



## Environment

## Water Community



### Solution Exchange for the Water Community Consolidated Reply

#### *Query: Impact of Mining on Water Availability and Quality - Experiences*

Compiled by Pankaj Kumar S, Resource Person and Ramya Gopalan, Research Associate

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From [Pramel Gupta](#), Bhopal Rehabilitation, Bhopal  
Posted 3 July 2007

We are working on supporting local communities in assessing and overcoming health risks from water contamination arising out of mining in some parts of India. Our experiences from Tikamgarh in Madhya Pradesh, Rajasamand in Rajasthan - and based on reports from other secondary sources- show that mining activities normally cause the following adverse impacts on water availability and quality during mining and post-extraction processing:

- Drastic reduction in the water quality in the immediate neighbourhood of mines through an increase in harmful chemicals (such as heavy metals) due to mining
- Contamination of local surface and groundwater due to discharge of untreated effluents into water body bodies during treatment of mined ores
- Significant changes in local hydrology, thereby disturbing water percolation and groundwater recharge patterns, and consequently reducing local freshwater availability
- In some cases, post-mining operations may create fine dust, which pollutes surface water bodies, causing lung diseases for workers and neighbouring populations, and destroying productive capacity of adjacent agriculture lands
- Irreversible destruction of vegetation cover due to improper mining methods and lack of restoration efforts
- Contamination of drinking water sources by radioactive mining wastes

In the above context, I request members of the water community to share the following:

- Experiences of members from other parts of India, where mining activities are causing similar problems in water availability and water quality
- Initiatives taken by government, mining authorities, civil society, local residents and people's groups to overcome these problems
- Projects where suitable preventive and curative steps have ensured that negative impacts of mining and mineral treatment have been successfully controlled and overcome, causing little or no contamination of local drinking water sources

Additional suggestions on how current Laws/ Policies/ Acts can be utilized to check such water pollution; areas where these can be strengthened; and how enforcement of these can be improved are most welcome.

Your inputs will help us in designing strategies for tackling such problems in our field implementation areas, and would be most appreciated.

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### Responses were received, with thanks, from

1. [Sachin Tendulkar](#), Mineral Foundation of India, Goa
2. [Anonymous Contributor](#)
3. Kuntala Lahiri-Dutt, The Australian National University, Australia ([Response 1](#); [Response 2](#))
4. [Pranab R Choudhury](#), Freelancer, Bhubaneswar
5. [Suhas Gogate](#), ION Exchange(India) Ltd., Mumbai
6. [Pradeep Mohapatra](#), UDYAMA, Bhubaneswar
7. [Pankti Jog](#), Janpath, Ahmedabad
8. [Latha Nagesh](#), Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change (ISEC), Bangalore
9. [R. Sreedhar](#), Environics Trust, New Delhi
10. [Murali Kochukrishnan](#), AFPRO, Bhubaneswar
11. [Indira Hirway and Sujit Kumar](#), Centre for Development Alternatives and Coastal Salinity Prevention Cell (CSPC), Ahmedabad
12. [Latha Bhaskar](#), Consultant, Kerala
13. [B. Muralidharan](#), UN Resident Coordinator's Office, New Delhi
14. [Debadutta K Panda](#), MP Associates, Bhubaneswar
15. [Pran Ranjan](#), Society for Promotion of Wastelands Development (SPWD), Ranchi
16. [B.S. Choudri](#), The Energy and Resources Institute (TERI), Goa

*Further contributions are welcome!*

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### Summary of Responses

In response to the query seeking reactions on adverse effects of mining on water availability and quality, members shared insights from across States and explained the contextual complexities as well as the measures that could be adopted to address the issue.

Presenting experiences from various parts of India, respondents agreed that mining caused a number of **negative impacts** on the environment and the people living near mined areas, in spite of increasing labour availability for local populations and supporting industrial development. Among the **direct impacts**, members listed degradation of land, vegetation cover (e.g. forests) and floral and faunal biodiversity; air and noise pollution; reduction of quality and quantity of surface and ground water; multiple displacement of local populations due to mining and compensatory afforestation; and health impact on local populations due to ingestion of dust and contaminated water such as stomach diseases, skin diseases, fluorosis, kidney disorders, etc.

Respondents further enumerated the **indirect impacts** of mining such as an increase in sex-work and consequently HIV-AIDS near mines; mineral transport causing traffic congestion, road damage, dust deposits on agriculture lands; apathy of local people towards farming and increased crime rates near mined areas. Participants cited cases from [Bellary](#) in **Karnataka** and [Bhaitarani Basin](#) in **Orissa** to support these assertions.

Participants also mentioned that in most parts of [Orissa](#), mining led to severe contamination of drinking and irrigation water, heavy sedimentation of agricultural lands, pollution of waterways due to dumping of redmud, acid drainage and emission of fluorides. Additionally, in [Gujarat](#), participants reported that mining in coastal areas has increased salinity of groundwater and reduced recharging capacity, thereby seriously affecting livelihoods in agriculture, animal husbandry, handloom and leather processing. Members' experiences from [Jharkhand](#) showed that problems of mining induced displacement, drastic loss of biodiversity, untreated open-cast mines and mine-fires had not been addressed satisfactorily. In other locations, water use for post-mining processing reduces its availability for alternative uses, leading to conflicts between multiple stakeholders. Other negative impacts members listed included increased soil infertility, as in Hampi District, and severe degradation of human health, as seen by contamination of the Tunga Bhadra river. Mining also destroyed aquatic ecosystems and dried up perennial rivers. In Bhadra valley near [Kudremukh Region](#), **Karnataka**, the above negative impacts forced some NGOs to appeal for Supreme Court's intervention, which ordered stopping of mining in sensitive areas, related members.

Discussing the **causal factors** behind the above situation, members admitted that damage to water availability and quality cannot be attributed to mining alone, and noted the interplay of factors like water quality and water quantity, water access and rights, gendered access, and compensation for loss of common property resources in mined areas. However, not much work had been done on such issues. The group felt that the multifarious impacts of mining were exacerbated by the inability of the legal superstructure to address social and technical issues. As a result, existing guidelines (such as those by [International Journal of Mine Water](#)) were often violated, even though companies are publicly liable for ensuring water quality of the tailings. Participants listed corruption, inadequate staff with regulating agencies, a low priority given to conserving biodiversity over industrial development, strong vested interests and a lack of public action against destructive activities as other main causal factors.

Respondents mentioned various **mitigating technologies** such as settling ponds and conventional flocculation methods to address high water turbidity in active mining pits, as used in [Goa](#), and added that multigrade filters with iron removal filters could further resolve turbidity. Additionally, members referred to recharging traditional water sources with rainwater as a [technology](#) employed by some coastal Panchayats in **Kerala**, reported to induce a backwashing effect, thus preventing saline intrusion and improving water quality. Extensive use of Geographical Information Systems and remote sensing, as in Kudremukh, could be used for better mitigation, felt members.

The group gave following **broad suggestions** to address negative impacts of mining:

1. Map and earmark ecologically sensitive areas as priority areas, ensuring that these are not put under mining.
2. Phasing out ecologically sensitive areas from mining and treating mined areas through appropriate measures like watershed development, natural regeneration, etc.
3. Comprehensive review of ecological and social impacts of mining; introduce mining sector reforms; evolve a clear framework for restoring ecologically sensitive mined areas.
4. Adopt mandatory, stringent, participatory, transparent Environment Impact Assessment Procedures for all mining establishments and strictly enforce environmental standards.

5. Respect tribal land rights, as per Supreme Court's "Samatha Judgement" and raise awareness of tribals towards their rights under the Scheduled Areas notifications.
6. Uniting communities, people's groups and children to resist mining of sensitive areas.
7. Corporate-Government-CBO-Community efforts to regenerate, plan and negotiate mine reclamation without affecting local livelihoods.

Concluding that the negative impacts of mining could not be disputed, members asserted that balanced development without seriously affecting environment and community livelihoods could only be ensured through designing and enforcing various mitigation measures under an appropriate framework from mining. The dominant question that needs to be addressed by various stakeholders, felt members, is development of what, for whom and in what way?

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## Comparative Experiences

### Goa

#### **Neutralising High Turbidity Levels in Water Quality** (from [Sachin Tendulkar](#), *Mineral Foundation of India, Goa*)

Open Cast Iron Ore Mines are operated and high levels of turbidity exists in water quality from active mining pits, especially during rains. Turbidity level is neutralised through necessary precautions such as settling ponds or conventional flocculation. Water in non-working mining pits is of potable quality. Other problems include development costs which is being mitigated by promoting watershed development, social development and natural resource regeneration.

### Karnataka

#### **Movement by NGOs to Prevent Mining Activities, Kudremukh** (from [Anonymous Contributor](#))

Some NGOs moved the Supreme Court (SC) against mining activities and consequently, Kudremukh mining activity and encroachments into forest lands in Western Ghats stopped in response to SC order. Further, the State Government initiated detailed survey of illegal mining and quarrying with a team headed by an honest forest officer, using remote sensing and GIS technologies. The government thus profited by Rs.300 crores in tax

From [Latha Nagesh](#), *Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change (ISEC), Bangalore*

#### **Conversion of Productive Land into Unproductive Land, Bellary**

In this District, conversion of the entire area into mine waste severely affected agricultural cultivation over a period with drastic changes in the productivity of land. The cropping pattern changed from banana, betel nut and paddy to jowar, millets and cotton. The yield has continued to decrease inspite of increased use of fertilizers after 1990's.

#### **Water Contamination, Kudremukh**

In region where Kudremukh Iron Ore Company Limited (KIOCL) was operating, mining resulted in water contamination of Bhadra River and affected agricultural land downstream. Millions of farmers dependent on the river were in peril due to the impact of sediment from the mines brought down through the river. The Comptroller and Auditor General estimated environmental damage from this to be Rs 19.33 crores.

#### **Degrading Human Health, Bellary and Hampi**

Red Alert, a documentary by an NGO Saki, records the health problems of mineworkers. According to a mineworker, they suffer from stomach pain, because with every gulp of tea they take in dust. At Hirehalli of Bellary district, villagers using the contaminated Tunga Bhadra water complained of stomach ailments and at Kamakapura, Hampi, soil infertility were observed.

### **Loss of Biodiversity, Kudremukh and Bellary**

A study on amphibian assemblages in undisturbed and disturbed areas of Kudremukh National Park, Central Western Ghats shows how mining activities fragmented amphibian habitats and affected amphibian diversity and distribution in Kudremukh area. Since 2002, Bellary district 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.

## **Jharkhand**

### **Problems of Private Leasing of Lands for Mining** (from [Pran Ranjan](#), *Society for Promotion of Wastelands Development (SPWD), Ranchi*)

Large forest lands are being destroyed by mining in the Saranda Forests of South Jharkhand. The biodiversity rich area is being leased to private companies without any proper EIAs. In Ramgarh block of Hazaribag district, people displaced from coal mining are engaging themselves in illegal mining, extracting coal from abandoned and active open mines, selling it to local coal mafias and nearby towns. However signing of MoUs and issuance of coals blocks continues to take place.

## **Orissa**

### **Few Benefits and Large Costs Related to Mining Activities** (from [Murali Kochukrishnan](#), *AFPRO, Bhubaneswar*)

Large-scale mining created few jobs and some export earnings, but at huge costs for locals and their environment. Also, last five decades, saw the displacement of 2 million people. Other issues include contamination of water sources, health problems, sedimentation of agricultural lands, damage to aquatic systems, etc. To address this, FCFC network initiated a study on negative impacts of mining on agriculture/water in one district, results of which will soon be published.

### **Corporate-Government-CBO-Community (CGCC) Initiative, Bhaitarani River Basin** (from [Pranab R Choudhury](#), *Freelancer, Bhubaneswar*)

In areas adjoining mining areas, surface water quality in the river/streams/nullahs underwent drastic changes, posing problems to local inhabitants. Water for mining/ancillary activities reduces water availability for other uses. Field investigations captured other impacts on vegetation, health, roads. Thus, to meet these challenges, the potential of CGCC Interface is being explored as a pilot with all stakeholders including local communities and school children

## **Gujarat**

### **Impacts of Mining in Coastal Villages** (from [Pankti Jog](#), *Janpath, Ahmedabad*)

A study of 450 coastal villages shows that mining destroys aquifers, reducing recharging scope and capacity, allowing saline water intrusion. This affects livelihood resources like agriculture, animal husbandry, handloom and leather processing. In the last 20 years, in areas of increased mining caused 60% increase in migration, 70% decrease in animal husbandry, ill health effects on more than 40% of women and children and major impact on agro-diversity.

## **International**

**Impacts of Transnational Mining Companies, Africa** (from [Ramya Gopalan](#), Research Associate)

Mineral resource expropriation still denies the economy and people equal benefits and a clean, diversified environment. Governments continue to revise laws for MNCs to undertake mining activities, thus polluting fresh water bodies and increasing spread of water-borne diseases. Significant change enabling translation of wealth into developing productive capacities of local communities is yet to take place despite huge foreign direct investment in the sector. Read [more](#)

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## Related Resources

### Recommended Documentation

**Stone Quarry Workers Win the Battle for Right to Drinking Water** (from [B. Muralidharan](#), UN Resident Coordinator's Office, New Delhi)

Paper; by Madhura Kulkarni; Oxfam Australia

Available at <http://www.solutionexchange-un.net.in/environment/cr/res03070701.pdf> (PDF Size: 3 MB)

*Accounts the attempts of Santulan, an agency working on helping stone quarry workers in Western Maharashtra to get access to drinking water*

From [Latha Nagesh](#), Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change (ISEC), Bangalore

### Battle for Kudremukh

Article; by Praveen Bhargav and Niren Jain; Eco Watch, The Hindu; Sunday, 4 January 2004

Available at <http://www.hindu.com/mag/2004/01/04/stories/2004010400240400.htm>

*Comments on one of the biggest wildlife conservation victories with the Supreme Court's Order to KIOCL to wind up its destructive open cast mining operations by 2005*

### Amphibian Assemblages in Undisturbed and Disturbed Areas of Kudremukh National Park, Central Western Ghats, India

Paper; by Dr. S.V. Krishnamurthy; Foundation for Environmental Conservation; Cambridge University Press; 2003; Paid Subscription, Abstract available at <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=176875>

*A four-year study which assessed the fragmented distribution of amphibians in the Kudremukh National Park (KNP) caused by iron-ore mining and associated activities*

### India Case Study - The Case of East Parej Coal Mines Open Cast Project in Jharkland, India

 (from [Kuntala Lahiri-Dutt](#), The Australian National University, Australia; [response 1](#))

Paper Presentation; by Bineet Mundu; Presented at the workshop on "Indigenous Peoples, the Extractive Industries and the World Bank"; In Exeter College in the University of Oxford; UK; 14 - 15 April 2003; Available at

[http://www.forestpeoples.org/documents/prv\\_sector/eir/eir\\_internat\\_wshop\\_india\\_case\\_eng\\_apr\\_03.pdf](http://www.forestpeoples.org/documents/prv_sector/eir/eir_internat_wshop_india_case_eng_apr_03.pdf) (PDF Size: 605 KB)

*Presents an overview of the extractive industries and its implication on indigenous people and natural resources drawing from the case study of Agaria Tola, a natural spring*

### Industrialization & Environmental Pollution in Talcher Belt of Orissa

 (from [Debadutta K Panda](#), MP Associates, Bhubaneswar)

Paper; by Debadutta Kumar Panda

Available at <http://www.solutionexchange-un.net.in/environment/cr/res03070702.doc> (Doc Size: 113 KB)

*Studies the impact of coal mining on environment, especially on water and air*

**“Backwashing” -Injection of Harvested Rainwater into Open Wells for Enabling Water Quality Improvement** (from [Latha Bhaskar](#), Consultant, Kerala)

Paper; by Planet Kerala

Available at [http://www.planetkerala.org/downloads/Backwashing\\_English.pdf](http://www.planetkerala.org/downloads/Backwashing_English.pdf) (PDF Size: 450 KB)

*Details this experimentation wherein a technology results in backwashing effect, which prevents saline water intrusion and recharges wells, thus improving the water quality*

From [Ramya Gopalan](#), Research Associate

**Comments on Environmental Impact Assessment on Proposed Uranium Mining Project at Mohuldih**

Paper; by M. V. Ramana; Centre for Interdisciplinary Studies in Environment and Development, ISEC Campus; Nagarabhavi, Bangalore; 4 August 2005

Available at <http://www.cised.org/Mohuldih-EIA-Comments.pdf> (PDF Size: 29 KB)

*Argues the EIA prepared for the project explaining also the significance of an EIA in accurately estimating environmental and social impacts of mining activities*

**Rapid Environmental Impact Assessment for Mining Operations in Bellary; Hospet Region Karnataka**

Report; by Department of Mines and Geology; Bangalore; NEERI; 2002; Available on request

*Reports how mining activities affect surface water quality in intensive mining areas of Bellary district water which contains neutral pH, high turbidity and suspended solids*

**Kashipur’s 13-Year Anti-Mining Struggle Vindicated**

Article; by Nilanjana Biswas; InfoChange News & Features; November 2006

Available at <http://www.infochangeindia.org/features394.jsp>

*Accounts the entire judicial process and the struggle in Kashipur by local adivasis and dalits against a consortium of multinational aluminium mining companies*

**NGO’s Approach and Views Towards Opening of a New Mine**

Technical Paper; by Mahesh Pandya; 25 April 2004

Available at <http://paryavaranmitra.org.in/misc/MINING%20PAPER%20.doc> (Doc Size: 43 KB)

*Details the impact of mining activities in Gujarat, specific experiences of newly proposed sites and possible recommendations to address their negative impact on the environment*

**Goa’s Farmers Say Unchecked Mining Contaminates Water, Reduces Yields**

Article; Sourced from [www.newindpress.com](http://www.newindpress.com); 2 August 2003; Available at

<http://www.infochangeindia.org/archives1.jsp?secno=10&monthname=September&year=2003&detail=T>

*Records claims of farmers and small plantation owners in Goa that mining activities in the region have polluted local water resources, thereby reducing agricultural yields*

**Mathematical Modelling of Groundwater in Mining Area**

Meeting Report; Current Science, Vol. 88, No. 11; 10 June 2005

Available at <http://www.ias.ac.in/currensci/jun102005/1722.pdf> (PDF Size: 25 KB)

*Reports on mathematical modeling of groundwater in mining area, for the benefit of earth scientists dealing with groundwater for civil and mining engineering projects.*

**Impacts of Activities of Canadian Mining Companies in Africa**

Paper; by Abdulai Darimani; Third World Network - Africa Secretariat; 31 October 2005

Available at [http://www.miningwatch.ca/updir/Africa\\_case\\_study.pdf](http://www.miningwatch.ca/updir/Africa_case_study.pdf) (PDF Size: 182 KB)

*Discusses impacts of activities of Canadian mining companies on the environment, local communities, human rights, and the national economy in Africa with reference to Ghana*

### **Mining Related Sediment Impacts: Causes, Significance and Solutions**

Paper; by John Hull and Joanna Moreno; AquaBlok Ltd. and Adventus Americas Inc.; CLRA/ACRSD Publication; Canada; July 2006

Available at <http://www.adventusgroup.com/pdfs/AquaBlok-Mining-Article.pdf> (PDF Size: 2 MB)

*Details the sources of contamination of natural resources from mining particularly acute pollution of surface water and identifies possible solutions to improve the quality*

## **Recommended Organizations and Programmes**

### **Regeneration of Mining Areas Using Tri-Sector Partnerships, TERI, Goa (from [B.S. Choudri](#), The Energy and Resources Institute (TERI), Goa)**

The Energy and Resources Institute (TERI), Western Regional Centre, F - 9, La Marvel Colony, Dona Paula - 403 004, Goa; [teriwrp@sancharnet.in](mailto:teriwrp@sancharnet.in); <http://www.teriin.org/teri-wr/partnerships/index.htm>

*Seeks to regenerate selected areas in the mining region through the involvement and/or support of the government, Mineral Consortiums, local villagers, panchayats and NGOs*

### **Mineral Foundation of Goa, Goa (from [Sachin Tendulkar](#))**

P.B.113, Vaglo Building, Panaji - 403001, Goa

*Goa's mining consortium comprising 13 leading mining companies, support this NGO to ensure that genuine concerns of communities in the mining belt are addressed*

### **Baitarani River Basin Project, Orissa (from [Pranab R Choudhury](#), Freelancer, Bhubaneswar)**

N3/312, IRC Village, Bhubaneswar, Orissa; Tel: +91 674 6450323; [baitarani@gmail.com](mailto:baitarani@gmail.com); <http://www.baitarani.org/>

*A civil society initiative to proactively explore options for futuristic resources management in the basin, connecting stakeholders to address negative impacts of mining in the basin*

From [Latha Nagesh](#), Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change (ISEC), Bangalore

### **Kudremukh Iron Ore Company Limited (KIOCL), Bangalore**

II Block, Koramangala, Bangalore - 560034; Tel: +91 80 25531461-70; Fax: +91 80 25532153  
[kiocclcom@vsnl.com](mailto:kiocclcom@vsnl.com); <http://kudremukhore.co.in/>

*A Government of India Enterprise located in the Western Ghats of Karnataka, which was ordered by the Supreme Court to cease its mining operations in the Kudremukh region*

### **Institute for Social and Economic Change (ISEC), Bangalore**

Nagarabhavi, Bangalore - 560072; <http://www.isec.ac.in/>; Contact Dr. N Jayaram; Director; Tel: + 91 80 23217010; [nj@isec.ac.in](mailto:nj@isec.ac.in)

*Undertaken work on environmental issues of mining activities primarily based on literacy review concentrating on the State's 568 major mines and 5,650 quarries*

### **Ion Exchange (India) Ltd, Mumbai (from [Suhas Gogate](#))**

Tiecicon House, Dr. E. Moses Road, Mahalaxmi, Mumbai - 400 011; Tel: +91 22 3989 0909; Fax: +91 22 2493 8737; [hocro@ionexchange.co.in](mailto:hocro@ionexchange.co.in); <http://www.ionindia.com/>

*Manufactures multigrade filters followed by state of art Iron removal units to remove the turbidity and iron in water from mining activities to improve water quality*

**mines minerals and PEOPLE (mm&P), Andhra Pradesh** (from [R. Sreedhar](#), Environics Trust, New Delhi)

SAMATA, Plot No. 169, Ravi Colony, Tirumalagiri, Secunderabad - 500015, Andhra Pradesh  
<http://www.mmpindia.org/>

*A growing alliance of individuals, institutions and communities concerned and affected by mining aimed at combating the destructive nature of mining, mainly on water resources*

From [Ramya Gopalan](#), Research Associate

**Singareni Collieries Company Limited (SCCL), Andhra Pradesh**

Singareni Bhavan, Red Hills, PB. No. 18, Khiratabad PO, Hyderabad - 500004; Tel: +91 40 23397775/23311898; Fax: +91 40 23307653; <http://scclmines.com/environment.ASP>; Contact S.Narsing Rao; C & MD; Tel: +91 40 23393746; [cmd@scclmines.com](mailto:cmd@scclmines.com)

*Generates environmental base line data for proposed mining projects, undertaking post project environmental monitoring for all MOEF cleared projects/old mines/allied units*

**SRK Consulting Limited, UK**

Churchill House, Churchill Way, Cardiff CF10 2HH; Tel: +44 29 2034 8150; Fax: +44 29 2034 8199; <http://www.srk.co.uk/pages.asp?pagename=impacts>

*Has 25 years experience in mine water management and environmental impact assessment addressing issues of adverse impacts on ground and surface water resources*

### **Recommended Portals and Information Bases**

**Journal of International Mine Water Association (formerly "International Journal of Mine Water")**, Germany (from [Kuntala Lahiri-Dutt](#), The Australian National University, Australia; [response 1](#))

<http://www.imwa.info/journal/index.htm>

*Deals with the quality aspects of water impacted by mining and related activities*

**Mines and Communities (MAC), England** (from [R. Sreedhar](#), Environics Trust, New Delhi)

<http://www.minesandcommunities.org/>; Tel: +44 20 7700 6189; [info@minesandcommunities.org](mailto:info@minesandcommunities.org)

*A global alliance providing information (organizations, issues, laws, etc) across countries concerned about the impacts of mineral extraction and processing*

**Mining Impact Coalition of Wisconsin Inc., USA** (from [Ramya Gopalan](#), Research Associate)

<http://www.miningimpacts.net/home.html>

*Global coalition to educate people, conduct research and communicate about various impacts of unsafe mining and sustainable use of the world's mineral resources*

### **Recommended Upcoming Events**

**1st International Conference Managing the Social and Environmental Consequences of Coal Mining in India, New Delhi, 19 – 21 November 2007** (from [Kuntala Lahiri-Dutt](#), The Australian National University, Australia; [response 2](#))

Jointly Organized by The Indian School of Mines University in association with University of New South Wales and The Australian National University. Information available at [http://www.mines.unsw.edu.au/Conference/New\\_Delhi\\_Coal\\_Mining\\_Conference\\_2007\\_earlyflyer.pdf](http://www.mines.unsw.edu.au/Conference/New_Delhi_Coal_Mining_Conference_2007_earlyflyer.pdf) (PDF Size: 76 KB)

*Specifically aims at investigating whether the Indian coal mining industry is in a position to maintain its 'social license to operate' in its future operations*

**National Seminar on Crisis in Drinking Water in Coastal States in India, 9 - 10 August 2007** (from [Indira Hirway and Sujit Kumar](#), Centre for Development Alternatives and Coastal Salinity Prevention Cell (CSPC), Ahmedabad)

Jointly Organized by Centre for Development Alternatives and Coastal Salinity Prevention Cell (CSPC), Ahmedabad; Contact Indira Hirway; [indira.hirway@cfda.ac.in](mailto:indira.hirway@cfda.ac.in)

*Aims at studying status and impacts on health of non potable water, finding technology alternatives to improve water quality, analysing causal factors e.g. mining activities*

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## Responses in Full

**[Sachin Tendulkar](#), Mineral Foundation of India, Goa**

You have raised a question, which is close to our heart in the state of Goa. I represent Mineral Foundation of Goa, a non profit organization supported by the mining consortium in Goa. About 13 leading mining companies of Goa have come together to promote this organization and to ensure that the genuine concerns of communities in the mining belt are addressed.

In Goa, we have Open cast Iron ore mines. As regards water quality we do have high level of turbidity in the water pulled from active mining pits, but necessary precautions are taken to neutralise the turbidity level either through a settling pond or through conventional flocculation method. We have non-working mining pits where the water available is of potable quality. Except for a high level of turbidity in rainy season we do not notice any kind of pollution.

There are a few problems arising out of mining – such as its cost on development - and we have been trying our best to mitigate the problems by promoting watershed development, social development and natural resource regeneration. The drastic reduction in water quantity cannot be attributed to mining alone, but there are other relevant factors like increased water demand for irrigation, domestic use and concurrent reduction in recharge areas due to developmental activities.

At Mineral Foundation of Goa we have been trying to promote sustainable practices and would invite members to share the best practices, which we could adopt in Goa.

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### **[Anonymous Contributor](#)**

The key environmental problems and impacts of mining/quarrying are:

- Land degradation
- Degradation of forest and loss of biodiversity
- Air and noise pollution
- Surface water pollution
- Ground water pollution
- Environmental degradation due to abandoned and closed mines

In addition to the above, indirect impacts are also noticed in increase in prostitution, spread of AIDS in Bellary, due to increased mining activities. There was also damage to roads, deposition of dust on villages, disinterest in farming, and an increase in crime.

These things happen mainly because of corruption, inadequate staff with regulating authority, low priority of government to conserve nature, low concern of public, fear with public to complain against environmental problems, activities being carried out by influential people.

In Karnataka, Some NGOs moved the Supreme Court against mining activities. Consequently, Kudremukh mining activity in Western Ghats was stopped in response to Supreme Court's order.

Further, the Government of Karnataka also initiated detailed survey of illegal mining and quarrying with a team headed by an honest forest officer. Remote sensing and GIS technologies were also used extensively. Now the government is profited by about Rs.300 crores through tax. Encroachments into forest lands have also stopped. In a recent raid on illegal mining areas, officers were also attacked (which is also one of the negative impacts of mining- an increase in crime).

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**Kuntala Lahiri-Dutt, The Australian National University, Australia** *(response 1)*

Unfortunately, there are not many previous works on mining & water. There are a few sets of interrelated issues involved in mining-related impacts on water: water quality, availability, access/rights, water rights (which are often tied to land in mining areas), gendered access, and above all, compensation for common property resources.

The international journal of mine water quality deals with the quality aspects; frankly speaking scientific experts have flogged it to death. This is especially so because mining companies are (as it should be in India too) publicly liable for water pollution through dumping of tailings. The social issues described above are more subtle and complicated by the fact that our legal frameworks do not often address or resolve them. Sometimes laws simply do not exist with which to address these questions. There unfortunately is not enough work, based on rigorous & foolproof methodology, on the social issues surrounding mining & water.

There is one case study of Agaria Tola, a natural spring in Parej East open cut coal project in Jharkhand (Tony Herbert, Bina Stanis & Kuntala Lahiri-Dutt). I can share the article with members, if interested.

I would like to know more about your work - is it on coal mining or small mines? If I knew, I could indicate you to a possible direction. If you are working on coal mining, it will be great if you participate in a forthcoming conference on 'Social and Environmental consequences of Coal Mining in India' to be held in IIC, New Delhi, November 19-21. As usual, the social side of impacts are poorly represented in this conference.

PS: You may write directly to me in my ANU email address: [kuntala.lahiri-dutt@anu.edu.au](mailto:kuntala.lahiri-dutt@anu.edu.au)

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**Pranab R Choudhury, Freelancer, Bhubaneswar**

We are promoting a civil society initiative towards Integrated River Basin Management in the Baitarani River in Orissa ([www.baitarani.org](http://www.baitarani.org)). It works towards enabling informed choices and enhancing multi-stakeholder voices towards socially and environmentally responsible basin management for resilient basin ecosystem health and sustainable basin livelihood.

Baitarani is the third biggest river in Orissa and its basin is spread over thirteen thousand sq km

inhabiting 3.83 million people in 8 districts. The upper catchment of this basin is home to the major Iron, Chromite and Manganese mineral reserves of Orissa, and also to a rich tribal population including two primitive tribal groups. There are about 200 mines in this basin and the Keonjhar district, which contributes to about half of the basin area, has got 76 mines. Some of our preliminary investigations through analysis of secondary data (Pollution Control Board, literature review) and exploratory field visits to some of the mining areas have revealed similar findings as brought out by you.

The surface water quality in the river, streams and nullahs in areas adjoining the mining areas has undergone drastic changes, causing hardships to local inhabitants. Water use for mining and ancillary industrial activities is also reducing the quantity of water available for alternative uses. We have also observed negative changes in the quantity and quality of ground water, with many tube wells going dry and many other yielding poor quality water.

Different types of negative impacts on local vegetation, crops and human health due the mining activities, have also been captured during field investigations. This, apart from the problems of double displacement due to mining and compensatory afforestation (for mining) is also adding to tribal woes.

The existence of sponge iron units in areas adjoining mining sites is also multiplying the problems of dust pollution. Ongoing massive transportation of ores to Paradeep Port by trucks is making life tough for local population with road damages, traffic congestions, dust pollution etc.

As mining activities are going to intensify, we expect such problems to multiply. In our strive towards integrated river basin management, we also face the challenge to accommodate the conflicting and competing interest of multi-stakeholders inhabiting the basin or depending upon basin resources. To meet the challenge of pollution abatement in mining areas in the basin, we are planning to explore the potential of Corporate-Government-CBO-Community (CGCC) Interface as a pilot initiative in a few basin locations. Such CGCC interfaces will work towards creation of local institutions acceptable to all these stakeholders with an objective of reducing pollution, negotiating water sharing and working towards livelihood promotion in adjoining villages in Corporate Social Responsibility (CSR) mode with a broad objective of promotion of social and environmental responsibility in managing basin resources.

Local communities including school children will be empowered through participatory monitoring of pollution and environmental impacts of mining with representatives of mining company along with Govt and CBO, and will work towards their mitigation.

We are also looking for experiences and suggestions to refine and transform these ideas to actions.

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**[Suhas Gogate](#), ION Exchange(India) Ltd., Mumbai**

Dear Sachin Tendulkar,

Ion Exchange (India) Ltd. is a pioneer in the field of water treatment for more than four decades. We are active in almost all parts of the world pertaining to water treatment industry. In India, we have done many installations for fluoride removal, arsenic removal and iron removal units attached to hand pumps as well as power pumps. We had taken help of NGOs to operate and maintain the plants and increase awareness in consumers.

With reference to your specific query, recently Mr. Nitin Umbralkar, from my organization met you in Goa. He briefed me about the problems you are facing with the water quality such as turbidity and iron. I have given Mr. Umbralkar a simple proposal for tackling this problem, viz. Multigrade filters followed by state of art Iron removal unit manufactured by Ion Exchange. We can send you the detailed proposal soon, for further discussions on the same.

I will be pleased to know your ideas, suggestions in this subject.

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**[Pradeep Mohapatra](#), UDYAMA, Bhubaneswar**

The World Water Week, Aug – 12 – 18, in Stockholm will touch upon some of the issues you have raised. For details, please see the links below.

<http://www.worldwaterweek.org/> for a large number of seminars and events and the full programme looking at pro-poor perspectives

[http://www.worldwaterweek.org/Sanitation\\_Hygiene.asp](http://www.worldwaterweek.org/Sanitation_Hygiene.asp) for a number of key sanitation and hygiene-related events

This is for your information. Best

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**[Pankti Jog](#), Janpath, Ahmedabad**

In Gujarat, we have the following types of mining:

1. Milliolite Limestone
2. Shell Limestone
3. Lignite
4. Bauxite

Majority of mining is done along the coast in Gujarat, where the quality and availability of water is severely hampered.

In places where milliolite limestone and shell limestone is being mined, it is clearly seen that the local water resources have turned saline. In a study conducted along 450 villages of the coast, it is clearly seen that mining destroys the aquifers, there by reducing recharging scope and capacity and allowing saline water to intrude in.

As local water resources turn saline, this affects livelihood resources like agriculture, animal husbandry, handloom and leather processing.

In Gujarat, in last 15-20 years, in areas where mining has grown many fold, migration has increased by 60% and animal husbandry has gone down by 70%. The agro-diversity is most affected. Out of 37 different crops grown in villages of the Gujarat coast, 80% of had to be dropped in favour of cotton due to saline water. More than 45% of women and children are suffering from stomach diseases, kidney disorders, skin diseases.

Though one of the major arguments in favour of mining is that the pits are used for water recharging, when done on large scale it is actually disturbing the recharging permanently.

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**Latha Nagesh, Centre for Ecological Economics and Natural Resources, Institute for Social and Economic Change (ISEC), Bangalore**

I work for Institute for Social and Economic Change (ISEC), Bangalore. We worked on environmental issues of mining in Karnataka, which is primarily based on literature review. Karnataka is one of the mineral rich states and it ranks fifth among other states with more than 40,000 sq km of green stones belts containing vast mineral deposits of gold, silver, platinum, copper, diamond, iron, manganese, chromite, lime stone, dolomite etc. The state has 568 major mines with an area of 21,247 sq.km and 5,650 quarries in 4,526 sq.km area. Bellary and Chikamangalore districts ranks first in iron ore mines.

During literature review, we came across several negative impacts that have been caused by the mining activity on the environment. They are,

1. Conversion of productive land into unproductive land - In Bellary, the agricultural cultivation has been affected over a period of time as the entire area has been converted into 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.
2. Water contamination - In the Kudremukh region, where KIOCL was operating, the mining had resulted in water contamination of Bhadra River and affected agricultural land downstream. Millions of farmers dependent on the river were in peril due to the impact of sediment from the mines brought down through the river. The Comptroller and Auditor General estimated environmental damage from this to be Rs 19.33 crores.
3. Degrading human health - Degradation of Human health is another major issue to be looked into. Red Alert, a documentary by an NGO Saki, records the health problems of mineworkers. According to a mineworker, they suffer from stomach pain, because with every gulp of tea as they take in dust. At Hirehalli of Bellary district, villagers using the contaminated Tunga Bhadra water complained of stomach ailments and at Kamakapura, Hampi, soil infertility were observed.
4. 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. 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.

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**Kuntala Lahiri-Dutt, The Australian National University, Australia (response 2)**

Members may be interested in attending the 1st International Conference on managing the social and environmental consequences of Coal Mining in India. Please see the Flyer at the link below for details:

[http://www.mines.unsw.edu.au/Conference/New\\_Delhi\\_Coal\\_Mining\\_Conference\\_2007\\_earlyflyer.pdf](http://www.mines.unsw.edu.au/Conference/New_Delhi_Coal_Mining_Conference_2007_earlyflyer.pdf) (Size: 76 KB)

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**R. Sreedhar, Environics Trust, New Delhi**

Mining and its impact on water resources is a legion and we as mines minerals and PEOPLE (<http://www.mmpindia.org/>) face numerous situations where mining has severely impacted the water scenario. Indeed, no mining could be done without impact on land and water resources. Please have a look at this site and our global alliance site <http://www.minesandcommunities.org/> for impacts of mining.

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**Murali Kochukrishnan, AFPRO, Bhubaneswar**

The so-called Development initiatives in the form of large scale industrialization and mining without considering the depth of the ecological, social and economic impacts on the local and indigenous communities have become a major concern. This exploitation is only possible at the cost of other much more precious resources like water, land, forests and soil. This has become a major issue in Orissa. Large scale mining has created a few jobs and some export earnings, but quite often it is at a huge cost for the locals and their environment. The question, raised for the umpteenth time, is development of what and for whom? Can we not have a balanced development without seriously affecting the ecology, local socio economics and livelihoods adversely? Also, mining has not only affected the fragile eco-sysyem of Orissa but also has had the following impacts:

- Mining in Orissa has created "an estimated 50,000 environmental refugees," according to news reports.
- In the last five decades in Orissa alone more than 2 million people were displaced.
- New projects are expected to evict another 100,000 people.
- Serious health related problems like asthma, T.B, fluorosis, etc. has become more prevalent in the mines and adjoining areas in Orissa.
- Contamination of drinking water and irrigation water sources at the vicinity of mines and its allied industry is a drastic thing happening even with the minimum scale of opencast or underground mining.
- Several perennial sources of rivers seem to drying up due to sedimentation loads from the mined areas.
- Pollution of waterways due to dumping of red mud over-burden from alumina mines into the rivers has raised the pH to 13, making it totally alkaline in the stream course in the vicinity of the various plants annexed to mines.
- Heavy sedimentation of agricultural lands due to flow of dust and subsequent loss in crop production.
- Regular discharge of effluents into the river causes damages to the entire aquatic system.
- The emission of fluorides presents a particularly alarming problem in region where a large number of indigenous people have already been affected by fluorosis (a debilitating dystrophy of the bones caused due to fluoride deposits).
- The deforestation caused by the mines and smelter has aggravated into many fold ill effects because of the hilly nature of terrain in Orissa, resulting in more frequent flash floods, landslides, and nutrient/sedimentation enrichment of water bodies. Simultaneously, forest loss also means the loss of habitat for the region's wildlife too which is a matter of prime concern.
- Acid drainage is one of the most serious environmental impacts associated with bauxite mining, iron ore, pyrite mineral etc. Acid drainage impacts aquatic life, when acidic waters are discharged into nearby streams and surface waters, the entire ground water

regime is polluted and the water in the immediate vicinity and also effected based on the dynamics of the ground water flow and topography of the area.

- The heat wave in Orissa that has claimed many lives draws attention to the alarming change in the State's climate, which experts attribute to reckless industrialization and unchecked deforestation leading to such disastrous consequences.

### **What can be done?**

- To urgently take stock of the ecologically sensitive areas in the Orissa state impacted by existing mining activities or likely to be impacted by future mining activities.
- Giving due respect the Supreme Court orders on "Samatha judgment" which clearly states that any state government cannot lease the land to non-tribal as it contravenes to the 5th schedule of the constitution amendment.
- Ecologically sensitive areas and biodiversity areas, especially water Catchments, should be earmarked as a priority area for safeguarding through appropriate land/water use planning and clear, long-term designation of areas where no mining should be permitted by the Government at any cost. This includes phasing out of existing mining in ecologically sensitive/fragile areas.
- More stringent, participatory, and transparent Environmental Impact Assessment procedures should be made a mandatory application to all sizes and categories of mining under the environmental laws.
- Identification and prioritization of mine-affected areas in ecologically sensitive areas for ecological restoration and evolving a clear framework for the purpose through community involvement.
- A comprehensive review of ecological and social impacts of economic and mining sector reforms, including the impacts on biodiversity, on water resources, on local residents or nomadic communities traditionally using the areas affected by mining, and so on need to be thoroughly studied and put up with the government.
- The rights of tribal and other communities, and the content and spirit of Constitutional provisions in place in specially notified tribal areas such as scheduled areas should be made available to the respect communities to curtail exploitation and fight for their rights.
- Comprehensive action plans to be framed for transition to safe and sustainable livelihoods for labor impacted by stoppage of mining activities in ecologically sensitive areas. Sudden bans without provisions for alternative livelihoods for labor involved in ongoing legal mining in ecologically sensitive areas will also posse a big issue to be tackled diligently.
- Communities, people's groups, and NGOs may unite and network more strongly, to resist the increasing take-over of sensitive areas for mining by the rich to get richer and forcing the poor to become the poorest and pathetic.

*As part of FCFC network, we have initiated a study on the negative impacts of industrialization and mining on agriculture and water in one of the most polluted districts in the state of Orissa. The outcome of the results will be made known to the members once the study is completed and published.*

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**[Indira Hirway and Sujit Kumar](#), Centre for Development Alternatives and Coastal Salinity Prevention Cell (CSPC), Ahmedabad**

We would like to inform the Water Community that our organisations, the Centre for Development Alternatives and Coastal Salinity Prevention Cell, are planning to organize a national seminar on Crisis in Drinking Water in Coastal States in India on 9 - 10 August 2007.

The main objectives of the seminar are:

- (1) To examine the status of drinking and domestic water supply in coastal regions of the different coastal states in India
- (2) To understand the factors responsible for creating the problems, and to assess the success of the state government policy and programmes in different coastal states
- (3) To understand the impact of non-potable drinking water on human health, and examine the approaches to fight these health problems
- (4) To study technological alternatives emerging in this area and examine their comparative advantages
- (5) To examine innovative models demonstrated by civil society organizations, governments, private corporations, experts etc in and
- (6) To develop an area specific strategy for ensuring water supply for drinking and domestic use in coastal regions.

We have requested about 18 experts to write papers for the seminar. We would like to get inputs - comments and suggestions from the Water Community on this subject.

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**Latha Bhaskar, Consultant, Kerala**

This is with reference to the letter of invitation from **Indira Hirway and Sujit Kumar**. I invite their attention to an experimentation attempted by an NGO - Planet Kerala in some selected coastal Panchayats of Kerala, to recharge traditional water sources with rain water. They claim that the technology results in backwashing effect, thus preventing saline water intrusion and also recharges the wells, thereby improving the water quality. This low cost technology is reported to bring many sustainable impacts in raising fresh water storage of coastal Panchayats and many families have come forward to try this out. The results so far are positive.

Kindly refer to the URL [http://www.planetkerala.org/downloads/Backwashing\\_English.pdf](http://www.planetkerala.org/downloads/Backwashing_English.pdf) (Size: 450 KB) for details of this experimentation.

Analysing the scientific basis of such experimentations will be fruitful to replicate the strategy in a wider circle. I request the Centre for Development Alternatives and Coastal Salinity Prevention Cell, to consider the viability of this scheme and to incorporate such trials in the proposed national seminar on Crisis in Drinking Water in Coastal States in India on 9 - 10 August 2007.

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**B. Muralidharan, UN Resident Coordinator's Office, New Delhi**

I am attaching below a Case Study titled "*Stone Quarry Workers win the battle for Right to Drinking Water*" by Madhura Kulkarni from Oxfam Australia on the attempts of Santulan, an agency working on helping stone quarry workers in Western Maharashtra to get access to drinking water. Please see the link below:

<http://www.solutionexchange-un.net.in/environment/cr/res03070701.pdf> (Size: 3 MB)

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**Debadutta K Panda, MP Associates, Bhubaneswar**

I had made a study on the impact of coal mining on environment, especially on water and air. Please go through the attached report given in the link below:

<http://www.solutionexchange-un.net.in/environment/cr/res03070702.doc> (Size: 113 KB)

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**Pran Ranjan, Society for Promotion of Wastelands Development (SPWD), Ranchi**

Thanks for such a healthy discussion on the issue of mining. In the state of Jharkhand, where the Parej coalmine is situated, there are several other mines, which are affecting the natural environment of the area. Some of the very relevant issues, which need to be focused upon, are:

Mining vs displacement  
Mining vis a vis priority to more production  
Mining and other livelihood option  
Mining and its impact on agriculture  
Mining and compensation

In the state of Jharkhand, apart from common lands and private lands, a big chunk of forest land is also being destroyed by mining in the Saranda Forests of South Jharkhand. The area is rich in biodiversity but large portions are being leased to private companies without any proper environmental impact assessments.

In Ramgarh block of Hazaribag district, people displaced from coal mining are engaging themselves in illegal mining as they are left with no option. These are extracting coal from abandoned mines as well as active open mines and sell it to local coal mafias and also in nearby towns. Some large industries situated near these mines are also using such coal as their main fuel. Several other local issues are related but are not being addressed adequately by any institution. The Government of Jharkhand appears to be concentrating on signing MoUs and issuing coal blocks. Fires inside the mines in Bokaro, Rajrappa, Jharia are a reality but no one appears to be caring about this, as well as about refilling open cast mines.

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**B.S. Choudri, The Energy and Resources Institute (TERI), Goa**

We have done lots of work on mining and the problems are more or less similar to the rest of mining areas of India. The most typical problems in the Goan context are:

1. Loss of agriculture land to mining activity
2. Extraction of groundwater (more concerned on quantity, since they work below mean sea level)
3. Down-flow of Overburden into near by streams, ponds, creeks, etc.
4. Air pollution
5. Noise pollution
6. Loss of biodiversity, etc.

We tried to address some of these issues and help the local community in the vicinity of iron ore mining. Since 1997, we have tried our level best to bring in change in the area and some of the works done are:

1. We have demonstrated rehabilitation trails on dumps and communicated to mining companies about potential best practices
2. Development of micro-plans for rehabilitation of villages around the mining areas in terms of natural resources development
3. We have developed tri-sector partnerships (mining company + Government departments and local community) in order to bring changes; we had very good response on this.
4. Developed water balance studies for entire mining area on micro-watershed concept
5. We developed mine pit rehabilitation indicators - often there are confusions to backfill the open pits and this technique was very useful for decision making.

I hope you will find this information useful.

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*Many thanks to all who contributed to this query!*

*If you have further information to share on this topic, please send it to Solution Exchange for the Water Community in India at [se-wes@solutionexchange-un.net.in](mailto:se-wes@solutionexchange-un.net.in) with the subject heading "Re: [se-watr] Query: Impact of Mining on Water Availability and Quality - Experiences. Additional Reply."*

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