	13573	7193	756
Oil							8024(GS)	21430
	1971	2008	26952	152809	68724	248486	-	1856
Non-coal	2002	1912	10266	83183	65837	159286	-	188291
Abbr. : N.A. : Not Available. R Revised. GS : Gas.								
Note : Output of oil is in ' 000 tonnes except for gold ore and gas for which units are respectively tonnes and million cubic meters.								
* : As compiled by Indian Bureau of mines, Nagpur.								
$: The unit is Kg.								
Source : Ministry of Labour, Govt. of India.								

Table 2: Agreements Signed between 1997-2002

Company	Minerals	Area (in sq km)	District/State	Year of Approval
BHP Billiton (Australia)	Copper, lead	2,532.14	Tonk, Ajmer, Bundi, Bhilwara/Rajasthan	1997
BHP Billiton	Copper, lead	2,637.58	Tonk, Sawai, Madhopur and Bundi/Rajasthan	1997
BHP Billiton	Copper, lead	903.84	Bhilwara/Rajasthan	1997
Phelps Dodge	Copper	2,472	Singhbhumi (east) and	1998
Australian Indian Resources (AIR)	Gold, copper	2, 692.30	Sonbhadra/UP	1998
AIR	Gold	196.5	Lalitpur/UP	1999
BHP Billiton	Copper	568, 389	Bhiwani, Mohindergarh/ Haryana	1999
Admas India	Diamond	1,966.22	Bellary, Chitradurga/	2000
ACC Rio Tinto	Diamond	2,480	Chitradurga, Tumkur, Bellary, Devanagere	2000
Phelps Dodge (US)	Copper	963.585	Lalitpur/UP	2000
Hutti Gold Mines	Gold	2,240	Bagalkot/Karnataka	2000
De-Beers (SA)	Gold	300, 2,333,	Kurnool, Anantapur,	2000
Phelps Dodge	Copper	2,770, 2,565	Cuddapah/Andhra Pradesh	2000
NMDC India	Diamond	2,300	Anantapur/Andhra Pradesh	2000
ACC Rio Tinto	Diamond	1,202.6	Raichur, Bellary/Karnataka	2001
Phelps Dodges exploration	Copper, gold	1,869	East Singhbhumi/Jharkhand	2002
Indophil Resources Exploration	Gold	3,453	Belgaum, North Kannada, Dharwad, Haveri and Gadag	2001
Anglo-American Exploration	Copper, nickel	2,487	Guntur/Andhra Pradesh	2002
DeBeers	Diamond	2,000	Nawarangpur/Orissa	2002
DeBeers	Diamond	2,000	Nuapada, Bolangir/Orissa	2002
DeBeers	Diamond	2,000	Kalahandi, Nawarangpur/	2002
DeBeers	Diamond	1,733	Kalahandi, Bolangir,	2002
Anglo American	Lead, zinc	453	Rajasthan	2002
DeBeers	Diamond	679	Andhra Pradesh	2002
BHP	Nickel, cobalt, gold	2,293	Narasinghpur, Hoshangabad, Chhindwara/Madhya Pradesh	2002
ACC Rio Tinto	Diamond, gold	2,450	Chhatarpur, Sagar, Dmoh, Tikamgarh/Madhya Pradesh	2002
Anglo-American	Copper, nickel	2,701	Andhra Pradesh	2002
ACC RTZ	Diamond	3,000	Dhamtari, Mahasamund/	2002
DeBeers*	Diamond	9,000	Raipur, Mahasamund, Kanker, Jaspur, Durg/ Chhattisgarh	2002
ACC RTZ**	Diamond, gold	5,200	Madhya Pradesh	2002
ACC RTZ*	Diamond	3,000	Chhattisgarh	2002

Source: Debaranjan Sarangi (2004) Mining 'Development' and MNCs in Economic and Political Weekly, April 24, 2004
Note: * in three separate projects, ** in two separate projects

1.2 Negative Externalities of Mining

Though the mining sector has significant contribution to the GDP, it has several negative contributions as well. It affects all the components of environment and the impacts are permanent/temporary, beneficial/harmful, repairable/ irreparable, and reversible/ irreversible. They can be divided into impacts on society, ecosystem, health etc.

Impacts of mining on Society

Displacement of the people: For opencast as well as underground mining it is required to clear the surface of all the buildings and structures along with the vegetation not only in the area designated for mining purposes but also in a large area nearby which is required for making external dumps and placing associated activities. Therefore, all the people living in this area get displaced.

Loss of livelihood: The ethnic people living in the designated areas depend generally for their livelihood on the land. Since, in mining areas the land is taken for mining and associated activities these people loose their livelihood.

Changes in population dynamics: Invariably all the managerial, skilled, and semi-skilled manpower required for mining and associated activities comes from out side as such trained manpower is usually not available in ethnic population. In addition people come to the mining areas for trade, etc. Thus, the population dynamics of the area undergoes a major change over the years resulting in dilution of the ethnic population and their culture and religion, reduction in sex ratio, etc.

Cost of living: Societies dependent on agriculture and forests usually have a lower level of economic scenario. The development of industrial and other associated activities in such areas increase the level of the economic activities manifolds. Increased industrial and economic activities generate more money and increase the buying power of the people directly and indirectly associated with these activities. This leads to an increase in the cost of living, which adversely affects the other people, including ethnic people, who are not associated with these activities.

Water scarcity: Mining either by opencast or by underground methods damages the water regime and thus causes a reduction in the overall availability of water in and around the mining areas. In the sedimentary deposit mining areas the water table and aquifers are damaged and thus the availability of water from these sources reduces.

Health impacts: Health and well being of the people living in and around the mining complexes get affected due to the pollutants in the air and water, noise and vibrations. In fact, the society in the mining complexes has to bear the various costs of abating the affects of environmental pollution in various ways. The people working in the mines and associated facilities also get affected by the work place environment, which can cause various problems, e.g., skin problems, lung diseases, deafening, etc.

Infrastructure facilities: The mining and associated activities in the mineral bearing areas bring about infrastructure development, i.e., roads are constructed, schools and hospitals are established, communication facilities are developed, etc., which tend to improve the quality of life of the complexes.

Employment opportunities: The mining and associated activities offer opportunities of employment to the eligible people from the ethnic population. The Project Affected People (PAPs) are given jobs and are trained for self employment as a result of the provisions in the Rehabilitation and Resettlement (R & R) schemes. People also get employment in the other developmental activities and also the mineral based activities in and around the complexes.

Increase in aspirations: The ethnic people of the mineral bearing areas, with the advent of mining and associated activities, are exposed to various developments and this tends to increase their aspirations. In fact, this is necessary for the overall community development in the mining complexes.

Addictions: Increased economic activities and effluence brings in more addictions in the society. In the tribal areas the ehtnic people may also get affected by additional addictions.

Economic disparity: Industrial and economic activities in mining complexes bring about economic disparity among the population living in the complexes. The people employed in the organized activities usually earn more than those employed otherwise. This economic disparity leads to the development of frustrations in the poorer class of the people.

1.3 Ecological Impacts

From opencast mining

- Removal of all vegetation (flora) and thereby fauna from the area required for mining and other purposes
- Pollution of water in the surrounding water bodies due to leaching from overburden dumps and due to the pollutants from the other activities. This affects the aquatic ecology of these water bodies.
- Dust in atmosphere, contributed by mining and associated activities, when deposited on the leaves of the plants in the surrounding areas may retard their growth.
- Noise and vibrations due to blasting and operation of the machines drive away the wild animals and birds from the nearby forests.

- Water scarcity caused due to the impacts of opencast mining on water regime affects the growth of vegetation and agriculture in and around the complexes.

From underground mining

- Clearing of area for developing shaft/incline complex, infrastructure, colonies, etc. may require removal of some vegetation and thereby driving away the fauna.
- Water scarcity, caused due to the impacts of mining on water regime, along with pumping and release of polluted water on the surface may affect vegetation in the surrounding areas.
- Top-soil in tensile zones of subsiding areas may loose its vegetation supporting capability.
- Release of polluted water from the underground mines into the surface water bodies may affect their aquatic ecology.

From mineral handling and preparation

- Land clearance of almost all vegetation in the area earmarked for the construction of the mineral handling and preparation units.
- Disturbances to fauna of the nearby areas from the noise and vibrations from the mineral handling and preparation units.
- Impacts on aquatic ecology due to discharge of effluents from the units.
- Retardation in vegetation growth in neighboring areas due to deposition of dust on the leafs.

1.4 Impact on Land

Land is one of the most important resource for the human beings as this is needed for all the activities. Mining activities both by underground as well as by opencast methods affect the land in various ways. These impacts are briefly outlined hereunder**.**

Impacts of opencast mining

- Topography and land scenario changes due to digging of open pits and dumping of overburden rock mass in the form of the heaps.
- The land-use pattern undergoes a change due to the use of the land for mining, dumping, and other mining and associated activities.
- The land-use in the surrounding areas may get affected due to the impacts of mining on water regime.
- Leachets from overburden dumps and other rock masses and polluted water from the pits affect the characteristics of the top-soil affecting the land-use.
- In the mines having mineral concentration/preparation it is required to make tailing dams to store the tailings form the concentration/preparation plants. These dams

need land and may cause pollution of nearby underground and surface water sources.
- The drainage pattern on the surface undergoes a change due to the alterations in the surface topography due to mining and associated activities.

Impacts of underground mining

- Changes in land use due to constructions and infrastructure development.
- Changes in topography and drainage pattern due to subsidence.
- Disturbances in the effective land-use due to damage to the surface, sub-surface and underground water bodies.
- Discharge of polluted water from the underground mines affects the top-soil on the surface.
- The rock mass having carbonaceous shales may develop mine fires and when these fires become surface fires they tend to damage the land over and adjacent to them due to subsidence and heat.
- In the con-coal mining sector there are chances of sudden collapse of underground workings causing a marked depression on the surface. This was observed at Zawar and Khetri.

Impacts of mineral handling and preparation

- Changes in the land use due to the construction of mineral handling and preparation plants.
- Impacts on top-soil due to effluent discharge from the plants.
- Pollution of underground water bodies (water table) due to effluent discharge and leachets.

1.5 Impacts on Water Resources

Impacts of opencast mining

- All the surface water bodies have to be removed from the area designated for opencast mining and associated activities.
- All the aquifers, including the water-table aquifer, above the mineral deposit to be extracted are damaged because for exposing the mineral for extraction the overburden rocks are removed.
- If there are high pressure aquifers below the mineral deposit it becomes necessary to pump out water from these aquifers to reduce water pressure to facilitate mining.
- Water in the nearby water bodies gets polluted due to leaching from overburden dumps, discharge of pumped out mine water, and other activities in the vicinity of the water bodies.

- In the areas having pyrites and sulfides in the rock mass the mine water as well as the leachets may be acidic and their discharge in the surface water bodies may enhance heavy metal pollution potential.
- In the reclaimed open pits the filled out areas may accumulate water in rock's interspaces. This may in the long run serve the purpose of a water body.
- During rainy seasons the run off water from the areas surrounding the mines may carry with it a large doze of suspended solids into the nearby water bodies.

Impacts of underground mining

- If the subsidence movements on the surface are more than the safe limits for the surface water bodies it becomes necessary to remove/drain them.
- Due to underground mining the overlying underground water bodies are disturbed and water from them finds way to the underground workings from where it is pumped out. The disturbances to the underground water bodies reduce the availability of water not only in the mining area but also in the neighboring areas.
- With the development of the cracks up to the surface water from the surface specially during rains finds way to the underground workings through the cracks. This water may carry with it various pollutants from the surface.
- The underground mine workings not in use may become waterlogged. The caved and stowed goaves also store a sizable quantity of water. These water bodies are sometimes very useful.
- The polluted underground water when pumped out and discharged on the surface may pollute the surface water bodies.

Impacts of mineral preparation

- The effluents from the mineral preparation plants when discharged into the surface water bodies, pollute their water.
- The effluents when discharged on the surface pollute the top soil and sub soils and also the water table.

1.6 Impacts on Atmosphere and Noise Pollution

Impacts of opencast mining

- Removal of vegetation from the area designated for mining and other purposes produces dust which when air-borne causes an increase in the concentration of SPM in the surrounding air.
- Removal, handling, transportation and storage of soils also causes an increase in the concentration of SPM in the atmosphere. The use of diesel equipment in these activities causes an increase in the level of NOx.

- Drilling and blasting of overburden and the mineral contribute SPM and explosive fumes into the atmosphere.
- In-pit crushing, loading and transportation of the mineral and the overburden rock mass and making the dumps contribute SPM and NOx.
- Minerals and rock mass having sulfur and its compounds may contribute SO2.
- Making of the overburden dumps and the use of diesel equipment for this purpose contribute SPM and NOx.
- Some of the sedimentary rocks may have CH4 and when mined they may contribute this gas to the surrounding air.
- Fires in opencast mines contribute heat, SPM, SO2, CO2 and CO.
- Use of petrol vehicles in the mines contributes hydrocarbons and lead.
- The equipment used in the opencast mines for various purposes including the transport of the overburden and mineral generate continuous noise, while blasting produces impulsive noise. All the noise generated in the mine does not become ambient nose as the noise generated from the different sources gets reflected and refracted and ultimately the resultant of all the noises after reflection and refraction reaches the surface to become the ambient noise.

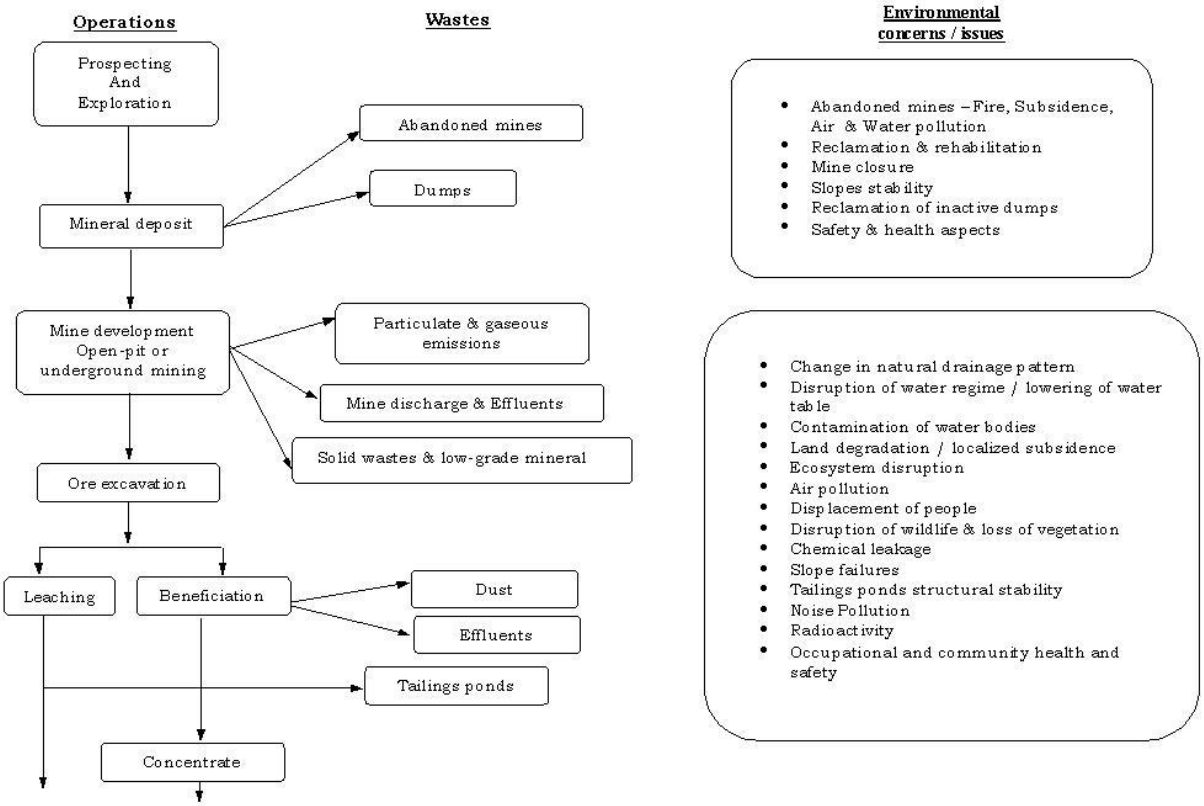
Impacts of underground mining

- The exhaust air from the underground mines contributes SPM, CO2, CH4, NOx, SO2, and other pollutants.
- The surface activities in the underground mining areas, e.g., diesel generating stations, boilers, etc. contribute SPM, NOx, and CO2.
- The machines and equipment installed at the shafts, inclines, compressor houses, workshops, etc. generate noise, which tends to become ambient noise as it is generated on the surface.

Impacts of mineral preparation activities

- Mineral handling, mineral preparation and associated activities mainly contribute SPM to the atmosphere. In the mineral preparation plants having chemical processes producing gases the atmosphere may get polluted due to emission of the gases.
- The crushers, conveyors and other equipment installed in the mineral handling and preparation plants produce continuous noise.

Figure 2 : Mining processes, wastes and related environmental concerns & issues



1.7 Environmental Governance

To ensure the proper governance of this important sector, GoI has evolved a system, wherein,

a) The Department of Mines administers the Mines and Minerals (Development & Regulation) Act, 1957 (MMDR Act, 1957) in respect of all minerals other than coal, lignite, natural gas and petroleum.
b) The Department of Coal administers the MMDR Act, 1957 for coal and lignite, while
c) The Ministry of Petroleum and Natural Gas administers oil and natural gas under specific statutes.
d) The atomic minerals are administered by the Department of Atomic Energy.
e) Ministry of Environment and Forests to review the environmental impacts

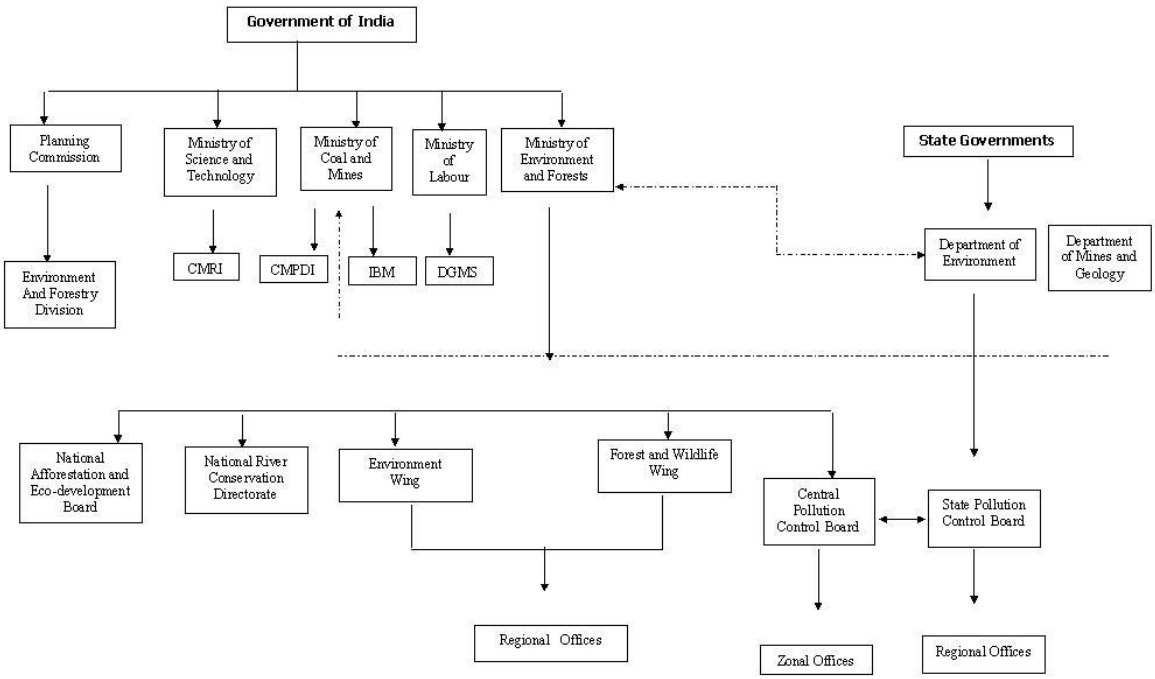
1.8 Environmental Regulatory Framework:

Consists of several legislative enactments, viz.

a) Mines and Minerals (Development & Regulation) Act, 1957, amended in 1994;
b) Mineral Concession Rules, 1960;
c) Mineral Conservation and Development Rules, 1988.
d) The Water (Prevention and Control of Pollution) Act, 1974 (amended in 1988)
e) The Air (Prevention and Control of Pollution) Act, 1981 (amended in 1988) The Environment (Protection) Act, 1986 (with rules 1986 and 1987)
f) The Forest (Conservation) Act, 1980 (amended in 1988)

g) The Wildlife (Protection) Act, 1972 (amended in 1991)

Figure 1 : INSTITUTIONAL MECHANISM : MINING AND ENVIRONMENT



CMRI:Central Mining Research Institute, Dhanbad CMPDIL :Central mine Planning Design Institute, Ranchi

IBM:Indian Bureau of Mines, Nagpur DGMS :Directorate General of Mines Safety, Dhanbad

In the Indian federal structure, State Governments are the owners of minerals in their respective territorial jurisdiction and issue Reconnaissance Permits, Prospecting Licences and Mining Leases over these minerals. In respect of ten minerals included in Part `c` of the First Schedule of the MMDR Act, prior approval of the Central Government is necessary before grant of mineral concessions. Further, National Mineral Policy for non-atomic and non-fuel minerals prohibits mining operations in identified ecologically fragile and biologically rich areas and strip mining in forest areas. Opencast mining could be permitted only when accompanied by a comprehensive time bound reclamation. It states further that the environmental management plan should have adequate measures for minimising environmental damage, restoration of mined out areas and plantation as per prescribed norms. As far as possible, reclamation and afforestation have to proceed concurrently with mineral extraction.

1.9 Environmental clearance

Initially, the development projects from the public sector undertakings of the Central Government requiring approval of the Public Investment Board of the Ministry of Finance were normally considered for environmental clearances. For example, the multi-purpose river valley projects were cleared by the Planning Commission, Government of India in consultation with NCEPC in regard to environmental aspects. Environmental impact assessment based environmental clearance procedure was adopted as an administrative measures in late seventies for the river valley projects. The procedure was later extended to cover other sectors like industry, thermal power, nuclear power, and mining. India has over 24 years of experience in conducting environmental impact

assessment of development projects. On 27th January, 1994 the Ministry of Environment & Forests had issued the Environmental Impact Assessment [EIA] Notification under EPA, 1986 imposing certain restrictions on undertaking new development projects or expansion and modernization of existing ones, unless prior environmental clearance has been obtained from the Ministry. Environmental clearance is mandatory for 30 development projects including the mining. Details of environmental clearence are given in the Annexure

EIA/EMP Process: The Ministry, under the World Bank assisted Environmental Management Capacity Building mining project has also obtained recommendations of the international consultant on changes required to be made in the EIA mechanism in India, keeping in view the practices being followed in other countries.

i. Guidelines and timetable for a formal process to determine the scope of EIA / EMP for each project need to be evolved.

ii. Guidelines for collection and documentation of environmental baseline data for the key resources like surface water, ground water, flora & fauna, land use, meteorology and air quality including socio-economics shall also be developed along with standardised format for preparation and submission of EIA / EMPs.

iii. Today, proper coverage is not given to occupational and community health aspects in the EIA / EMP reports. Guidelines for inclusion of full operation, mitigation, reclamation, mine closure and monitoring in the EIA / EMP also need to be developed.

Emphasis on Mine Closure: The mining method used to extract minerals from the earth determines many aspects of post-mining topography. Disturbances depend on the geological structure associated with the mineral, depth of the deposit from the surface, surface character and method of mining. The natural land surface is drastically changed through removal and placement of materials and dumping of overburden, waste rock or tailings. Adequate amount of material is not normally available to fill the final pit created due to mining. Therefore, proper reclamation of the mined out areas is a must. Proper guidelines need to be developed for this purpose. A Committee has already been set up to go into various issues relating to mine closure aspects of mining.

Size of mining lease: In India, the State Governments grant mining leases as a small as 0.5 ha. for mining of certain minerals. In such a situation, scientific working and compliance with environmental protection measures and standards is not feasible. Unscientific mining practices have altered landscapes, natural drainage pattern, soil productivity, water regime, and air & water quality. Really, the small size mines can never function in an environmentally friendly manner nor can comply with the regulations regarding mine safety and conservation. When such small sized mines operate in clusters, damage to the environment is quite serious. A two fold approach is

being adopted to tackle the problem. First is to rationalize the size of new leaseholds (except in case of gemstones). For the existing mines, amalgation of small leaseholds wherever feasible or permission to go in for a collective EIA / EMP for a cluster of mines is the second alternative. In extreme cases, where scientific and systematic working is not possible, cancellation of the leases may be the only option. For realistic assessment of environmental implications of such clusters, there is a need to adopt a regional planning strategy. While carrying out environmental appraisal, emphasis is given to predict cumulative impacts of the proposed and existing activities.

A decision has been taken to discourage such small-scale mining operations from the environmental management point of view. Recently, a Committee has been constituted to look into the issues and make recommendations about the minimum size of mining lease that should be followed in the interest of systematic and scientific mining.

Environmental Standards: The existing environmental standards applicable to the mining industry are a composite of general environmental standards except for coal. These standards are inadequate in certain respects for effective environmental protection and management of minerals sector when compared to international norms. Very recently, the Ministry of Coal & Mines, the Department of Mines based on the recommendations made by the Indian Bureau of Mines has come out with a set of mineral-wise air quality and effluent standards for nine minerals in a suggestive form for a period of one year. These standards are for chromite, copper, iron and manganese ore, lead and zinc, bauxite, limestone and dolomite mines.

Demonstration of best management practices: Two demo sites having different topographic features and environmental management issues have been selected in Goa and Himachal Pradesh to demonstrate best management practices involving international consultants. The purpose is to demonstrate actual implementation of specific mitigation measures in a time bound and cost effective manner for replication at other mine sites. This would offer advantages like –

i. Develop feasible mitigation measures and techniques for mining projects.
ii. Train mine operators in principles of mining, designing, implementing and monitoring the mitigation measures
iii. The projects will generate information that could be used for policy making and standards setting processes
iv. Development of technical and management guidelines for different minerals mining projects

R&D Efforts: The Ministry of Environment & Forests has funded 14 research projects in the following identified priority areas to develop indigenous know-how: a) Management of solid wastes, b) Optimisation of tailing pond /settling pond designs, c) Application of EPA models to predict pollution levels, d) Utilisation of industrial wastes, fly ash etc, d) Stabilisation and control of OB dumps, e) Study of air borne respirable dust concentrations at work places, f) Digital modeling of contamination of ground water, g) Development of fugitive dust dispersion model for mining areas, h) Determination of

emission rates of dust and validation of air quality models, I) Methodology for cumulative impact assessment in non-coal mining projects.

Data bank and networking: There are many organizations in the country, which could effectively serve as a resource in select areas of mining environment issues. However, because of inefficient networking capabilities, coordination among them often does not take place. An effective database management system and networking among the concerned institutions and the selected Central and State Government Departments and Pollution Control Boards is being established for facilitating dissemination and sharing of information on various aspects of mining and environmental data. The Ministry of Environment & Forests has also initiated a project to establish and operate a pilot Environmental Information Centre (EIC) in three States (Andhra Pradesh, Gujarat and Maharashtra) to act as a repository of validated environmental data which can be accessed and used by the stakeholders in the environmental clearance process, to evolve a suitable mechanism for net working with data providers / generators and to identify constraints and develop a blue print for up scaling the scope of the Centre at the national level. The mining data base Centre would be finally hooked to EIC.

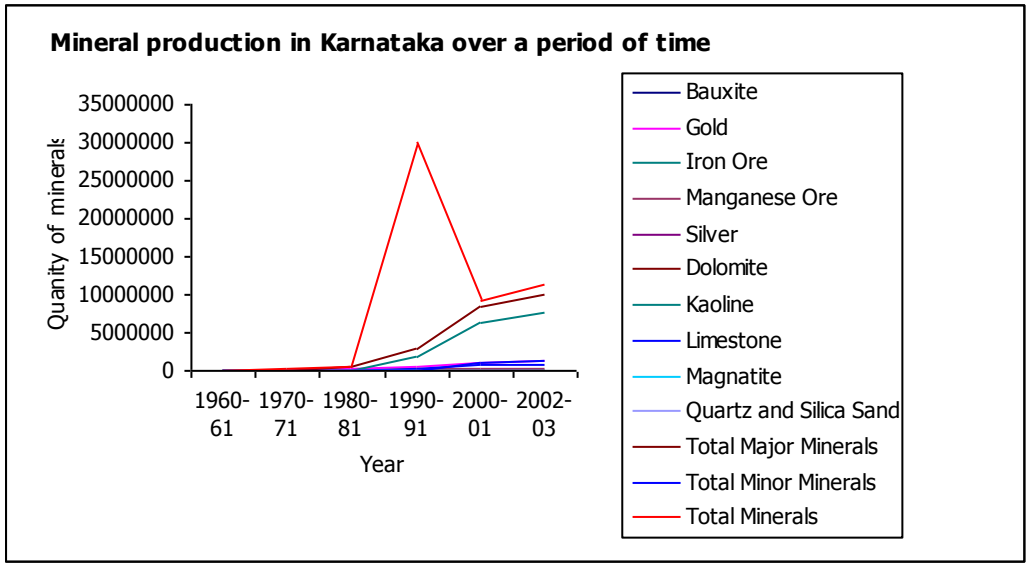
Institutional Strengthening: Institutional capacity of Government Departments who are responsible for policy making, legislating, standard setting and enforcing compliance is being enhanced to ensure effective monitoring of EMPs and observation of the prescribed environmental standards by mine operators. It has also been planned to develop expertise in planning, designing and implementing environmentally benign projects in the institutions working in the field of mining and mining environment. They will also become a resource group for the Government Departments in discharging their responsibilities and for the miners in implementation of environmentally benign designs and carry out the specific research / studies to equip the Indian mining industry with latest developments.

Training - Resource Group Development: Environmental management training courses based on the best practices from around the world have been taken up to upgrade the knowledge and know-how of selected personnel from mining industry, resource institutions, Pollution Control Boards, MoEF and other Central and State Departments in planning, designing and implementation of environmentally benign projects; and development and monitoring compliance of regulations, standards and EMPs.

Baseline Data Generation: It is also conceived that baseline information on micro-meteorological and environmental (air - RPM, SPM, SO2, NOx & CO; water quality - ground as well as surface, soil - physico-chemical characteristics; flora and fauna) data should be generated by all agencies during mineral exploration activities.

2. Mining in Karnataka

Karnataka is one of the mineral rich states of the country. It ranks fifth among the states in India for mining. More than 40,000 square kilometers of green stones belts contain vast mineral deposits of gold, silver, platinum, copper, diamond, iron, manganese, chromite, lime stone, dolomite etc of the total area. Presently 20 varieties of major minerals and five varieties of minor minerals are exploited in the state. The state government declared some areas as De-reserved area in 2002. Thus indirectly increasing the mining and quarrying activities in the state. There has been increase in the mineral production over a period of time as shown in the graph 1.0 below (refer Annexure 1).



Graph 1.0: Increase in the production of Minerals in Karnataka over a period of time

2.1 Annual income from Mining and quarrying

The state has 568 major mines in an area of 21,247 sq.km and 5,650 quarries in 4,526 sq.km area. In addition to this, according to Ministry of Environment and Forest that there are 128 illegal mines in the state. The state receives 250 crore revenue annually from mining and quarrying operation (Deepak 2005). The state receives a royalty of 80 crore annually from iron ore mines whereas the total cost is 8000 crore. The mine owners pay less than one per cent as royalty. Iron ore (62 per cent) and limestone (34.7 per cent) together contributes nearly 97 per cent of total mineral exploration.

Table 2.1: Mines in Karnataka

Type of Mines	Number of mines	Area covered in ha
Major	568	21,247
Minor	5,650	4,526
Illegal mines	128	NA
Total	6346	NA

Source: State of the Environment Report 2003, NA – not available

Bellary and Chikamagalore districts ranks first in the iron ore mines. Around 95 per cent of minerals are produced in Bellary, Bijapur, Chikamanaglur and Chitradurga.

The iron ore deposits both magnetite and heamatite are available in Bellary district. A study of Karnataka State Remote Sensing Applications Centre in three taluks of Bellary showed that there is an increase in the mining area from 230 ha to 820 ha between 1988 and 2000. Bellary-Hospet contributed 25 million tonnes of the 80 million tonnes iron ore produced in India in 2004-2005. Huge reserves of low-grade iron ore also available in the state.

Gulbarga is top in contributing limestone, dolomite and bauxite ores with the total reserve of 20000 million tons. For building stones, sand and granites Bangalore rural district has the majority of quarries. Total estimated reserves for granite is more than 220 million cubic meters. The famous varities of granite are ilkal pink, multicolor granite, black granite, grey granite, juparano, Hassan green, cats-eye, pink porphyry etc. The table 2.2 below shows the district wise contribution of minerals in the state.

Table 2.2: District wise contribution of minerals in Karnataka

Minerals	Average annual production in MT	Districts
Iron ore (Hematite and Magnetite)	18.17	Bellary, Chikmagalur, Chitradurga, Bijapur, Dharwar, Tumkur and Uttar Kannada
Lime stone, bauxite	10.42	Gulbarga, Chitradurga, Belgaum, Bijapur and Tumkur
Manganese	0.25	Bellary, Chikmagalur, Shimoga, Chitradurga, Tumkur and Uttar Kannada
Magnetite	0.082	Mysore
Gold	1.583 (tons)	Kolar, Hatti, Ajjanahalli and Hirebudini
Building stones	2.42	19 districts mainly Bangalore, Bellary, Belgaum, Mysore, Mandya, Tumkur and Chitradurga
Sand	0.88	17 districts manily Belgaum, Dharwad, Shimoga, Uttara Kannada, Tumkur and Dakshina Kannada
Granite	109.00 (cu m)	17 districts mainly Bangalore, Tumkur Bijapur, Bagalkot amd Raichur
Shahabad Stone	5.51 (million sq. ft)	Mainly in Bijapur and Gulburga
Brick earth	1.88	Mainly in Bangalore, Chitradurga and Kolar
Laterite	0.46 (lakh tons)	Mainly in Dakshina Kannada

Source: Department of Mines and Geology, 2003

The mining status of districts is shown in the table 2.3 below.

Table 2.3: Mining status of districts

Districts	Source	Per cent of contribution	Area in ha	Forest cover in ha	Percentage of Forest area
Bellary	Iron	39.94	16973	11130	65.5
	Manganese	0.81			
Gulbarga	Lime stone	23.4	2689	-	-
Chikamagalore	Iron	17.95	4675	4509	96.3
Chitradurga	Iron	7	1989	757	38
	Lime stone	0.7			
	Manganese	0.08			
Bijapur	Lime stone	0.52	-	-	-
	Iron	5.09			

Source: Dept. of Mines and Geology, 2003

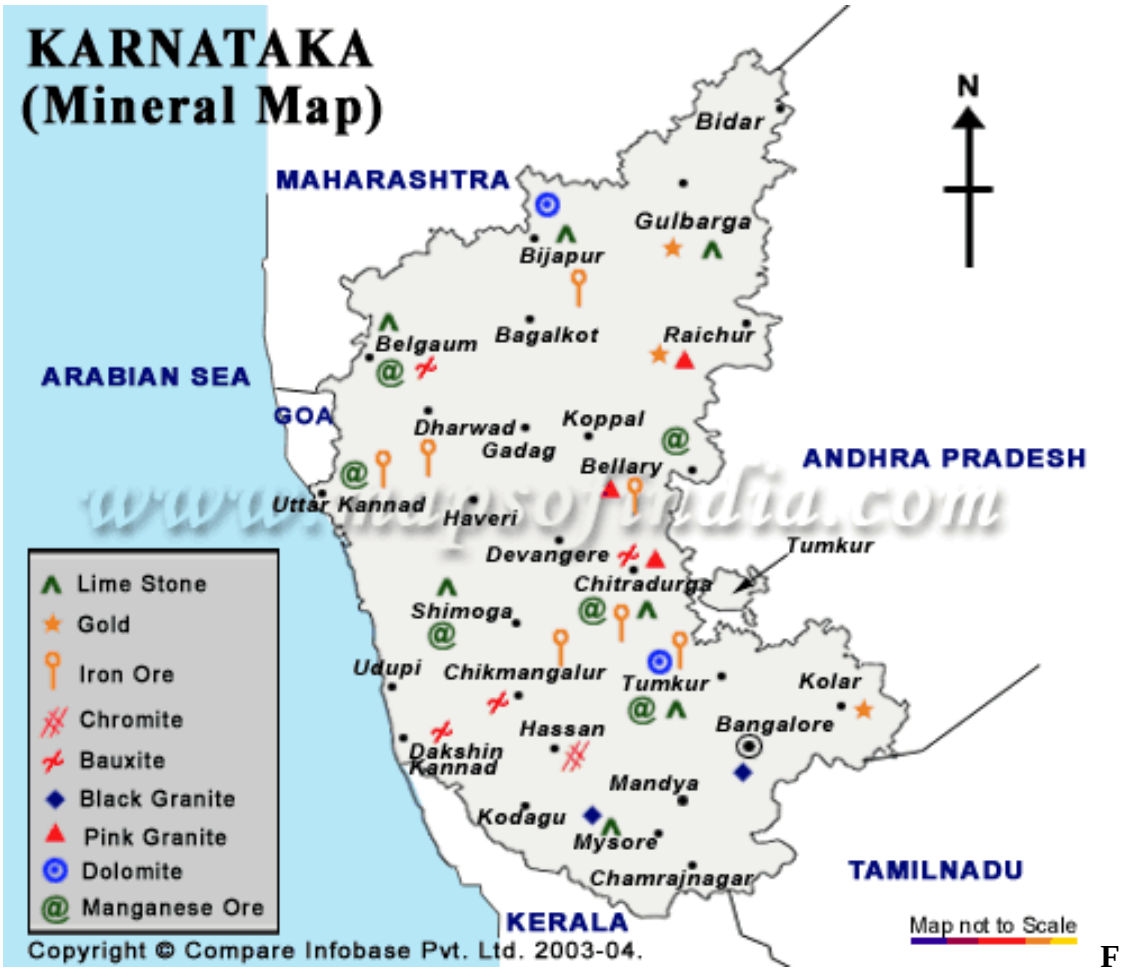


Fig1: Mineral map of Karnataka

3. Mineral Resources get progressively exhausted as they are mined and removed. Great care is therefore required in planning for a wise utilization of mineral resources. The exploitation of this non-renewable resource has caused irreparable damage to the environment.

4.0 Policy and Legal Aspects

Table 4.1: Legal policies for mining activities

Policies	Objectives
The Mines and Minerals Development and Regulation Act (1957)	Approval of GOI is necessary before grant of mineral concession for 20 minerals.
Forest Protection (Act) 1980	To control adverse affect on forest.
Environment (Protection) Act 1986	To regulate effect on Environment.
Mineral Concession and Development Rules 1988	To encourage foreign investment and technology
National Mineral Policy 1993	Increase role of 13 minerals by decreasing the list of minerals from 20 to 13.
Karnataka Minor Mineral Concession Rules 1994	Strict regulations on minor minerals and to provide rehabilitation for mined area.
Environmental Impact Assessment Notification 1994	To assess environmental impact.
Karnataka Mineral Policy 2000	To minimize the impacts on environment and to provide health facilities for workers.

Source: Ministry of Mines, 2004

4.2 Policy and legal aspects in Karnataka

In recent years, the Government of Karnataka finds itself under attack for non-compliance with the laws, when it failed to stop indiscriminate illegal mining in different parts of the state. The failure of the executive to implement the laws relating to illegal mining has led to public protest across the state, particularly in the Western Ghat, to protect the environment and wildlife from the disaster impact of mining. The impact of mining issue began when the largest mining company in the state, namely, Kudremukh Iron Ore Company Ltd. (KIOCL), was given environmental clearance to continue and expand its mining activities in the Kudremukh National Forest and adjoining areas for a further 20 years in 1999.

KIOCL has been mining over 3,703 ha of forestland in the Aroli and Malleshwara regions of Kudremukh National Park (Shola grassland in western ghats), based on a 30-year mining lease in 1969, which expired in 25 July 1999. During that time, the company started campaigning to get a 20-year extension of the lease. When the lease came up for renewal, Environment Support Group, Kalpavriksh, and various action groups and individuals from India and abroad pressured the MoEF not to extend the lease, instead urging the Ministry to ban mining in Kudremukh altogether.

Pressure from action groups, however, met with some success, for MoEF provided only a temporary extension. A few conditions were attached to this extension, moreover. KIOCL would have to commission detailed environmental and wildlife impact studies within the temporary period (one year), and any future lease extension would be subject to the findings of these studies. Instead of these detailed assessments, the Government conducted only the much shorter Rapid Assessments; these were made by the Centre for Ecological Sciences (Indian Institute of Science - IISc) and the National Environmental Engineering Research Institute (NEERI). The IISc rapid assessment recommended against further mining. NEERI, for its part, has claimed that its Environmental Impact Assessment is "confidential" and refuses to disclose its findings. The company was also required to set up the Centre for Study of Biological Diversity in Western Ghats in consultation with the MoEF, and has so far not complied with this stipulation either.

One reason the company is careless in complying with the laws is that the Karnataka Forest Department (KFD) has historically inefficient to take actions against the KIOCL. Over 40 kms of roads were constructed in preparing to expand mining operations and several wells drilled all over the Nellibeedu area of Kudremukh National Park in abject violation of the Wildlife Act, as the KFD looked away.

There is a legally binding procedure for obtaining the environmental clearances. The Karnataka State Pollution Control Board (KSPCB) should issue a 30-day prior notice for Public Hearings keeping the Environment Impact Assessments on the project in public view. It is only after the Public Hearing is held, if required repeatedly and in different locations, can the Board proceed to grant No Objection Certificate (NOC). On the basis of the NOC the Indian Ministry of Environment and Forests reviews the application for final environmental clearance. The entire process could take a minimum of three months, if there are no delays or lack of compliance.

The Karnataka Government contends that the proposed mining is merely a continuation of the existing activity, and therefore no public hearings are needed. The Member Secretary of the KSPCB has claimed that "existing mining activity need not full fill the requirement of public hearing". What is being attempted, instead, is an effort to grant clearance benefiting KIOCL based on what is known as the "forest clearance cycle" that questionably involves no public review. This procedure can be applied only when extension is sought on the basis of an ongoing activity provided no expansion,

modernisation or change of process is involved resulting in an increase in "pollution load" as originally assessed.

The present 20 year extension sought by KIOCL involves deep mining for primary ore and increase in the height of the existing Lakya Tailings Dam and even building of one or two more dams. Implying, therefore, that the extension sought is for a wholly "new project" as defined by law. Consequently the present extension application should fully comply with the procedure laid down in the Environmental Impact Assessment Notification. Instead what is attempted is a covert accordance of clearance by the "forest clearance cycle".

5.0 Key issues

5.1 Conversion of productive land into unproductive land

Agricultural cultivation is affected over a period of time as the entire area of Bellary got covered in mine waste. There is drastic change in the productivity of land. The cropping pattern has changed from banana, betel nut and paddy to jowar, millets and cotton. In addition there has been increase in the use of fertilizers after 1990's and even then the yield has decreased. Recently, out of the 35 mega units which have been given permission for setting up operations in the state in the last 18 months, nine iron and steel units are slated for Bellary alone. New steel units that will withdraw water from the dam (for an annual production of 6.6 mt of steel, a minimum of 237.6 million litres of water is required daily) will affect about 65 per cent of the district's agriculture.

The mining has resulted in environmental damage of the Kudremukha region, to the Bhadra river and reservoirs, to agricultural land downstream, resulting from mining operations. Millions of farmers dependent on the river were in peril due to the impact of sediment from the mines brought down through the river. Remote sensing imagery had also shown in the period between 1999 and 2002, after the lease had expired, KIOCL had opened up a further 56 hectares of land in total contravention of existing laws. The Comptroller and Auditor General estimated environmental damage from this unauthorized land use to be Rs 19.33 crores.

5.2 Degrading human health

Degradation of Human health is another major issue to be looked into. Red Alert, a documentary made by non-governmental organisation (NGO) Saki, records the health problems of mine workers. According to a mineworker, they always have stomach pain with every gulp of tea as they take in dust. The mining area has high incidence of lung infections, heart ailments and cancer. The problem of dust during transportation and as there are no basic standards fixed no action can be taken according to KSPCB environment officer. Villagers using the contaminated Tunga Bhadra water complain of stomach ailments (as in Hirehalli in Bellary) and soil infertility (in Kamalapura at Hampi). In Bellary, Hospet and Sandur about 25,000 mining labourers in the private sector work 14 hours a day for Rs 60 a week.

5.3 Lack of coordination between states

In Bellary, the eco system has been totally destroyed through illegal mining. In connection with this issue, the Government of Karnataka claim that Andhra Pradesh government had not been cooperative with regard to stopping of illegal mining. Though there was a High Court order in 1988 itself in this regard, illegal mining continued unabated and the Andhra Pradesh government had not initiated any action. Several department officials are also involved in illegal mining in the district (Sify news, 14 August, 2006, Karnataka CM Kumaraswamy calls for Nationalisation)

5.4 Illegal mining activities

In Kanakapura taluk, MML has involved in illegal mining activities. Recently a team appointed to investigate illegal mining of MML says Mysore Minerals Ltd (MML) has encroached upon forest area in Kebbehalli and Nidgal areas for illegal mining activities. MML has been described as having encroached 0.36 acres in Kebbehalli and 3.36 acres of Nidgal in the report. In Chamarajanagar district illegal mining for black granite is seen. According to Environmental protection Act (1986) there should not be any mining activities near to Wildlife sanctuaries and National parks. But this region, Jyothigowdanapura is just 10 km away from B.R. Hills. It is very sensitive zone. There are more than 25 quarries operating in this region. Similar activities is also seen in Kemanugundi area after KIOCl closed (webindia123.com news, August 12, 2006)

According to local mine owner Asha Farooq at Bellary, illegal mining is taking place in forest land and the officials are not taking any action about it. The state Forest Minister recently admitted that 23 mining companies were going to be hauled up for violating the norms. The state has also decided to regularise encroachments of 14,000 hectares of forestland in the area (NDTV.com news, 28 June 2005)

5.5 Increase in number of child labor

The child labors are increasing at an alarming rate. Most of the children are migrant labourers. They are working in highly hazardous and painful conditions in the mines and related "ancillary" activities and the situation calls for urgent action. The mining industry is violating all national and international standards, laws and human rights of children. These children are susceptible to chronic health problems, as they handle toxic materials and are exposed to high levels of dust (Centre for Child Rights, 2005)

5.6 Loss of biodiversity

According to study on “Amphibian assemblages in undisturbed and disturbed areas of Kudremukh National Park, central Western Ghats, India” by Krishnamurthy (2003) mining activities have fragmented amphibian habitats and affected amphibian diversity and distribution in Kudremukh area. Similarly more than 40 quarries are operating around Bannerghatta area in Bangalore Rural district for building stone and granites. It is closer to National Park and affects the flora and fauna of the region. Since 2002 the

Bellary district has lost 180 ha of forest cover and around 200 hectares of scrubs. Presently an area of 307 ha is under mining activities, which covers 156 ha of forestland.

6.0 Possible options

The mining and quarrying sector is vital to the development and economic growth of the state. At the same time on the other hand the mining activities results in the various negative impacts on the environment as discussed in the earlier sections.

The environmental, social and health costs should be given adequate consideration while determining the economic viability. While issuing the license, the adequate mitigation measures should be incorporated into the project cycle, including project design and implementation.

Policy dimensions: The link between existing laws and implementing is missing. For ex in the case of KIOCL instead of conducting a detailed environmental and wildlife impact studies within the temporary period (one year), and any future lease extension, the Government conducted only the much shorter Rapid Assessments (these were made by the Centre for Ecological Sciences (Indian Institute of Science - IISc) and the National Environmental Engineering Research Institute (NEERI). Therefore strict enforcement of the existing laws should be done. In addition there is need for policy to support the protection, maintenance, and rehabilitation of natural habitats.

Use of sophisticated technologies: It is estimated that every 25 tonnes of minerals produced results in a death and one ton in 30 non-fatal but disabling accidents (Ritu Gupta, 2006). There is urgent need for research in sophisticated and environmental friendly technologies to mitigate the occupational health impacts.

Reuse options: In deep mining the water utilization is high. Most of the mining companies depend on the ground water source to meet their requirement leading to over extraction and ground water depletion. Recycling of wastewater is another possible option to reduce the burden on fresh water.

Social remedies: In order to conserve the natural resources from mining it is necessary to start the rehabitation simultaneously with mining for government lands and the renewal of mining should not be considered unless the Rehabitation has taken place.

Management options: The lease period and consent period prescribed by Department of Mines and Geology and Karnataka State Pollution Control Board should go simultaneously. Environment fund should set apart Rehabitation and reclaim the mining area. Out of the royalty collected from DMG, 50 per cent should be the retained by the department for reclaiming and ecological restoration of the leased area. Abating the illegal export of ores by putting district check post is necessary.

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MINING STATUS AND PERSPECTIVE
A STUDY FROM SANDUR AREA

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Introduction:

- Sandur-Hospet sector of Bellary district constitutes an hub of mining activity and in news in recent days for the political and administrative supremacy over controlling the mining activity of the wealthy region of the state.

- Due to the rapid industrialization in Bellary district, particularly for iron and steel industry, exploitation of raw material to need the ever growing demand for steel as increased manifold resulting in ecological imbalance.

- An increase in the price of the iron ore in the world market has opened the flood gate for exploitation of ore by legal or illegal means. In addition to mining by lease holders, many contractors mining the ore in the forest area, government revenue land and in farmers land (agricultural field).

- Though, the main occupation of the people in this region is agriculture, they have felt that leasing the land for mining is better than farming in the field. The farmers have leased their agriculture lands for 2 –3 lakh per acre.

- According to mines and Geology Department in the year 2005-06 an amount of Rs.83.60crore has been collected as royalty. During the year 2004-march 2006 nearly 90 illegal mines/transportation of ore have been recognized and seized. Illegal dumping and stock yards have been seized and auctioned. Ore mined from agricultural /forest land by small contractors supplied to middle men for Rs.250 to 450 per ton depending on grade. In turn, the middle men sell it to iron ore exporters for Rs.950, 1000 or 1400 depending upon grade.

Impact of mining on environment :

- Nearly 130 mines (both legal & illegal) and 20 steel industries are operating in the Bellary district and are the potential sources of environmental pollution. The pollutants in the form of solid, liquid and gases have hazardous effect on the environment.
- Since mining is carried out by open cast method by using explosives, lot of dust is generated causing air pollution. In addition to this, mine owners/contractors are dumping huge quantity of ore along the road side and in the agricultural land near by villages. Many villages situated very close to the mining area are strongly affected

- Because of these, many people are facing ailments like Bronchitis, Tuberculosis, breathing disorders and even skin allergy. The admissible air pollution limit is 120mg/m³. Where as in many areas it is more than 500mg/m³.

- And at places, where crushing operations are there still it is more. The ecological imbalance caused by mining activities lead to undesirable change in temperature, rain pattern ,humidity, erosion of top soil and siltation

- Due to the movement of trucks, blasting and crushing units installed at places has increased the air and noise pollution. More than 1000 trucks passes through Sandur and people experiencing sleepless nights.

- From mining area to factory sites and to railway heads transportation of iron ore is mainly by heavy trucks and dumpers.. Since the load bearing capacities of the roads are totally inadequate to with stand the weight, road conditions are pathetic.

- It is practically impossible to travel on Sandur roads. People traveling in two wheelers are painted red with the mine dust.

- If we consider the present status of unplanned mining and over exploitation of iron ore, the deposit will last for 25-30 years and area will become desert with no fertile land. It is our duty to protect the environment and people should realise the gravity of situation

- It is necessary to improve the socio economic condition of the people living around mining area. A detailed action plan for mine area reclamation , greenbelt development and proposed pollution controlled measures for a clean and eco-friendly mining operations are needed.

Nexus between industrialist, political leaders and officials:-

- Since, huge money is involved in the business, group clashes, murders and theft are common features. This crimes are to safe guard the self interest. Such things are possible only when there is a close nexus between politicians, officials, industrialist/mine owners and criminals.

- Convergence of these self interests are common and increased in recent days in the Bellary district. For example, one of the mine owner with his followers attacked properties of MSPL near Hospet. Mob set fire to mining equipment worth Rs.10 crores. These activities have been supported by political leaders of different parties and their followers.

- To curb this type of activities, it is necessary to organize awareness camps to educate the public especially youth to work as watch dogs to prevent social, economic and political crimes. Government institutions and NGO's should work with understanding to promote social responsibilities.

Conclusions:-

- The following points have been suggested to consider for increasing the environment friendly system.

- Industrialist and the mine owners should be made responsible for the development of the area

- A committee of local people comprising academic institutions, NGO's, senior citizens and leaders of various political parties should be constituted at taluk level with concerned officials of the department to monitor and control the polluting industries. Legislation in this regard is needed.

- Trucks carrying ore run through the towns and villages, causing congested traffic in a big way. To ease the traffic congestion, by pass roads and truck terminals should be developed at places. Thanks to recent GO which has helped to some extent to reduce the traffic in day time.

- Royalty charges should be raised to mobalise more revenue. At present, the royalty collected is very negligible compared to the price of the ore and the ecological imbalance created by the mining activities.

- At present, the royalty collected for ore having above 65% Fe is Rs. 27 per metric ton, between 62-65% it is Rs.16 per metric ton and below 62% it is Rs.11 per metric ton. It is suggested to increase the royalty at least 10 times from the existing fees which would help to increase the economic position of the state, And 30% of the profit should be spent to improve infrastructural and socio-economical condition of the region.

- More awareness camps should be arranged from Gram Panchayat level wherever ecology is disturbed.

- Cutting of trees for mining should be avoided. Strict vigilance should be made to protect the forest. Planting of saplings and care for its growth should be ensured by the mine owners.

- There should be a good harmony and will among officers and political leaders to promulgate the environment laws to reduce the ecological imbalance.

INDIAN IRON ORE MINING AND STEEL INDUSTRY AND ITS IMPACT ON ENVIRONMENT – STATUS REPORT

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IRON ORE AND STEEL MANUFACTURE

Indian minerals sector, which contributes today to over 3.5% of the GNP, must search for new and purposeful strategies for growth on the threshold of the new millennium. The forces of globalization and along with it the need for competitiveness, are emerging as major challenges for the minerals sector which must compete today while preparing for tomorrow. Among metallic minerals, iron ore is the major contributor to the bulk of India's mineral production. Iron ore forms the basic ingredient in the manufacture of steel based on which a nation's industrial growth and economy depends.

GROWTH OF STEEL INDUSTRY

During the First Five Year Plan itself, the need for enhancing the existing steel capacity of Tata Iron and Steel Co. (TISCO), Indian Iron and Steel Co. and Visveswaraiah Iron and Steel Ltd. (VISL) and to set up new capacities was emphasized. As a result, new integrated steel plants at Rourkela, Bhilai and Durgapur between 1957 and 1959, Bokaro in 1978 were set-up under public sector, i.e., SAI (formerly Hindustan Steel Ltd.). The latest addition were the Rashtriya Ispat Nigam Ltd. (RINL), the first coast based plant at Visakhapatnam and Jindal Vijayanagar Steel Limited (JVSL) at Thoranagallu, Bellary District, Karnataka.

IRON ORE MINING – NEED FOR CAPACITY ENHANCEMENT

Iron ore mining has been primarily an export intensive industry. With the setting-up of new steel plants and subsequent capacity enhancement, the demand for iron ore increased considerably. Consequently, several new mechanized mines were opened by SAIL as captive source to its steel mills and National Mineral Development Corporation (NMDC), OMC and Kudremukh Iron and Steel Ltd. (KIOCL) for export. To boost the exports, NMDC opened new mines in Bailadila, Donimalai, Meghataburu etc. OMC started working the Daitari iron ore deposit, chiefly for export, KIOCL, a 100% export oriented unit of Government of India, was created in 1978 to mine, process and export low silica magnetite deposit a Kudremukh in Chikmagalur district, Karnataka.

NATIONAL STEEL POLICY

National Steel Policy, a Vision Statement, unveiled by the Government of India in November 2005 envisages achieving a long-term target of 110 million tonnes of domestic steel production by the year 2019-20. The Steel Policy discusses the major issues concerned with this projected growth: most critically the domestic raw material availability situation – which has already become a source of concern for domestic steel producers. Government of India would encourage iron ore trading in order to make this essential raw material available to the iron and steel industry throughout the country. It further lays emphasis in encouraging investments in adding value to iron ore fines. On the basis of the anticipated 110 million tones production by 2019-20, the Steel Policy envisages an iron ore consumption of 190 million tonnes. The policy says "Government would encourage investments in creation of an additional modern mining and beneficiation capacity of 200 million tonnes" to meet the raw material requirement.

INDIAN IRON RESOURCES

The Indian resources of iron ore have been made compatible with United Nations Framework Classification (UNFC), which is more scientific and adopted in most countries of the world. Iron ore reserves and resources estimated on the UNFC basis as on 1.4.2000 are about 12,906 million tonnes of hematite ore and about 10,628 million tonnes of magnetite ores. For the first time, Indian Bureau of Mines (IBM) has given the lumps and fines break up the hematite iron ore reserves (Table-1). There are four types of ores: lumps, fines, lumps and fines and others. Others include blue dust etc.

Table 1: Iron Ore (Hematite) Reserves in India As on 1.4.2000 *Source: IBM Year Book, 2005*

GRADE	Total Resources 000 tonnes	Per cent to Total Hematite %
A. Lumps		
High Grade	915276	7
Medium Grade	2822917	22
Low Grade	1131915	9
Unspecified Grade	533225	4
Sub Total A	5403333	42
B. Fines		
High Grade	139221	1
Medium Grade	2506868	20
Low Grade	1325515	10
Unspecified Grade	354187	3
Sub Total B	4325791	34

C. Lumps & Fines		
High Grade	409095	3
Medium Grade	421225	3
Low Grade	331754	3
Unspecified Grade	116650	1
Sub Total C	1278724	10
D. Prospective Resources	1480005	11
E. Others	417940	3
Total Hematite (A+B+C+D+E)	12905793	
Magnetite Ore	10682207	
Grand Total	**23588000**	

Table 2: Iron Ore Production:
Product-Wise, quantity: '000 Tonnes
Source: Indian Bureau of Mines, Nagpur

Grade	2000-01	2001-02	2002-03	2003-04	2004-05
Lumps	33567 (42)	34572 (40)	39581 (40)	48960 (40)	57590 (40)
Fines	41189 (51)	45224 (53)	52994 (53)	67679 (50)	79976 (56)
Concentrates	6006 (7)	6497 (7)	6497 (7)	6199 (5)	5145 (4)
Total	80762	86226	99072	120601	142711
% Growth		7	15	21	18

Note: Figures in parenthesis are percent to total

Table 3: India's Iron Ore Export – Lumps / Fines,
Qty. Million Tonnes

	2002-03			2003-04			2004-05(p)		
Total	Qty. Fines 35.72 (74.39)	Qty. Lumps 12.30 (25.61)	Qty. Total 48.02 (100)	Qty. Fines 49.12 (78.50)	Qty. Lumps 13.45 (21.50)	Qty. Total 62.57 (100)	Qty. Fines 64.60 (82.67)	Qty. Lumps 13.54 (17.33)	Qty. Total 78.14 (100)

Note: Figures in parenthesis indicate the percentage to the total exports.
Source: GMOEA, KIOCL, MMDC MMTC ROS/ PRIVATE MINE OWNERS Pellets included in lumps and concentrates in fines Information compiled on the basis of data as available / collected from above sources. E & OE. Data for Financial Year 2004-05 is on provisional basis.

Table 4: India's Iron Ore Exports:
Grade-Wise, Qty: Million Tonnes

Year	+64% Fe	62-64 Fe &	62% Fe & below	Total
2002-03	24.11 (50.21)	5.44 (11.33)	18.47 (38.46)	48.02 (100)
2003-04	21.87 (34.95)	15.61 (24.95)	25.09 (40.10)	62.57 (100)
2004-05	20.15 (25.79)	34.22 (43.79)	23.77 (30.42)	78.14 (100)

Note: Figures in parenthesis are the percentages to the total exports. Pellets included in lumps and concentrates in fines
Source: GMOEA, KIOCL, NMTC ROS / PRIVATE MINE OWNERS Information compiled on the basis of data as available / collected from above sources. E& OE. Data for Financial year 2004-05 is on provisional basis.

ENVIRONMENTAL ISSUES

1. Water pollution (industrialization, domestic sewage, exhaustion of the groundwater);
2. Air pollution (transport, energy and industry);
3. Waste management (the increasing volume of household and industrial waste);
4. Land degradation (soil erosion, water logging and salinity);
5. Deforestation;
6. Loss of biodiversity (loss of species and habitat).

Environmental Management

- The environment is an outcome of millions of years of evolution and mutation, harboring all kinds of myriad life forms and ecosystems. Humans are intelligent beings capable of comprehension of their surroundings and are evolved over the years.
- It is obvious that humans have benefited greatly from the advances in science and technology. However, we cannot ignore the fact that, howsoever advanced the technologies may be, humanity still depends almost entirely on natural environment to meet its basic requirements such as food, fuel, fibre, fodder, minerals and vital support systems (water and air). Laws of nature cannot be changed, despite phenomenal increase in our prowess to harness and adapt environment for our basic comfort.

THE INDIAN RESOURCES OF IRON ORE

About 42% of the total reserves are lumps – 5403 million tones,
that of fines of about 34% -4326 million tonnes and
lumps and fines together, constitute 10% of the total reserves – 1287 million tonnes and
11% are the prospective resources.
The remaining 3% are blue dust etc.
11% of the total reserves are of high grade (7% lumps + 1% fines + lumps and fines).
Major chunk of the reserves, around 45% are of medium grade quality (22% lumps + 20% fines + 3% lumps and fines).
Besides these hematite ore reserves, India also has a substantial magnetite resource base.
Of the total 1068 million tonnes of magnetite reserves, Karnataka with a reserve of 7883 million tonnes has a major chunk of about 74% magnetite iron ore resources of the country. Another point that should be noted here is that the hematite resources are estimated at 55% cut of. It is, therefore, quite obvious that as and when the mining activity intensifies, concomitantly, exploration will also increase leading to the discovery of more resources. The resource position will increase further if the cut-off is brought down to 45% Fe. With the modern technology it should be possible to utilize iron ore of 45% Fe and above.

PROBLEMS OF IRON ORE INDUSTRY during 2000

The decreasing trend in exports of iron ore in recent past has been basically due to the problems faced by the steel industry, the world over, especially Japan, South Korea and China which were also affected due to financial crises in South-East Asia. Substantial import of iron ore are taking place due to cheaper freight and lower customs duty. Today, the iron ore industry is having the problem of transporting ore for exports due to the very high rates of railway freight. The other problems include the Government procedural formalities, port facilities, environmental issues etc. With regard to surface transport of iron ores, geographically India is at a disadvantage vis-à-vis Australia which supplies ores to south-east Asian countries like Japan, China, South Korea and Taiwan and has modern, high-capacity ports. Brazil in the Atlantic is closer to the European and American steel mills and also has better port infrastructure and efficient railways which enables it to overcome distances. It is for this reason that unless the infrastructure within the country, i.e. the railways and the ports are to be geared up to enable the iron ore and steel industry in the country to meet international competition.

ENVIRONMENTAL ISSUES

With regard to environmental issues, obligations/regulations were enforced some where in 1987. A lot of work has been and is being done to correct the damages done to the environment due to the port operations. There is urgent need for the proper development and expansion of the iron ore industry. The environment clearances from the concerned ministry may also be simplified and made rational for the overall development of the industry.

WASTE MANAGEMENT IN STEEL INDUSTRY

World Scenario

Steel industry is one of the major metal processing industries, where huge quantities of raw materials are handled. Consequently, large quantities of solid wastes are generated right from the mining of raw materials. Further, depending on the process route, level of technologies, quality of input materials and geographical location, solid wastes are generated during operations also. Throughout the world, today's concern is to gainfully utilize these wastes with an ultimate objective of 'Zero Waste' or 100% recycling. In the developed countries like Australia. USA, Canada, UK, Germany, Japan, etc, many plants have already achieved more than 90% recycling/reuse rate.

In an integrated steel plant, solid wastes generated comprise of Blast Furnace (BF) Slag, BF Sludge/Dust, Converter Slag/Sludge, Mill Scale, Mill Sludge, used refractories, etc. Blast furnace and steel making Slag account for about 90 per cent of the solid waste generation followed by about 10 per cent of oxide wastes and other miscellaneous items

from blast furnace, steel making and mills. The oxide wastes are recycled completely. Recycling and utilization of Slag is the main challenge for the steel industry.

Indian Scenario

In India, about 10 Mt of Blast Furnace Slag is generated per year. Currently, only about 40% of this Slag is produced in the form of Granulated Slag. The remaining quantity is the Air Cooled Slag. The generation of SMS Slag is over 2 Mt per year. While the Granulated Slag can be used for Cement manufacturing, the Air Cooled Slag from Blast Furnaces and SMS Slag can be use as aggregates in road-making.

The present level of recycling/reuse rate in Indian steel plants is about 40 per cent compared to over 90 per cent in the developed nations. Main reasons for the lower utilization/recycling rate in Indian plants can be attributed to availability of dumping sites in abundance, lack of willingness to implement environmental protection laws, paucity of funds and socio-economic consideration.

Use of BF Slag as feed materials for cement manufacturing and for road construction has fully been exploited throughout the world, including India. Recycling of oxide wastes from blast furnace, steel melting shops and rolling mills it resorted to for sinter-making. There is much left to be improved in utilizing Steel-making Slags as compared to BF Slags.

ENVIRONMENTAL MANAGEMENT

- The present world is facing multifarious problems of environmental degradation due to unplanned development activities as well as burgeoning population, which has caused enormous strain on environmental resources.

- Thus there is a need for maintaining a balance between the capacity of the environment and the quantum of sustainable utilization. This is only possible by understanding the environment in its totality and the principles of its scientific management.

- Hence, to understand the topic of environmental management, it is essential to know various crucial issues ranging from population growth to environment-ecology interaction.

SOIL POLLUTION AND ENVIRONMENTAL ISSUES WITH MINING

By Dr. N.G. Raghu Mohan
Former Head & Principal Scientist (Soils) ICAR

Mining in earlier times used to be for the betterment and economic up-liftment of Mankind. However with advancement in science and technology the framework of mining has crossed the barriers. Illegal mining and indiscriminate mining has extended its tentacles to pedosphere, Bioshpere, Hydrosphere and the Stratosphere beyond survival of Mankind and the planet Earth itself. The fragile mantle of soil cover, which is the fabric of life and the only medium of plant growth has endangered with degradation of the epipedon.

Classical examples are the huge mining activity in Goa, During the soil mapping survey with satellite imagery it has revealed that more than half of the total area in Goa consisting 3813 sqkm has undergone physical & chemical degradation. The left over dumps and dust have crippled the Biosphere with inactivating the photosynthetic activity of perminnial plants. The iron toxicity have suppressed the paddy lands, the marine population is constantly on a decline. From Greening Goa has turned into Graying and Browning

In Karnataka the story is different. The classical example of Kuderemukh for iron ore removal at a faster phase in the name of Environmental protection has brought a total disaster to the living population and settlers. The suspended soil particles (SSP) have brought in respiratory problems, which was unheard of in Malnad area. The colloidal fraction of amorphous ion and AFAS has rendered the streams, Nallas, Rivulets and the river Bhadra to bleeding red with the ultra fine iron fractions forming colloidal suspension. The soluble iron in water has reflected in kidney problems. The rich aluminum oxide in acid soils has brought in loss of memory and other physiological disorders in human systems. The entire flow track carrying silt and sand of the mines is unfit for even to be used as construction material. The water has reached toxic levels with trace elements and collidal amorphous materials. Extinction of sensitive flora and fauana is already on. More than all soil erosion is on a rampant. All these imbalances have brought in change in the climate and Greenhouse effect. The rhythm o nature is under stakes. In a nutshell the paper aims to foucs that **SOIL IS A NON-RENEWABLE RESOURCE** and once gone is gone **FOREVER.** And this is the gift of mining. The alarm is on and mining should follow the norms to protect the Environ.

MINING AND LIVESTOCK LIVELIHOODS

Dr ObeiReddy

The surge in exports of iron and manganese ore has lead to rampant land digging in Hospet and Bellary districts of Karnataka. Men and machinery dig in plots of land, while women and children, some as young as three years, chip the ore to pieces. The red earth of Bellary district has become a symbol of the regions red-hot iron ore market, witnessing an unprecedented boom. With large mining companies in Bellary- Hospet region expanding feverishly, the concerns about agriculture, ecology, human health, livestock population and labour laws have taken a back seat.

Over a period of time, the entire area got covered in mine waste. In the beginning there was a shift from banana, betel nut and paddy to jawar, millets and cotton and now even this dry-land agriculture has come to a halt.

Impacts on water bodies

In many arid and dry land areas lack of sufficient water for humans, animals, plants etc, is a problem. Dewatering in open pit mines inevitably lowers the local, and sometimes regional water level. Reductions in springs, streams, drying open wells, ponds etc, are harming livestock and wild life species.

Mining and mineral processing produces numerous wastes and products that contaminate water. Mining wastes, waste rock, chemical reagents, containers, dusts, spent leached ores, ore stick piles result in damage to vegetation and increase of sediment loads into water bodies, which harms water quality and aquatic organisms.

Mining breaks and crushes of rocks, create new pathways for oxygen, air and microbes to react with the rock. Thus, both underground workings and open pit walls may generate acid rock drainages[ARD], which contaminates ground and surface waters for longer period. Simple mining process[without ARD generation] also contaminate waters by increasing amounts of suspended sediments released, and by increasing concentrations of nitrates and ammonia due to the blasting compounds used. All these process result in entrophication and contamination of water bodies.

Livestock is more vulnerable to diseases caused by drinking contaminated water. Gastro-intestinal problems are very common in these areas and are attributed to contaminated water bodies.

It is not uncommon to encounter deaths due to chemical and metallic poisoning. Continuous dependence on contaminated water results in damage to vital organs such as lever, kidney etc.

The mining dust

Iron dusts and other mineral dusts cause Conjunctivitis, choroiditis, retinitis etc. Chronic inhalations of excessive inhalation of iron oxide dust or fumes may result in enhanced risk of lung cancer development. Studies have also implicated iron as animal carcinogen.

The most pervasive environmental threat comes from mining dust, a suffocating rust- coloured cloud of debris that coat everything in and around mining area.

The dust coverage on vegetation hinders the growth of pastures as well as dryland crops. There is loss of top soil resulting in declining in soil fertility. The growth of animal friendly crops such as maize, jawar, bajra etc, is severely affected thus reducing the availability of crop residues to livestock. With both pastures and crop residues not available, the dumb animals degenerate and die of prolonged starvation.

Offensive odours to water

Metals such as iron, manganese and copper in ponds can produce offensive tastes, which may affect animal intake. Iron and manganese may cause offensive tastes that will cause animals to limit or refuse in take of water. High iron concentrations may precipitate as an orange coating on the bottom of a pond or vegetation. Iron concentrations above 0.30mg/lit and manganese concentrations above 0.05mg/lit will impart a metallic taste to water. Livestock in the vicinity suffer due to offensive colours and tastes in these water bodies and vegetation.

The dwindling cattle populations

The famous Krishnavally breed of cattle native to Bijapur, Belgaum, Raichur, Hospet and Bellary regions is almost extinct with only a few (< 100) specimens available in the breeding tract. The breed has been developed by Maharaja of Sangli and was a duel purpose breed proven for milk and draft under these agro-climatic zones. The decreased grazing area, dwindling dry land crops are severely hindering livestock survival.

The net result

The mining process ultimately leads to

- Dwindling livestock health
- Breed degeneration
- Increased incidence of diseases
- Loss of valuable indigenous Germplasm
- Loss of bio-diversity
- Diminishing green cover

- Contamination of water bodies
- Depleting soil fertility
- No revegetation/rejuvenation
- Crest formation
- Desertification etc,

Impact on farming economy

Destruction of Livestock populations in these mining areas result in:

- Reduced Livestock numbers drastically reduces availability of farmyard manure leading to reduction in soil fertility and total dependence on chemical fertilizers leading to contamination of soil and water bodies.
- Loss of valuable local breeds of cattle seriously derailed sustainable agriculture leading to high input chemical agriculture, which proved to be non-remunerative. The farmers were lead to debt-traps and finally to suicides due to high input costs.
- The sheep-husbandry was the most sustainable enterprise for small farmers in these areas. With decreased water bodies and pasture lands, their populations dwindled depriving the valuable livelihood support to sheep farmers.

ENVIRONMENTAL CONCERNS IN MINING LAWS IN INDIA: A CRITICAL OVERVIEW

Dr. M. K. RAMESH
Professor,NLSIU

A. LAWS RELATING TO MINES AND MINERALS:

- **TILL 1980s' ENVIRONMENTAL CONCERNS UNDER MINING LAWS,AS A GENERAL RULE, VENEER THIN.**

I. THE MINES ACT, 1952:THE MINES RULES, 1955:

Central Legislation to regulate

i) Labour and

ii) Safety in mines

II THE MINES AND MINERALS (REGULATION AND DEVELOPMENT) ACT, 1957

1) Central Legislation for
   i) regulation of Mines and
   ii) the development of minerals under the Control of Union Government.

2) Excludes Mineral Oils (-like, Natural Gas and Petroleum)

3) Prospecting or mining operations possible only under a licence or lease. Geological Survey of India, Indian Bureau of Mines, Atomic Minerals Division, Directorate of Mining and Geology of any State Government do not require such licence or lease.

4) S. 4A (introduced by amendment in 1986 and came into effect from 10/2/1987) refers to premature termination of prospecting licences or mining leases by State Government, upon a request of central Government forms on opinion (-after consulting State Government) that such a measure was

   (i) expedient in the interest of regulation of mines and mineral development
   (ii) for preservation of natural environment,
   (iii) to control of floods
   (iv) prevention of pollution,
   (v) to avoid danger to public health

(vi) Communication
(vii) monuments or other structures
(viii) for conservation of mineral resources
(ix) for maintaining safety in the mines or
(x) for such other purposes

The State Government may, on its own, resort to this measure for similar aforementioned reasons. Following such a premature termination, the State Government may grant a prospecting licence or mining lease in favour of such Government Company or corporation owned or controlled by Government as it may deem fit. Order of premature termination can be issued only after giving a reasonable opportunity of being heard by the licencee or lessee.

S. 18: Mineral Development: (1986 Amendment effective from 10/2/21987) Central Government has the duty to take such steps as are necessary for the conservation and systematic development of minerals in India and for the protection of environment by preventing or controlling any pollution which may be caused by prospecting or mining operations. The Central Government has the power of making appropriate rules in this regard.

III. THE MINERAL CONSERVATION AND DEVELOPMENT RULES, 1988

1) Rule 3 Definitions: Clause (j): "Environment" and "Environmental Pollution" - to have the same meaning assigned under EPA.

2) Ch. IV Ss 31-41: Environment:

(i) Rule 31: Licence/Lessee to take all possible precautions for protection of Environment and control of pollution while conducting prospecting, mining etc.

(ii) Rule 32: The top soil that gets removed in the operations, should be removed separately and the same has to be utilised for restoration or rehabilitation of land which is no longer required for prospecting or mining operations or for stabilising or landscaping the external dumps. When such top soil cannot be used concurrently, it shall be separately stored for future use.

(iii) Rule 33: The waste rock etc, generated during prospecting/mining shall be stored in separate dumps and so secured as not to cause degradation of environment or cause floods. The operations should be such that every conceivable effort be made, to the extent possible, to back fill the same in to the excavations to restore the land to its original use or terraced for growing vegetation upon it.

(iv) Rule 34: Duty is imposed upon the prospector to undertake the phased restoration, reclamation and rehabilitation of lands affected by prospecting/mining operations. This should be completed before conclusion of the operations and abandonment of the activity.

(v) Rule 35: Scientific Investigations carried out by the prospector involving blasting operations and resultant ground vibrations, should be within safe limits as not to damage public buildings or monuments.

(vi) Rule 37, 38, 39 and 40: Air Pollution caused as a result of prospecting mining activity should be within the prescribed limits under Air Act, 1981 and EPA 1986. Any discharge of Toxic liquids, should be subjected to proper treatment as to conform to standards prescribed. Noise pollution, too emanating from the operations, should be within the prescribed limits.

(vii) Restoration of flora(Rule 41): Prospector/miner is required to ensure, that the operations cause least damage to the flora of the area and should take expedient measures to plant twice the number of trees destroyed by the activity besides taking care of them before handing them over to the concerned authorities.

IV THE KARNATAKA MINOR MINERAL CONCESSION RULES, 1994

1) Rule 6: Quarrying not permitted within 50 metres (if no blasting is involved) and 200 metres (if blasting is involved), from the boundary

of any railway line, reservoir, tank bund, canal or other public works and public structures or any public road or building.

2) Rule 8: Quarrying lease/licence cannot be granted to a person other than an Indian Citizen, except with the prior approval of Central Government, no quarrying lease shall be granted in any forest land.

V THE KARNATAKA MINERAL POLICY, 2000

1. **One of the objectives**: is to exploit mineral deposits by promoting adoption of mechanized and scientific mining with due regard t the optimum exploitation, mine safety and minimizing the adverse effects of mineral development on the forests, environment and ecology.

2. **Balancing Environmental Concerns and Promotion of Mineral Development**, by creating environmental awareness and orientation of leaseholders to preserve ecological balance; participation of lease holders in afforestation in degraded areas; dumping of wastes at specified sites and proper stacking of top soil for later use as part of lease agreement

3. **Forests and Mining Leases**:

   (i) **Constitution of an Empowered Committee**, headed by Additional Chief Secretary, to look into inter-departmental issues in the grant of licences, especially in relation to the difficulties faced in granting new mineral concessions owing to the stringent regulations under Forest-related laws.

   (ii) **Allowing 90 days time for the Forest Department** to file objections, if any for the grant of mining lease/prospecting licence, over non-forest lands.

4. **Rehabilitation of Mining Areas.** By making provision for collection of certain amount of money so as to provide health facilities for people living in the mining region, growing trees in the mining areas, stabilization of slopes and dumps etc.

B. GENERAL LAW: -Law relating to PUBLIC NUISANCE:

- Tort Law (Law of Civil Wrongs)

- ♦ Criminal Law (S.133 Cr.P.C)

- Declaratory Decree and Injunctive relief for removal of Public Nuisance

C. SAFEGUARDS UNDER ENVIRONMENTAL LAWS

I LEGISLATIVE FRAME:

♦ **ENVIRONMENT (PROTECTION) ACT**, 1986: Framework, and overarching law to regulate every conceivable human activity affecting the environment in addition to facilitating sectoral legislations to protect, conserve and improve the quality of environment. Legal and administrative equipment for enforcement are provided through Rules & Notifications issued and Authorities created under the Act, from time to time. The following require specific mention:

♦ **COASTAL REGUALTION ZONE NOTIFICATIONS**

- Ecologically sensitive coastal region classified into 4 zones either to prohibit or restrict development – related activities to ensure conservation and protection.

♦ **ENVIRONMENT IMPACT ASSESSMENT NOTIFICATIONS** –along with Notification concerning PUBLIC HEARING, to provide for Environmental safeguards and facilitate the process of consultation on matters pertaining to developmental decisions that would affect Environmental Integrity(-these concern siting, environmental feasibility and alternatives for mega projects)

. **POLLUTION CONTROL LAWS:**

♦ WATER (PREVENTION & CONTROL OF POLLUTION) ACT, 1974
♦ AIR (PREVENTTION AND CONTROL OF POLLUTION) ACT, 1981 – To regulate, control abate and eliminate human and industrial activities affecting water and air quality, ensure wholesomeness of water, etc.,

. **FOREST AND BIO-DIVERSITY RELATED LAWS**:

- ♦ INDIAN FOREST ACT, 1927;.WILDLIFE PROTECTION ACT, (1972, 2002); FOREST CONSERVATION ACT, 1980;
- ♦ BIODIVERSITY ACT, 2002.
- Laws to protect, conserve and maintain forest, wildlife and biodiversity and regulate activities for non-forest use and commercial exploitation of resources governed by them.

2.CASE LAW:

1. **T.N. GODAVARMAN THIRUMULKPAD v. UOI, AIR 1998 SC 769**:- Orders of Supreme Court for investigation by a fact-finding committee to enquire into illegal mining activity in the Doon valley and censuring the Director of Geology and Mining for his casual approach to such activities and instructions to Karnataka Government to prevent new encroachments and for retrieval of encroached forest land in the Chickmagalur District.

2. **COURT ON ITS OWN MOTION v. STATE OF H.P 1994 FOR L.T. 103: H.P** High Court framed a scheme for facilitating stone quarrying while protecting Shimla Environs, by requiring quarrying and stone crushing in the region to conform to Environmental regulations. The Stone Crusher operators specifically required to contribute 20% of their gross profit to a fund to be used for restoring the scarred hills and afforestation.

3. **M.C. MEHTA v. UNION OF INDIA, 1992(3) SCC 256, 257**: Supreme Court ordered closure of quarries in Delhi and surrounding areas. Haryana government asked to make available 'alternative sites' to locate 'new crushing zones' – subsequently, second petition highlighted poor air quality in the relocated zone owing to stone crushing – Supreme Court ordered for installation of sprinklers as to reduce air pollution in the area.

4. **OBAYYA PUJARI v. KSPCB , AIR 1999 KAR 157**: High Court issued directions to the Karnataka Government and the State Pollution Control Board to frame suitable zoning policy for stone quarrying and crushing.

5. **KENNEDY VALLEY WELFARE ASSOCIATION Vs. Ceylon R.L.W & S. SOCIETY 200(2) SCALE 143:** Supreme Court restored a ban imposed by a single judge of the Madras H.C. prohibiting stone crushing operations within 500 meters of residential colonies.

6. **R.L.E.K, DEHRADUN v. STATE OF U.P AIR 1985 SC 652:** Haphazard and dangerous lime stone quarrying practice in the Mussoorie Hill Range resulting in landslides, loss of vegetation, chocking of water bodies and air pollution viewed seriously by S.C. A series of orders passed that resulted in creation o f a fact-finding body, closures of illegal mines and creation of a corpus fund and administrative oversight for reforestation in the region – Triggered formulation of Central Polices, rules and regulations concerning Mining activities with a clear focus on ensuring and restoring ecological integrity –

7. **(i)SAKTI v. STATE OF AP,** APHC 27.8.1993 **(ii)SAMATHA v. STATE OF A.P.** AIR 1997 SC 3297; **(iii) K.V. SHANMUGAM v. STATE OF TAMIL NADU** AIR 1998 MAD 150;

   - Prior approval of the Central Government for mining in protected Reserve Forests is a condition precedent for the grant of a lease or renewal. Provision should be made for investment or infrastructural planning to reforest the area and protect environment and regenerate forest.

8. **TARUN BHARAT SANGH, ALWAR v. UOI** AIR 1992 SC 514, 516 Widespread open-cast mining for limestone and marble in the Alwar District affected the aquifers, springs, hilly terrain, the flora and the fauna there.

   - Supreme Court ordered for fact-finding and corrective actions and held that Environmental Conservation and Protection should be accorded the highest priority in facilitating and engaging in developmental activities.

9. **HINDALCO INDUSTRIES LTD., v. STATE OF JHARKHAND**

   Jharkhand High Court, 9.5.2005:- State Government to obtain prior central approval for grant of lease for mining activity and to exclude forest lands from such grant of lease.

10. **KUDREMUKH CASE (2002) – S.C**. Orders for stoppage of mining of Iron ore and end of lease issued in that regard to the company in the Joint Sector on a variety of grounds – (Water Pollution, Forest Conservation, Wildlife Protection etc.,

D. CONCLUDING OBSERVATIONS:

1. Policy perceptions do set clear environmental goals- focus on conservation and least adverse impact on ecological integrity while engaging in mining activities.
2. Display of concern for environmental conservation in Mining laws, more of an after thought and imperative need created by the environmental legislative developments of 1980s'.
3. Draft National Policies(2005 EIA Draft, for instance), show greater urgency and desire to put Environmental clearance for Developmental Activities on a FAST TRACK
4.Clear disconnect and lack of harmony between Environmental Laws and L aws concerning Mines and Minerals.
5. Coordination among different agencies of state, to effectively enforce the legal provisions, does not exist.Poor oversight over mining operations, lax enforcement and administrative indifference to violations, abound.
6.The Justice-delivery system , in relation to meeting the demands of development(-prospecting for minerals etc), and addressing concerns for Environmental conservation, in recent times, display a distinct inclination in favour of the for ost-SAMATHA, the approach of the courts is not to question policy decisions of the State in using Forest for non-forest purpose(- including prospecting for minerals and mining), if the decision is backed by assurances that the same is for a "public purpose" and that environmental safeguards would be adhered to(-endorsement of the stand of the state as to mining in Orissa- perhaps, the only mer.P honourable exception is the KUDREMUKH case)
7. Tragectories of Reappraisal of Mining and Mineral Legal Regime with Environmental Orientation depend on the nature and extent of Priority the System and people would accord to ensuring Environmental Integrity and internalize the Environmental values in every aspect of human endeavour**.**

Impact of Mining on environment and conservation of minerals

Dr. H.S.M. Prakash.

With rapid industrialisation in the nineteenth and twentieth centuries the demand for all types of minerals increased manifold. To meet with the requirement, new areas were explored intensively and new mines came into existence. Because of their location in ecosensitive forest areas, the mines became the centers of controversies with the green brigade on one hand and the mine owners on the other. As it is the natural dispensation that "to gain some thing one has to lose something" some selected mining areas were degraded due to loss of green cover which was compensated by maniatory afforestation in most of the cases such affected areas are very minor when compared to the vastness of the land vis-à-vis total land cover. Of late, it has dawned on the minds of the protagonists of eco-protection that nature is very selective in concentrating the ore minerals in isolated and secluded terrains and not in barren areas our liking. After all mineral deposits are a result of complex geological processes taking place over the hundreds of millions of years. They are there where they are as a culmination of continuous geological processes over the last 4 billion years. Mineral deposits are nature's gift to the mankind. Man cannot be hukind to the nature by scarring with fulfill to his wants. It is here that man has to strike a balance to conserve nature and to conserve minerals so that the coming generation will not have any scope to say that the present generation emptied every thing.

Modern life has created an artificial hunger for materialism and material consumerism with the result that more and more raw material is required to be supplied at regular intervals to keep up the industrial production.

The products which were considered has luxury some time back have become today's necessities and with the ever increasing population the 'greed for possession' is also increasing. At this juncture- at the tern of millennium it has become imperative to realise the hard fact that we have reached a point of no return as for as mining is concerned. We have consumed all that was preserved by nature over millions of years in a few decades of the 20th century. At this rate of rapid expansion it is no wonder that what is remaining now will be completely exhausted in the first few decades of 21st century barring a few surplus category commodities such as coal, limestone, dolomite, beach sand etc. Almost all the known resources of important minerals such as gold, PGE, copper, lead, zinc, tin, rare metals, rare earth metal, fertilizer minerals and fuel minerals are on the brink of exhaustion. It is, off course for ever as the mineral deposits are finite and cannot be regenerated annually or even once in thousand years which is at the most stretchable limit of any civilization.

In this 'Catch 22 'situation, we have to rethink and reprioritise our requirements. We have to either switch over to 1) alternative materials or 2) reduce consumption. In case of core minerals both the options are not viable as the substances will not work in core applications. In that case 3) 'recycling 'is another limited option before us.

Following our 'Freedom' our nation had to export rich grade minerals due to socioeconomic compulsions. Our mineral deposits are almost emptied due to this long term 'MOU'sat old tariffs. Now at least, we have to break our "MOUNA" and rethink about national priorities and our feature need. Value added experts would be another option to gain more in the barton. Tanks to improved forex reserves and appreciated rupee at the moment due to enhanced IT, BT contributions, the ones on the on the mineral industry can be shifted to technology so that the precious mineral can be conserved for our feature

generation. India has an enviable human resources political in the whole world with improved education facilities in the country, more and more disciplined educated work force is being released year after year this ‘excess talent’ can be used in the BPO/KPO sector to earn foreign exchange to keep the book balanced and save the mineral sector.

India is richly endowed with some essential minerals such as coal, iron ore, bauxite, barites, ball clay, bentonite, calcite, dolomite, feldspar, fire clay, fuller’s earth, gypsum, ilmenite and rutile, kaolin, limestone, manganese, mica, pyrophyllite, pyrite, ochre, quartz, beach sand, sillimanite, zircon, steatite and dimensional stones including marble. Other important minerals such as lignite, chromite, zinc, corundum, graphite, rock salt, vermiculite, wollastonite etc., are adequate enough to meet with our requirements. Whereas strategic minerals asuch as coking coal, copper, lead, apatite, rock phosphate, asbestos, fluorite, kyanite, diamonds and other precious stones, precious metals, nickel, tungsten, cobalt, molybdenum, vanadium, antimony, tin, potash etc., are deficit. It is the second and third category of minerals that need our attention for prospecting and exploration for new deposits, whereas our all out efforts should be focused on the first category of minerals which we deem as surplus and abundant at this moment of time. Nut with continued exploration for either internal consumption or for export, they are going to gradually deplete over timeand after nearly 50 to 60 years, they may reach a stage of exhaustion.

One such important commodity is iron ore. With the increase in demand from an advancing country like China for low grade iron ore when upgraded and exported (similar to Kudhremukh) would fetch 3 times the price. This value addition would add to the Indian economy and generate employment internally to lakhs of people. Similar strategy would help to review the status

of chromite mining in India. Chromite is normally associated with nickel and PGE with inadequate intrumentation techniques the presence of low abundances of PGE was not detected earlier. But, now it is possible to subject every tonne of chromite ore for PGE and any abnormal concentration of PGE in any of the deposits would lead to a sizeable prospect for PGE.

GROUND WATER AND ENVIRONMENT

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September 2006

DEVELOPMENT IS AIMED AT PROVIDING GOODS AND SERVICES FOR THE PEOPLE AT LARGE. IT IS NOW RECOGNIZED THAT THE DEVELOPMENTAL PROCESS WILL BE ABLE TO DELIVER ITS BENEFITS TO THE PUBLIC IF ENVIRONMENTAL CONSIDERATIONS AND RATIONAL UTILIZATION OF RESOURCES ARE INTEGRATED INTO DEVELOPMENTAL ACTIVITIES RIGHT FROM THE INITIAL STAGE OF PLANNING.

Groundwater plays a critical, but often poorly understood, role in the natural environment. Aquifers discharge on land and at sea as springs and seeps. They provide base-flow to wetlands and rivers, maintaining aquatic ecosystems during dry months. Where the water table is relatively close to the surface, trees tap ground water directly.

Ground Water and Environment

Managers in the field often do not sufficiently understand how, when and where ecosystems are dependent on groundwater. Groundwater dependent ecosystems are often critical in supporting sustainable livelihoods and biodiversity. Sustainable use of groundwater should account for the vital role that groundwater plays in maintaining the natural environment.

Ground Water Resource National Scenario

(Jointly assessed with State Governments and NABARD)

- Annual Ground Water Recharge - 433 BCM.
- Net Annual Ground Water Availability - 399 BCM
- Ground water draft - 230.58 BCM.
- Stage of Ground Water Development – 58%
- In-storage ground water reserve - 10800 BCM

Ground Water Resources
(in-storage)

- GW resources available in deeper aquifers below active recharge zone.
- Replenished over longer period due to limited scope of recharge.
- In Storage GW Resources : 10,800 BCM
  - Soft Rock : 10,600 bcm (down to 450m.)
  - Hard Rock: 200 bcm (down to 200m.)

Ground Water Resources

- GW is essentially a dynamic resource.
- Occurrence highly uneven due to:
  - Diversified hydrogeology and terrain conditions.
  - Rainfall distribution
- High yielding aquifers in alluvial formation.
- Low yield potential in hard rock areas.

Ground Water Resources – Annual Replenishable Resource

- Delhi, Haryana, Punjab, Rajasthan, UT of Daman & Diu & Pondicherry >100%
- Gujarat, Tamil Nadu 75-100%
- Karnataka, Uttaranchal, U.P., Lakshadweep 50 - 75%
- Rest of India < 50%

Options for Ground Water Protection

- Renovation of tanks
- Rain Water Harvesting
- Artificial Recharge
- Conjunctive use of surface and ground water
- Role of society
- Community Awareness

- Ground water legislation
  No single action will in itself alleviate the crisis. The effective answer to the freshwater crisis is to integrate conservation and development activities – from water extraction to water management – at the local level.

Existing Measures for Ground Water Regulation

The existing controls were:

- Indirect administrative measures being adopted by institutional finance agencies that by and large insist on technical clearance of the schemes from authorized Ground Water Departments of the respective states. These departments in turn look into the various aspects of Ground Water availability.
- Another control imposed by the institutional agencies, availing financial facilities from NABARD is by way of prescribing spacing criteria between the Ground Water structures.
- Denial of power connections for the pump sets financed through loan from banks.

Existing Measures for Ground Water Regulation

However, in the absence of any Law, the administrative measures do not prevent affluent farmers from constructing wells in critical areas. An efficient farmer with his large capital investment can construct a high capacity well, which can affect shallow wells in the neighborhood.

National Water Policy

The National Water Policy (1987) states that water is a prime natural resource, basic human need, and precious national asset. It gives special attention to drinking water for both humans and animals over its other uses. The policy calls for controls on the exploitation of groundwater through regulation and an integrated and coordinated development of surface- and ground-water.

WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974

- It applies in the first instance to the whole of the States of Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Rajasthan, Tripura and West Bengal and the Union Territories
- The Central Government shall, constitute a Central Board to be called the Central

Pollution Control Board to exercise the powers conferred on and perform the functions assigned to that Board under this Act.

- The State Government shall, constitute a State Pollution Control Board.
- In India the Act was passed in 1974 and by 1990 all the states adopted the Act.

Central Ground Water Authority

- On the directions of Hon'ble Supreme Court CGWB has been constituted as an Authority with the objective to "Regulate indiscriminate boring & withdrawal of ground water in the country".
- The authority has been constituted under Section 3(3) of the Environment (Protection) Act, 1986 (29 of 1986) on 14th January, 1997.
- The Members of CGWA are the same as that of CGWB.
  The main objective of constituting the Board as an Authority was the urgent need for regulating the indiscriminate boring and withdrawal of ground water in the country**.**

Activities of CGWA

- Activities of the Authority include
  – registration of agencies involved in construction of wells,
  – registration of persons/agencies engaged in sale and supply of mineral water,
  – clearance to ground water based projects,
  – monitoring of ground water contamination,
  – conducting mass awareness programmes and training in rain water harvesting.

The Model Bill

- With a view to guide the State Governments / UT's in enacting legislation, a Model Bill was circulated in 1970, revised and re-circulated in 1992, 1996 and again in 2005.
- The Model Bill stipulates –
  - Establishing of State Ground Water Authorities to frame policies for administration of the legislation
  - Empowering the State/Union Territory Government to control and/ or regulate the abstraction of Ground Water
  - Requiring users of ground water to seek permission from the State Ground Water Authority to sink a well in the notified area.

Enactment of Legislation for Regulation of Ground Water

- Objective of legislation is to regulate and control the development of ground water.

- Water being a State subject, legislation has to be enacted by the State Governments/UTs only.

The Model Bill……contd.

- With a view to bringing equity in the distribution of the resource, the 'Small' and 'Marginal' farmers have been exempted.
- Registration of existing users in the notified as well as non-notified areas in the States/UTs.

States/UT's where Legislation Enacted and Implemented

STATES/UT's Where Bills Passed But Not Enacted

States/UT's which have initiated action for preparing Legislations

Status of States/UT's which have initiated action for preparing Legislations

Status of States/UT's which have initiated action for preparing Legislations

Status of States/UT's which have initiated action for preparing Legislations

Status of States/UT's which have initiated action for preparing Legislations

Status of other States/UT's on preparation and enacting Legislations

States which have not responded yet

Andhra Pradesh Water, Land and Tree, Act 2002

Tamil Nadu Ground Water (Development & Management) Act, 2003

Goa Ground Water Regulation Act 2002 (Goa Act 1 of 2002)

Ground Water Regulation –
Kerala, Lakshadweep, Pondicherry

Sustainability of
Ground Water Development

Legal and Administrative measures

- Amendment of Building Bye laws

– By 2025 most of the world's population would be living in urban and semi-urban areas. The people and industries in these areas will demand a large share of the total water available.

– In urban areas, there is an urgent need for amending building bye laws and making Rain Water Harvesting as mandatory.

ACTION TO BE TAKEN BY STATE GOVERNMENTS FOR RAIN WATER HARVESTING

States to initiate action for Rain Water Harvesting on priority.

- States other than TN, AP, Gujarat, Kerala, UP, Rajasthan, Punjab, Haryana, Maharashtra, Jharkhand, Nagaland and NCT of Delhi may initiate action for Rain Water Harvesting on priority.

States to modify building by-laws making Rain Water Harvesting mandatory for new buildings.

- States of TN, NCT of Delhi, AP, Gujarat, Kerala, UP, Rajasthan, Punjab, Haryana, Maharashtra, Jharkhand and Nagaland already made provision for making Rain Water Harvesting mandatory for new buildings.

ACTION TAKEN BY STATE GOVERNMENTS FOR RAIN WATER HARVESTING

1. **NCT. Delhi** - Modified Building Bye-laws, 1983 to incorporate mandatory provision of RTRWH in new building on plots of 100 sq.m. through storage of rain water runoff to recharge underground aquifer in NCT, Delhi.
2. **Tamil Nadu** - RTRWH mandatory in all Corporations and Municipalities.
3. **Andhra Pradesh** - Enacted 'Andhra Pradesh Water, Land and Tree Act, 2002' with appropriate provision making it mandatory for new buildings on plots of 200 sq.m. or above.
4. **Gujarat** - Metropolitan areas have notified rules under which no new building plan is approved without corresponding RWH structure.
5. **Kerala -** The Government of Kerala has enacted legislation "Kerala Municipality Building (Amendment) Rules, 2004" making RTRWH mandatory in all new

constructions in municipal areas.

6. **Uttar Pradesh** - U.P. Housing Board has made RTRWH mandatory in new buildings of >300 Sq. m area in U.P in Municipal Areas.
7. **Rajasthan** - RTRWH mandatory in State owned buildings of plot size >500 Sq.m and for Jaipur Metropolitan area all buildings of plot size >500 Sq.m
8. **Punjab (Municipal Corporation of Ludhiana) -** Bye-laws have been framed by Municipal Corporation of Ludhiana and to make RWH mandatory in new buildings
9. **Haryana -** Haryana Municipal Building Bye-laws 1982 has been amended to incorporate the provision of compulsory RTRWH Compulsory**.**
10. **Maharashtra -** The Government of Maharashtra has adopted a resolution to promote the scheme on RWH under the "Shivkalin Pani Sthawan Yojana". which provides that all houses should have provision for RWH without which house construction plan should not be sanctioned.

    Bombay Municipal Corporation and Pimpri - Chinchwad Municipal Corporation has made RWH mandatory by enacting building bye-laws.
11. **Jharkhand -**Chief Minister has directed to amend the law appropriately for making RTRWH mandatory in urban areas of Jharkhand. RWH has been included in Bye-laws by Ranchi Regional Development Authority
12. **Himachal Pradesh** - RTRWH made mandatory for the following:-

- ✓ All buildings which come up in urban areas of the State in future.
- ✓ All commercial/institutional buildings existing or proposed for construction in future and having plinth area of more than 1000 Sq meters located anywhere in the State.

13. **Karnataka** - Karnataka Government has initiated action to amend building bye-laws in major cities having population of more than 20 lakh to make rain water harvesting mandatory.
14. **Nagaland** - The Government of Nagaland has made provision of roof top rain water harvesting compulsory for all new Government buildings.
15. **West Bengal** - The Government of West Bengal has taken up promotion of RTRWH in Government buildings in seven priority districts.
16. **Meghalaya** - The Government of Meghalaya has instructed the concerned Department to provide funds under their respective annual plan for construction of RTRWH structures in Government buildings.
17. **Daman & Diu** - The Administration of Daman & Diu has issued instruction to the local PWD for construction of RTRWH structures and accordingly, PWD has initiated action. It has also advised the local bodies such as Municipality and District Panchayat to make provision for construction of RTRWH structures

    Explore possibility of giving incentive in the form of rebate in property tax etc. in case of existing buildings.

- Govt. of AP is providing rebate of 5% in property tax subject to maximum amount of Rs. 400/- per annum as one time measure.
- Govt. of NCT, Delhi is providing financial assistance upto Rs. 50,000/- to Group Housing Societies for adoption of Rain Water Harvesting.

Future Strategies

- GW Management in 'Notified Areas' through Advisory Committees.
- Monitoring and surveillance of activities of SGWA.
- Identification and notification of new overexploited areas for regulation and management.
- Stepping up of awareness and capacity building activities for rain water harvesting and GW recharge.

Some highlights on the effects of mining on the socio-economic aspects

Dr. B.S. Shivakumar
Professor in Geology, Dept. of Geology, Bangalore University

'Mining' is essentially a necessary 'act' for the survival and progress of human beings. It is only next to agriculture which in turn depends on the raw materials like iron, aluminium, copper, various minerals, granitic rocks and various equipments/ machinery etc. Agriculture, Mining and various industrial activities are interrelated and should go hand in hand and any hindrance or problems in any stage will only result in adverse effect on the overall national economy. It is seen in the Indian experience, that except mining all other activities are quite progressing and the shortage of important Metallic, Petroleum/ Coal and other raw materials due to poor mining are being imported in large scale. Therefore, although it is very clear that there is no proper mining in the country, there are no serious efforts to improve

There is a kind of discouragement for mining activities at all levels. The main reason being given is the environmental pollution. This cause of environmental effects due to mining is blown up beyond proportions in such a way that even a common man in villages is against any such mining or preliminary geologic activities like exploration and prospecting. The result is the overall protest, boycott and even forceful closure of such constructive and productive activities. It appears as if from a common man to the highest learned policy making or implementing authority that any mining activity is dangerous to the country. But in contrast, as it is understood by a few and a section of wise people and experts, mining activities are fundamental for the sustainance and growth of any country. They definitely increase or improve the

socio-economic activities in any country. This is clearly seen in countries like, China, Brazil, Australia, Canada and in many European countries. The main reason or slogan that mining is detrimental to environment can be disproved if one were to visit any mine in the above countries. For example in the world famous Kiruna (Sweden) magnetite mines, the entire underground is air-conditioned and once in a year a national car race is held. In many other mines, visiting and spending time in underground is an occasion for an enjoyable experience. Often mining sites are 'tourist centres' and big museums exist near by. The famous Kalgorlie and Coolgardy gold mines in Western Australia have funded and maintained beautiful museums which display diamond studed gold ornaments and other finished products from the raw materials mined out from the nearby mines. So a glimpse of such centres and activities clearly prove that mining activity is not a curse but 'boon' provided it is done in a proper way.

The basic feature of mining is the provision of jobs to a large number of unemployed youths and making the mining centre for improving the socio-economic condition. It is seen in many places in India like at KGF, Kudremukh, Sandur (Karnataka), Neyveli (Tamilnadu), Dhanbad, Singhbum (Bihar), Biladila (Madya Pradesh) etc that the living conditions of the workforce of the mining/industrial area are much improved with a great tendency of education of rural/tribal children. There is of course some environmental effects which should be taken care of by deviating some profits and with the help and co-operation of the local people and governing bodies.

In summary all mining and geological activities should be encouraged by educating and creating an awareness among one and all.

APPLICATIONS OF REMOTE SENSING TECHNOLOGY IN MINING - CASE STUDIES FROM RAJASTHAN

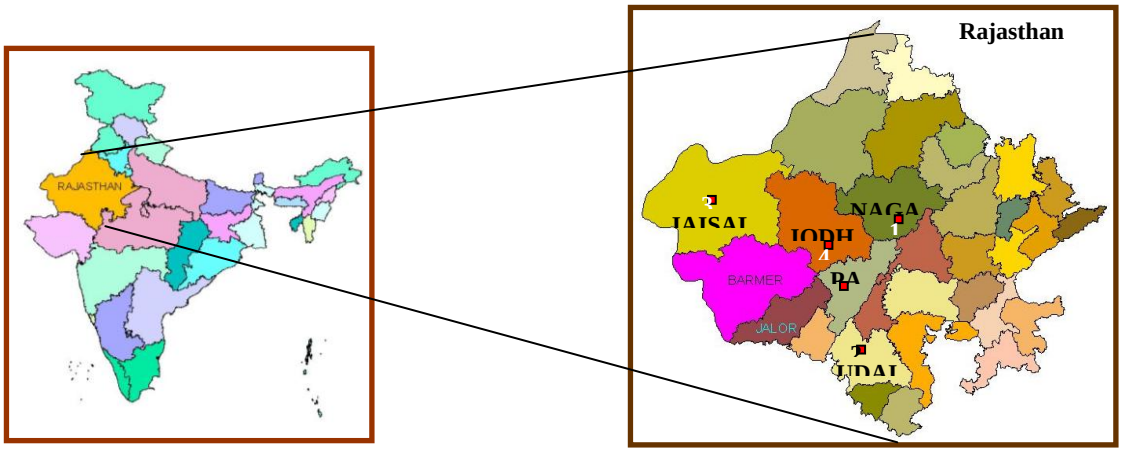
S.Adiga
Former Director, NNRMS-RRSSC, ISRO

APPLICATIONS OF REMOTE SENSING IN MINING

- Mine area mapping – Active, abandoned, dump
- Environmental Impact Assessment (EIA) – Land and Water
- Land use/land cover mapping – Built-up, agriculture land, forest land, wasteland, water bodies etc.
- Digital Elevation Model (DEM) – 3D perspective through stereo product
- Legal and illegal mining status through GIS
- Forest encroachment during mining
- Damage assessment – Vegetation, drainage, cultural objects

FOUR CASE STUDIES OF RAJASTHAN

1. Makrana Marble Mines, Nagaur district
2. Jhamar Kotra Phosphate Mines, Udaipur district.
3. Sanu Limestone Mines, Jaisalmer district.
4. Jodhpur Sandstone Mines, Jodhpur district.

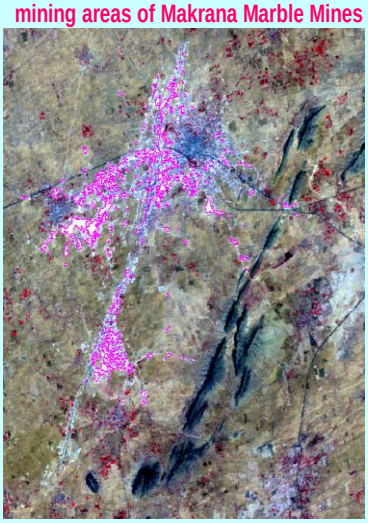


Case Study: 1
MARBLE MINES OF MAKRANA,
NAGAUR DISTRICT

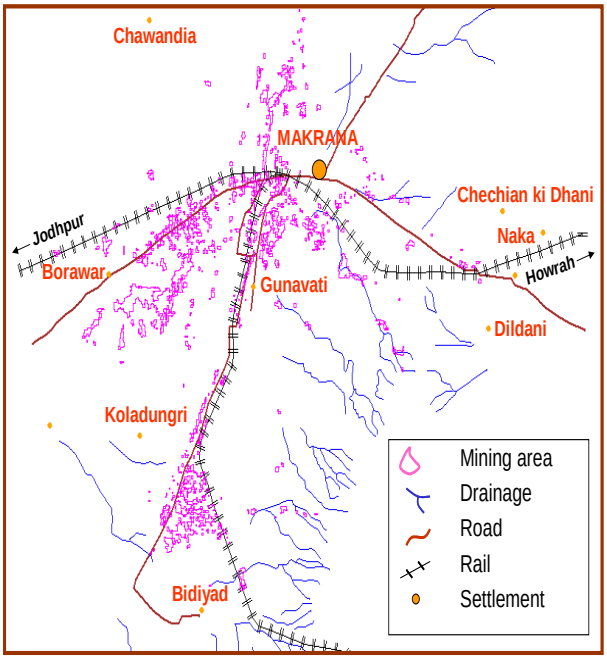
Salient Features

1.Location – Makrana (Lat.27°02’25”; Long.74°43’44”)
2.Exploitable mineral – Marble
(Composition- High CaO=50-56%; Low MgO=0.9-1.77%)
3.Shape of the deposit – It occurs as thin parallel bands (11 ranges); different marble bands have formed due to tight to isoclinal folding.
4.Strike length of the deposit – NNE-SSW with steep easterly dip. Strike length between Matabhar in the north and Bilu-Mored in the south is approx. 13 km.
5.Average width of the deposit – Width of the deposit between Gunawati in the east and Borawar in the west is approx. 1.6 km.

IRS 1D-L3 Satellite Image of April 2003 showing mining areas of Makrana Marble Mines



Interpreted map showing the present active mining areas of Makrana Marble Mines



Makrana Marble Mines- Present Status

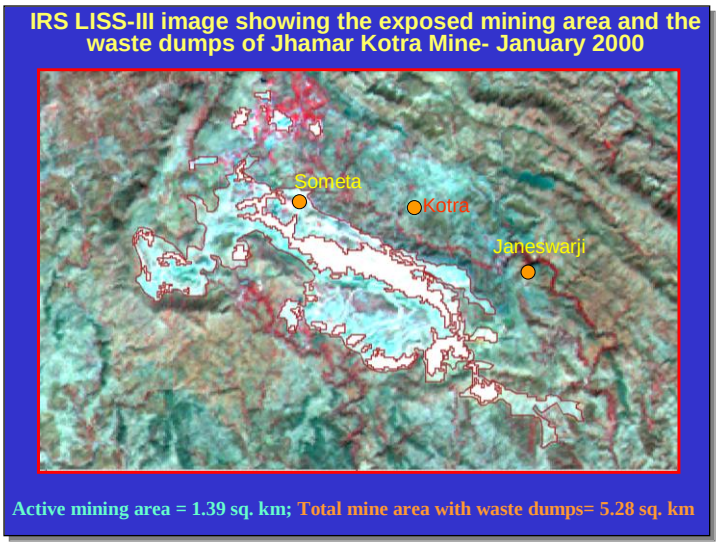
1. Total mining area = 3.13 sq. km
2. Total length of drainage = 79.87 km
3. Drainage length reduced due to mining = 1.67 km

Case Study: 2
ROCK PHOSPHATE MINES OF JHAMAR- KOTRA, UDAIPUR DISTRICT

Salient Features

- Location – 28 km SE of Udaipur city
- Exploitable mineral – Rock phosphate
- Shape of the deposit – Crescentic
- Strike length of the deposit – 16 km along NW-SE
- Average width of the deposit – 15 m
- Host rock – Dolomite Limestone of Aravalli Group

IRS LISS-III image showing the Jhamar Kotra Mine area swerved by the Aravalli ranges, SE of Udaipur



Sanu Limestone Mines- Status on May 2003

1. Total mining area = 4.93 sq. km
   (Active Mine + Waste Dump)
2. Active mining area = 2.14 sq. km
3. Total length of drainage in and around the mines = 12.91 km

Case Study: 4
SANDSTONE MINES AROUND JODHPUR

Conclusion

The satellite remote sensing providing data on various spatial, spectral and temporal scales offers economic and timely assessment of many environmental issues relating to mining. Such data could further be integrated with other socio-economic aspects using geographic information system (GIS) towards spatial modelling to generate Environmental Impact Assessments (EIA) and Environmental Management Plans (EMP).

MINING: Boon or bane?

Dr.T.R. Sreedhara Murthy
Professor of Marine Geology (Retd)
Mangalore University
Mangalore

Mining of mineral resources is an age old practices of tapping metals for the benefit of society. Large number of old workings found in places where mineralized formations are exposed .suggest the interests of ancients in exploration and exploitation activities... With the development of technology. The quantum of Exploration and exploitation of minerals deposits increased. With the availability of export market, particularly for iron ores, unhealthy completion in mining has lead to unethical practices in mining activity. With this, what is suppose to be a boon has become bane to the society.

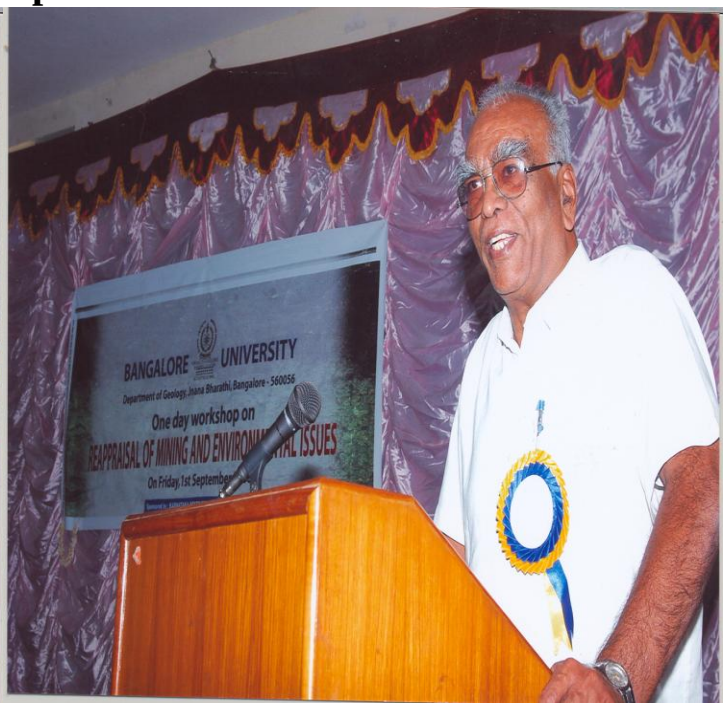
This is because of lack of Administrative, social and environmental responsibility in monitoring the mining activity.

1. Administrative responsibilities: involves exploration of mineral resources. Identifying suitable resources for min9ing, giving lease for mining, monitoring the production, to check illegal mining to collect revenue, to review the policy from time to time.
2. Social responsibilities: to provide facilities to the employees and their employees
3. Environmental responsibilities to keep check on the impact of mining on environment. Restoration of mining area to the extent possible, to make use of the abandoned mining land for alternate use like fisheries, tourism, social forestry etc.

Panel Disscusion

Participants

Dr H Paramesh



Prof.C.Naganna

Sri.Yellappa Reddy, Dr.K.V.Raju

Delegates

Panel Discussion

Chairperson : **Sri.Prabhu Shettar.**
Regional Comptroller of Mines
IBM, Zonal Office, Bangalore

Members : **Sri,Yellappa Reddy**
Dr.T.J.RenukaPrasad
Dr.T.R.Sridhara Murthy
Dr.S.Channabasappa
Dr.H.S.M.Prakash
Dr.B.S.Shivakumar
Dr.Nandini
Dr.N.MalarKodi

Participants : **Registered Participants (Annexure II)**

Recommendations:

1. Natural wealth of the land should be utilized judiciously for the welfare of the people.
2. There is an urgent need to conserve the available iron ore for our future need and our own sustainable development.
3. To investigate by modern analytical tools of all the Iron Ore Deposits for Gold and other associated metals before exporting them to other countries.
4. To set up"Mine area Reclamation Board" to upgrade the environment around abandoned mines to utilize the waste and tailings to develop horticulture, aquaculture, geotourism etc., - A CESS on royalty can be collected. Royalty sharing, for funding 5% cess restoration.
5. Mining should have R& D for the development
6. Taluk level committee should be formed to reduce the degradation, and to upgrade the development.
7. to recruit qualified environmental scientist in mining companies should be made mandatory.
8. To utilize the limestone mine waste material to make bunds along the Krishna and Bheema rivers to prevent flooding.
9. For a stricter implementation of existing mining laws.
10. To export value added steel only instead of Iron ore to other countries.

The natural wealth of any land should be used for the welfare of the people of the land. When it is plundered for the benefit of a few individuals, the state cannot remain as a mute spectator to the looting of the natural property and atleast the inteligentia of the land should rise the voice to arrest the loss of natural resources. In this regard the Dept of Geology, BUB and connected technocrats /scientists of the Bangalore based organizations have planned to meet on September 01, 2006 to focus the attention of Govt. to take up corrective measures to set right the anomalies happening in the mining sector.

The minerals are not going to last for ever. The Classic example is the closing of BGML mines KGF. Similarly all mines have to be closed one day and before that the judicious utility of the minerals keeping in view of the need of the posterity has to be taken up. It is the duty of the present generation to leave sufficient resources for the future need of the successive generations. Conservation has to be planned in such a way big damage is not done to the Mother Earth.

Emphasis to upgrade around the abandoned mining, reclamation and development activities is a must.

Annexure-I: Press Coverage

ಗಣಿಗಾರಿಕೆ ಹಾಗೂ ಪರಿಸರದ ಬಗ್ಗೆ ಮರುಪರಿಶೀಲನೆ
ಕಾರ್ಯಾಗಾರದಲ್ಲಿ ಚರ್ಚಿಸಲಾದ ವಿಷಯಗಳು

೧. ಭಾರತದಲ್ಲಿ 89 ಬಗೆಯ ಖನಿಜ / ಅದಿರುಗಳನ್ನು ಉತ್ಪಾದಿಸಲಾಗುತ್ತದೆ. ಮುಖ್ಯವಾಗಿ ಕಬ್ಬಿಣ, ಕಲ್ಲಿದ್ದಲು, ಯುರೇನಿಯಂ, ಮ್ಯಾಂಗನೀಸ್, ಚಿನ್ನ, ಪೆಟ್ರೋಲಿಯಂ ಹಾಗೂ ಸುಣ್ಣದ ಕಲ್ಲು.

೨. ಖನಿಜ ಉತ್ಪಾದನೆಯಲ್ಲಿ ಕರ್ನಾಟಕ 5ನೇ ಸ್ಥಾನದಲ್ಲಿದೆ. ಮುಖ್ಯವಾಗಿ ಕಬ್ಬಿಣದ ಅದಿರು ಹಾಗೂ ಸುಣ್ಣದಕಲ್ಲು 97% ಉತ್ಪಾದನೆ ಆಗುತ್ತದೆ.

೩. ಕರ್ನಾಟಕದಲ್ಲಿ 25773 ಚದರ ಕಿ.ಮಿ. ಪ್ರದೇಶದಲ್ಲಿ ಒಟ್ಟು 6346 ಗಣಿಗಳು ಕಾರ್ಯಾನಿರತವಾಗಿವೆ.

೪. ರಾಜ್ಯದ ಬೊಕ್ಕಸಕ್ಕೆ ಸುಮಾರು 250 ಕೋಟಿ ರೂಪಾಯಿಗಳ ರಾಜಧನದ ಆದಾಯವಿದೆ.

೫. ಗಣಿಗಾರಿಕೆಯ ಪರಿಣಾಮ ಸಾಮಾಜಿಕ, ಆರ್ಥಿಕ, ಆರೋಗ್ಯ, ಮಾನಸಿಕ ಹಾಗೂ ಪ್ರಾಕೃತಿಕ ಸೌಂದರ್ಯದ ಮೇಲಾಗುತ್ತದೆ.

೬. ಗಣಿಗಾರಿಕೆಯಿಂದ ವಾಯು, ಜಲ ಹಾಗೂ ಶಬ್ದಮಾಲಿನ್ಯವಾಗುತ್ತದೆ ಇದರಿಂದ ಕ್ಯಾನ್ಸರ್, ಅಸ್ತಮ, ಶ್ವಾಸಕೋಶದ ಕಾಯಿಲೆ, ಮಾನಸಿಕ ಅಸ್ವಸ್ಥತೆ, ನರದೌರ್ಬಲ್ಯ, ಆತಂಕ, ತಲೆತಿರುಗುವಿಕೆ, ನಿಶ್ಯಕ್ತಿ ಮುಂತಾದ ಸಮಸ್ಯೆಗಳು ಬರುತ್ತವೆ.

೭. ಗಣಿಯ ಸುತ್ತಮುತ್ತಲಿನ ಜಮೀನಿನ ಮೇಲೆ ತೀವ್ರವಾದ ಹಾನಿಯಾಗುತ್ತದೆ.

೮. ಇವುಗಳ ನಿವಾರಣೆಗಾಗಿ ಆಧುನಿಕ ಗಣಿಗಾರಿಕೆ ಹಾಗೂ ಪರಿಣಾಮಕಾರಿಯಾದ ಕಾನೂನು ನಿಯಂತ್ರಣವನ್ನು ತರುವುದರಿಂದ ಗಣಿಗಳ ಪ್ರಭಾವವನ್ನು ತಗ್ಗಿಸಬಹುದು ಹಾಗೂ ಪರಿಸರ ಮತ್ತು ಜನರ ಆರೋಗ್ಯವನು ಸುಧಾರಿಸಬಹುದು.

೯. ಗಣಿಗಳ ಸುತ್ತಲಿನ ಪರಿಸರವನ್ನು ಉತ್ತಮಗೊಳಿಸಲು "ಗಣಿ ಪ್ರದೇಶ ಅಭಿವೃದ್ಧಿ ಬೋರ್ಡ್" ನ ನೇಮಕಾತಿಗಾಗಿ ಒತ್ತಾಯ ಮಾಡುವುದು.

ಭೂವಿಜ್ಞಾನ ವಿಭಾಗ
ಜ್ಞಾನ ಭಾರತಿ,
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ
ಬೆಂಗಳೂರು – ೫೬೦ ೦೫೬

Experts moot new body

TIMES NEWS NETWORK

Bangalore: Alarmed by the rampant mining in Bellary and surrounding taluks, geologists and mining experts are formulating a policy to be forwarded to the government.

Geologists are suggesting a body called Mine Area Reclamation Board, on the lines of a Malnad Development Board, which would comprise industrialists, mine owners and officials, to check into the exploitation of iron ore resources. At a seminar organised by Bangalore University, Department of Geology, professors, environmentalists and geologists presented papers on a variety of subjects under the banner of — Reappraisal of Mining and Environmental Issues.

ಅವ್ಯಾಹತ ಗಣಿಗಾರಿಕೆಯಿಂದ ಪರಿಸರ ನಾಶ

10 ವರ್ಷದಲ್ಲಿ 350 ಲಕ್ಷ ಮಂದಿಗೆ ಅಸ್ತಮಾ..!

ಬೆಂಗಳೂರು,ಸೆ.7: ಗಣಿ ಮಾಲಿನ್ಯದ ಪರಿಣಾಮ 2016ರ ವೇಳೆಗೆ ಸುಮಾರು 350ಲಕ್ಷ ಜನರು ಅಸ್ತಮ ರೋಗಿಗಳು ಸೃಷ್ಟಿಯಾಗುತ್ತಾರೆ ಎಂದು ಲೇಕ್‌ಸೈಡ್ ಆಸ್ಪತ್ರೆಯ ನಿರ್ದೇಶಕ ಡಾ.ಎಚ್.ಪರಮೇಶ್ ಬಹಿರಂಗಪಡಿಸಿದ್ದಾರೆ.

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ ಭೂಗರ್ಭಶಾಸ್ತ್ರ ವಿಭಾಗ ಆಯೋಜಿಸಿದ್ದ ಗಣಿಗಾರಿಕೆ ಮತ್ತು ಪರಿಸರ ವಿಷಯಗಳ ಪುನರ್ ಪರಿಶೀಲನೆ ಕಾರ್ಯಾಗಾರದಲ್ಲಿ ಭಾಗವಹಿಸಿ ಮಾತನಾಡಿದ ಅವರು, ಹೆಚ್ಚುತ್ತಿರುವ ನಗರೀಕರಣ ಮತ್ತು ಗಣಿ ಮಾಲಿನ್ಯದ ಪರಿಣಾಮ ಮುಂದಿನ 10ವರ್ಷದ ವೇಳೆಗೆ ದೇಶದಲ್ಲಿ ಅಸ್ತಮ ರೋಗಿಗಳ ಸಂಖ್ಯೆ ಹೆಚ್ಚಾಗಲಿದೆ ಎಂದರು.

ಬಹಳಷ್ಟು ರೋಗಗಳು ವಂಶವಾಹಿಯಾಗಿದ್ದರೂ ಪರಿಸರ ಮಾಲಿನ್ಯದಿಂದ ಉಂಟಾಗುವ ರೋಗಗಳ ಸಂಖ್ಯೆ ಕ್ರಮೇಣ ಹೆಚ್ಚುತ್ತಿವೆ ಎಂದ ಅವರು, ದೇಶದಲ್ಲಿ ಪ್ರಸ್ತುತ 247.4 ಲಕ್ಷ ಅಸ್ತಮಾ ರೋಗಗಳಿದ್ದು 350.7 ಲಕ್ಷ ಜನರು ಅಸ್ತಮಾ ರೋಗಕ್ಕೆ ತುತ್ತಾಗಲಿದ್ದಾರೆ ಎಂಬ ಸತ್ಯವನ್ನು ಕೇಂದ್ರ ಸರ್ಕಾರ ಬಹಿರಂಗಪಡಿಸಿದೆ ಎಂದರು.

ಹೆಚ್ಚುತ್ತಿರುವ ಗಣಿಗಾರಿಕೆಯಿಂದ ಗಾಳಿ ಮಲಿನವಾಗುತ್ತಿರುವ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಕೆಮ್ಮು, ಅಸ್ತಮಾ, ಕಣ್ಣು ಉರಿ, ಕ್ಷಯರೋಗ, ಪ್ಲೂರೋಸಿಸ್, ಟೈಫಾಯಿಡ್ ಮತ್ತು ಮಲೇರಿಯಾ ರೋಗಗಳು ಉಲ್ಬಣಿಸುತ್ತಿವೆ ಎಂದು ಆತಂಕ ವ್ಯಕ್ತಪಡಿಸಿದ ಅವರು, ದೇಶದಲ್ಲಿ ಅಸ್ತಮಾ ರೋಗಗಳ ಚಿಕಿತ್ಸೆಗೆ ಸುಮಾರು 3108ಖರ್ಚಾಗುತ್ತಿದ್ದು, ಇದು ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ 13,525 ಕೋಟಿ ರೂ.ಗೆ ಏರಿಕೆಯಾಗಲಿದೆ ಎಂದು ಕೇಂದ್ರ ಸರ್ಕಾರ ಅಂದಾಜು ಮಾಡಿದೆ ಎಂದು ವಿವರಿಸಿದರು.

ಐಸೆಕ್‌ನ ಇಕಲಾಜಿಕಲ್ ಎಕಾನಾಮಿಕ್ಸ್ ಘಟಕದ ಮುಖ್ಯಸ್ಥ ಪ್ರೊ.ಕೆ.ವಿ.ರಾಜು ಮಾತನಾಡಿ, ರಾಜ್ಯದಲ್ಲಿ ಸುಮಾರು 128ಅನಧಿಕೃತ ಗಣಿಗಳಿವೆ ಎಂದು ಬಹಿರಂಗಪಡಿಸಿದರು.

ರಾಜ್ಯ ಗಣಿಗಾರಿಕೆ ಮತ್ತು ಕ್ವಾರಿಗಳಿಂದ ವಾರ್ಷಿಕವಾಗಿ 250ಕೋಟಿ ರೂ. ಆದಾಯ ಬರುತ್ತಿದೆ.

ವಾರ್ಷಿಕವಾಗಿ ಕಬ್ಬಿಣ ಆದಿರಿನಿಂದ 80 ಕೋಟಿ.ರೂ. ಆದಾಯ ಬರುತ್ತಿದ್ದರೂ ಕೂಡ ಗಣಿ ಮಾಲೀಕರು ಶೇ. ಒಂದಕ್ಕಿಂತ ರಾಯಧನ

ಸಲ್ಲಿಸುತ್ತಿದ್ದಾರೆ ಎಂದರು.

ರಾಷ್ಟ್ರ ನಿರ್ಮಾಣದ ಕಾಮಗಾರಿಗಳಾದ ಅಣೆಕಟ್ಟು ನಿರ್ಮಾಣ ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳ ಸಂದರ್ಭಗಳಲ್ಲಿ ಭೂಗರ್ಭ ಶಾಸ್ತ್ರಜ್ಞರನ್ನು ಬಳಸಿಕೊಂಡರೆ ಪರಿಸರದಲ್ಲಿನ ಖನಿಜ ಸಂಪನ್ಮೂಲಗಳನ್ನು ರಕ್ಷಿಸಬಹುದೆಂದು ಜಿಯಾಲಜಿಕಲ್ ಸರ್ವೆ ಆಫ್ ಇಂಡಿಯಾ ಉಪ ಮಹಾ ನಿರ್ದೇಶಕ ಎಂ.ಎಂ.ಸ್ವಾಮಿ ಅಭಿಪ್ರಾಯಪಟ್ಟರು.

STATE

Despite pollution, asthma cases come down in City

VIJAY TIMES NEWS

Bangalore: Despite increase in pollution of the City, there has been marked reduction in asthmatic cases, said Dr H Paramesh, Director, Lakeside Hospital on Friday.

Speaking at the sidelights of a workshop on 'Reappraisal of Mining and Environmental Issues' organised by Department of Geology, Bangalore University, he said, new asthmatic cases have decreased by three percent as compared to figures in 1999.

" We had nearly 29 percent asthma cases in 1999, but the figure, came down by three percent in 2004. This because of genetically pre-disposed cases reaching a saturation point," he added.

Describing the present situation as serious due to increase in number of chronic asthma cases, estimated to touch 350 lakh by 2016. Paramesh opined, asthmatic diseases are caused by a variety of reasons including indoor and outdoor pollution.

Mine pollution: Earlier speaking at the inaugural session of the workshop, he said, about 30 percent of mine employees across the world suffer from acute respiratory problem such as rhinitis, asthma and eye irritation due to high level of dust from mining and transportation of ores.

"While water used by mines lead to water borne disease like flourosis, gastroenteritis and hepatitis, blasting and drilling can cause deafness." He also stated, no work on impact of mining pollution has been done in the state.

Annexure-II: List of Participants

1	DR A S RAVIKUMAR	BANGALORE UNIVERSITY
2	DR INAYUTHULLA	BANGALORE UNIVERSITY
3	DR S.V.GOUD	BANGALORE UNIVERSITY
4	NANDINI	BANGALORE UNIVERSITY
5	PROF K L N RAO	BANGALORE UNIVERSITY
6	PROF PARTHASARATHI	BANGALORE UNIVERSITY
7	R K SOMASHEKAR	BANGALORE UNIVERSITY
8	PROF T R SREEDHARA MURTHY	PROFESSOR OF MARINE GEOLOGY
9	DR FAROOQUI`	CENTRAL GROUND WATER BOARD
10	DR HUNSE	CENTRAL GROUND WATER BOARD
11	DR NAJEEB	CENTRAL GROUND WATER BOARD
12	T J RENUKA PRASAD	GEOLOGY, BANGALORE UNIVERSITY
87	DHARANESH	DROUGHT MONITORING CELL
13	DR CHANNABASAPPA BG	DOCTOR SANDUR
14	ANIL	ERDAS INDIA
15	DR S ADIGA	ERDAS INDIA
16	DR M JAYANANDA	GEOLOGY, BANGALORE UNIVERSITY
17	DR MALARKODI	GEOLOGY, BANGALORE UNIVERSITY
18	DR P C NAGESH	GEOLOGY, BANGALORE UNIVERSITY
19	DR U B MALLIKARJUNA	GEOLOGY, BANGALORE UNIVERSITY
20	PROF B C PRABHAKAR	GEOLOGY, BANGALORE UNIVERSITY
21	PROF B MAHABALESWAR	GEOLOGY, BANGALORE UNIVERSITY
22	PROF G SRINIVAS	GEOLOGY, BANGALORE UNIVERSITY
23	PROF H C VAJRAPPA	GEOLOGY, BANGALORE UNIVERSITY
24	PROF K R SUBRAMANYA	PROFESSOR OF MARINE GEOLOGY
25	PROF N S SWAMY	GEOLOGY, BANGALORE UNIVERSITY
26	PROF T S SURESH	GEOLOGY, BANGALORE UNIVERSITY
27	CLARABAI	GOVT SCIENCE COLLEGE
28	DWARAKANATH	GOVT SCIENCE COLLEGE
29	JEELANI	GOVT SCIENCE COLLEGE
30	KRISNAPPA	GOVT SCIENCE COLLEGE
31	SHEKAR	GOVT SCIENCE COLLEGE
32	SRIRAMAIAH	GOVT SCIENCE COLLEGE
95	BALAKRISHNA S	GEOLOGICAL SURVEY OF INDIA
33	DR HSM PRAKASH	GEOLOGICAL SURVEY OF INDIA
94	HANUMANTHA RAO	GEOLOGICAL SURVEY OF INDIA
96	JANARDHAN	GEOLOGICAL SURVEY OF INDIA
98	JAYPRAKASH	GEOLOGICAL SURVEY OF INDIA
34	M M SWAMY	GEOLOGICAL SURVEY OF INDIA
97	PANDURANGA R	GEOLOGICAL SURVEY OF INDIA

35	SRINIVASAN J	GEOLOGICAL SURVEY OF INDIA
36	V P MISHRA	GEOLOGICAL SURVEY OF INDIA
37	M S RAJU	CONSULTANT
38	RAVINDRA RAJU	GEOLOGICAL SURVEY OF INDIA
39	SURESH BABU	GEOLOGICAL SURVEY OF INDIA
40	DR RUDRAMUNIYAPPA M V	GULBARGA UNIVERSITY
41	PROF NIJAGUNAPPA	GULBARGA UNIVERSITY
86	GOPALAKRISHNA	HARISIRI
42	D J TAHALRAMANI	INDIAN BUREAU OF MINES
43	DR M I HUSSAIN	INDIAN BUREAU OF MINES
44	DR RIYAJULLA M S	INDIAN BUREAU OF MINES
45	KRISTAPPA MG	INDIAN BUREAU OF MINES
46	N P HARAN	INDIAN BUREAU OF MINES
47	PRABHU SHETTAR	INDIAN BUREAU OF MINES
48	SELVAN	INDIAN BUREAU OF MINES
49	DR YELLAPPA REDDY	ENVIRONMENTALIST
50	S C PRAKASH	ENVIRONMENTALIST
71	PROF K V RAJU	ISEC
51	DR GANESH RAJU	ISRO
52	DR J KRISHNAMURTHY	ISRO
53	Y LINGARAJU	JSYS
54	DR PUJAR	KARNATAKA SCIENCE COLLEGE
55	DR ASHOKAREDDY	KSRSAC
57	DR LAKSHMIKANTH	KSRSAC
58	DR MAHABALESHWAR	KSRSAC
56	DR V SHREEDHARA	KSRSAC
59	RANGASWAMAPPA	KSRSAC
60	RAVIKUMAR	KSRSAC
61	RAVINDRA SINGH	KSRSAC
62	VENKATESH	KSRSAC
63	DR SRINIVAS A	KARNATAKA UNIVERSITY
64	DR WAGMARE	KARNATAKA UNIVERSITY
65	DR.JAYASHEELA	KARNATAKA UNIVERSITY
66	PROF M BASAVANNA	KARNATAKA UNIVERSITY
89	ASHFAQ AHMED	KUVEMPU UNIVERSITY
67	DR CHANDRAKANTHA	KUVEMPU UNIVERSITY
68	DR CHANDRASHEKARAPPA	KUVEMPU UNIVERSITY
69	PROF K S ANANTHA MURTHY	KUVEMPU UNIVERSITY
70	DR H PARAMESHWARA	LAKE SIDE VIEW HOSPITAL
72	MEDA VENKATAIAH	MINERAL SALES PVT LTD
91	DR B SURESH	MYSORE UNIVERSITY
92	DR D NAGARAJ	MYSORE UNIVERSITY
93	DR M SHANKAR	MYSORE UNIVERSITY
90	DR MAHESH BILWA	MYSORE UNIVERSITY
73	PROF C SRIKANTAPPA	MYSORE UNIVERSITY

74	PROF H T BASAVARAJAPPA	MYSORE UNIVERSITY
75	PROF S GOVINDAIAH	MYSORE UNIVERSITY
76	DR A OBEI REDDY	NDRI
77	PROF RAMESH	NLSUI
78	PROF C NAGANNA	PROFESSOR OF GEOLOGY
79	BASAVARAJ	ROLTA
80	SHASHIBHUSHAN	ROLTA
81	DR S CHANNABASAPPA	SECRETARY
82	DR RAGHU MOHAN	SOIL SCIENTIST
83	HARINDRANATH	SOIL SCIENTIST
84	BALAKRISHNA GOWDA	UAS
85	SRINIVASA RAJU	UNNATHI