naturenomics™

Nature and Economics - Nurturing Interdependence

4.0

Optimizing Biodiversity and Social Security in Indian Mining Areas

An Earthy Vision

2011

Volume - I

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Printing
Steel City Press, Jamshedpur

December, 2011

English www.baliparafoundation.com Not For Sale

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Supported by Naturenomics™ knowledge Foundation

Picture Books

I HOLD the finest picture-books
Are woods an' fields an' runnin' brooks;
An' when the month o' May has done
Her paintin', an' the mornin' sun
Is lightin' just exactly right
Each gorgeous scene for mortal sight,
I steal a day from toil an' go
To see the springtime's picture show.

It's everywhere I choose to tread--
Perhaps I'll find a violet bed
Half hidden by the larger scenes,
Or group of ferns, or living greens,
So graceful an' so fine, I swear
That angels must have placed them there
To beautify the lonely spot
That mortal man would have forgot.

What hand can paint a picture book
So marvelous as a runnin' brook?
It matters not what time o' day
You visit it, the sunbeams play
Upon it just exactly right,
The mysteries of God to light.
No human brush could ever trace
A droopin' willow with such grace!

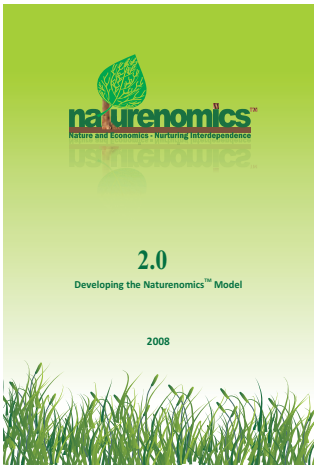
Page after page, new beauties rise
To thrill with gladness an' surprise
The soul of him who drops his care
And seeks the woods to wander there.

Birds, with the angel gift o' song,
Make music for him all day long;
An' nothin' that is base or mean
Disturbs the grandeur of the scene.

There is no hint of hate or strife;
The woods display the joy of life,
An' answer with a silence fine
The scoffer's jeer at power divine.
When doubt is high an' faith is low,
Back to the woods an' fields I go,
An' say to violet and tree:
"No mortal hand has fashioned thee."

- Edgar Guest

- We launched a collection of articles titled - Nurturing Interdependence between nature and economics as the first in a series of articles in 2007.
- The collection identifies itself with our natural inheritance and tries to highlights the overuse and misuse of nature leading to near collapse of our ecosystems.
- The articles highlights the deteriorating balance between nature and economics resulting in a stress around Food, Water and Energy.
- We have covered attempts to create nature driven economics models including Green Accounting.
- Attempts have been made in the articles to understand global warming, both mitigation and adaptation
- The compilation concludes with an interesting articles on Philanthropy's role in the fight against global warming.



- Our second publication "Naturenomics™ 2.0" takes a step further to address the need for a changed economic model to address the changing circumstances of ouruse of our Natural Resources.
- An introduction to the concept of LEWWAC - Land, Energy, Water, Waste, Air, Carbon and the measurement of these resource utilization and patterns of consumption thereof.
- We have focused on articles highlighting the current wealth of nations and genuine progress indicators.
- The most challenging concern of out time if food security therefore focus has been on whether food shortage will bring down our civilization!
- Fascinating concepts have been presented on sustainable design planning of urban areas, optimizing natural resources.

- Our third publication "Naturenomics™ 3.0" is focused series of case studies of real diagnostics and implementation done on various green initiatives across various verticals in Indian Industries.
- An introduction to the concept of LEWWAC - Land, Energy, Water, Waste, Air, Carbon and the measurement of these resource utilization and patterns of consumption thereof
- We are hoping to create a bio-diversity knowledge bank and the capter 'eco-restoration through bio-diversity parks' is an another step towards this.
- The compilation highlights - 'green industry is smart industry' to be achieved through ecological competitiveness for ecological sustainability
- NATURESCRIPT is an addition in the series and highlights amongst other useful tips the Naturefirst's Ecological Code for Sustainable Development.

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naturenomics™ 4.0

Nature and Economics - Nurturing Interdependence

Volume I

Supported by Naturenomics™ Knowledge Foundation

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Ranjit Barthakur

Retaining a Better Earth for Social Security

In the last decade India as a country has achieved many developmental milestones: Industries have prospered, road infrastructure has improved, markets are flooded with products and economic indices are on the upswing. But on the reverse of the coin, we see a contradiction in most of our vast population devoid of basic necessities, often denied primary rights, living in urban and rural areas unable to take advantage of improved educational and medical facilities.

Human migration especially to urbanized areas has increased manifold and as a consequence social and cultural conflicts and problems have increased. Similarly, biodiversity and quality of water, air and soil have depleted at the cost of ill-managed developmental projects and the combination of the social and environmental upheavals, conflicts among different sections of the society have increased leading to great divides among groups which co-existed peacefully in the past.

When we started discussing the various socio-environmental issues, we chose the mining industry because we came face to face with the reality of extractive technologies never being able to achieve biodiversity neutrality. Mining leads to large-scale changes in a landscape and all its elements, though some are positive, most tend to be negative, especially if the management of the process has not been sensitive enough to the social and environmental neutralisation paradigms.

To validate our thoughts, we launched a series of consultations tilted "Optimizing Biodiversity & Social Security in Indian Mining Areas – An Earthy Vision 2010" at the following locations:

Pune (Maharashtra)	Regional level	28th September 2010
Ranchi (Jharkhand)	Regional level	7th October 2010
Bhubaneshwar (Orissa)	Regional level	28th October 2010
Balipara (Assam)	National level	2nd & 3rd December 2010
Canada, Europe, South Africa	International level	2010 - 2011

First Approach: Subjective and Objective Social Security with the well being of displaced people and fair allocation both in terms of monetary and non-monetary needs with a special focus on Health, Education, Sanitation, Woman and Child Welfare

Second Approach: Measurement of Biodiversity Security with natural and man made assets like Land, Energy, Water, Waste, Air & Carbon (LEWWAC)

Third Approach: Economic well-being increased by real per capita income, measure, energy, increased resources coupled with valuation of natural assets. The Challenges of illegal mining negatively impacts, the economic wealth from both the local communities and stake holders and thereby challenges the very ethos of economic value-add

Fourth Approach: Using the case studies approach to view and identify good practices and models to address issues in the areas of Biodiversity and Social Security

Balipara Tract & Frontier Foundation Consultations process 2010

Since the launch of Naturenomics™ in 2007 the world has moved towards the discipline of discussing, if not achieving the management of our valuable natural resources in more effective and sustainable manner.

During this period 2007-2010, Naturenomics™ 1, 2 & 3 made an attempt towards emphasizing: -

- A major paradigm shift for displacing economics at the heart of all activity, and replacing it with **natural assets** as the soul of all activity and we have already achieved some success in this
- Appealing for a common system and methodology of valuing natural assets- a list of nature parameters to measure biodiversity value and performance, and we have progressed much into the idea of green accounting

During this consultation, many biodiversity issues were brought to fore, which show that biodiversity concerns need to be specifically emphasized. Biodiversity and the linkages of abiotic and biotic components of this earth have great influence on the human society and hence its conservation should be a common objective in all projects.

With government and industry discussing the concept of "Consumption Neutrality", i.e. lowering their footprints with initiatives focused on improving efficiency and enhancing productivity, avoiding or replacing processes that are dependent on resource intensive inputs and offset or neutralize the impact through a suitable implementation program, including compensatory mechanisms.

New regulations also started a series of debates with each company now having to remain even more competitive in this new regulated market. In order to do this some companies are already creating comprehensive strategies to address the following questions:

1. **Targets and Roadmaps**
   What resource utilization targets are the companies ready to announce? What type of roadmap is required to reach those targets and who are the stakeholders involved? How can the organization contribute towards for Energy, Water, Waste, Biodiversity security?

2. **Continuous Monitoring and Audits**
   How will the company ensure effective monitoring and improvement? Will they subscribe to third party audits? Publicly disclose their emissions data? What type of tools will they require to track and manage this data?

3. **Responsibility Integrated into KPIs**
   What training is required among employees to implement green practices? What capabilities already in the employee base that can be leverage? How can the organization motivate the middle management to create importance around the environmental sustainability strategy?

4. **Investment and Research/Development**
   How much is the organization willing to invest in sustainability? Are there opportunities to develop cutting edge technologies? Can investment or research translate into new revenue streams or increased brand value from enhanced products and services?

5. **Governance**
   Who will be accountable for the company's emissions? Will they appoint a Chief Responsibility Officer? Hold the CEO directly responsible or individual Administration Heads?

6. **Illegal Mining**
   How should illegal mining be stopped? Will NGO's and Government agencies monitor illegal mining?

Naturenomics™ 4.0

Our endeavor was to bring together opinions from the society on sustainability issues in mining industry and deliberate on issues and resolutions on two volumes:-

- Naturenomics™ Volume I – Focusing on Social Security
- Naturenomics™ Volume II – Focusing on Ecological and Biodiversity Security

Mining in biodiversity rich, culturally diverse areas in India leads to large landscape-level changes and affects local communities and their livelihoods in many complex ways. In recent years, there has been growing opposition to mining on the grounds of biodiversity loss and social issues. There is also an inter-generational issue, since gainers tend to be from the younger generation, while the losers are from the older.

The key 'Take-aways' from the Consultations 2010 were:-

- **Tribal Populations:** When tribal populations lose traditional land to mining and are forced to resettle elsewhere, they must be ensured access to the biodiversity they ordinarily rely upon for their sustenance.
- **Traditional knowledge**: The knowledge of local communities about biological diversity should be documented and included while developing eco-restoration plans.
- **Species selection:** Local people should be involved for species selection and native species should be planted
- **Restoration:** After the mining is over, the area should be restored and local communities should have access to the resources like firewood, grazing, medicinal plant collections, water bodies for fishing, etc.
- **Awareness:** Localised mining dependent economies should be carefully studied for sustainability. Local people should be made aware about the changes brought about by mine closure and loss of biodiversity security.
- **Eco-restoration:** Need-based survey of mining area and selection of species under expert guidance essential for all eco-restoration work. Need to develop a mechanism by which local villagers can come forward and conserve rich forest areas under their control.
- **Sustainable Mining Technology:** Application of Sustainable Mining Technology - Sustainable mining technology should be adopted for mineral conservation.
- **Innovation of Extraction Technology:** Use of latest technology for restricting the effects of pollution below maximum permissible limits prescribed by various statutes.
- **Biodiversity Threat:** Threat to water, threat to forest, threat to agriculture are some of the major biodiversity issues thereby affecting food security.
- **Forest and Wildlife conservation:** Eco-tourism has been found to have the potential to make substantial positive contribution to management and conservation of forest and wildlife.
- **Depletion of natural resources:** The Social impacts of mining activities on the surrounding socio-economic environment, affected individuals and communities are very pertinent due to the various direct and indirect role of mining operations and use/depletion of available natural resources
- **Social Responsibilities:** Mining has both positive and negative impacts on local communities but it generates income and employment, needs greater ownership and focus on health, education & child care.

Social Security issues covered by Naturenomics™ 4.0 Volume - 1

Local Communities' Struggle against Mining in Goa

- The struggle against mining is highlighted by the role of single committed individuals who have stood against the dominations and fought environmental and degradation caused by mining.

Mining and livelihood: Voices from the Ground

- Strengthened community consultation should be incorporated in Land Acquisition Act and mining laws.

Social Impact Assessment for Ankua Iron and Manganese Ore Deposits in Jharkhand

- Social impact assessment (SIA) should be regarded as a tool to be used to promote sustainability for regional socio-economic development.

Economic Impact of Coal Mining in Meghalaya and the Question of Sustainability

- The environmental impacts on land, water, forest and agricultural resources are threatening for biodiversity security of the region.

Strengthening of Community Based Conservation through Tourism as Incentive in Western Arunachal Landscape, India

- Community Based Tourism is a most suitable livelihood option which has the potential to benefit maximum number of villagers without any recurring expenditure.

Getting Ready for Public Hearing

- It is important to involve the outside experts to deal with Public hearing, but the leadership and follow-up has to be by the local knowledgeable, committed person from the village /area.

Initiatives towards Sustainable Development at Raw Materials Division of Tata Steel

- Over a century, the company has demonstrated commitment towards improvement of environment and society in general and will continue to do as company policy in future too.

In conclusion, we have endeavored to align our thoughts to the spirit of the pre-eminent political and ideological leader, *Mahatma Gandhi,* who reminded us that "*There is enough for everyone's need but not for everyone's greed*".

Towards this end, we hope that the outcomes recorded in Naturenomics™ 4.0 (Vol. I & II) will help in retaining a better earth.

Editorial

Asish Kumar Ghosh,
Centre for Environment and Development

Biological Diversity has sustained Human Society since the days of hunter- gatherers. With the advent of modern civilization and progressive use of science and technology, perception about the need for conservation of Biological Diversity for social security changed. But, technology can never sustain life. Living forms- all plants and animals- composing the wonderful world of Biodiversity provide food security for the entire Human Society, fodder for millions of domesticated animals, natural fibres for garments, housing materials for vast rural populations, biomass for cooking fuel, medicines for healthcare, oilseeds and spices for all forms of cuisine… the list goes on. It is said, plants and animals can live without Human Beings but Human Society can never survive without plants and animals!

On the other hand, industrialisation is but a natural phenomenon to guarantee economic growth and assure development. Industries need minerals, hidden below the land and rich mineral deposits viz. Coal, Bauxite, Dolomite, Limestone, Iron Ore etc. are best found below forested land. It is also to be noted that forests harbour more than 80 percent of global biodiversity, so far recorded. The goods and services derived from the forests have gradually been quantified and their economic valuations made. Forests are no longer seen as provider of wood but as the most important component providing oxygen, helping recharge freshwater, absorbing carbon, helping soil conservation, offering habitat for Biodiversity and opportunities to develop ecotourism to contribute towards local economic developments. Economists have calculated average ***'Net Present Value' (NPV)*** of forests in different bio-geographical areas as a part of ***Green Accounting***.

The country needs growth and development and the needs for power and industries are surely to be met. India had set a target of putting 33 percent of Geographical areas under Forests, but with all efforts it has reached at most 23 percent, of which not more than 14 percent can be said as 'Good' forest (with 40 percent or more canopy cover). These forests offer best habitats for biological diversity- both in terms of richness of species and density of trees. Ecosystem services from such areas, economists calculated, are by far more valuable than the direct economic gain that could be derived from mining. So the controversy continues. Biodiversity issues in the Indian Mining Areas have been discussed by Watve to facilitate the process of understanding the focal theme.

The series of public discussions held in 2010 with the objectives of ***'Optimizing Biodiversity and Social Security in Indian Mining Areas'*** provided opportunities to hear voices from the concerned sectors. During the four-city dialogues, several issues have emerged. These include: does mining benefit the country's economy and has there been any realistic cost benefit analysis reflecting extent of economic gain and loss of ecosystem services, disruption of social fabric? It logically led to yet another question – is ecologically and socially responsible mining possible? Other areas of discussion include criteria for selection of 'No-Go' Areas for mining, policy of mineral export for foreign exchange earning, compliance with extant laws, the process of implementation of legal provision and monitoring during construction and operational phase of mining projects. Serious concerns have been expressed about “illegal mining” in different mineral rich states of the country, which should be stopped using the provisions of the law; as of now private mining in North East India are not within the purview of Government of India's regulatory control and if such mining operation violate extant law – how will it be controlled and by whom?

The deliberations also pointed out to the need of adopting new technologies to minimize damage to the natural capital. So was the demand for appropriate mine closure and reclamation plan with a fool-proof, accountable monitoring system. The issue of Corporate Social Responsibility (CSR) came up often with demand for sharing

of revenue with the project-affected families besides investment in social welfare during mining operation and beyond the lease period. Participants also opined that requirement for appropriate “Mine Plan” should be made compulsory for both Major and Minor mineral sectors.

The participants raised an important issue, that is, valuation of “Natural Capital” which should be best done before deciding the value of land above ground and mineral beneath. It should logically include all the ecosystem services that the proposed mining area may render.

Strangely enough, the people who normally lose their homestead land or common pool resource, be it in the agricultural or forest landscape remain deprived of benefits that are generated using their resource. The most common example cited is the lack of electrification of rural areas in close proximity of coal mines, supplying raw material for thermal power. Current situation only denies inclusive growth and inclusive benefit.

The voices from civil society also raised the question of continuing long-term deprivation from social development schemes in tribal dominated, mineral rich, forested areas. That such continuing deprivation in the long run could lead to violent unrest has been noted in the recent times in at least 8 states and 33 districts. Timely planning and implementation of social welfare schemes including access to road, safe drinking water, health care and education, could have helped maintain peace through a legitimate process of providing better quality of life for all.

The readers will have an idea on the entire outcome of these public consultations from the ***'Report'*** following the Editorial. Highlights of the year 2010 will indicate the course of past events resulting in the ***'Balipara Declaration'***.

The impacts of mining on local ecology, economy and culture have been discussed by contributors in the section of ***Impact Assessment***. This is followed by possible means of 'Ecorestoration' in varied forms.

However, the issue of ***'Social Security'*** remains a keyword for this entire study and therefore at least three authors have expressed their opinions from the different geographical areas of India.

Obviously India is not the only country facing the problem of balancing ecology and economy. Two papers, one based on scenario in South Africa and the other from Canada can help the reader to get perspectives from distant lands.

The entire issue revolves around conservation, sustainable restoration and improving 'Quality of Life'. Two papers, one by Dutta, Wange and Dorjee and another by Prof. M. C. Dash, have elucidated the potential of using right path. This publication has also used some of the material published elsewhere but available in public domain.

And finally, to provide an idea of extant policies, laws and conventions, a summary has been included; this by far is not exhaustive but indicative.

To sum up, the yearlong efforts of conceptualizing, discussing and arranging public consultation on this vital issue of Biodiversity and Social Security and current Mining Scenarios in India, have been incorporated in this volume of ***'Naturenomics™'***. It is expected that the data and information provided by the contributors will help the Policy Makers, Mining Industry, Academics and Civil Society, to arrive at a point of integrating Environmental Concerns with the needs of Development.

Editorial Review

Aparna Watve, BIOME

Metals form an integral part of life as we know it. Extraction and use of metals such as bronze and iron are major milestones in the history of mankind - so much so that the periods are marked as the “Bronze Age” and the “Iron Age”. Use of metals gave humans a distinct advantage in survival and developing powers to change the natural world instead of simply fitting into the web of life like other species on this planet.

But somewhere in this process, the architects of human growth seem to have forgotten that metals, and mineral-centric development, may have the power to make man's life easier, but they do not support life itself. Any amount of progress in mineral science cannot produce air for us to breath, water and food to sustain us nor can it replace culture, which gives us identity as society. Any amount of progress cannot justify destruction of other plant and animal species that have as much right to co-habit this earth as us.

Traditional communities, living in close connection with nature know this intrinsic truth which is integrated in their ethos. But such communities and their thinking are themselves fighting for survival, slowly being marginalised and disintegrating with the advent of a common thought of establishing dominion on the entire world and its resources.

We are all consumers of metal industry and also of related power and fuel industries. The products of these industries range from the tiny pin that secures my papers and pressure cooker that saves time in the kitchen to the aeroplane which makes it possible for me to fly across the world. As stakeholders in this industry, we all are also responsible for the environmental and social damage which this extractive industries cause, regardless of whether we are direct or indirect beneficiaries of mining. Therefore as a part of society, it is our collective responsibility to understand and help mitigate the impacts of this industry on ecological and social security.

With this in mind, **Balipara Tract and Frontier Foundation (BTFF)** took up the challenge of bringing together people from various sections of society to express their opinions about issues in Indian mining areas and give constructive suggestions for the future. It was necessary for this exercise to bring together mutually opposing opinions such as expressed by the corporates and the activists about mining. The views of social and environmental scientists and government departments set a background for evaluation of costs and benefits of the industry, not in terms of economic gains as are often available, but in terms of ecological and social gains for society at large. But most important of all, it was necessary to create space for the views of local communities whose landscape, culture and life changes irreversibly when mining begins in an area. Thus the consultations included all these groups- academics, bureaucrats, corporates, activists, civil society representatives and local people, and we heard them all express their opinions passionately on BTFF's platform.

This volume deals with only a fraction of the issues discussed in consultation series, as so many complex discussions ensued. We have therefore included a short report, summary of issues discussed and recommendations made during the actual consultations, along with the papers. Most of the discussions and recommendations will be understood better in the light of various mining related events that happened over short span in the year 2010. The cases against mining giants Vedanta, Posco, and changes in the Mines and Minerals (Development and Regulation) Act (MMDR) were the important issues, but several small and significant incidents also took place. We have added a section on these for the reader to realize the context of these discussions.

Biodiversity was considered a key issue in these consultations. The reason being that this extremely important component of ecology and environment is the least understood of all. Complex linkages between plants and animals and the natural world we all live in are studied by only a handful of researchers, but we all benefit from them. Dr. Ghosh in his editorial has written at length on why we ought to consider biodiversity and its protection as a key issue for ecological security. Indigenous communities as well as urban society depend on the products and services of biodiversity, which are irreplaceable. In fact, it was very clear during the discussions, (and which is also brought out in the papers in this volume), that, it is impossible to discuss Ecological and Social Security without discussing Biodiversity Security. Based on this, the concept and framework of Naturenomics™ and LEWWAC (explained by Ranjit Barthakur in the Introduction to this volume) will now lay special emphasis on biodiversity issues.

This entire exercise was meant to start a dialogue between people expressing diverse (and often opposing) viewpoints. It was heartening to see that participants, at the end of each consultation, continued to discuss and share on the issues as individuals, and not only as representatives of certain sections of society. We hope that in future such formal and informal discussions will enhance mutual understanding between diverse components of the society. It will aid in efficient decision making for the betterment of our entire society rather than for only a section of it.

Optimizing Biodiversity and Social Security in Indian Mining Areas - "An Earthy Vision"

A Report

Biodiversity embraces all living organisms and their genetic diversity, a vast and complex array of ecosystems and habitats, as well as the processes that underpin and result from this diversity, such as photosynthesis, nutrient cycling or pollination. In the International Year of Bio-Diversity (2010) Balipara Tract & Frontier Foundation had planned a series of consultations under the name **"An Earthy Vision: Biodiversity and Social Security Dialogues".** The focus of the dialogues was to discuss issues and suggestions for optimizing biodiversity and social security in Indian mining areas.

India is one of the mega- diversity countries in the world which also supports several communities traditionally dependent on biodiversity for ecological and livelihood security. It also harbors rich mineral deposits seen as essential for the growth of country. In recent years, there has been growing opposition to mineral extraction in India on the grounds of biodiversity loss and social issues. Mining operations and their impacts on environment, biodiversity and society, especially the local tribal communities have come under critical review. At this juncture it was thought necessary to establish a common platform for dialogue between scientists, stakeholders and communities. The aim was to discuss ecological neutrality with a special focus on biodiversity and social components of mining.

Key Objectives

- Provide a common platform to scientists and stake holders to start exchange of knowledge, experiences and ideas regarding biodiversity, eco-restoration, social security of mining areas in India
- Discuss merits and demerits of models of biodiversity conservation and restoration already in use in mining areas across the world
- Develop protocols and good practice guidance for the mining industry regarding the ecological and social security issues
- Develop action programmes for ensuring compliance to national and international good practice guidelines for the mining industry
- Publication of papers presented by the participants which will provide "state-of-art" actionable reference on the dialogue theme.

During the period September to December 2010, the dialogues took place at Pune (Maharashtra), Ranchi (Jharkhand), Bhubaneshwar (Orissa) and Balipara (Assam). The first three covered western and eastern Indian regions, while the last one at Balipara brought together national level speakers together with people specializing on northeastern issues and highlighting ecological and social security measures necessary for Northeastern India, a globally known hot-spot region.

There were about 150 participants, with the representation of biodiversity and eco-restoration scientists, social scientists, advocacy groups, people's organizations and mining industry personnel, discussing issues, challenges and creative solutions to conserve biodiversity and ensure social security in the mining areas of India. Forty papers were presented. In addition, discussions, participatory observations and comments, constructive criticism were inherent features of this exercise. The recommendations are collated in format of a declaration on the issue.

NATIONAL LEVEL CONSULTATION

OPTIMIZING BIODIVERSITY AND SOCIAL SECURITY IN INDIAN MINING AREAS

2ND AND 3RD DECEMBER 2010 – BALIPARA, ASSAM, INDIA

THE BALIPARA DECLARATION – "AN EARTHY VISION"

ISSUED ON THE OCCASION OF THE NATIONAL LEVEL CONFERENCE ORGANIZED BY BALIPARA TRACT AND FRONTIER FOUNDATION AT BALIPARA, ASSAM, INDIA

AND

IN CONTINUATION OF THE EARLIER REGIONAL CONSULTATIONS HELD AT PUNE, RANCHI & BHUBANESHWAR - INDIA

We, the delegates and participants in this consultation, having gathered here in Balipara, Assam, INDIA this 2nd and 3rd Day of December 2010:

Sharing the vision and belief that biodiversity is a unique and perishable natural resource which requires protection to enhance the present and to secure future generations;

Conscious that unchecked economic development leads to erosion and loss of biodiversity and other natural resources, adversely impacting the environment and society;

Realizing the need to formulate models for sustainable development to harmonize socio-economic growth with the preservation of our natural environment;

Considering that all stakeholders in development - groups and individuals, companies and governments – should come together as collective guardians of our natural heritage and take all steps towards its conservation;

Committed to discussing, advocating, formulating and implementing, principles and policies towards these objectives; and

Desirous of agreeing upon a shared set of principles, which can serve as a common guide towards specific, actionable initiatives undertaken hereafter by the delegates and participants;

DO HEREBY RESOLVE, DECLARE AND UNDERTAKE THROUGH THIS BALIPARA DECLARATION:

To adhere to and act according to the principles and measures embodied in this Balipara Declaration

To use this Declaration as a platform and guide in undertaking identifiable initiatives to protect and preserve our natural heritage and biodiversity

To take all steps to advocate and widely disseminate amongst stakeholders, including governments, organizations, companies, collective groups and individuals, the shared principles of this Balipara Declaration;

To work towards formulating, adopting and implementing policies, both at the national and state levels, in furtherance of the objectives contained in this Declaration;

To call upon all stakeholders to maximize their efforts in conserving this valuable intergenerational equity;

To emphasize the need for immediate action on the outcome of these consultations.

Shared Objectives

PRINCIPLES FOR EFFICIENT ECONOMIC ACTIVITY

Ascertainment of Land Value
Value of land must be based on the value of ascertained minerals.

Transparency in dealings
There should be transparency in the compensation package. At present, there is a lack of transparency in the compensation package mechanism, where local people are cheated of their minimum compensation for land/resources. Transparency in such situations will ensure that stakeholders are treated justly and get their dues.

Compensation directly to the Affected Families
Companies should pay rent (for land) and royalty (for minerals) to the host community / family.

Accountability of the Forest Department
It appears that in many cases, the money collected for NPV, Compensatory Afforestation and wildlife conservation is not spent on these activities/remediation measures. This must be a mandatory activity, with a clear policy for restoration of biodiversity. Money collected for (1) NPV, (2) Compensatory Afforestation, (3) Wildlife Conservation must be spent for the specific purpose in the affected area and state. Forest department should be made accountable.

Preservation of raw material
Export of minerals, crude waste should be critically studied and monitored to avoid losses.

Management of Finite Mineral Resources
Deploy techniques and technologies through intensive R & D which would entail optimal consumption of finite mineral resources in the country.

PRINCIPLES TO ENHANCE SOCIAL SECURITY

Access to natural resources for tribals

When tribal populations lose traditional land to mining and are forced to resettle elsewhere, they must be ensured access to the biodiversity they ordinarily rely upon for their sustenance.

Restoration of access to resources

People's access to resources should be restored post mining. After the mining is over, the area should be restored and local communities should have access to the resources for ex. firewood, grazing, medicinal plant collection, water bodies for fishing etc. This assumes that the land is restored without any environmental hazards post mining.

Documenting knowledge of bio-diversity

Traditional knowledge of local communities about biological diversity should be documented and included while developing eco-restoration plans. Bio-cultural diversity should be preserved. The traditional knowledge of people about biodiversity is a valuable national resource. It is the very basis of ecological livelihood security of people living with nature. Hence, restoration of biodiversity and social security is incomplete without preservation of traditional knowledge systems.

Involvement of local population

Local people should be involved for species selection and native species should be planted. Local communities are in need of certain species traditionally, hence they should be involved in selecting species for plantation, in the manner of eco-development work. Plantation of exotic species does not allow biodiversity restoration and does not provide people with the necessary resource. Hence native species should be planted.

Awareness amongst local population

Localised mining dependent economies should be carefully studied for sustainability. Local people should be made aware about the changes brought about by mine closure and loss of ecological security. A select few people benefit in the long run from mining and accumulate enough money to tide over the economic low that will come once the mineral resources are exhausted. However, the labourers and small land holders who are looking at the immediate economic benefits of mining do not understand that they are sacrificing long-term ecological security for it. They are not aware of the economic depression that is certain once the mining closes and have no contingency plans to deal with the same. It is therefore necessary that they are made aware of the dangers of losing fertile land, pure water etc for short term gains.

Integration of Indigenous communities

Indigenous communities must be respected and must be integrated into any development activity with suitable provision made for their participation.

PRINCIPLES FOR PROTECTION OF ENVIRONMENT

Remedial measures by consistent degraders

Environment / Biodiversity degradation not measured in the past and almost never even today. Consistent degraders must be made to pay with corrective programmes.

Costing of ecological degradation

Effective measurement of cost of ecological degradation and encouragement of players who perform genuine value addition and offset negative impact of mining.

Compensation for loss of biodiversity

Compensation for loss of biodiversity due to mining in Proven Forest Area should be made compulsory on an accepted sharing basis between National Biodiversity Authority, State Biodiversity Board, Biodiversity Managment Committee of concerned area. Such measures may or may not be adequate to assess the value of forests, In order to assess this loss, a thorough understanding of the ecosystem and the ecosystem services is needed.

Valuation of ecosystem services
Value of ecosystem services needs to be quantified and incorporated in the project document. Appropriate measures to re-create the ecosystem are imperative.

Eco-restoration under supervision of experts
Need-based survey of mining area and selection of species under expert guidance essential for all eco-restoration work.

Avoidance of modern plantations & promoting 'monoculture'.

Large area assessment
Carrying capacity of potential area with large mineral reserve should be studied holistically rather than through individual mining projects. EIAs often look at small parts of the entire landscape which is mandatory by law. However, in mineral blocks, several projects are drawing on the natural resources in long term. The problems cannot be addressed in project focused EIAs. Hence, carrying capacity studies should be conducted.

Preservation of heritage zones
Heritage zones must be treated under a special dispensation. Orissa's experience of mining by giant mine operators calls for critical evaluation on current practices of allowing mining in eco-sensitive and heritage zones in Khandagarh Hills in the Eastern Ghats. Many wildlife species, like leopards, elephants, monkeys and rare species like limbless lizards are found in its forests. There are several waterfalls in that area, and it is home to many tribal groups. And all of these are under threat of displacement and extinction.

Unchecked diversion of forest lands
Rampant diversion of forest land under the pretext that no non-forest land is available for an important project must stop. Forest lands are often taken for industrial activities as it is hassle free. Mining and industrial houses in connivance with the forest and state officials get the forest lands for the use, with environmental laws being twisted.

Application of Sustainable Mining Technology
Sustainable mining technology should be adopted for mineral conservation.

Eco-restoration planning methodology
Ecological restoration in a mined area is possible with pre-planning, right investment and effective implementation. Therefore, a Mining Plan and a Mine Closure Reclamation Plan should detail the work and base estimations on an acceptable standard.

Preservation of flora
Mother trees should be preserved for natural regeneration.

Bio accumulation of radio active materials
Non-edible species must be used where chances of bio-accumulation of radioactive minerals exist.

PRINCIPLES FOR COMPLIANCE MANAGEMENT AND IMPROVED REGULATIONS

Compliance Management
Measurement, monitoring and implementation based on regular and modern technology.

Sustainable Rehabilitation
All mining must be based on sustainable rehabilitation. Any mining plan must be a progressive plan for sustainable and integrated 'Mining-Tribal-Biodiversity' Development with an in-built cost for restoration along with a stipulation to deposit the cost on a quarterly basis. There is vast gap between the claim of the government/industrial houses and the ground reality. Uprooted from their land, displaced people suffer a loss of

their identity. When a village or community is displaced, there must be a fair policy at place to look after these displaced people. There also must be an agency to assess post-rehabilitation status of the displacement and ensure their rehabilitation and well-being in all aspects.

Large Leases to be promoted
Fragmentation of leases should be avoided. Mining lease should be for not less than 10 hectares. Larger leases facilitate better reclamation and rehabilitation.

Renewal of Leases
Leases are for fixed periods. Post expiration, land should be returned to the local community. Leases should only be renewed if lessee has complied with all conditions and new leases should be carefully awarded to obviate harmful mining.

Implementation of Mining Plans
No modification in implementation of cleared Mining Plan; Zero tolerance for manipulations.

Ownership with the original owner
Property laws to be changed in a manner that the ownership is retained by the original owner.

Ownership of natural resources
In case of natural resources, the right of ownership and management should rest with Gram Sabhas in both scheduled and non-scheduled blocks. Gram Sabhas with rights over minor minerals should be actively involved in reclamation of old mines and in mine closure plans. Clearance of land and forest should be done in consultation with the local village body. It will help the authorities to know the ground situation in the right perspective. Industrial houses fraudulently obtain the consent of the village body in connivance with some people and the administration takes no step to insure the authenticity to this. The Panchayat should be accorded rights over major minerals.

Enhanced Enforcement
Law enforcement institutions and PCBs (pollution control boards) to be strengthened and made accountable.

R & R Monitoring
R&R policy is not enough; an R&R Act is essential. There should be an independent body to monitor. Reform and amendments are required in R&R policy as there are many grey areas. It should be uniform for all Industries.

Responsibilities of the State
The State should take additional responsibilities for delivering on its constitutional duties to provide education, health care and basic amenities. The government cannot withdraw from its responsibility to provide education, medical facilities and local area development to the industrial houses. The government has slowly been relegating from this field which is primarily the responsibility of an elected government.

'Go' & 'No Go' areas
Mining in the forest / agro-biodiversity rich area needs a complete relook in terms of zoning of 'non-permissible' and 'permissible' areas. While deciding on “GO” or “No GO” areas, the community's decision should be final and binding on the State as well industry. It has been suggested that a complete study be undertaken to come out with zonation so that the industry is well aware of the status of a region and demands on resources in the non-permissible areas are not made.

Declaration of Bio-diversity heritage areas
No mining lease should be approved for prospective mining areas with biodiversity heritage (for example virgin relict forest tracts) and the state government should declare such areas as “biodiversity heritage sites” following the Biodiversity Conservation Act 2002 & Rules 2004.

Public consultation process
EIA process must be freed from being an expert-driven process to a multi-stakeholder driven process in letter and spirit through genuine public consultation. At present, the EIA process is carried out mainly by consultancies

appointed and the researchers chosen by the consulting agency. However, local people and their knowledge about the natural wealth of the region are not taken into account. For this reason, a public consultation to document the local peoples' knowledge and concerns about environmental impacts should be made part of the EIA process.

Documentation of PBR

At the time of public hearing, People's Biodiversity Register (PBR) should be shared and discussed along with EIA. It must be annexed to the EIA document. Peoples' Biodiversity Register is a document of traditional knowledge of the local communities about their natural resources. This should become part of the EIA document so that there is adequate coverage of the traditional knowledge, region's biodiversity and linkages of the same.

Habitat Management

Habitat management concerns should be included in the EIA. Mining companies often leave the areas unattended once the minerals are exhausted and there is no concern for the people who are left in the lurch.

Mining to include EIA / EMP & MCRP

Mining plan must keep in view the basic requirements of Environment Impact Assessment (EIA) / Environment Management Plan (EMP) and Mine Closure Reclamation Plan (MCRP). The biodiversity aspect - flora, fauna and ecology – in EIAs, should be dealt with in greater detail. The EIA document should specify the parameters to be studied, including Taxonomic diversity, ecological diversity along with quantitative ecological information, soil biodiversity of the area and ecosystem diversity of the area, including freshwater availability for flora and fauna and drainage patterns and such other aspects.

Descriptions in EIA

The aspect of biodiversity - flora, fauna and ecology – in EIAs should be dealt with in greater detail. The EIA document should specify the parameters to be studied, including:

- Taxonomic diversity
- Ecological diversity along with quantitative ecological information
- Soil biodiversity of the area
- Ecosystem diversity of the area, including freshwater availability for flora and fauna and drainage patterns and such other aspects

EIA components

The EIA document should indicate the present status of these parameters and the projected impact of mining and industrial activities along with environmental management plans. The objectives of EIA notification is to impose certain restrictions and prohibitions on some projects or activities and expansion and modernization of existing capacity of projects/ activities, to seek public consultation from stakeholders and to incorporate necessary environmental safeguards by assessing the impacts at planning stage itself through transparent process involving consultation of public and relevant experts.

Qualified Officers required in IBM

Technically qualified officers from Forest / Biodiversity may be posted in the relevant mining organization like Indian Bureau of Mines (IBM) for advising the mining sector. At present, the decisions taken by IBM do not take cognizance of the biodiversity, ecology issues, as they are not aware of the intricacies. Officers with knowledge of these issues should be posted in such organizations, so that even before the leases are granted, a screening mechanism can detect future environmental implications of the proposed project-saving time and costs for the industry.

Expert committees

Need for Expert Committees for such areas as Goa where mining is causing large-scale impact on all natural resources – water, agriculture, soil and livelihood – in open violation of laid down norms of OB dump height and

gradient. The expert body should help draw up a master plan to advise relevant authorities – Mining, Forest, Biodiversity, Environment, on the future course of action. The Expert Committee must be headed by a recognised professional and must assess damage caused by current mining operators and process of eco-restoration cost to be borne by the mining company.

Certification of restoration by experts

Professionally trained personnel should be given the responsibility to certify Restoration. Violation of Restoration Norms should result in stringent penalties being imposed.

Good Restoration Practices

Good Restoration Practices including successful restoration cases should be given recognition and wide publicity to present examples for other mining companies and to discourage illegal / unscientific mining.

Information sharing at grassroots level

There should be state of the art platforms to make information accessible and information-sharing possible for people at the grassroots. Best practices, scientific research and all relevant information should be made available on a credible platform. Community consent must be made mandatory when mining leases are given out. Community ownership and participation in the projects should be encouraged, and the rights of traditional forest land dwellers should be respected. After mining, the land should be reverted back to the tribal people, and diversion of land must be stopped in places having critical ecosystems. Last but not the least, the government should respect the communities' right to say no, and abide by their decision.

Research support systems

Research support systems should be extended for:

- Environmentally compatible land use zoning for selective mineral region;
- Emission factors for different mining sectors;
- Land subsidence for metalliferrous mining sectors;
- Use of Coir matting / Geo-textile for greening OB dumps;
- Manual detailing strategies for maximising backfilling;
- Reversibility in Cr+6 treatment in Sukinda mine water

Alternative nature dependent economies should be considered in development of eco-sensitive areas.

PRINCIPLES FOR HARMONIZATION & EFFECTIVE ADMINISTRATION IMPLEMENTATION & ENFORCEABILITY

Harmonisation for Effective Administration, Implementation & Enforceability (Single Window Concept)

The forest, environment, wasteland clearance may be taken up by a single window clearance committee under the MOEF and composite or part-wise clearances should be given at one go and not on a piecemeal basis.

Security of Finite Mineral Resources

Institute laws and incentives that promote research and development which would identify techniques & technologies for production of superior value added world class end products on one hand and securitization of finite mineral resources on the other.

Need for creation of Framework & format for implementation of laws

To advocate appropriate refinements in the draft MMDR Act 2010 to ensure the following :-

- Structured & transparent implementation mechanism for the fund contributed to the 'District Mineral Foundation' (DMF) from the 26% “profit sharing” formula for the affected / displaced tribals.

- Special focus on the transparent and effective utilization of DMF Funds towards Social Security, Health, Safety, Education, Biodiversity and Environment Neutrality.
- Continuing benefits from the DMF to the affected and displaced through special annuity measures.
- Enhanced role of the 'mining regulator' to not only check 'illegal mining' but also safeguard the benefits intended for the affected & displaced persons.
- The Mining Regulator as an effective watchdog and auditor to monitor the flow of benefits to the affected & displaced.
- Mining companies to continue with their CSR and R & R activities for the affected & displaced, including tribals.
- Spending from DMF under the aegis of the District Collector & State Government to be monitored and audited directly by the Central Government and findings placed in a public archive.

Illegal mining to be stopped

Government must take appropriate action to stop illegal mining and adopt the strictest possible measures against all illegal mining

Accountability of Officers

Introduce accountability provisions because administrative complexity of mining sector in conjunction with forest / biodiversity often results in violation of laid down laws and Rules. An empowered officer should be made accountable for the environmental degradation of any area under his charge, and not simply transferred to another area to perpetuate the damage. In most cases, officers who have given permissions are no longer in-charge when certain environmental concerns are brought out by the public. Officers should be held responsible for the decisions they took and should be accountable for their actions even when questions are raised in the future.

Rehabilitation of small mines

There is a special need to address rehabilitation of small scale mines, for which no one appears to be taking responsibility. Eighty-six per cent of mining is by small miners.

JFM Model

Joint Forest Management (JFM) type of models should be used for implementing plantation schemes (for large mines or association of mines).

Responsibility of the government

Strict adherence to allocated responsibility must be ensured by such designated authorities as the State Pollution Control Boards and the Regional Offices of the Ministry of Environment and Forests.

Revision of Minimum Mining Area

Small mining leases involve greater environmental hazards and the Government of India should revise the minimum mining area to 10 hectares from the current 4 hectares.

Conversion of Forest land once utilized

Forest land utilized for non-forest activities may remain classified as non-forest after due approval.

Evaluation of CSR and R & R commitments

There should be an effective/ accountable system to follow up/ check if all commitments, including CSR commitments, in the mining sector are implemented, and legal provisions pertaining to reclamation and biodiversity conservation are observed.

Overburden management
Overburden management is of critical importance for biodiversity sustainability. Without backfills, so-called recharge pits become discharge pits and affect water quality and availability throughout the region. This aspect needs close attention. Under the mining law it is obligatory under 'backfilling' for every mine to be filled up after completing the mining process, which seldom happens. It takes thousands of years for the formation of top soil which contains minerals and ingredients for the sustenance of plant and tree.

Land use policy
There should be a specific Centre & State land use policy. Mining and industrial activities in the country are going on without a proper land policy.

Rules for mine dump reclamation
An effective manual for mine dump reclamation must be developed. Agricultural lands must not be used for industrial purposes as it gets destroyed as a company uses it for dumping purposes. To provide for such a large population, agricultural lands must be kept apart from the industrial activities.

Accountability of departments
Indian Bureau of Mines (IBM), State Pollution Control Boards (SPCB), State Directorate of Mines, Regional offices of MOEF and State Environment Departments must be sensitized and held accountable for all violations of existing laws.

Role of Associations as watchdogs
If watchdog agencies report violation of existing laws by mine operators, Federation of Indian Mineral Industries (FIMI) should take responsibility of initiating action against such erring members.

Mineral blocks' carrying capacity
Carrying capacity surveys for entire mineral blocks should be conducted. EIAs often look at small parts of the entire landscape which is mandatory by law. However, in mineral blocks, several projects are drawing on the natural resources in long term. The problems cannot be addressed in project focused EIAs. Hence, carrying capacity studies should be conducted.

IT BE NOTED THAT PRINCIPLES ENSHRINED HEREIN SHALL HEREAFTER BE REFERRED TO AS PART OF "THE BALIPARA DECLARATION"

SO RESOLVED THIS 3rd DAY OF DECEMBER 2010, AT BALIPARA, ASSAM, INDIA

- In February 2010 in what could prove to be a major setback for the Rs 6, 000 crore mining industry in Goa, the Union minister for environment and forests (MoEFF) Jairam Ramesh told the Goa chief minister that the ministry has “imposed a moratorium on consideration of mining proposals for environmental clearance… till the mineral policy for the state of Goa is finalised.”

- The ministry of environment and forests had also asked for Environment Impact Assessment (EIA) of the ongoing mining activity in the tourist state.

- The moratorium on mining in Goa was followed by a wider study jointly conducted by the MOEF and coal ministries, which found that as much as 35% of coal mines are located in 'no go' zones.

- In February 2010, indigenous Dongria Kondhs of Orissa designated Niyam Dongar hill as inviolate, stepping up their resistance to a controversial alumina refinery and bauxite mine project by Vedanta Aluminium Ltd, the Indian arm of London-based Vedanta Resources Plc.

- The National Consultation on Impacts of Mining on Women in India was organised on 12th and 13th February 2010, at Angul, Orissa.

- In March 2011, the Department of Mines and Geology initiated proceedings to recover Rs. 600 crore from iron ore exporters for buying a staggering 57 lakh tonnes of ore from unlicensed dealers since 2003-04. The notices stated that the transaction was a clear violation of Section 4 and 21 of the Mines and Minerals (Development and Regulation) Act, 1957.

- The Prime Minister, constituted the 'National Council for Tribal Welfare' to review and guide India's policies affecting over 80 million tribal people living in the country.

- Ministry of Mines commissioned Environmental Resources Management India, Pvt. Ltd., India, to develop a Sustainable Development Framework (SDF) for the Mining Sector (Non Coal, Non Fuel) in India. SDF is a set of guiding principles for the mining sector in India, which aims at achieving resource efficiency, business viability and environment stewardship around development of affected communities. The report based on many consultations across India has been submitted.

- In June 2010, India and Canada declared that both countries are committed to enhancing cooperation in the sectors of mining, agriculture, higher education, culture and science and technology.

- On 3rd June, 2010 the draft of the new Mines and Minerals (Development and Regulation) Act, 2010 (MMDR) was released by the UPA government. It aims to provide for the scientific development of mines and minerals under the control of the Union and the regulation of activities connected therewith. One of the major provisions of this Act is that it is expected to introduce a clause that would make it mandatory for mining companies to share profits and in some cases giving equity to workers and project affected locals.

- 22 June 2010 marked the expiry of the Memorandum of Understanding (MoU) between the Government of Orissa and the South Korean major POSCO for setting up of a steel plant, captive port, mining and all related

infrastructure facilities. For 5 years since the MoU began, the project was vehemently opposed by the local communities in the project-affected area. In addition, violation of Forest Rights Act and other environmental laws were identified.

- In July 2010, Chief Minister of Karnataka, B S Yeddyurappa announced a ban on export of iron ore from Karnataka , saying that it was the only way to stop illegal mining in the state. He also clamped a ban on transport of iron to other states. Between 2000 and 2010, over 30 million tonnes of iron ore were illegally mined and exported from Karnataka, according to data provided by Yeddyurappa to the State Assembly. Janardhan Reddy, a Minister in the Karnataka Government and his brother Karunakara Reddy are facing allegations of indulging in illegal mining of iron ore in Anantapur district of Andhra Pradesh by encroaching upon a large chunk of forestland in the area causing huge damage to the environment in Bellary district of Karnataka

- The Saxena Committee, comprising of four members, was appointed on July 19, 2010 by the Ministry of Environment and Forests (MoEF). One of its mandates was to investigate the proposed diversion of nearly 660 ha of forest land (Niyamgiri Hills, Lanjigarh) in the Kalahandi and Rayagada districts of Orissa for bauxite mining.

- Saxena committee recommended that mining at Niyamgiri should not be allowed as the project is:
  - Not-compliant with the Forest Rights Act,
  - Has violated Environmental Protection,
  - Has violated Forest Conservation Act,
  - Shown contempt towards Supreme Court
  - Could not show proof of sourcing minerals from mines with adequate environment clearance
  - Has submitted falsified and inadequate EIA reports
  - Non-complied with the pollution control norms at the refinery

- MoEF rejected the proposal to divert the land on Niyamgiri Hills for bauxite mining on 20th August 2010. It also sent show cause notices to Vedanta with regard to numerous issues related to the running of the refinery and summoned the Chief Minister of Orissa to explain the prolonged and systematic failure of the state machinery in implementing relevant laws.

- In September 2010, the Coal and Environment Ministries had jointly undertaken an exercise to mark 'go' and 'no-go' areas for mining in nine coal fields in June 2010. As per the parameters set by the ministries, of the 582 coal blocks over 600,000 hectares, 49 per cent were declared no-go zone, where mining could be carried out in compliance with the environment and forest laws. The coal ministry and the Prime Minister's Office opposed this. The environment ministry re-examined the classification of coal blocks into the two categories. This time, 23.27 per cent of the area was declared no-go zone. But even after the revised study was appreciated by the Committee chaired by B K Chaturvedi, a member of the Planning Commission, the coal ministry proposed that the zone classification should not be implemented. In December, it wrote to the Cabinet secretary asking it to “consider all coal blocks without reference to go and no-go areas”, arguing that coal blocks in the no-go zone had already been allocated to mining and power companies.

- A four member Posco Enquiry Committee, led by Ms. Meena Gupta submitted a report on October 18, 2010 which presented two divergent views.

- Broad agreement that the process for recognition of forest rights act should be redone.
    - There were two different opinions about adequacy of compensation & divergence of forest land.
    - Opinions differed about the cancellation of environmental clearance & CRZ clearance.
    - The majority view of the members was cancellation of clearance to POSCO while the view of Ms. Gupta was that necessary studies should be redone.
    - In January 2011 MOEF gave conditional clearance for the steel plant with 28 additional conditions and for the POSCO part with 32 additional conditions as part of environmental clearance. The ministry also sought assurance from the Orissa government for the compliance of the Forest Rights Act.
    - In October 2010, Union minister of Environment and Forest, Shri Jairam Ramesh asked Maharashtra Chief Minister to review the 49 mining leases given for excavation of iron ore and bauxite in Sindhudurg region. The move follows a Times of India expose on the state government`s decision to approve the leases in the eco-sensitive district of Konkan Maharashtra.
- In March 2011, Bharat Swabhiman Trust (BST), supported by Yoga guru Swami Ramdev, decided to take up the anti-mining campaign in Goa by bringing activists under one banner.

Section 1

Optimizing Social Security

7

Review of Local Communities' Struggle Against Mining in Goa

Sebastian Rodrigues,
Mand Goa

1.0 Introduction

Mining industry in Goa is open cast with three major minerals: iron ore, manganese and to some extent bauxite. It has its beginning in early twentieth century and exports of the ore began in 1948. The chief destination initially had been Japan. Gradually, European countries also entered as the destination in later years. Towards the beginning of the twentieth century, China surpassed everyone else as the destination of Iron Ore. Protests against mining industry began during the decade of 1970s. They were repressed by the State police force. Renewed sophisticated protests swept Goa from 2007 onwards. Various organizations have played an important role in politicizing the common people, and media. One of the distinctive features of these protests is the decentralized, autonomous multi-layered dissent by tribal groups and middle classes. The use of information technology to defuse State repression has been another key ingredient.

2.0 The Beginning

The mining activity in Goa started during colonial era dominated by Portuguese political domination with the support of local caste and class elites. The Portuguese steadily increased their hold on Goa after landing in Goa in 1510 on the invitation of local Brahmins wanting to overthrow the Muslim rule of Adil Shah. This was done successfully. Muslim rule was replaced by Christian rule. Both the rules were of colonial nature. Portugal went on increasing their hold over Goa in the next few centuries. Goa has the world's longest colonial domination in terms of time. It ranged from 1510 to 1961.

Portugal was the first direct European colonial power in India and was the last one to leave. Its basic concern remained in using Goa as a port for trade strategy due to its appropriate location on the west coast of India. Spices were among the items that were mostly sought by the Portuguese and mining never crossed into their priorities till the early twentieth century when the German geologists were drafted to undertake Goa's mineral survey that confirmed the existence of mineral wealth in Goa. Over the next few decades, mining activity began with the manual digging of the earth – open cast mining. This technique of manual digging led to the export of 100 tones of iron ore to Japan in 1948. It went to Japan to contribute substantially towards the rebuilding of its war torn economy after US nuclear bombings on Hiroshima and Nagasaki in August 1945. Japan continued to be Goa's stable destination for Iron ore and manganese trade till date. China boom is an additional burden on the Goa's resources along with Japan.

This involved granting of mining leases by Portuguese colonial rulers. Nearly 891 mining leases were granted with patrimonial rights to the individuals and companies that supported perpetuation of colonial rule of Portuguese in Goa. Portugal granted the mining leases from 1929 to 1959. Technically colonial government had granted concessions – *tutelar de cocessao*. However Indian government through legal intervention changed it into leases that need renewal periodically and removed patrimonial rights to the lease holders.

The total area covered under these mining leases touches nearly 68,000 hectares of Goa's land in a distance of 95 kms out of total 105 kms from north to south of Goa. The mining activity was manual in nature and could not inflict major damage to the ecology at the site of mining even though the rivers transporting iron ore were damaged early in the loading and unloading operations. Manual mining could not go deeper than ground water table. Hence it can be called an ecologically sustainable mining practice even though economically it is

exploitative practice as few families usurped almost all the economic gains. This could be sustained because these entities involved in mining trade were a stable source of support to the Portuguese colonial administration. This kind of arrangement is so typical of any colonial regime. It was mining companies that were major source of strength for Portugal to continue colonial rule in Goa even after India's Independence when British rule came to an end. The Portuguese earned major advantage in this till 1961 when the Indian army intervened to end the colonial era.

Goa's mining trade is deeply entrenched in global geo-politics. Because Japan wanted the steady supply of raw materials, value addition in the form of manufacture is strikingly absent in Goa. Centre-Periphery relationship characterizes the relationship between Goa and Japan in mining sector. Japan buys Goa's ore, indulges in value addition and then markets the finished products all over the globe. It is against the interest of the destination countries to let Goa develop its own industry. Hence these powers have cultivated a tiny yet rich coterie of elites that have kept their firm control over polity and media in Goa to effectively checkmate any voice of dissent to this exploitative and dominating arrangement of power.

The 1961 transfer of power of rule over Goa from Portugal to India came about only after India's Prime Minister Pandit Jawaharlal Nehru assured the local mining elites in Goa that mines in Goa would not be nationalized even though contrary was the situation in rest of India. This concession granted to the mining companies in Goa was a major factor that led to neutralizing of NATO strikes on India after Indian army marched inside Goa's International borders. Nehru made very lucrative exception to the miners in Goa and that made them continue their hegemonic position in the polity of Goa during post liberation period.

Around the decade of 1970s, mining industry in Goa began the process of mechanization of mining sector. The rapid change in the excavation process led to dramatic changes in the character of the industry. Exploitation that was largely limited towards economic sphere found itself flowing into ecological sphere very rapidly.

3.0 The Pressures on Ecology

With the introduction and intensification of mining industry, ecological threat became gradually visible. Location of mining leases in the villages depending upon forest, agriculture and nature water bodies gradually became the target of this predatory industry. The paddy fields began to be directly affected in number of ways. All the ways however are negative. Quite often the location of paddy fields became the site for the mining activity and peasants lost control over the land directly. Sometimes mines were located at a close proximity of the paddy fields and waste discharges were released in paddy fields with no control from state authorities. Sometimes mine in the relatively close proximity would be causing the drying up of natural water bodies that include drying up of springs that would supply water to village wells and village paddy fields. Sometimes the varying combinations of all these factors would cause serious social and ecological insecurity in the village.

The village level perception of ecological threats when viewed in combination with various other villages and topography some new level of ecological threats becomes visible. The first factor that becomes clear is that huge chuck of Goa's land is under mining activities - some mines are in operation, others can become operational in future. There is something particularly disturbing which quickly comes to the fore is that besides paddy fields and water bodies, large number of mines are directly located inside the ecologically sensitive areas of the Western Ghat range of mountains known as one of the dozen biodiversity hotspots on earth. Doing mining activity here could dramatically cause huge amount of loss to the global ecological wealth.

The second factor has to do with the topography of the State of Goa. On the eastern past are the Western Ghats, in the middle are fertile alluvial planes and towards the west is the coastline. These three ecological regions falls within various zones classified under the watershed map of India and are sensitively intergraded. Mountains from the Ghats harvest sunlight as well as water from the rains. Naturally harvested water is what causes fresh water perennial water bodies like rivers, rivulets, streams to flow onto the plains and supply water for agriculture, dams, industry and myriad of other things.

Plains are also the approximate sites wherein the fresh water and saline Arabian Sea water intersect and forms the ecotone region. The coast of Goa is largely reclaimed from the Arabian Sea by the ancestors of tribal settlers of Goa – the Gawdas. Their ancestors worked on the geography of Goa over the centuries to reclaim the fertile

lands. This fact has been too often sought to be covered up by invasive Brahmin tribe with their Parshuram Arrow myth reclaiming the coast of Goa. Currently this coast is covered with tourism destination centres of attraction. The tourism industry depends entire on the water from the hinterlands piped from various dams – Selaulim, Opa, Asanaora etc., all of which are facing threat due to rapidly expanding mining industry in the hinterlands. The three regions of Goa closely related to each other and mining activity is perceived as causing major social and ecological threat to the state of Goa fearing that this industry may turn Goa into desert besides providing body blow to the fisheries industry due to polluting of rivers.

Threat to water, threat to forest, threat to agriculture, are some of the major ecological issues on the horizon in Goa. These are the issues that the State government that is dominated by mining industry as well as mining industry itself sought to put under the carpet to escape its liabilities for over half a century of mineral usury of Goa. It was done through various formal and informal structures of domination.

4.0 Mining Industry's Structures of Domination

One of the favoured tools of the mining industry particularly when the protest began to show themselves resisting mining industry, was the use of violence through state police force. Mining industry in Goa never cultivated their private mafia. State police force would do their job perhaps for some off the record considerations. The first known protests against mining industry came about in later half of the decade of 1970s when the two villages in Goa's northern taluka of Bicholim revolted – Mayem and Sirgao. Bicholim taluka has mines of number of mining companies – Dempos, Chowgules, Bandekars, Sesa Goa etc. Those who were involved in rebellion were arrested by Goa Police. Mere arrest that time was sufficient enough to demoralize the peasants. They did not know any way of surpassing police repression and suspended their agitation. Few village peasants were offered money to suspend the rebellion. The decade of 1970s went about with these sporadic protests with no co-ordination of politics of one village with another. There was no serious search for surmounting police siding with mining companies. These protests were exclusively of the people directly affected by mining – particularly their paddy fields. Protests during this time evaporated yet the thought of havoc that mining was ravaging their villages and the need to do something remained in a latent yet simmering state only to resurface in the first decade of the twenty-first century. So the first mechanism of domination has been the use of police force.

The second favoured structure of domination of mining industry has been the control of media. Mining industry with a remarkable foresight set up their newspapers. Dempos set up Navhind Times in English and Navaprabha in Marathi. Chowgules started Gomantak in Marathi and later Gomantak Times in English. Salgaoncar started monthly magazine 'Goa Today' and later Konkani daily 'Sunaprant'. These papers saw to the fact that public attention never gets focused on the ecological crimes that their owners were indulging in. The remaining papers – Tarun Bharat, Rastramat in Marathi and Herald in English too did not carry any consistent exposition of mining industry's ill doings even though their owners were not mining companies. Press in Goa suffered from three major defects – censorship by owners, self-censorship, and fear of the mining industry that was all pervasive in society. Overall it served as an effective structure of domination for mining industry till 2008 when media began to become increasingly vigilant, aware and ownership of few newspapers shifted away from mining industry, with entry of Times of India in English, Lokmat, Pudhari and other publications in Marathi, and effective use of internet by activists in Goa to overcome limits posed by mainstream media.

The third favoured structure of domination of the mining industry has been the donations to the village temples. This is an informal structure that worked wonders for the mining industry. Paltry sums of donation to demolish and reconstruct the village temples would see that the village never comes to pursue the path of rebellion against mining industry. Psychology of the villagers is such that that they remain indebted to the donor for a long time. This phenomenon is rampant all over Goa and effectively exploited by mining companies. It is not uncommon to witness scenes of posh temples in mining ravaged villages. Religion has been hijacked by mining industries and people in various areas have not been able to put a brake on this trend. It continues to serve the mining companies. Related aspect here is periodic payments made as compensation for the destruction of agricultural fields. However of late, people are refusing to subscribe to the ideology of compensation.

The fourth strong structure of domination has been the hold over educational institutions. Mining companies set up graduate colleges – Dempos - and law college – Salgaoncar, to make their presence felt in ideological spectrum of the society. Mining companies has also instituted fellowships for senior researchers. Dempos is one such example. Mining companies and their caste alliances are also involved in writing their history. One of the favoured aspects of process is to establish hegemonic hold over Goa, particularly its tribes. It is project of conquest through ideological apparatus to further the agenda of domination not just of the mining industry but over the entire society through thought control measures. Mining companies also has significant influence over the senate of Goa University and its policies. It is because of this influence Goa University was stopped from getting Central University status. It is because of this that Goa University has not set up centre for the study of tribes in Goa. It is because of this that fees of Goa University are constantly hiked in order to keep the students away from access to higher education. To a large extent, mining companies are successful in this venture. It is against the interest of mining that higher education becomes widespread as the ignited minds will be difficult to curtail in their path if chosen to direct against the mining industry and their caste, class alliances that form coteries and select vice-chancellors.

The fifth strong structure of domination is NGO sector. Mining industry, after facing severe criticism from TERI report in 1997 set up its combined NGO – The Goa Mineral Foundation in 2000. It is working as a buffer for public criticism on mining industry. It is involved in whole range of activities from dance classes, distributing notebooks to students, building of toilets, building of bus sheds, sending people for vocational training, watershed programs in one village etc. It has got full time staffs that engage in all kinds of activities except in criticizing mining industry. The funds for this are shared between various mining companies, Sesa Goa being one of the prominent ones. However it is important to observe here that this NGO of mining company has come as response to the protests against mining and to earn credits for the corporate social responsibility.

Government of India in a draft mineral policy has cited this NGO as one of the examples to be replicated by the mining industry in India. On ground in Goa however it has not at all succeeded in diverting attention from core damage caused by mining industry. Nevertheless it is a structure of domination sought to be made effective by mining industry but has not succeeded.

The sixth strong structure of domination by mining industry is use and abuse of judiciary in Goa. After the intense protests, this is a phenomenon that has come about providing some succour to the mining industry. Police cases are registered on a number of false pretexts; people are then arrested, forced to take bail and then after some months charge-sheeted and cases gets listed in the courts. Then people are served notices at home by court bailiffs and asked to appear in the court on a particular date. After appearing in the court the next date is given for appearance. Judiciary's role in mining belt of Goa has been largely to frustrate the protesting people. Mining companies aim for exactly that. Currently there are over 300 cases in various courts of Goa against various people protesting mining industry's onslaughts.

The state government has the power to withdraw these cases but since the mining companies are using the state government as their executive committee, these cases are carrying on. Goa Chief minister Digambar Kamat holds a portfolio of mining minister for over past 15 years and shares personal interest in the continuation of mining industry. He also has family ties with mining companies. In this scenario, the judiciary has been used to further the agenda of the mining companies. Judiciary was also used to silence the vocal critic of the mining industry – the author of this paper – by Fomentos, by filing civil defamation suit of Rs.500 crores in Calcutta High Court, Kolkata, for his online writings or blog, belonging to Gawda, Kunbi, Velip and Dhangar Federation (GAKUVED). Mining companies are using Judiciary as the very reliable structure of domination.

Seventh strong structure of domination of mining industry is EIA and Public Hearings. These are paid for by mining companies and are thoroughly rigged in almost all the cases in numerous manner. EIA studies are tailored not to the objective reality on ground but to suit the interest of the mining companies. This is because it is the mining companies that are financing the EIA studies. On the day of mandatory hearings there is manipulation in terms of venue – very often it is held in minister's cabin in a faraway place from the mining site. MoEF is guilty of ignoring public opposition to mining projects all over Goa and sanctioned environmental clearances there by establishing colonial relationship between the Central government and people of Goa.

5.0 Protest Agitations against Mining Industry

It was 1st April 2001 that the author got agitated on the issue of open cast iron ore mine in Goa. It was at one august gathering of environment lovers in Old Goa that one youth –Vasudev Porob- from Pissurlem village of Sattari taluka got up to intervene in the discussion on Mhadei river diversion by Karnataka Government thereby depriving Goa of water flow. Vasudev Porob sharply focused on his water rich village yet not a single drop existed in village wells due to continuous pumping out of water by mining companies thereby depleting ground water. Hence agriculture was not getting water; cultivation of paddy was becoming impossible.

He barely finished speaking for couple of minutes when a scientist and former director of National Institute of Oceanography, Dr. Untawale sprang up from his chair to scold Vasudev for speaking against mining in public "You must never discuss mining in public". The author challenged Dr. Untawale and declare that not only should all speak loud against mining industry in Goa but also invited everyone at the meeting to a sit –in or *Dharna* outside the office of mining company in Goa's capital city of Panjim.

After this, it was a huge learning experience, very often understanding through roving of boat backwards in time to know what to expect in future that spread vast open before one's mind. Every month one visit to Pissurlem became discipline for the next three years. Learning was not easy. Every visit would contribute towards weakening of chest that was already weak with tuberculosis as first 14 years has been in mining area. Memories of childhood and playing with dust were constant companion on every time author would visit Pissurlem. It dawned on the author that while family was rotting in dust from 1973 to 1987 - till the family left the place as sickness hounded, and dust made life impossible – there was no one to raise their voice and protest. He somehow survived the ordeals of childhood and early youth to speak out today.

Agitations in Goa's mining belt have been spurred for various reasons. In Pissurlem it was because of refusal of additional bucket of water that a villager Pandurang Porob was attacked by Chopper, causing injuries to his legs. Pissurlem is totally at the mercy of mining companies to supply them with water after village wells, springs, natural tanks, and ponds are rendered dry by unsustainable open cast iron and manganese mining carried on by at least 5 mining companies.

Another villager Hanumant Porob was arrested and imprisoned for protesting against mining silt in the village agricultural fields that once prided itself being highest yield giver in the Sattari taluka. Mining companies have not yielded to the demands of the Pissurlem villagers who are compelled to get into mining trucks business themselves. There cannot be any greater tragedy than this one unfolding in Pissurlem.

Colamb village in Sanguem taluka is blessed with people who refused to barter their land for money offered by mining companies. As a result there has been number of protests against the mining companies. A number of times the police force is pitted against them and arrests are affected. There are at least half a dozen charge sheets filed against Colamb villagers in various combinations and they now have to regularly report to the Courts in Quepem and Sanguem towns.

People from various other parts of Goa – including those from Goa Bachao Abhiyan (GBA), Ganv Ghor Rakhan Manch (GGRM), and Nature, Environment, Society and Transformations (NEST) has also regularly visited and offered solidarity to the Colamb villagers. Gawda, Kunbi, Velip and Dhangar Federation (GAKUVED), who played an important role to support Colamb villagers from 2007 till date and helped to make it state-level issue through the morcha it organized on December 10, 2007 on Human Rights Day in Quepem. Brother Philip Neri de Souza has played very crucial role in Colamb resistance from 2001 to 2007. Colamb villagers, due to their resolute decision to oppose mining, were even threatened with 'Tadi par' by then Police Inspector at Quepem Police Station, Santosh Desai. 'Tadi par' sentence is meant to prohibit the villagers from entering into the administrative jurisdictions of South Goa.

On one occasion nearly ten people from Colamb protesting against mining were arrested, criminally charged and photographed at Quepem Police Station with slates around their necks. This is a practice used on hard core criminals. Industry-police nexus in this manner tries to de-legitimize and criminalize the protests against mining industry in Goa.

Uncompromising stand of Colamb villagers against mining industry attracted higher level of collusion between Fomento mining company and the Leader of the Opposition Manohar Parrikar. In June 2008 people of Colamb along with author of this article was tagged as Naxalite in the Goa assembly. This however instead of daunting the spirit of the protest of the Colamb villagers further widened across the State of Goa. The jam packed meeting on 23 June 2008 at T.B.Cunha Hall, Panjim will be remembered in the books of history as creating a wave of second liberation of Goa from the mining industry.

After this attempt of the mining industry was foiled, Fomento filed defamation suit against the author of this article for Rs 500 crore in Calcutta High Court stating that the company is has suffered losses in business after some customers read the blog www.mandgoa.blogspot.com and terminated their contracts to buy ore from Fomentos. This scare tactic again failed as the rising public opinion against mining industry further popularized the online writings of this author.

Dora de Souza, a woman aged over 80, chained herself to the mine operated by Dinar Tarcar in Maina, Quepem in October 2009. She along with 7 others were arrested – four were beaten up by mining company's goons led by Subhas Phaldesai, then Balli South Goa Zilla Parishad member- criminal cases filed and imprisoned for two days.

Motes Antao from Colamb has been arrested number of times. He was arrested by Goa Police at Quepem Police Station because he filed application under Right to Information Act 2005 asking the detail information on assets held like mining trucks owned by police officials including PI Santos Desai who is currently posted at Margao Police Station. Motes was called at the police station under the pretext of collecting information sought under RTI and detained over some case the Fomento mines manager in Colamb had filed against him ten months earlier.Lawyer John Fernandes was charged for attempt to murder during a lathi charge on villagers of Ambaulim, Quepem in December 2008. Several people were injured during the lathi charge on villagers that were protesting against dust pollution caused in their village by mining trucks. Several people were arrested and criminally charged. PI Santosh Desai led the lathi charge on protestors. Advocate Fernandes was again physically abused by the agents of the mining companies in 2010. It was here that public gathered around Adv. Fernandes and staged one day hunger strike in front of Quepem police station forcing the police authorizes to criminally book the assaulters.

Determination of Colamb villagers infused courage to number of other villagers affected by mining industry. Advalpal in Bicholim revolted in May 2008 in spite of earlier compromises with the mining companies. Over 70 people were arrested and criminally charged. Akash Naik, a nine-year-old school boy supported by Goa Foundation in September 2009 got a stay order from Goa bench of Bombay High Court against marauding Sesa Goa mine owned by British corporate Vedanta listed on London stock exchange. The litigation is currently going on in the Court.

Sirgao villagers in Bicholim taluka revolted against this 40 year old industry in village and filed Public Interest Litigation in Goa bench of Bombay High Court. High Court appointed Nagpur based National Environmental Engineering Institute (NEERI) to conduct a scientific study. NEERI report submitted to the Court stated that agriculture and water bodies are negatively affected by three open cast mines operating in Sirgao village. NEERI in another case in the Goa Bench of Bombay High Court submitted a report that June 2009 floods in Advalpal was caused due to mining activities in the village. The case is currently on.

Wide spread protests against mining has led to the emergence of coalition of mining affected villages in August 2008. It is known as Goa Federation of Mines Affected People (GOAMAP). GOAMAP has raised the issue of mining destroying Goa's ecology and livelihoods at number of forum. On September 22, it raised the issue with banks financing Vedanta mining company at a meeting organized by Bank Track from Netherlands and Urgewald from Germany held at Amnesty International Headquarters in London.

A large number of people across the board have lent their voice and support to the movement to defend Goa from being swallowed by mining industry. They are artists, teachers, writers, professionals and people in media. Some deserve special mention. Kurush Canteenwala who was prison colleague of this author at Margao Judicial Custody in October 2008 has made a video documentary on Goa's mining struggles titled – 'Goa Goa Gone'.

Both were assaulted in Maina while filming protests led by 80 year old Dora de Souza accompanied by her daughter Cheryl de Souza Sanfransisco and other supporters including Fr. Mathias D'Cunha. Police force led by PI Santos Desai colluded with the mining company goons and merely watched protestors being beaten up. He then arrested and criminally charged the protestors and did nothing to those who were involved in the attack though he was a personal witness. Present at the occasion, Kurush made an impressive documentary “Goa Goa Gone” and on30th October 2009, it won the national award for Best Environmental Documentary at Vatavaran Film Festival organized by Centre for Media Studies in Delhi. It is the Indian nation lending its voice to rising wave of voices against mining industry in Goa. This documentary was used to create awareness of public in Goa since the time of its release and later further upgradation.

Ramesh Gauns, a teacher from Bicholim has successfully blocked commissioning of Zantye's iron ore mine at a village where he has been teaching for over past two decades – Sarvona in Bicholim taluka. He used agitation modes as well as judiciary to his advantage. Particularly important is the use of Right to Information Act 2005 to get hold of key documents of the mining industry.

Claude Alvares and Norma Alvares have rendered huge service to Goa. This couple has on several occasions successfully used judiciary against mining industry. Latest has been thwarting attempts by mining industry to mine Goa's Wildlife Sanctuaries.There are other cases such as on dust pollution that is aided by Goa Foundation in litigation stage.

Sangamitra Mainkar, Prabhakar Dhage,Carmen Miranda, Wendell Rodricks, Maria Aurora Couto, Venita Coelho, Hartman de Souza, Advocate Ritwick Dutta are some notable people who have lent their valued loud voices to the protests against mining in Goa. Trade Unionist Christopher Fonseca of AITUC in Television interview in June 2009 referred to the protest movements against mining as “Prophetic Voices and Goa is lucky to have them.” CITU workers union has also initiated dialogue with the people protesting against mining in Goa. Overall there is growing consensus that in the long term interest of Goa mining industry in Goa has to be shut down. Voice of protest against mining industry can be heard from Colamb to Sirgao, Nuem-Khola to Advalpal, and Bicholim to Usgao. This is a beginning of change in power relations and power structure in the State of Goa. Goenchea Xetkaracho Ekvot (GXE) got into working alliance with Goa Federation of Mines Affected People (GOAMAP) in January 2010 and since have been working in coordination with each other. One of the fruits of this collaboration has been bus trips to Goa's mining belt that took people on tour to mining areas from April to June 2010 on every Sunday. This helped to further broadening the contours of ecology movement in Goa by letting first hand exposure to people from various walks of lives who otherwise seldom visit mining areas, to see the mining reality of Goa.

In February 2010 Union Minister of Environment and Forest put a moratorium for any further mining in Goa till comprehensive cumulative EIA is undertaken by some agency like NEERI, Nagpur. This has been perceived as a direct result of the campaign against the mining industry in Goa and the ability it has acquired to influence policy maker s of the country.

Delhi High Court has struck down nearly three environmental clearances given by the Ministry of Environment and Forest (MoEF) largely due to the effective coordination between the protestors in Goa and lawyers in Delhi. Appellate authority too has struck off Pirla mine in south Goa after sending its judge on site visit to Goa.

MoEF through its regional office based in Bangalore has initiated direct discussions on mining with the protestors, government officials and the mining companies in 2010. First round of discussions took place in February and the second round in May. This if nothing has bestowed certain amount of official legitimacy by official agencies. It is called a round table on sustainable mining, the first of its kind in India. Although there is hardly any possibility of sustainable mining it is looked upon as a very important occasion to further the agenda of the protest movement that has found base in middle classes of Goa and people of Goa settled abroad.

Media in Goa took a u-turn on mining from 2008 onwards and there is increased coverage for mining issues in Goa. This was possible largely by lobbying of activists with media and dramatic naming of blog dealing with mining and tribal issues in Goa as promoter of naxalite ideology in Goa Assembly by the leader of opposition Manohar Parrikar. Media attention to mining issues since then has never waned. The use of internet played two important roles.

- First to make the issue of mining internationally know and get people from all over the world interested in mining issue. There was an advantage as Goa is a particularly well known tourism destination. Predictably it attracted outstation media and researchers to cover mining issues in Goa.

- Secondly, it bestowed freedom from censorship by vested interests that act as gatekeepers of information. Even though things remained less in terms of its reach, blog served as reference point for important resources on mining and land movements in Goa. Internet came particularly handy while dealing with police repression on villagers in various parts of the State in demanding their release. Messages were sent on mailing lists particularly on Goanet that has subscription of over 30,000 people across the globe. Publishing of photos of environmental destruction caused due to mining companies online and companies involved named. This led to increasing discomfort of mining companies with the protestors and increasing public support for the bold online exposures. The fear of mining industry that lasted in Goa for half a decade began to evaporate gradually from the 2007 onwards when GAKUVED marched on the streets of Quepem on 10 December 2010. Within next few days couple of mines were attacked by the villagers and forced to shut down.

There is also wide ranging ground collaboration with various activists' formations dealing with wide range of issue towards evolving a strategy of coordination of politics between the coast and the hinterland. This has helped in filling up loose ends providing necessary input to tackle wide range of challenges.

6.0 Conclusion

Protest against mining in Goa is modelled on decentralized absence of any single command structure. Multiple critical agencies are working against mining to suit their priorities without any kind of coercion on any one. People that are involved are because they are convinced about the issues involved. Each group retains its' own autonomy in decision making. NGOs, grassroots groups, support groups, teachers, intellectuals, media are playing their own role after self realization. Anti-mining movement has acquired necessary potency to attract newer people into its fold and sustain those already involved with new challenges.

Amongst the new challenges before the ecology movements in Goa is to devise strategies and formulate concepts that would facilitate transformation of the current upheaval into political power which would then rise from below and penetrate effectively in the process of governance. This needs to be achieved by defining and re-defining the relationships with political parties and understanding system of governance in place. If the movements in Goa are able to make headway in this direction then it would certainly be new leap for movement, new leap for Goa.

NaturalGist

- *Mining in Goa began in early 20th century and export of minerals began in 1948*
- *One of the distinctive features of these protests is the decentralized, autonomous multi-layered dissent by tribal groups and middle classes.*
- *The use of information technology to defuse State repression has been another key ingredient.*
- *Goa's mining trade is deeply entrenched in global geo-politics. Value addition to ore is not done within Goa, as the ore is exported.*
- *Mechanisation of ore extraction since 1970 which was harmful to the ecology due to overextraction.*
- *Mines have affected paddy lands and dried up water sources, contaminated rivers leading to social and ecological insecurity for the local farmers*
- *Threat to water, threat to forest, threat to agriculture, are some of he major ecological issues on the horizon in Goa.*
- *Protests against mining activities have been intense. The mining industry has used several ways of suppressing the protests by use of political and brutal force and in more subtle ways by manipulation of media, social organizations, educational institutes, law enforcement and religious sentiments of the local population.*
- *Protest against mining in Goa is modeled on decentralized, absence of any single command structure. One very important feature is the role of single committed individuals who have stood against the domination and fought environmental and social degradation caused by mining.*

Mining and Livelihoods: Voices From the Ground

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1.0 Introduction

The discussion on mining swings between three positions:

- Mining is essential for development and growth of national economy;
- Mining is the cause of environmental destruction and pollution, and ,
- Mining is the cause of misery for local people who lose land and livelihood and hence needs to be resisted.

The last is often dismissed on the basis of a misconstrued and misleading axiom that the interests of some people have to be sacrificed for a larger common good. This thinking tends to ignore the voices of those who are actually affected. I feel it is important to listen to these voices, understand their concerns and how they perceive this development. Here I present the views of the local people threatened by the proposed mining project of POSCO in Sundargarh district of Odisha and some recommendations for making mining policies and practices more just and humane.

2.0 Introduction to POSCO Project

On 22nd June, 2005, the Government of Odisha signed a Memorandum of Understanding (MoU) with Pohang Steel Company (POSCO) of South Korea to establish 12 MTPA integrated steel plant, captive power plant and a captive port. According to this MoU, the steel plant will be established in Jagatsinghpur district of Odisha. The plant will require around 600 MT of iron ore. For this purpose, the state government had initially recommended Khandadhar hill mining area to POSCO company which spreads across 6,204 hectares in Sundergarh district of Odisha for 30 years.

In 2007, the Kudremukh Iron Ore Company, a public sector undertaking, opposed the move and approached Odisha High Court challenging the state government's recommendation to grant mining lease to POSCO India in Khandadhar. In April 2007, the Odisha High Court asked the central Ministry of Mines to settle the issue of the mining license within three months.

On January, 9, 2009, the Odisha government recommended once again to the Government of India, the granting of prospecting licence to POSCO over an area of 2,500 hectares at Khandadhar.

On July 14, 2010, the Division bench of Odisha High Court that comprised of Justice B. P. Ray and Justice B. P. Das, rejected the state government's recommendation to hand over Khandadhar iron ore mines to the South Korean steel company. The court found that the preferential right for consideration was available to the

petitioner company, Geomin Minerals, (who is this) and the recommendations made in favour of POSCO was not valid. The Government of Odisha has now moved the Supreme Court of India against this order.

2.1 Khandadhar Hill – An Introduction

The Khandadhar Hill range is a part of the Eastern Ghats and extends from a place called Suakanthi in Keojhar district to Bonai in Sundargarh district. The range is very popular, especially among tourists, for its two enormous waterfalls, one on Keonjhar side in Bansapal and the other higher one, almost 244 meters in Sundargarh district block (Asher, 2009) Khandadhar range also abounds with streams and its forests are an ideal habitat for diverse, rare, and endangered wildlife like tigers, leopards, elephants and the recently discovered new reptilian species called the limbless lizard. Even a preliminary observation, indicates the enormous richness of the ecosystem as a whole.

The Khandadhar hill range is the habitat of the primitive tribal group (PTG) like Paudi Bhuyan. This tribal group is found only in this region with a total population of 4000. There is an apprehension that one of the oldest primitive tribal groups in Odisha would become extinct due to the complete destruction of their habitat by the POSCO mining company that is already under threat due to deforestation and existing mining and industrial activities.

In the Khandadhar hills, any large-scale felling and commercial exploitation of the forest was not allowed during the British period. The British feared that if they felled trees in this forest, it would hurt the religious sentiments of the tribals. This forest was kept away from all business and commercial activities until the government granted a lease to Odisha Mining Corporation (OMC) for iron ore mining at Rantha (Upper Khandadhar area) in 1966 (Pratap and Das, 2008).

2.2 The Potential Impact of the Proposed POSCO Mining

I. **Displacement and impacts on the local livelihoods:** Agriculture is the backbone of the local economy and nearly the entire population in the proposed POSCO mining area is dependent on agriculture, and forest based livelihoods. According to a rough estimate by local activists, around 30,000 people including 4000 belonging to PTGs, living in 29 villages would be directly displaced by the POSCO mining project. Apart from crop cultivation, mining will also have a drastic impact over horticultural farms developed by private and government agencies. The forest is playing a vital role by sustaining livelihood to the inhabitants of this area. Fruit, vegetable and lac cultivation in the area will be seriously affected by shortage of water and increase of density of particulate matter in the air. In addition to paddy and maize, collection of lac is very important source of income for the people.

   Villagers like Mr. Gurucharan Pradhan of Kolipsoh are anxious and apprehensive about their future. They have problems now too but they know how to deal with them. Mr. Pardhan says, “We know how to deal with the elephants. Now what will we do when there is no water and stone and red dust are scattered on our farm land? We are really worried about future. We don't know how we will survive.” A Member of Parliament from Sundhargarh, Mr. Juel Oram says, “If POSCO carries out mining activity in the area, the world will lose one of its finest forests consisting of some rare floral species” (Pratap and Das, 2008).

II. **Impact on availability of water:** Excavation of the Khandadhar hills will result in drying up of all the streams and that would directly affect local livelihoods. Odisha Mining Corporation (OMC) is already drawing water from the upper head of the Khandadhar waterfalls, which has resulted in reduction of 50% of the flow in Korapani stream according to the Talbahali, Koliposh and Kuntagaon villagers (Pratap and Das, 2008). People say that this would further worsen if POSCO is allowed to start mining in this area.

   Health problems are also rampant in the region, the mine workers and their children being the most affected. Increasing incidence of waterborne and respiratory diseases is reported in the area.

2.3 Responses from the Villagers

Kishore Chandra Giri from Phuljhar village is quick to respond. “The Odisha Mining Corporation has its mines only 8 kilometers away from our village. They have ruined the agricultural lands around the mines by dumping waste on the land and in the streams and our bamboo groves are completely destroyed”, he laments. But what bothers him more is the plight of his fellow villagers. “All the twenty mine workers from our village are suffering from respiratory disorders. There is no one to hold accountable as the contractors keep changing”, he adds. So the local communities are already aware about the implications of mining projects undertaken by Odisha Mining Corporation. They are quite apprehensive about their livelihoods and environment from the proposed POSCO mining projects.

“In spite of this being a Fifth Schedule area and 90% of it being dominated by tribal communities, the provisions of the Panchayats (Extension to Scheduled Areas) Act preventing transfer of land have been completely violated,” says Sudhanshu Panda, a local lawyer and activist who has filed several cases against the Odisha Mining Corporation and other companies, challenging the transfer of tribal land to industries for mining purposes. “This area was home to several indigenous tribal communities like the Bhumiyas and Juangs, but after the mining operations started, many of them disappeared. One doesn't know exactly where they went – they probably had to migrate after being robbed of their land and forest”, he adds.

3.0 Impact of Mining on Livelihoods of People (Pre and Post-mining) in Upper Khandadhar Hill and Gandhamardan Hill of Keonjhar

A study called Impact of Mining in Schedule Area of Odisha: A Case Study from Keonjhar, was undertaken in August 2008 by Vasundhara, an organisation in Bhubaneswar. The report found that the average income level of most of the households in this area has reduced at present in comparison to pre-mining period. More than 75% of surveyed households show a gross reduction in their annual income. Discussions with farmers living around the mines reveal that they are not cultivating various cash-crops anymore, which they used to do before commencement of mining activity. Almost all the households of this area were cultivating crops like maize, ragi, bajra, on the hill slopes and earned their livelihood.

However in post mining period, loss of fertility of soil and increased water pollution have drastically affected these crops. The small holdings of agricultural land that they still had, have become waste lands. 76% of the farmers said that reduction in natural water resources has affected their livelihood. It was found that one of the major impacts of mining activity on the local tribal people is loss of forest resources.

During pre-mining period, this area was full of forests of sal trees. A patch of teak forest was also found in this area. Majority of villagers, mostly Paudi bhuiyan and Juanga (both PTGs), were dependent on the 63 forest non-timber forest products (NTFP) for earning their livelihood. They collected various forest products like firewood, timber, mahul, toal, mushroom, resin that supplemented their family income. But this massive reduction in forest land due to mining and associated activities has lead to reduction in collection of the above NTFP. Maximum area has been dug up for extraction of iron ore. Trees have been cut down and the remaining trees are in bad condition. The quantity and type of various medicinal herbs which were collected from this area has been drastically affected. The Baidya (traditional healers), who used to collect various herbs, have left their occupation due to loss of medicinal plants.

Like forest resources, grazing lands too have shrunk by mining activities. Discussions with villagers reveal that prior to mining period, gochar lands like hill slopes were used for grazing of animals which are now being acquired by mining companies. Some vacant lands have turned into dumping yard of iron ore, thus seriously affecting the vegetation (Vasundhara 2008).

So diversion of forest not only affects the ecological system in the area, it also impacts livelihood of people who depend on it for sustenance – especially tribal people. Here, the important question raised about the proposed mining for POSCO projects is:

What is important - gain of Rs. 1044 crore as royalty value along with additional one thousand crore generated from other auxiliary activities or loss of Rs. 43500 crore as mineral value along with loss of rich bio-diversity, local agriculture, water regime, perennial streams, Khandadhar stream and most importantly the primitive tribal groups like Paudi bhuiyans?

4.0 Recommendation on Mining in Forest Areas:

On the basis of the preceding observations at the ground level, the following five points can be highlighted.

- The diversion of forest land for mining and other development projects has to be stopped by law in areas that have critical eco-systems – such as sanctuaries, national parks and areas which are crucial for water security and cultural & social values of people for their protection.
- There must be consent of Gram Sabha for any mining projects as per the PESA, 1996 and a strict practice of public hearing under environmental clearances for the project must be enforced. A strengthened 'community consultation' should be incorporated in Land Acquisition Act and mining laws. Where there is total opposition to mining, the project should be abandoned.
- Project components shouldn't be de-linked and shown as separate projects as in the case of POSCO and Vedanta project in Lanjigarh. Even if project components are remotely linked, each should be dealt with as part of original project even if their spatial location varies.
- Land Acquisition Law should be amended to provide transfer of land after mining not to the government but to the local community to serve as common land so as to serve as a resource for creating livelihoods. The consultation with and approval of local community should be mandatory in developing mine closure plan.
- Drastic policy changes at central level are necessary which should include:
    - No prospecting license without the consent of land owner and or without paying compensation for damage to his/her land.
    - Promotion community/workers' ownership in mining projects.

6.0 Conclusion

The mining policies should be people centred instead of being centred around huge investments that bring minimal or no returns to the local people. The livelihood systems of tribal communities and the rural poor are being increasingly threatened by huge mining operations in the tribal dominated states. In the name of mineral extractions and mining operations, the entire ecology in the tribal belt is vandalized. The issue of mining needs to be addressed in the wider context of people's right over natural resources. The government needs to be sensitive about the issues of mining and livelihoods. It is important to recognize the fact that in the current system, forced eviction of people from their land and their livelihood for projects like mining, creates poverty and not prosperity. Hence the government must recognize and respect the right of a community to say “no” to a development project. Only then the state will succeed in creating an atmosphere where progress will walk hand in hand with people's aspiration.

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- *Khandadhar region of Orissa is a region of rich biodiversity, and home of tribal communities, part of which was leased to Odisha Mining Corporation (OMC) for iron ore mining in 1966.*
- *POSCO has applied for iron ore mining lease in the region as part of its project including steel plant, captive power plant and captive port.*
- *Local people have already suffered loss of land, water, agriculture, horticulture, forest resources especially non-timber forest produce (NTFP) owing to the earlier mining by OMC. Health hazards due to mine are suffered by workers and local population*
- *Local people have opposed POSCO fearing it will again result in similar losses for a much larger population of about half lakh people.*
- *The voice of the people has been neglected and Act like provisions of the Panchayats (Extension to Scheduled Areas) Act for transfer of land have been violated*
- *Based on the study it is suggested that:*
- *Diversion of forest land for mining and other development projects has to be stopped by law in areas of critical eco-system crucial for water security and cultural and social values of people.*
- *Strengthened 'community consultation' should be incorporated in Land Acquisition Act and mining laws.*
- *Project components shouldn't be de-linked and shown as separate projects as in the case of POSCO and Vedanta project in Lanjigarh.*
- *Transfer of land after mining should not be to the Government but to the local community to serve as resource for creating livelihoods.*
- *The consultation with and approval of local community should be mandatory in developing mine closure plan.*
- *Government must recognize and respect the right of a community to say "no" to a development project.*

9

Social Impact Assessment for Ankua Iron and Manganese Ore Deposits in Jharkhand

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1.0 Introduction

The social impacts of mining activities on the surrounding socio-economic environment, affected individuals and communities are very pertinent due to various direct and indirect role of mining operation and use of available natural resources. Therefore, Social Impact Assessment (SIA) of these activities should incorporate into the operational activities of a mine as a management tool. Surrounding communities of a mine in general depend on the economic opportunities generated by it, especially within isolated rural areas. Apart from these dependencies and economic impacts, the social impacts are usually felt even more, i.e. squatting and low living standards, social ills (alcoholism, prostitution, drug addiction, women and child abuse, spread of disease, HIV/AIDS, etc.), disruption of traditional lifestyles and livelihood systems, increase in violence and crime, idleness and a disregard for traditional culture, etc.

The Social Impact Assessment (SIA) should not be regarded by mining companies as a moral responsibility, but as a tool to be used to promote sustainability for both the mining company and the affected communities for regional socio-economic development. Managing and assessing the social impacts of mining operations will ensure strong relationships with interested and/or affected parties and also ensure favour with the governments, which will equate to economic benefits for all stakeholders. If mining activities are to contribute to sustainable development for their affected communities and regions, the basic SIA methodologies have to be considered as a starting point.

2.0 Key Aspects of Mining Operations for Social Impacts

Some of the potential socio-economic impacts resulting from new mining operations are:

- The extent of general development in the area as a result of infrastructure and services provided by the mining operations, e.g. electricity, healthcare and transport.
- The economic changes that may occur as a direct result of the opening of the mine, e.g. economic returns to local settlements through royalties and mine taxes, and mine development initiatives.
- The likely direct economic changes that may occur as a direct result of the mining operation, e.g. jobs opportunity at the mine (permanent employees and contractors) and the impact of such changes on the local settlements, community organization and lifestyles.
- The extent to which skills and enterprises in the local economy are dependent on the mine and its activities; influences from outside; interventions by government, industry, NGOs, etc
- Cumulative impacts on the regions, i.e. the impact of the migrant labour system on labour-sending communities.
- Cumulative impacts due to the development of numerous mining waste deposits in a given area.

3.0 Objectives

The SIA focuses on the identification and mitigation of both positive and adverse social impacts that may arise from the establishment of a mine. It usually forms part of the Environmental Impact Assessment (EIA) process. The main aims of an SIA are:

- To understand the socio-economic characteristics and baseline of the area that will be impacted by a given mining project and how these relate to the dynamics of affected communities and economies.
- To identify the stakeholders, including landowners, farm residents, government and tribal institutions, businesses, NGOs, etc.
- To undertake a detailed Public Consultation Process (PCP).
- To describe the socio-economic issues that may become problematic if not adequately addressed.
- To quantify and assess the socio-economic impacts likely to result from the various phases of the project and to develop relevant mitigation and management measures to be implemented.
- To describe the existing opportunities for socio-economic upliftment, sustainable enterprise development and community livelihood development, which may act as a trade-off against any socio-economic impacts.

4.0 The Basic Steps for SIA of Mining Operations

Step 1: Preliminary Assessment and Identification of Communities (Scoping)

This includes a broad analysis of the social environment affected by the operations. This step will focus on the identification and defining the communities that are being affected by the mine. All relevant stakeholders within the mine-affected regions should also be identified, i.e. government authorities, NGOs, industry, community-based organizations, youth associations, women's associations, environmental associations, etc. A consultation process with interested and affected parties should be initiated in this phase to record the key social issues. A preliminary description of the socio-economic environment, potential social issues and likely socio-economic impacts should be provided.

Step 2: Baseline Socio-Economic Study-Survey and Profiling of the Community

The objective of the BSESS/profiling is to determine the baseline socio-economic characteristics, profiles and dynamics of mine-affected communities and areas. The baseline will indicate the 'true' needs and factual information on these communities/areas, thereby enabling appropriate identification and quantification of the social impacts, as well as enabling the planning/formulation of community development interventions and livelihood-creation initiatives. This will ensure that the SIA and community development programmes are contextually appropriate, focused on broad-based empowerment and provide for the true development needs of people, and that they also take into consideration the broader socio-economic conditions and sustainable development plans of the region within which the mine is located.

For this a pretested questionnaire or interview survey should be conducted with the mine's target communities and other stake holders with the focus on collecting qualitative and attitudinal data relating to: socio-economic status and livelihood profiles; household economic profiles; employment status; agricultural involvement; income streams, home ownership and the state of loan repayment on these homes; household assets; education and skills profiles; health and welfare status; cultural background; demographic information on the population; and perceptions and aspirations. This baseline socio-economic information on local conditions, local knowledge, local attitudes and perceptions is necessary to be able to assess the potential short and long-term positive and negative effects of the various project alternatives. This step will also include a detailed analysis of the current socio-economic conditions with other existing conditions. The information will be used as the basis for analysing the social impacts and for managing and monitoring future development programmes.

Step 3: Assessment of Impacts

Based on the data, the positive and negative potential socio-economic impacts are assessed. These impacts should be quantified in terms of: (i) extent (local, immediate surroundings, regional); (ii) nature (what causes the effect, what will be affected, how will it be affected); (iii) duration (short term < 5 years, medium term = 5–20 years, long term > 20 years, permanent); (iv) probability (improbable, probable, highly probable, definite); (v) status (positive, negative, neutral); and (vi) significance (no effect, low, medium, high, severe). With these, other qualitative assessment should also be undertaken.

Step 4: Formulation of a Community Development Action Plan

Based on the above a detailed development plan should be formulated indicating how the mine will implement sustainable community development and social upliftment in its affected communities with the focus of the project on the provision of infrastructure and basic services, and on the eradication of poverty or livelihood development.

5.0 Method

Field work was carried out in the month of January, 2009 and included visits to four villages in the region including one *Hat* (local market). The team was able to interact with some members of nearby villages, and also collected information.

We followed a directed interview schedule to collect social, economic and forest related information. The second half of each interview was reserved for undirected discussion of the villagers' perceptions of the social, cultural and environmental impact of the Mine including the developmental needs. This was undertaken keeping in view of authentic understanding of their culture, business, markets and other day-to-day activities. We could able to collect data from the villagers who agreed to discuss their problems and concerns with us, despite their apprehension about problems and its solutions. We had very useful conversations with a few prominent personalities of the region and experts on the socio-cultural milieu in Jharkhand.

5.1 Assessment of Impacts

The criteria for assessment of impacts for individual components will be as follows:

- **No significance** - requires no further investigation and no mitigation or management.
- **Low significance** - the project will have negative effects but these are low, and should be totally eliminated with correct management.
- **Moderate to low significance** - requires mitigation and management to reduce impacts to acceptable levels.
- **Moderate to high significance** - requires extensive mitigation and management to reduce impacts to acceptable levels.
- **High significance** - should influence a decision about the project if the impact cannot be mitigated or managed.

6.0 Preliminary Assessment and Observations

The villages of the region make regular use of natural resources particularly forest resources. Their access to the market, health care, schools is very restricted and only occasional wage labour opportunities exits due to the poor infrastructural development, remoteness as well as fear of extremist's movements, while maintaining their subsistence and residential base in the village. There are very few households, whose members work in nearby towns as well as Chiriya Mine Site.

6.1 Population and Assets

The population density is low and the villages are small, the villagers report that there is little competition for natural resources. The family sizes ranges from four to eight members with 3 to 6 children which are also actively involved in survival strategy once they become able to do so. They have nuclear family. Therefore, the babies are being supervised by the other kids or kept with the mothers on the work sites. A few members of some households migrated to Orissa for earnings.

Their houses are made of mud in most cases. The roof is covered by khaprail, a half cylinder or nail typed structure made of mud. In some cases, it is being purchased @ Rs 2.50 per piece from the local villagers, who made it. In some cases the front of houses are fenced by bio-sticks of height 1 m and 0.5 to 1 cm girth collected from forest. These fencing are in general for protection of vegetable crops from the wild animals covering an area of 10 to 15 m length and 5 to 7 m wide. Potable water is being collected from well or hand pipes. In general, hand pipes are not successful in the region.

Amenities such as vehicles, TV sets are limited to a few families only. Only 1-2% households have a two-wheeler. The communication facility is also not in good shape and only one or two households have phones at their residence.

6.2 Land Assets

The land on which the village is built is owned by the households with land rights in possession with the head of households in general. They possessed agricultural land too but its productivity is not appreciable due to lack of irrigation facility as villagers reported. Moreover it depends largely on rains. The size of land holdings is small to the households. They grow rice, maize as well as some vegetable crops. *Gunja,* an oil seed is grown in relatively waste land. Moreover, in some cases, some stone on stick has been kept at the centre of the agriculture field with the belief that it will distract insects from vegetable crops. Cow dung is used as compost. Chemical fertilizers were not used in the field as reported by them.

6.3 Livestock

They have livestock too with primary purposes of draft power. Oxen are being used for plough purposes through the wooden plough, which is made of locally available trees from forest and in some cases; cows and buffaloes too are used for draft power. However, all households do not possess livestock and thus, hire them from others for ploughing. The hiring charge of oxen for ploughing of field is Rs 25 per day per bullock together with labour force. They keep the livestock in a shade known as *Zamda* which is attached to house in most cases and made of wood in general. The roof of which, is being used for climber vegetables. In general the quality of livestock is poor.

Livestock sustain on rice straw as well as grazing in nearby forest and CPR areas. During slack period, once ploughing or other use of livestock is not apparent, these livestock are being handed over to herdsman/shepherd, who collect the livestock from a number of households and supervised for quite some times in the exchange of rice. This collected herd has been kept at one place and depends on CPRs or forest areas for grazing purposes. The villagers pay either Rs 120 per year for two bullocks or nearly 12 piles of rice to these herdsmen. One pile may vary from 3 to 5 kg in weight. Hens are very common and generally possessed by all households.

6.4 Energy Needs

They collect fuel wood from forest particularly of *Sal* and *Terminalia Tomentosa*. Men, women and children above 10 years visit the forest for fuel wood collection on alternate days and devote 2-3 hours in general and travel 2-3 km. A few of them sell the fuel wood to employees of Chiriya Mines @ Rs 30 per bundle and at most one sells up to 25 to 30 bundles in a year. For lighting purposes, kerosene is being used. It is either purchased from the locally or nearby town. In some cases, solar lights have been provided to the villagers by the SAIL Company.

6.5 Forest Products

The local people collect many items from forests and common property resources which include fuel wood, a few shrubs used for making local beer known as *Hadiya*, fruits, rhizomes etc. They exploit natural resources for many purposes, i.e. from energy sources to potable water in some cases to collecting valuables goods for self consumption for a few as well as for earning income by selling these. Seven different types of rhizomes are being collected from the forest for self consumption and selling purposes. The price for per half to one kg is @ Rs 5 per and sold generally in the local *hat*. The horticultural products especially papaya, banana, guava etc. is also being collected from forest or mostly selling purposes.

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The small sticks of less than one feet size of *Karanj* (*Pongamia pinnata*), Neem and Sal species are used as *datun*, a means for cleaning teeth like a toothbrush. It is also being sold in the *hat* as well as Manoharpur market @ Rs 5 per 12-14 sticks. *Chiraunji* (*Buchanania lanzan*) is being collected from forest for income purposes although at low level in the month of May – June and being exchanged with rice at the ratio of 1:10. The sal cocoon is also being collected in the month of June and being sold @ Rs 100 per 80 cocoons to the middleman. Poor people are using the sal seed for making *dal* for supplementing nutritious intake. Tendu (*Diospyros melanoxylon*) leaves collection is also in practice and tendu fruits are being sold @ Rs 1 or 2 for half kg of seeds. Ropes are made by men and women of the house from the forest products and being sold @ Rs 60 per two ropes, which can be made in one day. Wild roots are being used for self consumption purposes and generally used as medicinal purposes by the women.

Bamboo is also being extracted from forest for bio-fencing sticks, making baskets and ropes. One bamboo basket is prepared in one man day by male member of the family and being sold @ Rs 50 per two baskets. It is also used for many household purposes. In general, they prefer to the marketing channels for some valuables or bulk collected products through middleman or to the mahajan's designated persons either in Hat or directly from their houses. But in both cases, they are getting less deal against the worth of the products. Hunting is also in practice but it is not very common. Generally, wild boar, wild cock is being hunted for meat purposes. Besides this, meat of wild hare and wild deer is also being used although at low proportion.

6.6 Transportation and Marketing

The transportation facilities are not proper with non-metallic roads connecting the villages. Generally, cycle is used as transportation by the villagers. The private trackers or jeeps connect the villages to other locations and nearby towns. These are in general overloaded. Moreover their frequencies of operations are too low and daily timing is from 9 am to 3 pm only. This also restricts them for proper earning opportunities. One national bank is located at Chiria.

The local market for most of the household amenities is at Manoharpur. However, local market is also in operation at a fixed place and at a fixed day of week from 10 AM to 4 PM. On Sunday, it is at Chiria, on Wednesday it is at Dodhari, on Thursday it is at Roam, on Saturday it is at Chhota Nagra. In fact, the marketing strategy revolves around local *hat*. People are fond of visiting *hats* which also provides entertainment. Many types of shops including local beer shop to consumables, food materials either grown or collected are being operated. A few shops also offer gambling as a means of entertainment for the local community. The bartering system is in practice and used generally for rice, which is available in open market @ Rs 12/Kg.

The *Hadiya* are generally sold by young women and consumed by all except children. It is a locally made rice beer, sold @ Rs 2 per glass. Ironically the villagers believe that it has medicinal value for jaundice. We encountered hadiya being sold in six to seven (or even more) shops in a single *hat*. The fragmentation materials for it are collected from forests and being made through traditional brewing practices in a big aluminium pot. The fragmentation material "*Ranu*" is made by 10-15 shrubs of forest, and is also an important gradient of the hadiya. It is being made by nearly 40 -50 % households of each village.

Dry small fish is sold at a very nominal price, which is being collected from small water bodies or from seasonal Koina River. The red ant, collected from nearby areas and forests is sold for making pickle or chutney @ Rs 5 per patta. *Patta* is a plate of size 6 cm to 6 cm. Three to four shops has red ant each with 3 to 4 *pattas*. Papaya collected from forest is also being sold @ Rs 5 each in three to four shops, each with at most 4 papayas. The horticulture crops such as simdi, sem, kohda (kakru), cauliflower, tomato are also sold in many shops.

6.7 Education

In general education status is very poor. Old people are in general illiterate. Moreover, they are aware of education but due to lack of proper schooling and transportation facilities, besides poverty, they are unable to send their kids to school. There are no primary schools in most of the villages. One high school is situated at Chiria and the intermediate college is at Manoharpur. It is a major detrimental factor for poor educational status of the region. More than 50 % children from these villages go to school, however higher educational facility lacks.

6.8 Status of Women

Women are central part of the family and involved in income earning or expenditure saving activities for family affairs. They are also part of decision-making in household and social activities. They readily participate in marketing processes, social programmes and community related functions and are not hesitant of strangers. They are actively involved in a range of activities from domestic work, fuel wood collection, and agriculture labour to forest collections. They also do labour activities. In fact, we can say that they are the backbone of the family.

6.9 Livelihood Options

The livelihood options for the people of region revolve around the agriculture cultivation, forest resource utilization and labour work. They have surplus time in most of cases. Moreover, their life depends on more than one income options due to the stringent condition of the region. Male, female and children above 12 years in general involves in labour activities, farm operations and forest collections. The wage rates range from Rs 60 to Rs 80 per day. The labour man-day's is available on average 10 -15 days in a month during peak availability. However, its nature is intermittent. In most favourable conditions, one can earn up to Rs 400 per week too. However it is rarely available.

They earn from selling of goods too i.e. gunja, hadiya etc. Earning through selling of many forest items is also being practiced. *Gunja*, used for making oil, is being grown at wasteland by sowing in October and cultivated in January and being bartered with Mahajans against 18 piles rice with 10 piles of gunja. The oil is being used for cosmetic purposes. Mahua is also being sold @ Rs 12 to Rs 16 per kg in the *hat*. It is collected during its availability in nearby areas and 1-2 baskets, each with upto 5 kg are being collected in 10 days at the expense of one to two hours daily. They cultivate sahjan (*Moringa oleifera*) too and sell it @ Rs 5 per bundle.

In a few cases, they earn through exchange of impure ore too although, it is at low level to contribute for any significant impact on the household earnings. A rice-sized small piece of ore is being exchanged with 5 – 6 kg rice.

They actively market their produce with the Mahajans, who collects their goods either from their villages or from *hat* through bartering against rice either by themselves or through their agents. This bartering system varies with respect to products and its quality too.

6.10 Health Facility

Generally, they do not notice the health issues until and unless it is severe. There is no medical aid post in the village; if someone becomes seriously ill, he or she will be taken to Chiriya Mine Medical Unit for treatment.

7.0 Prediction of Impacts

7.1 Approach and Methodology

The criteria described in Table below have been used to evaluate the significance of impacts:

Table 1: Criteria used in the evaluation of impacts

Criteria	Significance			
Status	Positive		Neutral	Negative
Extent	Site specific	Local	Regional	National
Duration	Short term	Medium Term	Long term	Permanent
Intensity	Low	Medium Low	Medium High	High
Probability	Improbable	Possible	Highly Probable	Definite
Cumulative Effects	None	Low	Medium	High
Significance	Low	Medium Low	Medium High	High
Significance With Mitigation	Low	Medium Low	Medium High	High

The criteria are defined as follows:

a. **Status of the Impact:** negative (a 'cost'), positive (a 'benefit') or neutral

b. **Extent:** Site specific (restricted to the site) Local (the site and surrounds), Regional (Surrounding districts) National.

c. **Duration:** Short-term (up to 2 months), Medium –term (3 months to 1 years), Long-term (life cycle of the project i.e. 25 years) or permanent.

d. **Intensity:** the affects of the impact will be quantified as low, medium-low, medium-high or high, and the rationale for this is discussed in the written evaluation of the impact.

e. **Cumulative effects:** This refers to the degree to which an impact may combine with other project related (or other unrelated) environmental effects. The cumulative effect is described as not applicable, low medium or high.

f. **Probability of occurrence:** Improbable (unlikely), probable, highly probable or definite (certain).

g. **Significance before mitigation and after mitigation:** Based on a synthesis of th informationcontained in (I) or (VI) above, and taking mitigation measures into account an evaluation of the significance of the impact is undertaken in terms of the following significance criteria:

h. **No significance:** requires no further investigation and no mitigation or management;

i. **Low significance:** the project will have negative effects but these are low, and should be totally eliminated with correct management

j. **Moderate to low significance:** requires mitigation and management to reduce impacts to acceptable levels;

k. **Moderate to high significance:** requires extensive mitigation and management to reduce impacts to acceptable levels;

l. **High significance:** should influence a decision about the project if the impact cannot be mitigated or managed.

In certain instances, while discussing socio-economic effects of the project, it has not been possible to apply the rating table to quantify potential impacts (measurement of satisfaction or dissatisfaction). The extents to which negative socio-economic impacts occur primarily depend on the philosophy adopted by project management and the success of consultation, information dissemination and negotiations with local communities.

8.0 Impacts on Social Environment

8.1 Nuisance and Disturbance

8.1.1 Construction and Base Camps

The activities pertaining to construction will cause disturbance to the rural environment and to people living within the vicinity of project activities. Disturbance will relate to the noise and dust due to the movement of vehicles, and workers. Impact will depend on proximity to dwellings, the time of the day and the week in which the activity occurs and above all, the way in which the matter is handled with the project proponent. Most people will tolerate short-term nuisance.

Due to presence of in migrant work force, although low in numbers, there will be exchange of information about places and lifestyles with the local, and chances of social tension also exists. It may be minimized by keeping campsite away from the centres of local population.

Impact Ranking

Status:	Neutral
Extent:	Site specific
Duration:	Short term
Intensity:	Low
Probability:	Possible
Cumulative effects:	Low
Significance without mitigation:	Low
Significance with mitigation:	Low

8.1.2 During Operation

The activities pertaining to operation will not cause disturbance to the rural environment except the adjoining villages and to people living within the vicinity of project activities. Disturbance will relate to the noise and dust due to the movement of vehicles, and workers. Impact will depend on proximity to dwellings, the time of the day and the week in which the activity occurs and above all, the way in which the matter is handled with the project proponent. Most people will tolerate short-term nuisance.

Due to presence of in-migrant work force, particularly the management and engineers, although low in numbers, there will be exchange of information about places and lifestyles with the local, and chances of social tension also exists. It may be minimized by keeping the project operational site away to centres of local population.

Impact Ranking

Status:	Neutral
Extent:	Site specific
Duration:	Long term
Intensity:	Low
Probability:	Possible
Cumulative effects:	Low
Significance without mitigation:	Low
Significance with mitigation:	Low

9.0 Impacts on Settlement, Amenities and Facilities

9.1 Construction and Base Camps

There will not be any scope for change in population permanently and its structure. It may be temporary due to the nature of project, which does not require a huge in-migrant work force and staff for long time. The housing structure and facility will not be affected at all due to the construction and base camp. Since most of the in-migrant labours will stay temporarily at the site only and staff too. However, the managerial staff may stay in nearby township making not much impact on housing.

The project construction being of very short duration, in-migrant labour and staff are not supposed to bring their families. Thus, they will not be generating any formal education demand. As far as health facility is concerned, the in-migrants labour force is so low that it will not have any significant impact for provision of these facilities. Moreover, since most of the labour force will be local they will keep utilizing the existing facilities, thus having no significant impact on medical facility. However, due to the harsh site, the health problem may exits though the same may not be so serious that it will have any negative impact on this facility for this locality. Moreover the facilities itself is too poor in the region, therefore it will not share any existing facilities. Moreover for these issues, the project proponent will arrange their own infrastructure, which in turn will be beneficial to the villagers too.

This project will not have any sort of negative impact on the aesthetic value or situation of the area, as the operation does not change the general topography of the area.

Impact Ranking

Status:	Neutral
Extent:	Site specific
Duration:	Short term
Intensity:	Low
Probability:	Possible
Cumulative effects:	None
Significance without mitigation:	Low
Significance with mitigation:	Low

9.2 During Operation

There will be change in population permanently and its structure although low level. It will require a huge in-migrant work force and staff for long time during operational phase. The housing structure and facility will not be affected at all due to operation, since it all will have to be created anew. For other facilities, i.e. education, medical, potable water, too, the project proponent will have to make new arrangements. Therefore, this project will have positive impact on the facilities of the area.

Impact Ranking

Status:	Positive
Extent:	Site specific
Duration:	Long term
Intensity:	Low
Probability:	Possible
Cumulative effects:	Medium
Significance without mitigation:	Medium
Significance with mitigation:	Low

10.0 Impacts on Income and Employment

10.1 Construction and Base camps

Economic impacts include the direct economy impacts as employment and other indirect impacts, on the local and regional economy. The direct economic impacts have many indirect economic impacts on the livelihoods of people and on the locality. Direct employment through a project will generate expenditure on local services (e.g. food, drink). As far as construction is concerned, the impacts will not be wider for permanent employment. This will not have any crucial role in the regional economy. But it will certainly generate few man-days of employment for the local labour. This will give an opportunity to the local poor/labour and will be beneficial due to the fact that the labour force of the area is mainly dependent of agriculture related work and aquaculture.

The other important economic impacts may be due to influx of in-migrant labour force. The high proportion of in-migrant labour will have diversified implications for the demography of the locality and many indirect economic implications. The overall economic impact due to in-migrant labour will be low. However, managerial staff will be from industry itself, thus having negligible impact. The chances of secondary employment and business growth due to the construction are remote. Therefore, all the indirect impact is also insignificant. And if at all there will be any impact, it will be positive by creating of some temporarily opportunities, like temporary shops for the basic essentials, tea stalls, etc.

Thus, the construction will have short-term positive impacts on employment generation; however other direct and indirect economic impact will be temporary and insignificant.

Impact Ranking

Status:	Positive
Extent:	Local
Duration:	Medium term
Intensity:	Low
Probability:	Definite
Cumulative effects:	Medium
Significance without mitigation:	Medium Low
Significance with mitigation:	Medium Low

10.2 During Operation

During operation, more permanent immigrant work force will be staying on site. Therefore, some indirect income generating opportunities will be available and may be significant keeping in view of low density of local population.

Thus,the operation, which is long term, activities will have long-term positive impacts on employment generation; however other direct and indirect economic impact will be significant.

Impact Ranking

Status:	Positive
Extent:	Local
Duration:	Medium term
Intensity:	Medium
Probability:	Definite
Cumulative effects:	Medium
Significance without mitigation:	Medium Low
Significance with mitigation:	Medium Low

11.0 Mitigation Measures

11.1 Social Environment

11.1.1 Nuisance and Disturbance

The base camp should be away from the centre of population to avoid social tension. Base campsites should be chosen to encourage natural rehabilitation by indigenous flora/avoid removal of vegetation. Minimize size of camp/facilities consistent with operational, health and safety requirements. On the base camps proper handling and storage of fuels and hazardous materials are ensured. The activities of the work force for example hunting, interaction with locals, should be controlled to minimize/avoid conflict.

11.1.2 Settlement, Amenities and Facility

Although, the impact on health facility will not be high, still for safer side and to meet any accident, project proponent should provide proper medical facility during the whole operation. First- aid box should be made available at the site.

Base camp should be equipped with fire equipments to avoid any accidental fire in that area, if explosives are kept in the area. Care must be taken to avoid water-borne disease, the work force should be provided with clean and pure water as the operational area is devoid of any natural source of water. The work force should not discard litter and debris around the sites in order to maintain proper hygienic condition.

11.1.3 Income and Employment

The project proponent shall as far as reasonably possible employ local workers. Labour contractor engaged by project proponent shall communicate directly with community leaders about appropriate methods of hiring local labourers in order to avoid pitfalls with respect to labour and community relation.

12.0 Environmental Management Plan

It is felt that the project should contribute towards improvement of the quality of life of the people in the area. With this in view, following suggestions are tendered.

- The youth should be trained in skilled jobs to carry out mining operations.
- Local people should be given priority for jobs in the mining operations.
- New infrastructure facilities, viz. housing, medical, education, transportation, communication, sanitation, etc. should be provided.
- Facility for water for drinking purposes and irrigation purposes should be improved.
- The medical facilities in the area through health camps for general health, eye check up, health awareness should be conducted for the villagers.
- The road infrastructure with transport facility may provide some added advantage.
- Electricity supply and provision for lighting may be improved the situation.
- Effective marketing strategy through cooperative system or *mandi* may be introduced. This will improve the margin to the collectors.
- Scholarship to the students of the region may be provided with improved educational infrastructure.

- Villagers should be motivated towards hygiene through providing better sanitation facilities.
- Some small industries based on locally available raw materials either grown or collected from forests may be established.
- Improved energy devices may be introduced in the region for cooking.

13. 0 Community Development Issues

Resources, particularly natural resources subjected to households, depend on their location. Land, labour and capital availability affect the pattern of natural resource utilization and subsistence earning processes for individual household. Other household resources and attributes like livestock, family type and composition, education and social status, also influence the livelihood support system and resource utilization.

13.1 Cash Crops

The cash crops opportunities may be explored in the region. Moreover the existing crops should be sold with effective marketing system for better deal and margin. There are new varieties of commercial plants that are more resistant to disease, better suited to a range of environmental conditions and which produce greater yields should be introduced. New technologies for growing and harvesting various plant products and tree crops are already available. These should also be introduced in the region. With addition, the transportation network in the region, the potential export crop could take advantage of direct supply to the nearby city. The main market is local but there exists export potential as well for some products. It might be possible to create a market niche for many products available in the region.

13.2 Opportunities for Improved Health Care

The medical centre nearest to the site is located at Chiriyapur mine site. The project medical facility is available to the local community too, which is not sufficient to all the villagers. The major health threats are malaria, pneumonia, chronic coughs, diarrhoea, sores and infections, intestinal parasites. A key health issue is the cumulative threat to health from multiple infections. This has an impact on (1) childhood growth and development, (2) general health status, including the quality of life and stamina of the individual, (3) reproductive health, (4) outcome or response to morbidity (other ailments), and (5) mortality rates.

The most important factor in improving health of the region is the development of transportation infrastructure. Although the main road is under construction, however for connecting the villages and health centre will be directly or indirectly attributable to the mine. Emergency medical transport may also be provided to avoid transportation as the limiting factor. Another area for attention is in maternal-child health care, notably safety in delivery and child immunization. There are no traditional birth attendants in the area. Pregnant women are usually assisted by untrained maids or relatives. Rural immunization is not effective. A third area of concern is nutrition. The people in the area have a diet that has traditionally been deficient in protein. Most of the villages are poor and lack proper diets and in general people of the region are growing thin; which itself is a reliable enough warning of protein malnutrition.

13.3 Cultural heritage

It is natural that changing conditions, new opportunities and exposure to new ideas will lead to culture change. Such change, however, can take place at such an accelerated rate, or with such intensity, that unnecessary loss and destruction result. The study of culture changes in most communities has shown that these losses are frequently regretted later on, as revival movements struggle to reclaim what has been forgotten or destroyed. Programs that support cultural heritage are therefore not intended to prevent or even discourage change, but rather to preserve knowledge about culture and history for future generations. Support for local activities that communicate and preserve knowledge of local culture and history, through school programs and collection of symbolic items may be effective in this regard. Professionals may be contacted for field collections and the development of written materials on cultural heritage.

A balance between cultural events 'for consumption' and those with value 'for posterity' should be pursued. It is also essential keeping in view of extremist activities. Some of this material might be incorporated into reading and writing materials and exercises. Given recent education policy changes aimed at placing teachers in their own language areas, this project might best be carried out through the agency of the school system. Other projects might focus on traditional knowledge of the environment, e.g. names for plant and tree species, or traditional technology. Another focus for cultural preservation might be to develop a cultural centre in the region.

13.4 Employment Issues

Most modern mining operations, once construction of infrastructure is complete, provide very few jobs for unskilled and semi-skilled labourers. Therefore greater vigilance is needed to ensure that there is equity in hiring workers. Besides this, most of the subsidiary operations that provide services to the mine are in general, independently owned and run and therefore, indirectly responsible for a great many more jobs. Looking to a future which must more fully include the economic development of the region, a different perspective is required. A new development plan is needed for the area, and it is in this context that the employment patterns and business successes conditions should be re-examined.

13.5 Market Issues

In our survey of *hats*, we found people from many settlements selling a broad variety of products. The majority were selling food items, mostly collected from forest areas. Others sold tree crops, bush fruits, and fish. Some craft products were also being sold. The role of Mahajan from nearby town is apparent in the *hat*. It was also observed that villagers are less than deal for bartering the rice against the many products. These may be improved by introducing co-operatives, which will discourage social tension. Moreover the *mandi* system may also be improved with sufficient materials for consumption purposes as well as well connected by road infrastructure with local villages.

NaturalGist

- *Social impact assessment (SIA) should be regarded as a tool to be used to promot sustainability for both the mining company and the affected communities for regional socio-economic development.*
- *The SIA focuses on the identification and mitigation of both positive and adverse social impacts that may arise from the establishment of a mine.*
- *Baseline socio-economic information on local conditions, local knowledge, local attitudes and perceptions is necessary to be able to assess the potential short and long-term positive and negative effects of the various project alternatives.*
- *In the case study, various issue related to education, health, livelihood options, transport facilities and cultural heritage for local people have been discussed.*
- *Suggestions have been given for making provisions post –mining, without affecting the traditional values.*

10

Economic Impact of Coal Mining in Meghalaya and the Question of Sustainability

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1.0 Introduction

Coal is one of the most important non-renewable natural resources available in the state of Meghalaya which plays an important role in the socio-economic life of the state. Though majority of its stock (about 565 Mn MT) is found in the Garo Hills region (about 70% of state's stock), maximum extraction has so far been observed in the Jaintia Hills region. Historical records show that mining of coal started here in the early 1840s, which was limited only to Cherra and Lakadong areas and the extraction was mainly for the household use (Oldhan, 1854). Geological Survey of India (GSI) carried out the preliminary investigation on coal deposit in Jaintia Hills in 1962. Following repeated investigations, huge amounts of coal were found in the surrounding area. Coal mining started at a limited scale there and then in the early 1970s (Lamin, 1995). The mining activities assumed momentum with the elevation of Shillong-Jowai-Badarpur road to National Highway 44 in 1978. During 2005-06, total production of coal in Meghalaya reached 5565.715 thousand metric tonnes of which Jaintia Hills alone produced 3879.73 thousand metric tonnes (about 70 % of total coal production of the state).

Mining and trade of coal generate income both directly and indirectly. However, it is very difficult to capture all the indirect employment and income that it generates by its multiplier effect through several other sectors like limestone industry, brick kilns, iron re-rolling and so on, in a chain manner. Due to lack of information about the technical relationships among all of them, prices of all the products and the variation in linkages and prices over time. The indirect employment is also generated in the form of workers in tea stalls, motor repairing and other businesses developed in the coal mining area. However, the direct employment generated in the form of coal mine owners, mining labourer, loaders, middlemen, traders etc. can be approximated reasonablly well.

The rising extraction has thus raised two important questions:

- Doubt about how long the local economy that is highly dependent on coal mining activities for employment and income, would continue to grow unless the alternative sectors grow sufficiently to absorb people who would be unemployed if the coal is exhausted.
- How to mitigate its impact on neighbouring environment (water resources, forest biodiversity, agricultural activities etc)?

This paper tries to examine the direct and indirect impact of coal mining and its related activities on employment and income in Meghalaya from the case study in Jaintia Hills district. The income generated directly, indirectly and also from other sources by the owners, non-owners and businessmen has been considered. But due to the paucity of information, the socio-cultural aspects have been not considered here.

The Jaintia Hills district has rich mineral resources. Considerable quantities of coal and limestone deposits are found in the district. Total coal deposit in the district has been estimated at 42.30 million tonnes. Important coal fields of Jaintia Hills are located in Bapung, Ladrymbai, Lakadong, Sutnga, Jarain, Lumshnong and some other places. Here, extraction of coal has been carried out by the primitive method commonly known as the “rat-hole” mining. Most of the mining activities are small-scale ventures controlled by individuals who own the land.

The Jaintia Hills district was primarily known for agrarian economy before 1970s. But, after the discovery of coal in 1973 at Bapung and its adjoining areas, the economy of Jaintia Hills gradually shifted from purely agrarian economy to a commercial economy of coal. Within a very short period of time the district became the major coal producing area of Meghalaya. Bapung coal is famous today all over the India and also abroad (Bangladesh). A significant part of Net District Domestic Product (NDDP) is contributed by the mining and quarrying. For example, during 1999-2000, 27.95% of NDDP was contributed by mining and quarrying in Jaintia Hills. Also, Jaintia Hills district has been contributing substantially to the total output of mining and quarrying in the state of Meghalaya, 69.27% of the total mining and quarrying output of the state was contributed by Jaintia Hills alone in 1999-2000.

Mining and quarrying in Jaintia Hills primarily means the coal mining and quarrying because of the large-scale extraction of coal every year. Besides this, Dawki Land Custom Station, which is one of the important external trading points in Meghalaya, is also located in Jaintia Hills bordering Khasi Hills. During 1998-99, about 62% of the total coal export of the state to Bangladesh took place through Dawki. It however declined to 22.49% in 2004-05 due to increase in the quantity of export through other land custom stations. Thus, extraction of coal has important implications for the trade and other related activities and thus development of local economy of Jaintia Hills.

2.0 Some Earlier Studies

Coal mining has both positive and negative impact on the local economy. On the one hand it generates income and employment in several ways directly and indirectly. On the other hand, it adversely affects the soil, water quality, forest resources, etc. Studies on economic impact of coal mining and also those dealing with the environmental impacts of coal mining in the area are very few.

Lamin (1995) described that coal mining in Meghalaya especially in Jaintia Hills has brought about many changes, like steady flow of labourers from outside as well as from different parts of the state itself to the mining areas of the state sometimes raised conflict between the outside and local labourers. Also, the emergence of Ladrymbai market (located in the mining site of Jaintia Hills) was entirely due to coal mining activity. Hence it raised employment and generated income and welfare of the local people. He also mentioned the negative consequence of mining as some paddy fields were left fallow by their owners who had no time to cultivate due to their preoccupations with the more profitable mining activity. Thus coal mining also led to underutilisation or abandonment of land resources due to high opportunity cost of the owners. Moreover, the productivity of soil was adversely affected due to the deposit of coal dust and acid mine drainage that reached the nearby agricultural field.

Dasgupta *et al*. (2002) have made an attempt to analyse the adverse impact of coal mining on the soil characteristics. Through testing of soil (nutrients of coal mine areas of different ages) they have shown that the nutritional content declines with the age of mine or with the rising extraction of coal. Also the moisture content, sand, etc. have been increasing over time with the continuous mining activities that made the soil less suitable for growth and development of plants.

Rai (2002) has explained the impact of coal mining on the local environment of Jaintia Hills. He described how coal mining activity in Jaintia Hills has adversely affected the local environment; which was exhibited through the shortage of potable water, deforestation, water pollution, rising wasteland, land subsidence and dust pollution. The reason for those adverse impacts was assigned to unscientific primitive mining techniques and small-scale coal mining.

Singh and Swer (2004) have outlined the impact of underground coal production on water resources. In their opinion, unscientific coal mining in the area was the primary cause of deterioration of water quality. They also observed that the influx of acid mine drainage into the rivers and streams of the area were mainly responsible for degradation of water quality leading to degradation of aquatic habitat and affected agriculture and domestic water supplies.

Sahu and Goel (2004) have assessed the social implications of coal mining. By using chi-square test, they observed that the local labourers and the local inhabitants show positive attitude towards the influx of labourers from outside for the purpose of mining activities. Also there have been a spur of wine shops as well as anti-social activities due to the coal mining activities in Jaintia Hills. The analysis also shows that the current rate of extraction of coal in Meghalaya is not sustainable and there is every possibility of its exhaustion and thus development of alternative sector is well warranted (De, 2009).

3.0 Materials and Methods

Secondary information on income generated in coal mining and its allied activities is not available. Therefore, primary information has been used to estimate the income generated in the coal mining and its related activities in the state. Primary information on different aspects like extraction of coal and income generated by different agents from it and its related activities, number of working days, over time changes in activities, wages and salaries of the labourer and other employees, transportation cost etc. are collected from Bapung, Ladrymbai and Khliehriat coal mining areas and also from the Bapung, Ladrymbai, Khliehriat and Dawki trade centres of Jaintia Hills district of Meghalaya during April-May, 2005. Here, Jaintia Hills is chosen specifically for the sample survey due to its pristine position in the production and business of coal in Meghalaya. Bapung, Ladrymbai and Khliehriat are the main extraction centres of Jaintia hills district. Moreover, Dawki is the main international trade centre of coal. The method of extraction is almost similar all over Meghalaya and coal is available at similar depth in all places of Meghalaya having similar other conditions (wage, price etc except transport). Thus cost, revenue, income etc are estimated for the whole Meghalaya on the basis of observations from the samples of Jaintia Hills District.

Experience from the field shows that coal is generally extracted on contract basis and the cost of extraction per tonne of coal was on an average Rs 800 in 2005. The cost of extraction during the earlier years have been collected from the experienced coal mine owners who have been mining for more than 25 years. Multiplying the cost of unit extraction, which is paid to the labourers with the total production of coal of the respective year, total income generated by the coal mine labourers is estimated.

The income of the coal mine owners has been estimated on the basis of the difference between the selling price of coal per tonne at the depot and the total extraction cost plus other expenditures like (i) payment to the depot managers, and (ii) transportation cost for fetching coal from the mining site to the main roadside depot. The variations in the cost of extraction and the selling price have also been considered though it is not significant across different places. The average net income per tonne of coal has been multiplied by the total production of coal of the respective year, to estimate the total income received by the coal mine owners in total. Similarly, loading charge per tonne of coal, which was Rs 40 in 2005 has been multiplied by the total amount of coal despatched from Meghalaya in 2005-06, to find out the approximate total income of the loaders. The loading charge which was prevailing in the past years has also been collected from the experienced traders to approximate income of the loaders in the past years. The income of the depot managers has been estimated by taking into account the total number of depot managers and their annual income. The salary paid to depot managers has been collected from coal mine owners and has also been cross-checked with the information obtained from the depot managers. The total number of coal depots in the state is calculated on the basis of total number of coal depots owned by the coal mine owners and others in Jaintia Hills.

The income of international exporters and plus inter-state traders has been estimated on the basis of the average net profit of the exporters per tonne of coal. Then the total amount of coal despatched from Meghalaya has been multiplied by the net income per tonne of coal to approximate the income of the traders. The income of the truck owners has also been estimated on the basis of the average net income generated from the transport of one metric tonne of coal and relating it with the total despatch of coal from Meghalaya. The total income of the managers and assistant managers has been estimated on the basis of per individual annual income and the total number of employment. The total number of managers and assistant managers has been approximated on the basis of total number of traders (exporters plus inter-state traders). The income of the drivers and handyman has been estimated considering their individual annual income and the total number of employment. The total number of trucks used for both the mining and trading purposes gives an idea of the total employment of drivers and handymen.

It may however be noted that the number of managers, assistant managers and traders may change due to the variation in capacity of each of them. Therefore, in the present analysis the capacities or efficiencies of the managers, traders etc have been considered to be the same. This is also because of the over time improvement in efficiency, transport facility and other practices. Thus there might be some bias in the estimation. However, in the absence of any other suitable method and information this is the best possible estimation of all such categories.

Out of nearly 500 coal mine owners in Jaintia Hills region, 50 coal mine owners are selected by using the technique of stratified random sampling method. Among these 50 coal mine owners, 20 each are chosen from Bapung, Ladrymbai and 10 from Khliehriat depending upon the strength of mining of the respective areas. 200 coal mine workers out of approximately 50,000 workers have also been selected (80 from Bapung, 80 from Ladrymbai and 40 from Khliehriat) as sample for the collection of information. Similarly, a sample of 40 non-coal mine owners (20 from Bapung, 10 from Ladrymbai and 10 from Khliehriat) is also selected. 20 exporters out of 135 in total who are operating at Dawki land custom station of Jaintia Hills are also studied.

To analyse the impact of coal mining and its related activities on income and employment of the local economy, primary data has been collected on income, annual extraction of coal, duration of mining operation, asset holding position, income from other sources and so on for each coal mine owner of the selected sample. Similarly, data on annual export, duration of export operation, investment of export income, asset holding position, alternative business and other aspects are gathered from each coal exporters of the selected sample. Also data on wages of the coal mine labourer, their place of origin, consumption expenditure, daily extraction and loading of coal by them etc are obtained from each coal mine labourer of the selected sample. To find out the difference between the earnings of the coal mine owners and non-coal mine owners, the income of the non-coal mine owners in the neighbourhood are also collected.

In order to estimate the annual income generated by an individual coal mine owner, the annual extraction of coal by the sample coal mine owners was collected through a questionnaire. The annual extraction of coal was multiplied with the average net profit per tonne (which was obtained from different sample coal mine owners) to get annual net income of the coal mine owners.

The information on income, which is indirectly generated by the coal mine owners, was collected from the coal mine owners regarding activities like transportation of coal and management of coal depot etc undertaken by themselves. In case of coal mine labourers, information on income was also directly investigated through questionnaire. Regarding the income of the exporters, the same method was followed like that of coal mine owners. In case of non-coal mine owners, who are also neither businessmen and nor labourers of coal mines, the information on income and activities was directly collected from the respondents. To assess the extent of difference in the income of coal mine labourers and non-coal mine labourers, data on income of 100 non-coal sector labourers in Jaintia Hills have been collected and compared with that of coal mine labourers.

4.0 Extraction of Coal and Contribution of Coal Mining and Quarrying to NDDP of Jaintia Hills District

The contribution of coal mining and quarrying is estimated to be over 5% of the Net State Domestic Product (NSDP) of Meghalaya (Directorate of Economics & Statistics, Government of Meghalaya, 2003). Moreover, royalty collected from the despatch of coal to outside has also been contributing significantly to the revenue earnings of the government of Meghalaya. The royalty coming from the coal contributes around 17 % of the total internal revenue receipts of the state (official record of Directorate of Mineral Resources, Government of Meghalaya, 2005-06). Total royalty received by the state government has increased from Rs 8.69 crore in 1987-88 to Rs 89.75 crore in 2003-04 (Rout, 2008).

The district-wise contribution of mining and quarrying to NSDP of Meghalaya and their variations over time has been discussed. The importance of mining and quarrying in different districts is explained by the absolute and percentage contributions of mining and quarrying to the NSDP of Meghalaya.

Table 1: Over-Time Inter-District Variation in Contribution of Mining and Quarrying to NSDP in Meghalaya (Rs in Lakh)

Years	Jaintia Hills	East Khasi Hills	West Khasi Hills	Ri Bhoi	East Garo Hills	West Garo Hills	South Garo Hills
1994-95	4704 (69.93)	327 (4.86)	197 (2.86)	4 (0.06)	7 (0.10)	9 (0.13)	1484 (22.06)
1995-96	4120 62.87)	307 (4.69)	367 (5.60)	9 (0.14)	13 (0.20)	18 (0.27)	1719 (26.23)
1996-97	4529 (65.96)	253 (5.14)	340 (4.95)	8 (0.12)	13 (0.19)	18 (0.26)	1605 (23.38)
1997-98	4877 (73.45)	251 (3.78)	248 (3.78)	16 (0.24)	13 (0.20)	17 (0.26)	1218 (18.34)
1998-99	9693 (75.24)	405 (3.14)	344 (2.68)	16 (0.12)	24 (0.19)	33 (0.26)	2367 (18.37)
1999-00	8652 (69.27)	409 (3.27)	649 (5.20)	21 (0.17)	31 (0.25)	42 (0.33)	2687 (21.51)

Source: Directorate of Economics and Statistics, Government of Meghalaya, Shillong.

Note: Figures in the parentheses represent percentage to total of the state.

Table 1 reveals that during 1999-2000, contribution of mining to NDDP varied from 0.17 % in Ri Bhoi to about 69 % in Jaintia Hills District. Coal contributed the major portion of the mining and quarrying output across the districts. Jaintia Hills district has always been contributing more than 60 % to the total output of mining and quarrying in Meghalaya. Besides South Garo Hills, all other districts are contributing less than 10 % of the total output. It is evident from this data that mining and quarrying is an important economic activity in Meghalaya, especially in Jaintia Hills.

Table 2 describes the changes in the contribution of mining and quarrying to NDDP of Jaintia Hills during 1994-95 to 1999-2000. Here data is available only for the period 1994-95 to 1999-2000 from the Directorate of Economics and Statistics, Government of Meghalaya. It is evident that mining and quarrying has been contributing significantly to the NDDP of Jaintia Hills. The contribution was 23.53 % during 1994-95 and increased to 27.95% during 1999-2000 i.e. a gross increase of about 4%. In an absolute sense however, output

of mining and quarrying in total has increased significantly from Rs 47 crore to Rs 86.52 crore during 1994-95 to 1999-2000. Similarly, it is also revealed that the percentage contribution of coal mining and quarrying to the NDDP of Jaintia Hills has been increasing in absolute sense from Rs 39.23 crore to Rs 57.18 crore during 1994-95 to 1999-2000. However, the percentage contribution of coal mining and quarrying has declined marginally from 19.62 % in 1994-95 to 18.47 % in 1999-2000. This is because of the relatively faster growth of other mining activities; whose contribution was about Rs 8 crore and increased to Rs 29.34 crore in 1999-2000.

Table-2: Contribution of Mining and Quarrying to NDDP of Jaintia Hills (Rs. in crore)

Years	N.D.D.P. of Jaintia Hills	Output of Mining and Quarrying	Output of Coal Mining and Quarrying
1994-95	199.91	47.04 (23.53)	39.23 (19.62)
1995-96	217.93	41.20 (18.90)	35.12 (16.11)
1996-97	225.56	45.29 (20.07)	33.83 (14.99)
1997-98	241.54	48.77 (20.19)	35.92 (14.87)
1998-99	302.84	96.93 (32.00)	58.61 (19.35)
1999-00	309.55	86.52 (27.95)	57.18 (18.47)

Sources: (i) Directorate of Mineral Resources government of Meghalaya.
(ii) Directorate of Economics and Statistics, Government of Meghalaya.
Note: Figures in parenthesis represent percentage to N.D.D.P. of Jaintia Hills.

Tables 3 and 4 show that there have been a continuous upward trend since 1978-79 in the generation of direct employment opportunities by the coal mining and trading activities of Meghalaya. Besides contributing to the revenue of the state, income of the individual coal mine owners, traders, exporters, mine labourers and others who have been associated with the activities has been increasing with the rising extraction, wage of labourers of various categories, costs and price of the products. Total direct employment in coal mining and related activities has increased from about 4000 in 1978-79 to over a lakh during 2005-06 (Rout, 2008).

5.0 Impact of Extraction of Coal on the Earning of People in Jaintia Hills

Coal mining plays an important role in the social and economic activities of the local inhabitants of Jaintia Hills. The local people including owners and non-owners generate resources from such activities that can be invested for further raising income, employment and sustain growth process. Moreover, due to extraction and transportation activities, other businesses have been flourishing in the area. Also due to rising income, education, healthcare, etc. have been improving. Cultural interaction between the local and outside people have been taking place (though at limited scale) due to extraction of coal and related other businesses. This is very helpful for the enrichment of any society.

Table-3: Net Earnings of Various Categories from Coal Mining Meghalaya (Rs in Lakh)

Years	Coal mine Labourers	Coal mine Owners	Profit by Traders	Middleman Traders	Truck Owners	Loaders	Depot Managers	Managers and Asst. Managers	Drivers & Handymen
1980-81	724.00	114.80	144.80	36.20	36.20	47.06	30.36	21.51	140.16
1985-86	3289.00	632.50	632.50	177.10	189.75	189.75	711.46	124.59	305.86
1990-91	12739.80	2248.20	2248.20	749.40	749.40	749.40	181.98	401.94	1349.46
1995-96	17861.25	2435.63	2435.63	779.28	811.75	18118.75	242.64	540.96	2302.92
2000-01	24390.00	4471.50	4471.50	1544.70	1219.50	12119.50	3639.96	676.20	2184.00
2005-06	44525.60	10018.25	10018.25	6232.27	2059.60	22262.80	3639.96	811.44	3998.16

Source: (1) Sample survey by the author
(2) Directorate of Economics and Statistics, Govt. of Meghalaya, Statistical Abstract (Various Issues).

Table 4: Employment of Different Categories Generated in the Coal mining in the State (Numbers)

Years	Coal mine Labourers	Coal mine Owners	Traders	Middleman Traders	Loaders	Depot Managers	Managers and Asst. Managers	Drivers & Handymen
1978-79	1742	292	112	224	81	253	224	1168
1985-86	18071	526	338	706	475	456	706	2104
1989-90	32171	1167	1015	2030	1501	990	2030	8330
2000-01	58000	1167	1128	2256	2710	1000	2257	14000
2005-06	79500	1167	1128	2256	3710	1011	2257	14800

Source: Sample survey by the author

Table 5 shows that there is an inverse relationship between the direct earning from the coal mining and that of other sources across the individual mine owners. It indicates that the small owners give more importance to other alternative occupations. The average annual income directly from the coal mining of a coal mine owner is Rs.7,20,000 and annual average indirect income from coal mining is Rs. 2,64,800 and that from other sources is Rs. 68,800. Total annual average income from all sources together is Rs.10,53,600. The co-efficient of variation is the highest in case of income from other sources and very less in case of income from direct mining more income disparity is observed in case of income from other sources.

Table-5: Distribution of Coal mine Owners According to Their Annual Earnings

Earning Class (Rs in lakh)	No. of Coal mine Owners	Average Income directly from Mining (Rs)	Average Income indirectly from Mining (Rs)	Average Income from Other Sources (Rs)	Total Annual Average (Rs)
2.1 – 8.0	22	2,79,272.60 (76.03)	48,545.00 (13.21)	3,94,545.00 (10.79)	3,67,272.10 (100.00)
8.1 – 14.0	18	7,26,464.00 (67.81)	2,83,535.00 (26.47)	61,272.00 (5.71)	10,71,271.00 (100.00)
14.1 – 20.0	6	10,13,333.00 (63.17)	4,60,000.00 (28.67)	1,30,666.00 (8.14)	16,03,939.00 (100.00)
20.1 – 26.0	1	19,20,000.00 (75.70)	4,80,000.00 (18.93)	1,36,000.00 (5.36)	25,36,000.00 (100.00)
26.1 & above	3	22,40,000.00 (76.97)	5,40,000.00 (18.55)	1,30,000.00 (4.47)	29,10,000.00 (100.00)
Average		7,20,000.00	2,64,800.00	68,800.00	10,53,600.00
Coefficient of Variation		69.88	71.29	105.89	65.78

Source: Field study by the researcher

Notes: (i) Indirect mining income implies income from the transportation of coal; self-management of coal depot
(ii) Income from other sources implies income from house rent, local taxi and other business that has very little connection with the coal activities in the area.

Table-6: Distribution of Exporters according to Their Annual Earnings in Jaintia Hills

Earning Class (Rs. in lakh)	No. of Exporters	Average Annual Income directly from Mining (Rs)	Average Annual Income indirectly from Mining (Rs)	Average Annual Income from Other Sources (Rs)	Total Annual Average(Rs)
3.1 – 9.0	8	4,80,000.00 (87.15)	55,000.00 (9.9)	15,750.00 (2.86)	5,50,750.00 (100.00)
9.1 – 15.0	9	7,28,888.80 (68.83)	1,82,222.20 (17.20)	1,47,777.70 (13.95)	10,58,888.70 (100.00)
15.1 – 21.0	2	12,80,000.00 (71.11)	3,20,000.00 (17.77)	2,00,000.00 (11.11)	18,00,000.00 (100.00)
21.1 & above	1	15,20,000.00 (66.10)	4,80,000.00 (20.86)	3,00,000.00 (13.04)	23,00,000.00 (100.00)
Average		7,44,000.00	1,50,000.00	1,28,800	10,22,800.00
Standard Deviation		2,94,911.20	1,13,044.00	1,65,832.38	5,17,885.30
Co-efficient of Variation		39.63861	75.36267	128.75185	50.63408

Source: Field study by the researcher

Notes: *(i) Income from indirect export include income coming from transportation of coal by exporters, truck and self-management of export business etc.*

(ii) Income from other sources here includes income from other businesses like hotel, PCOs, cable TV, grocery, wine shop and income from vehicle (transport) etc. although some of the hotels and PCOs have been running well due to coal mine activities in the area.

Table 6 exhibited that with the increase in the quantity of export, the income from other sources also increases, i.e., big exporters are more engaged in alternative occupations. The annual average net income of the sample exporters directly from export of coal is Rs.7,44,000 indirectly from export is Rs.1,50,000 and from other sources is Rs.1,28,800. The co-efficient of variation is the highest in case of income from other sources, which is 128.75 and lowest in case of income from direct export of coal. The implication is that net income from direct export has less inequality than net income from other sources. However, average net income from direct export of coal for an exporter is very near to the average net income from direct mining of a coal mine owner.

From Table-7, it is evident that the average annual income of a non-coal mine owner who is not engaged in coal trade or transport but in agriculture or service or other business is Rs.72,975. Co-efficient of variation in annual income is 38.534. From the comparative analysis of the income of coal mine owners, exporters and non-coal mine owners, it is observed that the average annual income of the coal mine owners and exporters is very high compared to the non-coal mine owners in the area. But the co-efficient of variation is very less in case of non-coal mine owners, compared to that of coal mine owners and exporters.

Table-7: Distribution of Non-Coal mine Owners According to their Annual Earnings who are in no any way related to Coal Mining, Trading or Transport Activities

Earning Class (Rs)	No. of Non-Coal mine Owners	Average Income (Rs)
24.1 – 48.0	11	39,000.00
48.1 – 72.0	17	61,764.70
72.1 – 96.0	8	89,625.00
96.1 – 120.0	4	1,10,000.00
Average		72,975.00
Co-efficient of Variation		38.534

Source: Field study by the researcher.

Table-8: Distribution of Sample Coal mine Labourers and Non-Coal mine Labourers according to Their Monthly Income Range in Jaintia Hills

Earning Range (Rs)	No. of Coal mine Labourer	No. of Non-Coal mine Labourers
2501 – 3000	-	80
3001 – 3500	46	10
3501 – 4000	34	10
4001 – 4500	70	-
4501 – 5000	08	-
5001 – 5500	18	-
5501 – above	24	-

Source: Field study by the researcher.

Activities related to coal mining provide better earning scope than non-coal related activities for labourers in Meghalaya in general and Jaintia Hills in particular. Table 8 reflects a comparative picture of monthly earning of coal mine labourers and non- coal mine labourers (who are engaged in similar other activities like agricultural labourers) in the coal mining areas of Jaintia Hills during April- May, 2005. The table reveals that all the coal mine labourers have monthly income more than Rs 3000, whereas most of the non-coal mine labourer has monthly income less than Rs 3000. 21% of coal mine labourers have monthly income of over Rs 5000. It is observed from the sample that the average monthly income of coal mine labourer is Rs. 4246.50, whereas labourers in non-coal sectors earn on an average Rs 2600 per month. Since coal mining activities have better prospect of earning, labourers are attracted to this sector though the activity in this sector is associated with different kinds of risks (health, life). Labourers, especially from other regions, do not hesitate to undertake such job for raising current income due to lack of opportunity and thus give very little importance to the occupational hazards.

Table 9 shows that about 65% of the non-owner in the mining areas (except first three) also earn directly or indirectly from the coal mining or its related activities like running of retail business, tea stalls in the area or driving coal trucks, acting as middlemen or depot manager etc.

Table-9: Distribution of Sample Non-Coal mine Owner Families according to the Major Source of Income

Primary Source of Income	Number and Percentage of Non-owner Family
Agriculture	7 (17.5)
Retail Business	4 (10.0)
Government Service	3 (7.5)
Tea Stalls	5 (12.5)
Driving Coal Truck	8 (20.0)
Driving other Vehicles	4 (10.0)
Middleman Trader	4 (10.0)
Depot Manager	5 (12.5)

Source: Field survey by the researcher

6.0 Extraction of Coal and Composition of Mine Labourer in Jaintia Hills

The place of origin of the labourers is an important indication of the geographical composition of the labourers and thus the preference of people (local and outsiders) to work as mine labourer and their involvement in such activities. Pandey (1993) in his study, *Environmental Impact of Coal mining in Jaintia Hills District,* revealed that none of the mine-labourers belong to the coal mining areas of Jaintia Hills. The study found that among all the labourers, 61 per cent were from Nepal, about 35 % were from Assam and the rest were from West Bengal. On the other hand, he observed that all the mine owners hailed from the local area of the Jaintia Hills. In the present study also it is observed that out of 200 coal mine labourers, 90 are from Assam, 86 mine labourers are from Nepal, 14 are from Khasi, Jaintia and Garo Hills and 10 are from West Bengal. So the most important feature of the changes found in the coal mining sector is that the local labourers have started entering into the coal mining sector even though the percentage is only 7 % (Table-10).

Regarding the coal mine owners, the earlier findings (Pandey, 1993) has remained the same. In the trade of coal, local people from Jaintia Hills are predominantly operating at Dawki Land Custom Station. The study of Dawki Land Custom Station revealed that more than 90% of the people working at Dawki trade point are from local areas of Khasi and Jaintia Hills. Therefore, most of the coal mine labourers hail from other regions due to lack of jobs there and a few local labourers are working as miners due to rising scarcity of alternative safe opportunity in the interior areas and lack of capital to do other business. But till date, most of the local people prefer to be engaged in safe activities.

Table 10: Distribution of Mine Labourers according to the Place of Origin

Sl. No.	The Place of Origin	No. of Mine Labourers
1	Assam	90
2	Nepal	86
3	Khasi, Jaintia & Garo Hills	14
4	West Bengal	10

Source: Field study by the researcher

7.0 Impact of Coal Mining and its Trade on Asset Holding

The pattern of tangible asset holding of the coal mine owners and non-coal mine owners is considered here. Table 11 exhibits the distribution of coal mine and non-coal mine owners according to the pattern of owning tangible assets of various kinds that normally reflect their standard of living and pattern of expenditure on such assets. It also reflects the pattern of utilisation of income generated by the people either from mining or other sources. This is done to know whether the coal mine owners are more interested to invest in raising more assets or just to lead a luxurious life and their differences with the non-coal mine owner.

Table 11 shows that coal mining and its related activities have important implications for the asset-holding pattern of the people in Jaintia Hills. Coal mine owners are comparatively better off in the tangible asset holding. For example, 100% of coal mine owners own colour televisions, whereas only 10% of non-coal mine owners own the same. Similarly, 100% of coal-mine owners have mobile phones, while only 25% of non-coal owners have the same.

Therefore, it can be concluded that coal mining and its related activities have contributed significantly to the wealth and welfare of the people who are directly involved in such activities. Coal mining and its related activities is helping to build tangible assets of coal mine owners relatively more than the non-owners as their income is much higher than the non-owners. The non-coal mine owners are deprived of all these benefits. Had it been under state ownership, the whole area would have benefited uniformly. Moreover, the owners are interested in investing in houses, transport vehicles or other secured ventures to raise secured revenue permanently without taking any risk and lead a luxurious life that can be seen from the distribution of their income for different purposes presented in Appendix 1.

Table 11: Distribution of Houses of Coal mine Owners and Non-Coal mine Owners according to the Holding of Tangible Assets

Sl. No.	Items	No. of Household of the Coal mine Owners	No. of Household of the Non-Coal mine Owners
1	Having House in Town	40 (80.00)	3 (7.5)
2	Luxurious Vehicles	37 (74.00)	5 (12.5)
3	Black & White Television	-	25 (62.50)
4	Colour Television	50 (100.00)	10 (25.00)
5	Washing Machine	10 (20.00)	-
6	Music System	40 (80.00)	15 (37.50)
7	Expensive Camera	35 (70.00)	-
8	VCD, DVD Player	30 (60.00)	5 (12.50)
9	Mobile Phone	50 (100.00)	10 (25.00)
10	Landline Phone	50 (100.00)	10 (25.00)
11	Cable Connection	45 (90.00)	5 (12.50)

Source: Filed study by the researcher.
Note: Figure in parenthesis represent percentage to the total.

8.0 Impact of Coal Mining on Vehicle Ownership by Coal mine Owners in Jaintia Hills

Vehicle ownership is also an important economic indicator of status of wealth. The impact of coal mining and its related activities on the local economy can be examined by using this indicator. Table 12 explains the pattern of ownership of vehicles by coal mine owners, which is compared with that of non-coal mine owners in the coal mining areas of Jaintia Hills. Here the non-coal mine owners are also benefitting from coal mining, who earn as depot managers, assistant managers, trader or transport of coal.

Table-12: Distribution of Coal mine Owners and Non-Coal mine Owners According to Vehicle Ownership

Sl. No.	Types of Vehicles owned	No. of Coal mine Owners	No. of Non-Coal mine Owners
1	Saktiman Trucks	50 (100.00)	10 (25.00)
2	Tata Model Trucks	20 (40.00)	2 (5.00)
3	Maruti/Local Taxi	26 (52.00)	4 (10.00)
4	Other Personal Vehicles like Bolero, Alto, Marshall	29 (58.00)	5 (12.50)

Source: Field study by the researcher.

Note: Figures in parenthesis represent percentage to the total number of people studied.

Table 12 shows that coal mine owners are in a better-off position as far as the pattern of vehicle ownership is concerned. 58% of the sample coal mine owners have personal vehicles like Alto, Bolero, Marshall, while only 12.50% of the sample non-coal mine owners have personal vehicles. 100% of coal mine owners have Saktiman trucks, while 25% of non-coal mine owners have Saktiman trucks and those are used for carrying coal. 40% of coal mine labourers have Tata model trucks while 5% of non-coal mine owners have Tata model trucks. Hence, coal mining and its related activities have important implication for vehicle ownership in coal mining areas of Jaintia Hills. The coal mine owners have relatively more income than that of non-owners and hence they have the capacity to invest more in vehicles to raise further income. Therefore, coal mining and its related activities have increased the per capita vehicle possession in the local economy of Jaintia Hills especially of those who own the mine. It can be shown through the rising number of vehicles during 1990-91 to 2004-05 of different categories in Jaintia Hills district.

Table-13 reveals that the number of private trucks, private cars and tourist and local taxis has increased continuously since 1990-91 in Jaintia Hills. The total number of private trucks was 1870 in 1990-91, which increased to 3829 in 2004-05. Similarly, total number of cars was 339 in 1990-91 and it increased to 1737 in 2004-05. Also there has been enormous growth in the Tourist and Local Taxis in Jaintia Hills. The total number of Taxi was only 21 in 1990-91 that increased to 1213 in 2004-05. In total the number of vehicles has increased by about 108 per cent during last 14 years.

Table-13: Growth of Registered Vehicles in Jaintia Hills during 1990-91 to 2004-05 (Number)

Year	Trucks		Bus		Mini-Bus		Car		Jeep		Tractor		Trailer		Two Wheelers		Three Wheelers		Auto		Others		Total
	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	
1990-1991	16	1870	1	111	-	21	8	339	56	501	13	18	21	83	9	219	-	205	21	2	13	126	3401
1992-1993	16	2068	1	115	-	39	8	524	56	567	13	18	21	97	9	313	2	217	76	2	14	126	4050
1994-1995	17	2300	1	135	-	55	8	695	66	585	13	18	21	102	9	359	-	2	228	106	15	137	4600
1997-1998	14	2902	-	228	-	-	8	1022	67	708	13	22	18	109	9	407	-	-	563	177	19	131	6195
2001-2002	27	3439	19	268	-	-	8	1320	81	831	14	27	18	116	11	589	-	7	714	46	22	180	7377
2004-2005	27	3829	20	339	-	-	8	1737	82	918	14	32	18	146	11	815	-	14	1213	-	-	158	9385

Source: Commissioner of Transport, Government of Meghalaya.

9.0 Expenditure on Children's Education by Coal Mine Owners and Non-Coal Mine Owners

Expenditure on children's education is one of the important characteristics for the human capital formation in the economy of any region. Now-a-days, though the awareness of children's education has increased across almost all sections of population, the actual expenditure is significantly affected by the income. Though coal mine owners and non-owners both are benefited due to the coal mining activities in the area, the owners are benefited more. Therefore, they have more capacity to invest in their children's education if they have the intension to do so. Hence an investigation was made to assess the impact of coal mining and its related activities on the expenditure of children's education.

Table 14 illustrates the expenditure pattern of coal mine owners and non-coal mine owners on children's education in mining areas of Jaintia Hills. The table shows that the expenditure on the children's education by the coal mine owners is comparatively higher than the non-owners, who have relatively less income. Also one can correlate quantity of expenditure on education with the income across the owners and non-owners. But due to paucity of data it is not shown here. However, from the table one can safely argue that the tendency of spending more on children's education has increased in the area due to coal mining activity. Otherwise, the owners' spending pattern would be similar to that of non-owners' unless they would own coal mine hence earn huge income.

Table-14: Distribution of Coal mine Owners and Non-Coal mine Owners according to Monthly Expenditure on Children's Education

Range of Expenditure	No. of Coal mine Owner	No. of Non-Coal mine Owner
501-2500	-	25
2501-4500	2	7
4501-650	2	3
6501-8500	15	5
8501-10,500	14	-
10,501 & above	17	-

Source: Field Survey by the researcher.

10.0 Cross-Border Trade of Coal and its Impact on the Local Economy of Jaintia Hills

Cross-border trade of coal through Dawki Land Custom Station is an important external trade activity, which generates various impacts for the local economy of Jaintia Hills. In any working-day, 2000-3000 metric tonnes of coal are exported to Bangladesh through Dawki. Hence a considerable amount of income and employment is generated for the local people of Jaintia Hills.

The study of Dawki Land Custom Station revealed that the local youths get both direct and indirect employment at different levels due to trade activities. Local people are directly employed as international exporters, middleman traders, managers and assistant managers, drivers and handymen. Another important point noticed here is that local *kongs* (ladies) are also significantly benefited because of cross-border trade of coal. At Dawki Land Custom Station, there are nearly 20 hotel-cum-tea stalls run by the local ladies who have been earning their livelihood. Similarly, a study of 100 coal loaded trucks indicated that 98% of drivers and handymen belong to the local areas of Jaintia Hills. Therefore the coal trade here has multiplier effect on income and employment in the local area.

Another important field observation is that everyday 300-400 trucks have been parked at Amtapoh (near Amlarem Sub-Division of Jaintia Hills). So at parking point 5-10 tea stalls are operated by the local ladies. Moreover, a large number of hawkers are also found to sell *biri*, *kwai*, (local bettle leaf), cigarette, pineapples, oranges and other edible articles on any working day. They are all from local areas of Jaintia Hills. Around 50 local taxies shuttle between Dawki Land Custom Station and Dawki daily market. The drivers are mostly local youth from Jaintia Hills. Loading coal into the trucks for export to Bangladesh is another important occupation which attracts the local youth since this, unlike mining activities, does not involve any kind of insecurity of life. Therefore, through all these activities, about 315 people (both men and women) have been engaged, which is subject to change depending on the sphere of activities in the area.

11.0 Nature of Growth in the Local Economy of Jaintia Hills

Coal can be used in industries, where it is used as a major input or coal can be exported to other regions or other countries and the earnings from the export can be used for capital formation and development of any other sector so as to sustain the progress of the local economy. In Meghalaya, the quality of available coal is not suitable for metallurgical and other similar industries. But this variety can be used in brick kiln, cement industries and iron re-rolling activities. Sometimes, the coal is imported by the industries in other states of the country to blend with the good quality coke, which is used mainly in steel manufacturing. Also, every year, huge amounts of coal are exported to Bangladesh, where it is used in brick kiln, cement industries and tea gardens. However, few such industries have grown in Meghalaya depending on the locally available coal. Only some cement firms, brick kilns and small tea gardens have developed.

According to the Department of Central Excise, Shillong, there are nine cement manufacturing companies in Meghalaya at present. There were 166 cement-based small-scale industries operating in Meghalaya in 2004-05. In 1991-92, the number of cement based small scale industries were 128 and there were only two cement industries like Jaintia Cement Manufacturing and Mawmluh Cherra Cement Limited and the number of cement firms has increased to nine at present. There are only two cement firms in the name of Jaintia Cement and Star Cement in Jaintia Hills. After 2000, some brick manufacturing companies also came in. At present there are 22 brick manufacturing companies in Meghalaya. But the consumption of coal by these industries is not even 2% of the total coal production. So the only alternative here is to export the coal to different parts of the country and to Bangladesh and to develop other sectors like horticulture, floriculture and information technology sector, etc which have very good potential in Meghalaya. But the income generated through the export of coal is mostly invested in the real estate sector. Some of the owners reinvest a part of their earnings for the expansion of coal mining itself. The study of 50 coal mine owners revealed the fact that 30 of them have estate businesses either in Shillong or in Jowai. But there is no real capital formation in the local economy on which the growth of employment and income may sustain and the progress of local economy in the long period of time, when coal resources would be exhausted.

Another sector where income from the export of coal enters is the transport sector. Here it may be mentioned that some capital formation has been taking place when coal mine owners invest their earnings in the transport sectors. Most of the coal mine owners in Jaintia Hills own different types of vehicles like Saktiman trucks, Tata S-model trucks, Maruti and other vehicles like Tata Sumo, Bolero, Alto, etc. for the transportation of coal and the passengers.

A major part of the income generated from coal mining and its related activities is not invested in the creation of other alternative production sectors. This fact can be tested from the overtime credit-deposit ratio of the different districts, which is presented in Table 15. It is evident from this table that people in Jaintia Hills are not investing in different profitable undertakings since credit-deposit percentage of scheduled Commercial Banks in Jaintia Hills has always been the lowest among all the districts since 1995. People in Jaintia Hills have enough monetary deposits, which is higher than any other district except East Khasi Hills. The significant growth in the total monetary deposits in Jaintia Hills is largely due to the growth of earnings in the coal mine sector. But the matter of concern is that income generated from the coal mining and its related activities is not invested in the local economy for the creation of alternative sources to generate further income and employment, so that even when coal would be exhausted, the workforce engaged in this sector would be shifted to the created alternative occupations.

12.0 Concluding Remarks

It is evident that the coal mining and it related activities have been contributing substantially to the NDDP of Jaintia Hills. Also, income generated by coal mine owners, international exporters and coal mine labourers has been significantly higher than the non-coal mine owners and non-coal mine labourers in the area who have been depending on other activities not related to coal; or partially related to coal. Extraction of coal and its related activities have been helping coal mine owners, international exporters and others related to it to accumulate tangible assets like houses in Shillong, vehicles, etc that help raise further income. Besides, coal mine owners and exporters are in a position to enjoy luxurious durable goods that changed their quality of life. The parents who are in coal mining and trading are more conscious and able to provide better education to their children compared to the parents who are not in coal mining and trading. Local youth and women of Jaintia Hills are also benefited due to the generation of employment opportunities in the cross border trade in Jaintia Hills. A section of poor people also earned their bread through various informal activities generated due to coal mining.

Though labourers in coal mine earn more than other labourers, there is doubt of actual net earnings due to more health hazard and risk of life associated with mining activities. Also, there are other costs imposed by coal mining in the form of loss of vegetation, forest, water quality, fishery and the ecosystem of the area, which have been established by a number of studies.

The examination of existing rate of extraction along with the expected reserve reveals the un-sustainability of the extraction process (De, 2008). The overall picture of income and investment by all sections of people along with the nature of extraction of coal in Jaintia Hills raise doubt, whether the local economy would survive for long time or not. Even though the owners or their next generation would not suffer much due to their investment in secured venture, the employment, revenue of the government authority and other sections like businessmen, transporters would be seriously affected. It thus warrants for a judicious approach for extraction by suitable methods along with more value addition for enhancing the income and employment from the extraction of the same resource. The generated resource may be used for the development of alternative sectors which may reduce the pressure on coal and thus reduce its adverse impacts (on forest, soil, water etc) and also increase the life of the stock.

Table-15: District-wise Overtime Deposits and Credits in Scheduled Commercial Banks (Rs in crore)

Sl.No.	Districts	1982		1995		1999		2001		2005	
		Deposit	Credit	Deposit	Credit	Deposit	Credit	Deposit	Credit	Deposit	Credit
1	Jaintia Hills	3.28	0.82 (25.00)	42.64	6.39 (14.99)	90.34	12.60 (13.95)	137.56	15.46 (11.24)	257	33 (12.84)
2	East Khasi Hills	58.61	13.50 (23.03)	492.03	71.00 (14.43)	853.13	124.45 (14.59)	1336.89	206.06 (15.41)	2304	811 (35.20)
3	West Khasi Hills	0.67	0.32	18.12	4.75 (26.21)	34.75	10.78 (31.02)	43.53	9.82 (22.56)	78	31 (39.74)
4	Ri Bhoi	-	-	24.89	4.03 (16.19)	42.49	12.32 (29.00)	82.45	17.47 (21.19)	150	68 (45.33)
5	East Garo Hills	0.48	0.12 (25.00)	16.67	5.47 (32.81)	30.13	8.22 (27.28)	46.35	10.26 (22.14)	87	44 (50.57)
6	West Garo Hills	3.45	1.36 (39.92)	51.38	10.36 (20.16)	89.30	19.75 (22.12)	116.17	26.19 (22.54)	185	115 (62.19)
7	South Garo Hills	-	-	4.61	1.02 (22.13)	6.90	3.19 (46.23)	8.95	3.15 (35.20)	17	7 (41.18)
8	Meghalaya	66.49	16.12 (24.24)	650.34	103.02 (15.84)	1147.04	191.31 (16.68)	1771.90	288.41 (16.28)	3078	1109 (36.03)

Source: Directorate of Economics and Statistics, Government of Meghalaya.
Note: Value in the parentheses represents credit-deposit percentage.

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Appendix-1

Sl. No.	Annual Income (Rs in '000)	Expenditure on Children's Education (Rs in '000)	Consumption Expenditure (Rs in '000)	Other Expenditures (Rs in '000)	Saving or Reinvestment in Mines (Rs in '000)
1	200	36 (18.00)	72 (36.00)	25 (12.5)	67 (33.5)
2	200	48 (24.00)	60 (30.00)	30 (15.00)	62 (31.00)
3	312	60 (19.23)	84 (26.92)	25 (8.01)	143 (45.83)
4	400	72 (18.00)	80 (20.00)	30 (7.5)	218 (54.5)
5	312	84 (26.92)	96 (30.77)	30 (9.62)	102 (32.69)
6	436	90 (20.64)	120 (27.52)	25 (5.73)	201 (46.10)
7	448	96 (21.43)	108 (24.11)	40 (8.93)	204 (45.54)
8	540	96 (17.78)	96 (17.78)	40 (7.41)	308 (57.04)
9	540	84 (15.56)	108 (20.00)	45 (8.33)	303 (56.11)
10	636	90 (14.15)	120 (18.87)	50 (7.86)	276 (43.40)
11	636	96 (15.o9)	108 (16.98)	50 (7.86)	282 (44.34)
12	636	162 (25.47)	100 (15.72)	60 (9.43)	314 (49.37)
13	600	96 (16.00)	96 (16.00)	66 (11.00)	342 (57.00)
14	600	90 (15.00)	120 (20.00)	60 (10.00)	330 (55.00)
15	472	96 (20.34)	120 (25.42)	50 (10.59)	206 (43.64)
16	640	102 (15.94)	96 (15.00)	40 (6.25)	402 (62.81)
17	720	93.6 (13.00)	84 (11.67)	50 (6.94)	492.4 (68.39)
18	672	98.4 (14.64)	120 (17.86)	50 (7.44)	403.6 (60.06)
19	640	102 (15.94)	130 (20.31)	60 (9.38)	348 (54.38)
20	720	108 (15.00)	125 (17.36)	80 (11.11)	407 (56.53)
21	720	144 (20.00)	120 (16.67)	100 (13.89)	360 (50.00)
22	900	120 (13.33)	130 (14.44)	100 (11.11)	553 (61.44)
23	828	126 (15.22)	125 (15.10)	110 (13.29)	427 (51.57)
24	836	120 (14.35)	120 (14.35)	130 (15.55)	466 (55.74)
25	1080	108 (10.00)	130 (12.04)	90 (8.33)	752 (69.63)
26	1010	114 (11.29)	120 (11.88)	80 (7.920	696 (68.91)
27	1060	108 (10.19)	110 (10.38)	90 (8.49)	752 (70.94)
28	836	104.4 (12.49)	120 (14.35)	75 (8.97)	536.6 (64.19)
29	1060	120 (11.32)	130 (12.26)	80 (7.55)	730 (68.87)
30	800	108 (13.50)	120 (15.00)	90 (11.25)	482 (60.25)
31	1000	108 (10.80)	120 (12.00)	75 (7.50)	697 (69.70)
32	1180	120 (10.17)	100 (8.47)	80 (6.78)	880 (74.58)
33	1160	132 (11.38)	130 (11.21)	90 (7.76)	808 (69.66)
34	1260	132 (10.48)	135 (10.71)	100 (7.94)	893 (70.87)
35	1260	144 (11.43)	120 (9.52)	90 (7.14)	906 (71.90)
36	1192	156 (13.09)	125 (10.49)	75 (6.29)	836 (70.13)
37	1200	168 (14.00)	140 (11.67)	80 (6.67)	812 (67.67)
38	1320	144 (10.910	150 (11.30)	80 (6.06)	946 (71.67)
39	1480	132 (8.92)	160 (10.81)	90 (6.080	1098 (74.19)
40	1476	144 (9.76)	150 (10.16)	100 (6.78)	1082 (73.31)
41	1560	130 (8.33)	160 (10.26)	110 (7.05)	1158 (74.23)
42	1680	144 (8.57)	170 (10.12)	120 (7.14)	1246 (74.17)
43	1600	132 (8.25)	160 (10.00)	100 (6.25)	1208 (75.5)
44	1728	144 (8.33)	150 (8.68)	110 (6.37)	1324 (76.62)
45	1200	132 (8.57)	110 (9.17)	90 (7.50)	868 (72.33)
46	1600	140 (5.03)	115 9 (7.19)	75 (4.69)	1270 (79.38)
47	3100	156 (5.33)	160 (5.16)	100 (3.23)	1280 (41.29)
48	3003	160 (5.68)	175 (5.83)	125 (4.16)	1130 (37.63)
49	2536	144 (4.49)	180 (7.10)	130 (5.13)	2082 (82.10)
50	2940	132 (13.57)	175 (5.95)	125 (4.25)	2508 (85.31)
Average	1059.30	115.33 (13.570)	123.06 (15.010)	102.92 (8.24)	683.95 (60.62)
C-V	64.17	25.30 (37.82)	21.98 (46.07)	132.88 (32.41)	72.41 (22.76)

Source: Field survey by the researcher

Notes: (i) C-V implies co-efficient of variation.

(ii) Other expenditure includes expenditure for durable assets, instalment payment for purchasing house, instalment payment for purchasing vehicle, medical expenses, etc.

Appendix-2: Spatial Distribution of Coal Reserve in Meghalaya

Area/District	Reserve (in million tonnes)
Jaintia Hills	42.31 (7.48)
Khasi Hills	164.50 (29.07)
Garo Hills	359.00 (63.45)
Total	565.81 (100)

Source: Directorate of Mineral Resources, Government of Meghalaya.
Note: Figures in the parentheses represent percentage to total.

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- *The coal extraction in Meghalaya is made by primitive methods, mostly by individuals land owners.*
- *Rising extraction of coal raises doubts about what will happen to the coal dependent local economy once the reserves are exhausted.*
- *The environmental impacts on land, water, forest and agricultural resources are very high threatening ecological security of the region.*
- *Mining and trade of coal generate income for local people in Meghalaya both directly and indirectly. However, the mine owners get a much larger share of income than the non-owners.*
- *Heavy costs are imposed by coalmining in the form of loss of vegetation, forest, water quality, fishery and the ecosystem of the area, which will be affecting the region's population for long-term.*
- *It thus warrants for the judicious approach for the extraction by suitable methods along with more value addition for enhancing the income and employment from the extraction of same resource.*
- *Also, the generated resource may be used for the development of alternative sector that may reduce the pressure on coal and thus reduce its adverse impacts (on forest, soil, water etc) and also increase the life of the stock.*

11

Strengthening of Community Based Conservation through Tourism as Incentive in Western Arunachal Landscape, India

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1.0 Introduction

The state of Arunachal Pradesh situated in Eastern Himalaya, is one of the global biodiversity hotspots, endowed with great diversity in climate, landforms, ethnicity and resource availability. Nearly 62% of the total geographical area of 83,743sq.km of state is under forest cover of which 60% is under dense forest category. The state accounts for 2.54% of the total geographical area of India and is a custodian of more than 23.52% of the flowering plants reported from India (Hedge 2002).

The process of nationalization of forest in India began during the late 19th century during British reign. The recorded forest in India is classified as Reserved, Protected and Unclassed forests (Saigal 2003). However, for parts of North East India, the British rulers preferred to follow the policy of non-interference in administrative matters. Thus, management of natural resources remained with the community to be governed by the traditional customary laws (Pant 2001).

After Independence and with the adoption of the Constitution in 1950, the ownership rights over land and resources were further protected by special Constitutional Provisions (Sixth Schedule for Assam, Meghalaya, Mizoram and Tripura; Article 171 H for Arunachal Pradesh, Article 371 C for Manipur and Article 371 A for Nagaland, including the Fifth Schedule). As a result, in most of the North-Eastern states, substantial forest areas are under the Unclassed Category and are owned by private individuals, clans, village councils, district councils and other community institutions. Of the total forest area of Arunachal Pradesh, about 302,965 sq.km forest area is under Unclassed State Forest (USF) category where status of rights and ownership has not yet been settled and are under traditional control of local indigenous communities. Article 371H of Indian Constitution for Arunachal Pradesh has given special provision of having Elective Village Councils and Anchal Samitis (Panchayats) who decide upon the ownership rights over land and resources.

As the existing legally recognized protected area, categories like Wildlife Sanctuary, National Park andReserveForest don't recognize the age old ownership rights of the local communities over the land,givingraiseto conflicts between Government Management Authority and local villagers. Around the world, conflicts has consistently accompanied national park development (Coad *et al.,* 2008; McNeely and Minka, 2009; Redford and Fearm, 2007). Indigenous and traditional village institutions in the state have an edge over the modern formal institutions as during the British time. Even later in the post colonial era, formal laws were made to enable and recognize the authority of village councils and folk law. The state is considered as a legal pluralist state as both indigenous laws of traditional institutions and formal law enacted both at the state and Centre level in the country govern different spheres of the lives of the local tribal communities (Pant 2001).

Thus, an urgent need was felt to develop a mechanism by which the local villagers can come forward to conserve rich forest areas under their control by safeguarding age old traditional rights and ownership over the area. At the same time, for the long term active involvement of the local communities with any such initiatives, linking of the conservation effort with their livelihood activities was required as when communities realize tangible direct benefits from resource base, they are often willing to protect and police them at little or no cost to management (FAO, 2001; Chhatre and Agarwal, 2009; Odera, 2004).

Eco-tourism has been found to have the potential to make substantial positive contribution to management and conservation of forest and wildlife (Willamson, 2008). Based on the feasibility study conducted in this project, Community Based Tourism has been found to be a most suitable livelihood option which has the potential to benefit maximum number of villagers without any recurring expenditure.

In this paper outcome of the initiatives taken up by local indigenous communities from West Kameng and Tawang districts of Arunachal Pradesh with support from WWF-India declaring part of area under their control as Community Conserved Area to protect and manage the forest area and wildlife found within that has been described. The villagers have also adopted a mechanism for the first time to ensure direct benefit to villagers from the tourists visiting in their village and trekking inside CCA which they were deprived of earlier by tour operators.

1.1. About the Project Site

The Western Arunachal Landscape (WAL) lying in between 91˚36'-92˚42'N and 27˚8'-27˚52'E covers nearly 7000 sq.km area of West Kameng and Tawang districts of Arunachal Pradesh and is one of the priority landscapes of WWF and is a part of WWF's Eastern Himalaya Broad Leafed and Conifer Ecoregion. The region has a vegetation range from Temperate to Alpine Meadows due to its wide altitudinal range from 1200m to above 6000m. The landscape harbours an extremely rich faunal and floral diversity which includes many endangered or vulnerable mammals (Mishra *et al* 2004). The area is also a rich repository of many rare and threatened Rhododendrons, Orchids, Gymnosperms and medicinal plants.

The WAL is part of the Eastern part of the majestic Himalaya mountain range which has been identified as a globally important region for biodiversity (Olson and Dinerstein 1998, Stattersfield *et al.* 1998, Mayers *et al.* 2000, Wickramanayake *et al.* 2001) and supports one of the world's richest alpine floras with high level of endemism in the Temperate Broad Leafed forest areas (WWF and ICIMOD 2001). The extra moisture due to monsoon rains that sweep in from the Bay of Bengal in Eastern Himalaya supports many more species of plants and animals than the drier western reach of mountains (WWF and ICIMOD 2001).

The vegetation type of West Kameng and Tawang district, as a result of wide altitudinal variation, ranges from Tropical Evergreen forest type to Alpine meadows. The most dominant forest type is Temperate Broad Leafed Forest covering nearly 24% of the total geographical area. According to WWF and ICIMOD (2001), this particular forest type in Eastern Himalaya is among the most species-rich temperate forest in the world.

2.0 Materials and Methods

In this project the methodologies that have been followed for the activities have been taken up to develop the model can broadly be divided into three categories as has been described below.

2.1 Development and Strengthening of Local Institutional Mechanism:

Village level meeting was organised to finalise the name of local villagers for the constitution of CCA Management Committee for each site. The role and the function of committee members and their office tenure have been decided in the meeting. After consultation, By-laws of the committees were prepared and then the committees were registered under Society Registration Act. The main function of the committee decided in the village meeting is to execute and monitor the CCA Management Plan and coordinate the Community Based Tourism activities in the village and ensure that more and more villagers are benefited from livelihood activities. As for the members of committee, managing the technical matter after registration as a Society, like maintenance of financial records, writing reports and proposal for fund raising etc. was difficult, so on their recommendation, two educated boys from both the sites started working with WWF-India as trainees and are presently managing all official works of both the committees. as a Society, like maintenance of financial records, writing reports and proposal for fund raising etc. was difficult, so on their recommendation, two educated boys from both the sites started working with WWF-India as trainees and are presently managing all official works of both the committees.

2.2 Demarcation and Management of Community Conserved Area

For the demarcation of area to be managed as CCA, village level meeting was organised where all the villagers, members of village council and religious leaders from the village participated. After detailed explanation of the consequence and additional responsibilities the villagers will have after demarcation, draft map of area for demarcation as CCA was developed with the help of Google Earth and PRA exercise. Based on the decision of the villagers in the meeting, the village Panchayat first adopted a Resolution and then issued Village Proclamation where officially CCA got notified with map of the CCA and list of members selected for CCA Management Committee. The decision of the villagers was communicated to all concerned Government officials though it is not under any of the legally recognised Protected Area categories as per Wildlife (Protection) Act of India.

A detail baseline survey of the CCA with the help of local villagers for documentation of important flora and fauna found within the CCA and area of their distribution, forest resources on which villagers are dependent and area where it is available and its status, threats and pressure which needs to be addressed etc., have been conducted. Based on the ground information collected during the survey, GIS analysis and mapping of CCAs using LISS III and PAN satellite images of 2007 and 2008 have been done. Based on the findings, Interim Management Plan to address issues which needs immediate attention was developed in consultation with local villagers. Work for the development of detail Management Plan for both the CCAs is now in progress.

2.3 Promotion of Community Based Tourism as Conservation Incentive

For identification of suitable livelihood option to be promoted as conservation incentive for the villagers, feasibility study was first conducted where horticulture, handmade paper, incense stick, Rhododendron Squash, local handicraft and Community Based Tourism were analysed. Based on the study report, it was decided to promote Community Based Tourism in both the sites. After the villagers agreed to take up CBT activities, group of villagers from both the sites were taken to Gangtok and Yaksum at Sikkim on an exposure visit where they interacted with villagers running Home Stays and are working as Guides, porters and cooks. They interacted with tour operators and villagers to get a clear idea of how to manage CBT in their villages, the quality of service that they will have to provide to the visitors, likely negative impact of tourism and how to avoid the same.

After the exposure visit, in the village meeting with help of PRA exercise, trek route, camp sites, attractions and activities for tourist have been finalised. Villagers were selected to provide various tourism services based on their existing skills and capacities and also rates for all the services have been finalised. Mechanism for management of CBT, in consultation with local villagers, in which provision for direct benefit to villagers and to generate funds to develop the corpus of CCA Management Committee, has been developed. Effort has been made to ensure that villagers are able to manage and coordinate CBT in their village at their own and one local boy, from each site, have been assigned with the responsibility to look after all the arrangement for visitors and 10% of earning by Home Stay operators and 30% of earning from Camp site of the committee is paid to him as honorarium.

To ensure equal opportunity for all the selected villagers as per the rules adopted in the village, all the service providers for particular services are being engaged on rotation basis. Besides, pack animal owners are not allowed to provide more than 2 pack animals at a time during a turn, and all the tourists staying in Home Stays have to go to Home Based Restaurants for lunch. Onsite training workshop for the selected villagers were also organised where experts from Sikkim imparted training to them. Works to develop and improve existing infrastructure for CBT were taken up.

For marketing, the committee has officially informed all the tour operators about the mechanism which has been put in place, services and faculties that are available and charges for various services. As the villagers are still in a learning phase, they are not getting tourists directly as it needs strong networking outside the village and also the skills to manage. So all the tourists that the villages have received are through travel agents who are bringing tourist to these villages for 1-5 days as a part of their 10-30 days overall tour package and are making payment to committee as per the charges that has been fixed. Regular meetings are organised in the village to discuss on how to improve the service and also revise rates whenever felt necessary.

3.0 Results and Discussion

The outcome and impacts of the project that have been achieved so far after it was started in the year 2007 can be broadly described under the following heads:

3.1 Conservation Outcome and Impact

After the start of the project in the year 2007, in consultation with villagers, two Community Conserved Areas – *Thembang Bapu CCA* (TBCCA) and *Pangchen Lumpo Muchat CCA* (PLUMCCA) with approximate area of 312 sq.km and 98 sq.km respectively have been demarcated by villagers from Thembang village of West Kameng district and Lumpo and Muchat villages of Tawang district (Plate 1). In both the sites, CCA Management Committees, *Thembang Bapu CCA Management Committee* (TBCCAMC) and *Pangchen Lumpo Muchat CCA Management Committee* (PLUMCCAMC) have also been constituted to work for the management of the CCA and economic development of local villagers.

Series of baseline survey in the year 2007 and 2008 of both the CCAs were conducted jointly with the local villagers. During the surveys, areas under intensive use by local villagers for firewood, bamboo and timber, grazing sites (summer and winter), areas with rich floral and faunal diversity and different kind of existing pressure and threats were identified. The altitude range of both the CCAs is from 2300m to about 5000m and the vegetation types accordingly ranges from Sub Tropical to Alpine pasture. Both the areas have rich diversity of fauna which includes rare and threatened animals like Red Panda, Musk Deer, Blue Sheep, Takin, Goral, Leopard, Himalayan Black Bear, and Wild Dog. Blood Pheasants, Monal and Satyr Tragopan were found to be abundant and can be sighted easily. During the survey many rare and threatened plants like four species of Aconitum, Swertia, *Rheum nobile, Picrorhiza kurrooa, Saussurea gossypiphora, Taxus bacata* etc. were found growing abundantly.

Work is now in progress to demarcate various zones within the CCAs after discussion with local villagers and with help of GIS tools to develop Management Plan in order to ensure sustainable use of the forest resources and protection and management of rare flora and fauna and their critical habitat based on the information available. However, to address some of the immediate threats and pressure on the CCAs, villagers decided to follow an Interim Management Plan to take necessary steps to:

- Ban all commercial collection of firewood and NTFPs from the CCA area
- Ban any kind of hunting inside the CCA area, and
- Engage village youth for regular patrolling and monitoring within the CCA

Here are some of the actions that the villager's took:

- Notice was served to all the villagers and respective village heads banning any kind of hunting and commercial collection of medicinal plants by herders who every year goes inside TBCCA with Yak and Sheep for summer grazing.
- Notice was served to villagers and also some of the Government Officials who were found involved in hunting and were informed that on repeating same, besides penalty by CCAMC, the guilty would be handed over to the Forest Department.
  One foreign tourist was caught by TBCCAMC for collecting beetles and wild mushroom during trekking.
- Villagers from Thembang surrendered traps and snares in their possession to TBCCAMC which they were using for hunting.

- A joint declaration was issued by villagers of 6 villages in and around Lumpo and Muchat to ban hunting and fishing with provision of fine of Rs.20,000 for any villagers and Rs.10,000 for any outsider involved in hunting.

- Villagers during their movement within the CCA have resolved to destroy any traps and snares that they come across.

Presently work is also in progress to involve the villagers in periphery of TBCCAMC, who are traditionally using the summer grazing ground of TBCCA, for their active support to TBCCAMC in their initiative to conserve TBCCA. In a joint meeting of villagers and village heads of Sangte and Namshu, which are in the periphery of TBCCA, it has been decided that from the project, support will be provided to these villages to develop the faculties for CBT to share the benefit of CBT being promoted at Thembang. In return they will make sure that no one from these villages is involved in any activity not permitted by TBCCAMC as per the management strategy for TBCCA.

3.2 Livelihood Outcome and Impact:

Community Based Tourism is proving to be most inclusive initiative, providing highest economic returns and providing strong incentives to the villagers to conserve CCAs. The mechanism that has been put in place in consultation with villagers has got provision for direct income by villagers and at same time generate corpus of the CCAMC (Table 1). From project support to improve the existing facilities of Home Stays and Home Based Restaurants through CCAMCs have been provided. The necessary camping materials required for trekking by tourists were also provided directly to the CCAMCs. For the capacity building of the local villagers selected for various services, series of training workshops were organised where experts from Sikkim were invited. For both the CCAMCs, Office-cum Tourism Information Centre have been constructed with contribution from villagers.

Table 1 - Different earning opportunities from CBT

Earning Opportunities for Villagers	Earning Opportunities for CCAMC
1. Home Stay Operator 2. Home Based Restaurant Operator 3. Pack Animal provider 4. Guide 5. Cook and Cook Helper 6. Porter 7. Camp Manager 8. Performing Cultural Programmes	1. Space provided for pitching tent brought by Tourist 2. Camping materials taken from CCAMCs 3. CCA Entry Fee 4. Camera Fee 5. CCA Conservation Fee (15% for international tourist and 10% for domestic tourist of total cost of all the services being provided by villagers and CCAMCs)

During three tourist seasons, the total income by villagers in the four sites, Thembang, Lumpo-Muchat, Sangte and Namshu has been Rs.3,15,436.00 and saving by CCAMCs and Village Committees has been Rs.1,09,282.00 (Table 2). Out of these, maximum earning was by Thembang. At Lumpo-Muchat, though the project was started in the same time earning was low as being last village of India with village boundary with China and Bhutan, there is a restriction of foreigners visit to the area and trekking inside by even Indian tourists. Work is in progress for the permission by State Government for relaxation in the existing rules so that villagers from this area can also be benefited from tourism related activities to improve upon their economic status.

Table 2 - Income generation through Community Based Tourism by villagers and CCAMC

Name of Village	Income (Rs.)				
	2008-2009		2010 (Till Nov 2010)		Total
	By Villagers	By CCAMC	By Villagers	By CCAMC	
Thembang	2,21,736.00	51,444.00	67,750.00	28,823.00	3,69,753.00
Lumpo-Muchat	5,000.00	8,550.00	14,650.00	1,465.00	29,665.00
Sangte	Project started in 2010		6,300.00	10,500.00	16,800.00
Namshu	Project started in 2010		-	8,500.00	8,500.00
Total	**2,26,736.00**	**59,994.00**	**88,700.00**	**49,288.00**	**4,24,718.00**

3.3 Expansion and Replication

Based on the outcome of the first phase of this project, many villagers have expressed their interest to adopt similar model of conservation to ensure conservation of their natural resources and at the same time improve livelihood of the local communities. As a result, in the second phase, the work to further strengthen the existing CCA Management, in the month of November 2010, at Pangchen Valley, in a meeting, villagers from three new villages – Kharman, Kelekteng and Shocktsen decided to protect nearly 108sq.km area under their jurisdiction as *Shocktsen Lakhar CCA.* In the meeting it was also decided that new CCA Management Committee along with the existing Pangchen Lumpo Muchat CCA Management Committee will form *Pangchen Red Panda Conservation Alliance* and will work together to manage and protect the wildlife of Pangchen Valley with special focus on Red Panda. And also all the five villages of Pangchen Valley will work together for the promotion of CBT in the Valley as it will provide variety of choices for the visitors.

People from Assam, Meghalaya and others parts of Arunachal Pradesh are showing interest to replicate this model in their area and as a result these villages are also receiving groups of villagers and government officials from different parts coming on exposure visit. Discussions are now in progress with State Government for suitable policy level support to such community based initiatives for the long term success and extension to other areas.

4.0 Conclusion

To address issues related to conservation and livelihood objective side by side is neither easy nor straightforward (Brown, 2002; Adams *et al.,* 2004). In Arunachal Pradesh it becomes more complicated when conventional paradigm of conservation of exclusion of local communities from nature which they have been managing from time immemorial to ensure its protection, is applied. The mechanism that has been developed in this project so far has been successfully generating interest among local communities towards conservation. The model is not only ensuring to safeguard their traditional ownership and user rights over the resources but is also providing opportunities to improve their economic condition.

However, as the project is in its initial stage, it is necessary to ensure long term technical and financial support to communities to continue their ongoing initiatives, considering that nature and type of threats and pressure changes with time. The tourism market is dynamic and requires ongoing development of the product, which in turn requires creativity and innovation. There is also need to explore and promote new livelihood options linked with the available forest resources like NTFPs to strengthen the relation of the local communities with the nature.

It is also necessary to ensure policy level support for sustenance of such initiatives by communities. So far, for many of the villagers it is like many other projects being implemented by various agencies in their area and they are in state of observation. So it is necessary to recognise and appreciate such community initiatives to sustain motivation level and generate interest among others to adopt similar initiative ensure long term support to such initiatives.

5.0 Appendix

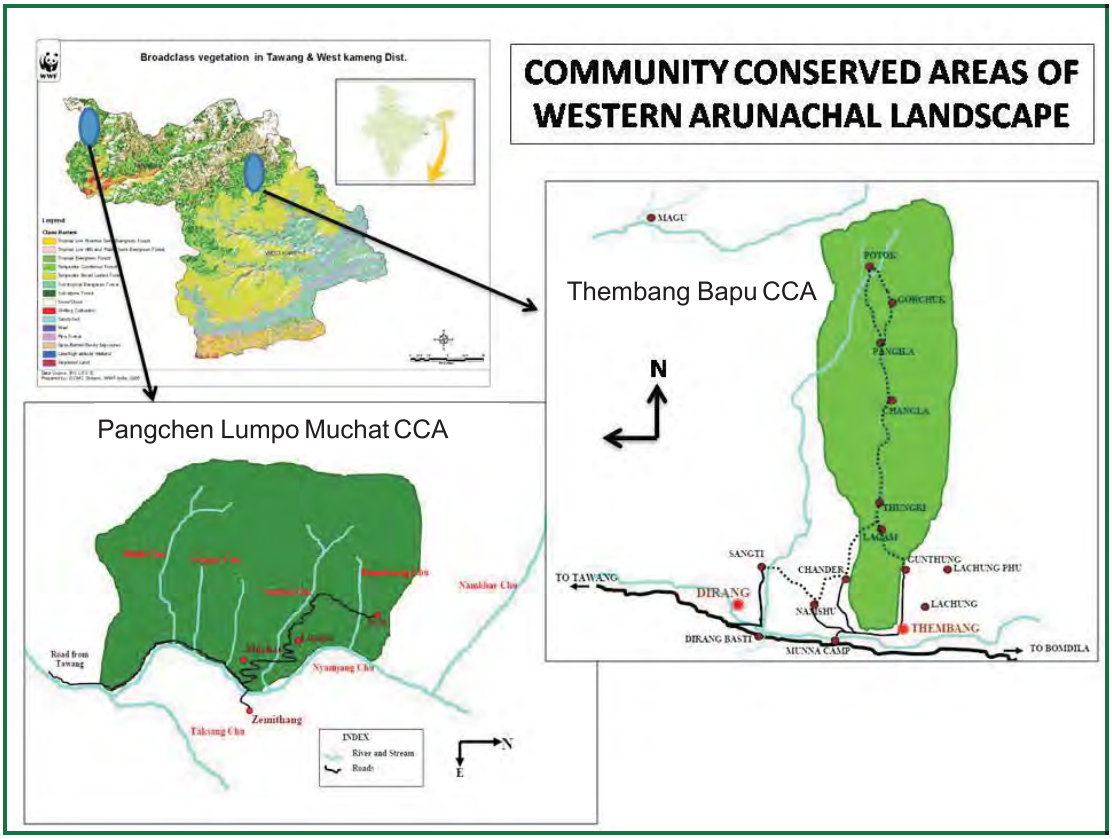

Plate 1. Community Conserved Areas (TBCCAMC and PLUMCCAMC) demarcated by local villagers.

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- *In most of the Northeastern Indian states substantial forest areas are under the Unclassed Category and are owned by private individuals, clans, village councils, district councils and other community institutions.*
- *Very often conflicts are raised in between Government Authority and local villagers owing to non-recognition of traditional rights.*
- *Community Based Tourism has been found to be a most suitable livelihood option which has potential to benefit maximum number of villagers without any recurring expenditure.*
- *Local institutional mechanisms had to be developed and strengthened for management of the community conservation areas (CCA).*
- *Villagers have also adopted a mechanism for the first time to ensure direct benefit to villagers from the tourist visiting in their village and trekking inside CCA.*
- *Capacity building of the local community for management of tourism was carried out by WWF.*
- *Mechanism was put in place for the equitable benefit sharing from tourism.*
- *Village council took decision to conserve flora and fauna around their forest and set up penalty for violation.*
- *Community Based Tourism initiated through this project is proving to be most inclusive initiative, providing highest economic returns and providing strong incentives to the villagers to conserve CCAs.*
- *However, it is necessary to ensure long term technical and financial and policy level and creative inputs to support the communities to continue their ongoing conservation initiatives and to promote other natural resource based livelihoods for future.*

12

Getting Ready for Public Hearing

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Applied Environmental Research Foundation (AERF)

From SAKAV 2011, AREF's Annual Marathi Issue

In Konkan coastal region of Maharashtra there had been a series of public hearings in the year 2010. These public hearings were for a range of projects like well-known and stirred Atomic power project at Jaitapur, thermal power plants at coast and iron ore mining projects in the Weston Ghats mountains. The process mandatory as a part of EIA notification is an important tool to have informed decision-making. But on the ground it was realised that the local community and stakeholders are hardly aware of the power of the tool. How to deal with this important event beyond the agitation was not known. Applied Environmental Research Foundation, AERF, a non-governmental organization working for conservation of forests in the region for last 16 years helped people of Asaniye village to prepare for an effective public hearing. It is extremely important for other villages to know the process in details and get fully prepared for the hearing.

A public hearing is a great opportunity given to the project affected persons and stakeholders by the law, to put our view points about the project. However to do so, it is important to prepare systematically. Many a times it never happens and the public hearing is just another protest and agitation. With such protest, most of the times the final decision about the project goes against the people and often conditional clearances are given despite peoples' protests. For systematic opposition to any project, the village and local stakeholders must prepare in three phases

Phase I: Before Public Hearing

If any development project is planned in an area, the Grampanchayat of the village must have official correspondence about it. Many a times such papers like lease area details, list of land owners, the letter of the proposing company to Government and other important papers are not provided to the Panchayat. It is necessary for Panchayat officials to demand the letters and copies of such basic documents. It can be easily done using the Right to Information Act provisions. The simple form to file application under RTI is easily available in the collector office.

Villagers should be alert about any different unusual happening in the village and the Panchayat can take objection to it, e.g. bulldozers or heavy machinery in a village area. If they start work in the name of research, immediate objection should be filed. The panchayat must conduct the detailed enquiry of such issues with respected government departments.

The land purchase process generally starts long before actual project. Those who sell the land do not have any idea of the ultimate objective of the buyer or the fact that they might be displaced in the future due to the project. The real motive of the land purchaser and his connections should be known to the land owner. Very often a few local people act as land agents and prosper visibly. But all will not prosper in the same way after selling land.

The basic idea behind the public hearing is to discuss the Environmental Impact assessment Report of the proposed project before the affected persons. Many a times the project proponents prepare such reports without visiting the area which are obviously wrong. According to the Biodiversity Act (2004) anyone from outside could not collect any data on biodiversity without official permission of the Panchayat. Therefore once any one in the village hear about such project, they must write to State Pollution Control Board, Collector as well

as Ministry of Environment & Forests indicating that the village and PRI have not given permission to conduct the studies. Anyone visiting, the village in the name of studies and research should not be allowed without deeper enquiry of the purpose of such research and the qualifications of researchers. It is advisable to have a written application from them for doing particular research.

The notice of Public hearing is published in major regional and few local newspapers and it is mandatory for the State Pollution Control Board (SPCB) to give the EIA report in English as well as in local language to all affected persons thirty days prior to the hearing. If these documents are not available 30 days in advance, the Panchayat and or any affected person can inform this to SPCB and the collector to postpone the public hearing.

Study of EIA reports authenticity and flaws is very important prior to Public Hearing. If the EIA reports both English as well as in local language have been received in the village, then the learned youth and the old knowledgeable people should read it together and check the same for authenticity and discrepancies. It is necessary to take help of experts and organisations with such experience. Many a times, those who lead the struggle on individual level, may not have the skill and expertise to find the technical flaws in the EIA report. Therefore they cannot use such points during the public hearing effectively. The public hearing could be cancelled or postponed in absence of correct EIA.

After discussions about the EIA with experts it is necessary to train some people from the village to speak about it in the public hearing. As local people may not have enough courage or experience to speak in front of senior government officials it is acceptable to read the objections rather than a speech. Good oratory is not necessary.

The strategies and actions during the Public Hearing should be discussed before to maintain the unanimity in the objections. Preparing the objections in details with reasons, in writing with signatures of the local people, for submission prior or during the hearing is important. Anything in writing is more valid evidence than the speeches.

Phase II: Actual Public Hearing

Everyone attending the public hearing must be confident to put our points. According to the Environment Impact Assessment Amended Rule (Sept. 2006) there is no time limit for the proceedings of public hearing. Therefore if the respected Authorities are trying to hurry the proceedings it has to be ignored. Similarly according to the same rule there is no age limit for expressing the thoughts in the public hearing. If a minor is trying to speak many a times the representatives of SPCB or collector trying to stop such minor from talking and create the confusion. But it should be ignored.

The group leading the public hearing from the village must keep the copy of the Environment Impact Assessment Amended Rule (Sept. 2006) with them. If the authorities of public hearing take objection to anything they can be questioned and people can ask them to show such provisions in the Rule.

The project proponents make a power point presentation before the public in the beginning of the public hearing. Often it is not possible to see the presentation correctly due to light etc. In such case people can take objection and can stop public hearing till they see the power point clearly. It is of utmost important to ask following questions before the presentation:

- Who has done the EIA studies and their educational qualifications? It is necessary to insist on names. One of the EIA team members should give the presentation.
- When this EIA team visited the village and project area, where did they stay during the study? Names of couple of specific sites from the village surroundings where they have collected data can be checked for verification.
- Whether the EIA team has informed the Grampanchayat about the study and did the consulting company or project proponent has received the permission of the Panchayat for such studies?

If the project proponents fail to answer these questions the public hearing could be cancelled. The basic objective of public hearing is to check the facts and impacts on environment due to project. Failing to answering

these questions implies clearly that the team had not visited the village for environmental studies and public hearing on such EIA becomes just a farce and formality.

People can ask questions to the presenter anytime and can interrupt him. Many a times the public hearing authorities do not allow people to ask questions. People can clarify it with the copy of EIA Amended Rule (Sept. 2006).

After presentation the people from the area/villages can speak. It is advisable that each speaker opposing the project talks about different points. It is necessary to prepare for it in advance and give concise and clear views. As a part of public hearing a detailed minute to minute video recording is mandatory for the authorities. Many a times this documentation is done by the project proponent and there are chances of changes and editing favourable to the project proponent. Therefore it is advisable for people opposing the project also do the video documentation .This will be considered as the evidence in the later stage. Some speakers must speak in English so that the EAC members in Delhi can understand while watching the official video.

It is important to avoid any confusion and quarrels during the public hearing. This may lead to missing out the main points in the minutes. As per the law there is no time limit to the public hearing. However once it is declared by the authorities that the hearing is over, then there is absolutely no scope to give any written or verbal objections or support to the project. If any authorities allows or accept such documents then this is against the law.

After each speech, the same in writing should be submitted to the State Pollution Control Board representative and must take the acknowledgement receipt on copy. It creates the documentary evidence that the point has been raised during the public hearing. After the public hearing the authorities must prepare and read the minutes of the said hearing on the spot to people and take their consent on the same. They also need to submit the signed copy to the Panchayat. If the public hearing is very long then at least the summery minutes are mandatory. Before such minutes the villagers may not allow the authorities to leave the dais and place of public hearing. It is also important to ask them the date for receive the video documentation and detailed minutes.

Phase III: After the Public Hearing

It is important to follow up with the SPCB for minutes of the hearing and further action regarding the proposed unwanted project.

On the date given at the time of Public Hearing the minutes must be received otherwise, the follow up with SPCB through letters and actual visits to regional office is important. Once the minutes are received, it is again important to study the minutes with experts and find out the flaws in them. Minutes are sent to Environmental Appraisal Committee EAC (MoEF) Delhi for final decision on the project. But many a times, minutes are fabricated, wrong and completely opposite of the facts that were put forth by people during hearing. If the minutes are not true to the facts and proceeding of the public hearing the immediate objections in writing should be prepared and sent to the EAC. The dates of EAC meetings and agenda (projects to be discussed for Environmental clearances) are available on MoEF website. It should be checked regularly.

To stop the harmful, unwanted project it is important to prepare the documentary evidences and make best use of the processes like public hearing. If it does not work agitation becomes necessary. But if the tool of agitation is used in the beginning it may boomerang and local people and supporters of the struggle may face problems and police actions etc. Agitations in the beginning create a very superficial understanding of the project and not the strategic opposition with evidences. However if all the lawful procedures go against the local people and affected persons, the protest, demonstration is the only way to fight further.

Once the project gets conditional clearance or clearance, it is utmost important to appeal to The National Green Tribunal (a special court) within thirty days from the receipt of clearance letter. If it is not done then just protest may not help.

Points to note:

- All the objections in writing must be submitted to SPCB well in advance of the Public hearing and the acknowledgement of the receipt is a must.
- It is important to involve the outside experts to deal with Public hearing, but the leadership and follow-up has to be by the local knowledgeable, committed person from the village /area.
- It is a fulltime job and someone especially youth from the village should take this leadership.
- The unity of the protesters is very important and the proponents always try to break the unity. Therefore everyone opposing the project should communicate frequently and maintain the unity.
- It is necessary to keep the platform of opposition apolitical then only it can be used for long term struggle.

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Initiatives towards Sustainable Development at Raw Material Division of Tata Steel

D.B. Sundara Raman, Sanjay Pattnaik,
Tata Steel, Jamshedpur

1.0 Introduction

Tata Steel has, from the very inception, integrated environmental promotion efforts and social responsibilities into their business. Its founder, J N Tata had visualised the importance of environmental care long back before the integrated steel plant let off its first steam. He had, at length, touched upon how the steel city, Jamshedpur would look like, with shady green trees all around. This tree care tradition had taken deep roots over these years. While technology improved, production multiplied, environmental efforts too intensified on an equal footing.

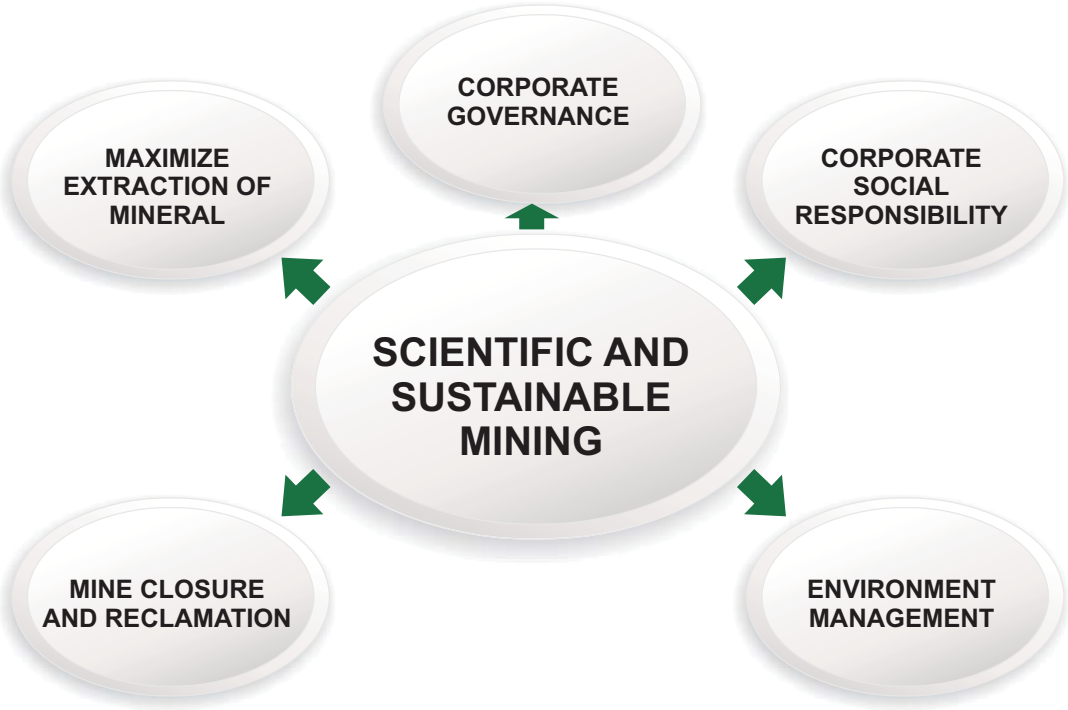
Mines of Tata Steel were not left behind. The issue of reclamation of mined out lands was initially given priority. What all started with plantation of trees has now grown into a systematic scientific way of looking at environmental promotion. Mines Division has a team of experts drawn from different disciplines to assess the environmental impacts, formulate mitigative plans and to help the management execute them in time. A lot has been attempted by way of futuristic reclamation, need-based research, participative awareness programmes, over and above regular monitoring of indicative physio-chemical-biological environmental parameters.

2.0 Raw Material Division

The primary objective of the Raw Material Division is to supply key raw materials, i.e., Iron Ore and Coking Coal from its captive mines. It comprises of underground Coal mines located at Jharia, opencast Coal mine at West Bokaro and opencast Iron Ore mines at Noamundi and Joda. The Jamshedpur Steel Plant is located within a radius of 200 Kms from the mines.

3.0 Sustainable Development in Raw Material Division

In line with the vision of the founder Mr J N Tata, in the *first phase*, reclamation of mined out pits and land was the central theme of Environmental Management in Raw Material Division. In the *second phase*, a department comprising mining, environmental engineering, chemistry, botany and forestry professionals was created with facilities for monitoring. *Third phase* saw implementation of Environmental Management System as per the guidelines of ISO 14001. After EMS implementation employees at all levels are adequately trained towards environmental protection. The mines are witnessing the *fourth phase*, where continual improvement in environmental performance is the thrust area. These mines being located in remote areas, the question of Rural Development, caught the attention of the Management. Tata Steel Rural Development Society was constituted to ameliorate the possible socio-economic imbalance.



Scientific mining ensures use of high investment and technological solutions for a safe & environmentally friendly, socially responsible & economically sustainable solution for a Mine Life cycle. The special emphasis is on planned scientific mining aiming at least disturbance to land and its effective utilisation. Pollution control measures are installed, maintained and operated at strategic locations, mostly in-built, so that pollution load on the environment is kept well below the permissible limits. Total compliance to all related statutes with regard to mining, processing and control of pollution is yet another commitment. Felt-need based Rural Development activities through Tata Steel Rural Development Society are unique features of Raw Material Division. Employees, their families, school children and all living around the mines are kept aware of the environmental requirement on a continuous basis.

4.0 Mine Planning, Scheduling and Optimisation

As a truly adventurous enterprise, Tata Steel pioneered the discovery of the rich mineral wealth of the present state of Jharkhand and Orissa region almost 100 years ago. Since then Tata Steel has developed experience and expertise in planning, development and operation of open cast iron ore mines. Mining is an integral part of steel making in Tata Steel. TATA Steel has got not only mining expertise with a rugged scientific mine planning process and long experience in development of mineral resources, but also it has the required beneficiation expertise. Mineral conservation and winning of mineral deposits in their natural proportion of occurrences with due care for environment and the communities to ensure sustainable development forms the essence of all its mining operations.

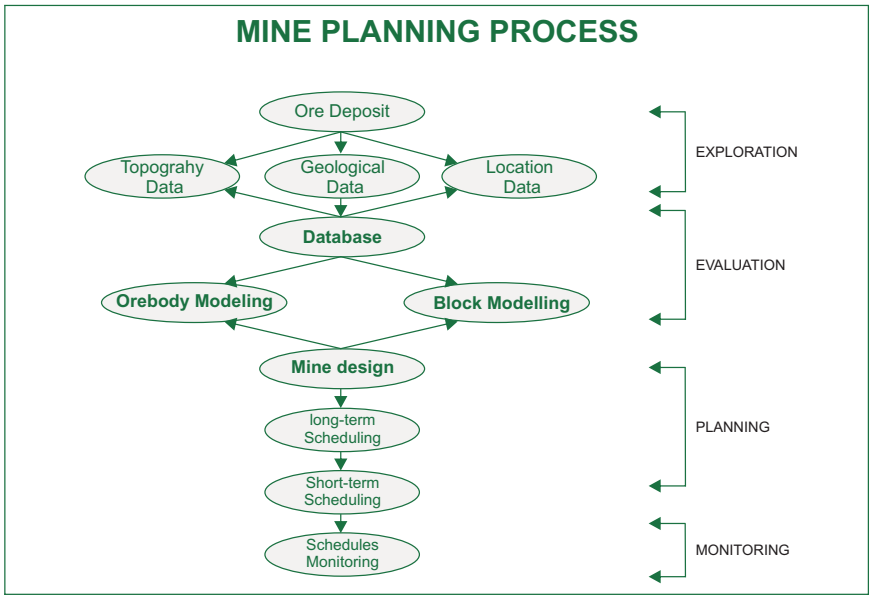
With a long experience in scientific, sustainable mining, computerized mine planning, development of highly mechanized mines, collieries and R & D activities. It has also been a leader in introducing modern mining techniques. TATA Steel also has the distinction of installing India's first beneficiation / Jigging plant.

Safe, scientific and efficient computer-aided mine planning forms the basis of operations at Raw Material Division. All the mines under Raw Material Division have well thought long-term and short-term plans for their systematic development. All mining plans have in-built Environmental Management Plan.

Mine planning also plays a major role in the gainful utilisation of lean grade ore, which is beneficially mixed with richer grade ore, at the same not affecting the final quality of the product. Blue dust, with the highest percentage of iron ore, found no use in the initial years because of its very fine size. Sinter Plants were later developed, where blue dust is mainly consumed. These are the ways by which the mission of mineral conservation is accomplished.

The Mine Planning Cell has been set up at mines with an objective to design & plan the mines of the Company in a scientific and systematic manner. Computer-aided Mine Planning using SURPAC – an integrated Survey, Geological Assessment & Mine Planning Tool from Australia was introduced for the first time in India in 1990 to undertake geo-statistical deposit evaluation, design of ultimate pit limits, concurrent back-filling and reclamation of worked out areas. Total Station Survey using Electronic Theodolite and Electronic Distance Measuring instrument was introduced in 1995.

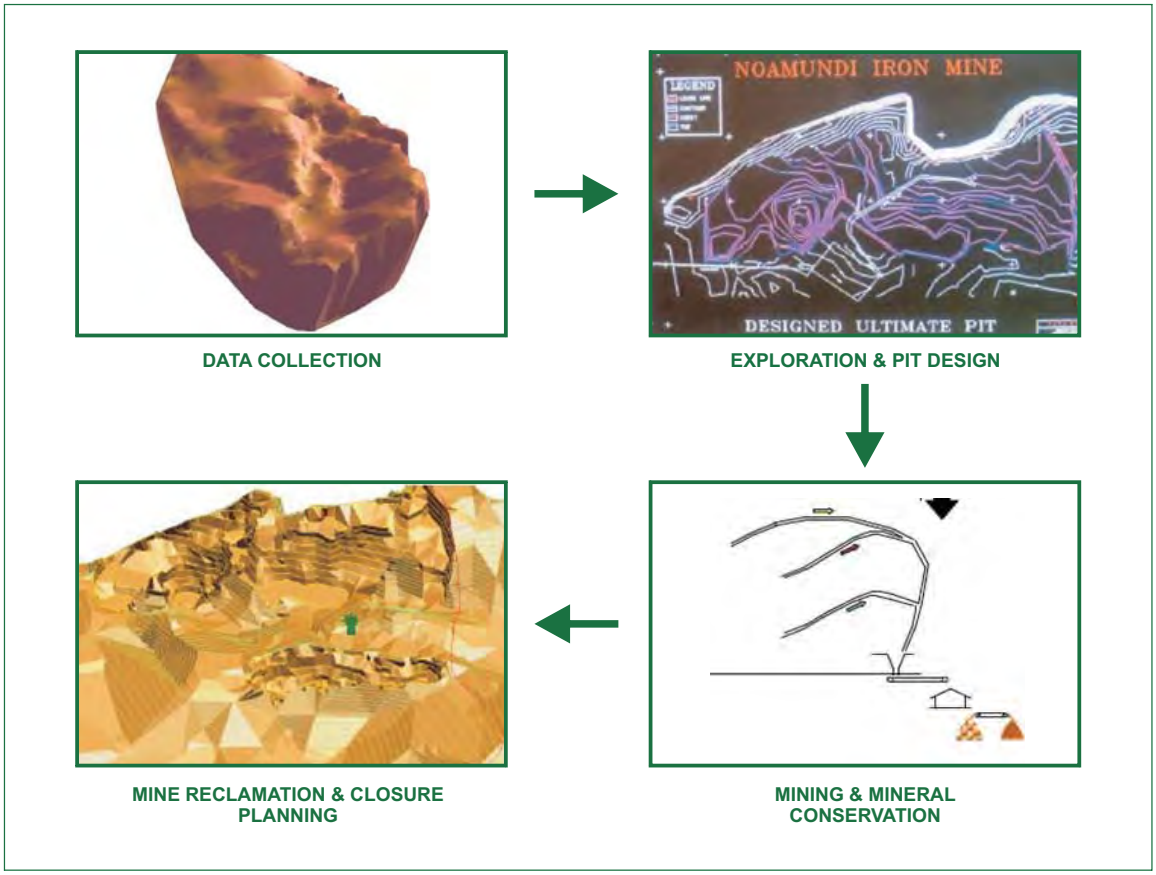
The concept of mine planning process can be explained by following diagram.



Computerized Mine Planning process has enabled us for:

- Long term scheduling for 5 to 20 years: Aiming for ultimate pit design for future investment and forecasting for technology require for using different types of mineral.
- Short term scheduling for 1-5 years: Aiming to optimize our process with future market trend.
- Annual, Monthly and daily Scheduling: It has enable us to utilize all types of ore available with proper blending process and to achieve day to day quality requirement and to reduce variation in our process.
- Optimize fleet capability: For achieving proper utilization and productivity of our fleet
- Ultimate Pit designing: To identify space for dump and future reclamation programme

The systematic approach for computer aided mine planning process is illustrated below.



5.0 Mineral Resource Management and Optimisation

a. **Geology:** Geological deposit evaluation is the first major step for planned scientific mining. SURPAC software in combination with Total Station Surveying instrument has given major input in planning process. The introduction of computers and powerful geological software have speeded up and eased the process of estimating the quantity and quality of sub-surface mineral deposits based on borehole data. Deposits are defined in a Block Model representing grade and type of ore in the section of the block.

The proposed exploration activities are given below:

Geological Mapping

Geological quick reconnaitre traversing is taken in 1:50000 scale using hand held GPS in those areas for identifying lithological units favourable for mineralization. Geophysical techniques depending on their applicability are deployed.. Follow up detailed geological mapping (1: 10000 or 1:5000 scale) are carried out n those areas found promising for further exploration.

Surveying

Ground control points/stations are established and survey grid lines are laid with the help of high precision Total Station Survey instrument and or Differential GPS for ground magnetic survey in the areas to be decided based on reconnoitre traversing. Detailed topographic survey (5m contour interval) is carried out in limited potential areas subject to the outcome of ground magnetic survey and wide spaced drill testing.

Exploratory Drilling, Sampling & Analysis

Exploratory drilling is planned in two stages for proving of the magnetic anomalies. In stage-I wide spaced exploratory drilling will be done for proving the presence of magnetic bodies. In stage-II limited detailed drilling are followed over reduced target area for delineating the mineralized area, if present. The borehole core samples are logged, sampled and analysed as per international standard and database are generated for further processing and evaluation.

Geological Modelling, Resource Evaluation & Reporting

The compilation & processing of drill hole data base are made SURPAC software for geological interpretation, correlation of different litho units & section / slice plan generation. Solid body modelling and Block modelling are carried out for resource evaluation, estimation and reporting as per UNFC guidelines for future mine planning and development.

Metallurgical test work, Geotechnical and Hydrogeological studies are conducted over the entire concession area

Metallurgical Test Work

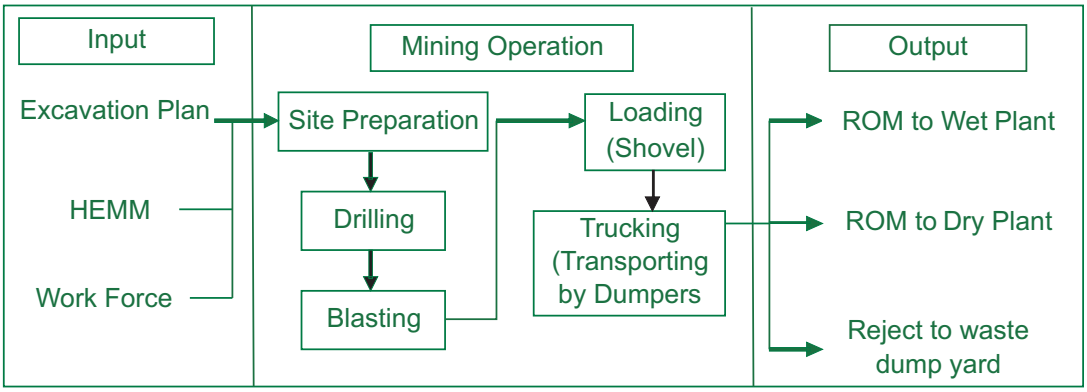
Drilling is planned through large diameter (~100mm.) borehole at suitable locations for collection of bulk samples for metallurgical test work. The test work includes the documentation of ore composition and impurity levels, characterisation of ore grindability and liberation and determination of mineralogical composition & texture including modelling of metallurgical responses.

Geotechnical & Hydrogeological Studies

Geotechnical and hydrological data collected during exploratory drilling are analysed for ensuring operational safety, maximise economic extraction, optimising blast fragmentation & mill feed and to obtain hydrogeological information.

b. Extraction

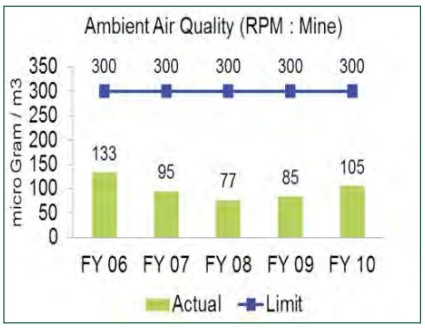
The Process flow of the extraction activities. Drilling and blasting carried out for all ore types & waste rocks. The blasted materials are dug out from mining benches through shovel and then transported by dumpers either to processing plants (Ore) or to Waste dump yard (Waste rocks, also known as Overburden).



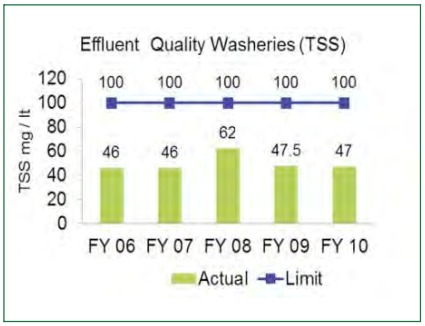
Introduction of Large diameter drills have witnessed three times increase in drilling rate along with longer life of drill accessories due to improvement in its material composition, monitoring systems based on electronics coupled with improvements in ergonomics to improve operator performance. All drilling operations are practically dust free. Wet drilling is employed wherever practicable. High speed drills have in-built dust extraction system with facilities in the form of multi-clones to clean extracted air off particulates.

Environmental Laboratory: An in-house **Environment Laboratory** has been established at mines with an objective to keep a check on indicative physico-chemical and biological parameters of ambient air, water, and soil, so that they conform to the standards prescribed by Central Pollution Control Board (CPCB) for safe, harmless and productive working. The laboratory has trained man power and the facilities to carry out regular monitoring of environmental quality parameters. Recently the laboratory has been upgraded by installation of sophisticated monitoring and analytical instruments as required under new Ambient Air Quality Standard that has come into force since November 2009. Facilities like PM_{10} and $PM_{2.5}$ Samplers, Sound Level Meters, Spectrophotometer, Water Analyser, P_H Meter, Turbidity Meter, Micro Balance to weigh up to 1 Microgram etc. have been added for better monitoring.

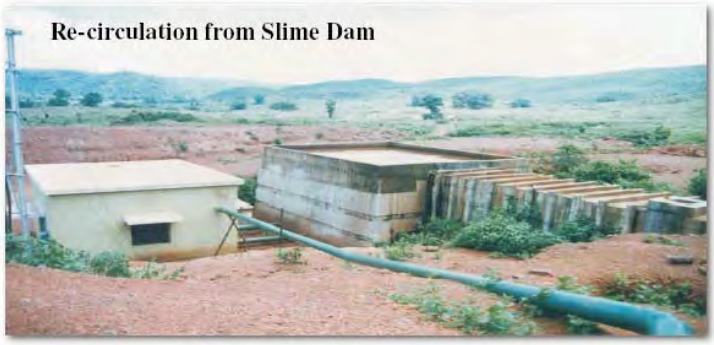
Raw Material Division constructed the first **slime dam** in the country, when operations at Noamundi Iron Mine were mechanised in the year 1967. The role of slime dam is to arrest the solids in the water used in ore washing and let out only clear water. When operations of Joda East Iron Mine were mechanised in 1994, a slime dam was constructed there as well. This improved version of slime dam has facilities to pump back the clear outflow of slime dam to the plant again for reuse. This concept of zero-discharging slime dam got now extended to Noamundi also, when a new slime dam was constructed in 2002 in the minerally-exhausted western pit of Noamundi. This new slime dam at Noamundi served two environmental causes, one being judicious land use and the other being zero-discharging slime dam.



Alternate energy-Solar Lights: Mine Town of Noamundi is equipped with solar power lamps in the streets which lights the lanes and by-lanes. Now the solar lights are also to be put up in adjoining villages. Pilot project for solar power generation is on and the day may not be far when the mines will be run by these alternative sources of energy to a great extent



Rain Water Harvesting: For conserving the depleting source of water and also to attain self-sufficiency in water, rain water harvesting site named as Aqua Park at Noamundi has been developed. The rain water harvesting would help in avoiding dependence on river source and huge cost of operating pumps and pipe lines. The park covering an area of over 1000 meter square with water shed area of 12 lakh meter square. The park has been designed with water bodies, graceful statutes, and park lights under shadow of avenue trees, water bodies, exquisite water falls, fountains and more than 100 numbers of glittering lights. To add further beauty to this park a garden with flowering plants, creeper and gargling sound of the water fall and fountain are certainly banquet for the visitors.



Check dams: have been constructed in the mining leases of Raw Material Division. Some of the check dams were constructed long back. The purpose is to arrest the rain run off. During dry seasons these check dams are cleaned and recovered silt is being used in afforestation and horticultural programmes.

Haulroads are kept optimally wet with water sprinkling, the frequency of which depends on the extent of the operations in the mine. Noamundi Iron Mine has three 28 KL sprinklers with pressurised jets.

In the field of rock blasting, the significant developments at include use of Site-Mix-Slurry explosives, which offer greater flexibility in controlling rock fragmentation through variation in explosive strength & density properties.

Ground vibration during blasting is controlled by using down the- hole delay and inter-hole delay detonating systems. We are in process of using Electronic detonation system, where the blast results can be simulated in the computer by altering the delay timing and thereafter the optimized firing sequence can be transferred to the field before firing of actual shots. These techniques greatly improve the fragmentation, muck-pile profile and facilitating improved machine performance. It also improves environmental performance through reduced noise and ground vibrations.

Bigger capacity excavators (Hydraulic Shovels of > 6.5 CuM bucket capacity) and Rear Discharge dumpers (60 tonne Capacity) have increased productivity while offering improved safety features. Haul roads are kept optimally wet with water sprinkling, the frequency of which depends on the extent of the operations in the mine. Cabins of dumpers and Shovels operated in the Division are air-conditioned and ergonomically designed. Similar ergonomic efforts have been made in a number of workplaces in the Division, which include cabin of locomotives, process control rooms, etc.

6.0 Environmental Promotive Measures

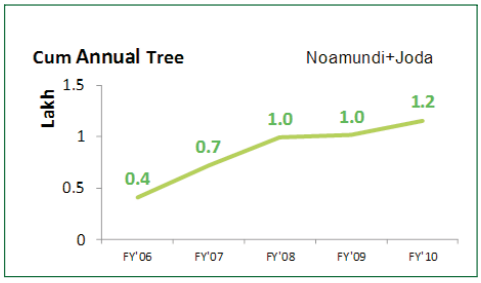
Pollution Control measures: at Raw Material Division aim at keeping the pollution load because of the operations as low as possible and much below the maximum permissible limits prescribed by Statutes. The efforts include

- keeping the haul roads optimally wet
- employing wet drilling methods and drills provided with dust extraction syste
- making use of dust suppression in the form of water sprinkling and dry fog system
- installing and operating dust extraction/encapsulating facilities at strategic locations in the entire route of ore processing
- providing oil & grease trap for treating waste waters from workshop
- developing toe walls and garland drains for waste dumps
- raising green belt around the processing plant

Biological Reclamation: Plans are drawn for each mine, based on available mined out/barren area/dump and, as per approved Environmental Management Plans, Mining Plans and/or Review Schemes of Mining. To achieve the reclamation targets, Annual Afforestation Programmes are worked out and adequate budgetary provisions are made.

Afforestation so far: At Noamundi alone as a step towards restoring nature to its unique GREEN FORM, large scale afforestation has been done Hill No. 1 & 2 which stands as one of the best examples where lush of tall trees have created a dense forest and do not let visitors to believe that, mining was being carried out one day there. The green loving mine management has planted more than 19 lakhs of saplings over an area of 363 ha and it is green all around.

A special **study** has been initiated to arrive at the optimum **soil amendments required in afforestation.** Twelve different species were studied for their rates of growth under varied simulated soil conditions. The treatment regime includes soil, soil + cow dung, soil + slime, soil + chemical fertilisers, soil + compost organic manure, etc. in different combinations and ratios. The outcome of this study is helpful in exacting the species-specific soil amendment required while planting these saplings in afforestation.



Some of the need-based environmental research projects taken up are given hereunder:

- Study on variation of dissolved iron concentration in drinking water at different stages of treatment
- Correlation between dust fall in grams/m^2 and the suspended particulate matter (SPM) concentration in micrograms/m^3.
- Evaluation of nutrient return to soil from the vegetative litter of different plant species.
- Study on siltation pattern of check dams
- Age-height influence on lung functional volume in the form of best-fitting equation, as applicable to th population of this region.
- Correlation between noise-exposure and blood pressure, the levels of fasting blood sugar and serum cholesterol.
- Age-occupation-wise disease pattern among employees.
  The relation between one-time dust exposure and reduction in lung functional volumes.

Ergonomically designed dumper cabin: is yet another unique feature in human resource conservation. To ensure comfortable work environment is the objective of this effort, which goes a long way in sustenance of human productivity. Heavy duty dumpers operated in Raw Material Division have Air-Conditioned, ergonomically designed cabins.

A regional study on the pollution load on River Baitarani: was conducted during 1995-96. The attempt was to assess the extent of pollution on the river because of the operations of mines of Tata Steel located in Joda-Banspani valley. The findings revealed that there is no contribution to pollution load on Kundra Nalla and River Baitarani because of the activities in the mines of Tata Steel. It is only indicative that the environmental protective measures implemented in these mines are adequate and effective. The findings were presented to the Ministry of Environment & Forests officials at Bhubaneswar in September 1997.

An **"Independence Golden Jubilee Park"**: was inaugurated on 15th August 1997 to mark the celebration of India's Independence Golden Jubilee. The uniqueness of the park that the public are encouraged to plant a sapling of their own choice to mark an occasion of personal importance or to leave behind a message of social importance. The person planting the sapling is charged a nominal fee for maintenance of the sapling planted. This park is housing more 300 such saplings planted by visitors. The message is that there could be long lasting environment-friendly ways of celebrations also.

A **"Rare Plants Park"**: has been designed over an area of about 2 ha at Noamundi. This was declared open in March 2000 with the motive of housing rare species of this region.

World Class Drinking Water Supply: It may be interesting to note that the new water supply system installed at the Water Supply Office in Noamundi is one of its kinds in the company. The French Doshion-Veolia Acti Flo Clarification System has been installed at one third cost of conventional clarification system. This Acti Flo System has one third Foot Print and cost, one fourth chemical consumption and very low chemical carry over compared to conventional clarification system. From this new water supply plant water is supplied to different plants like Bottom Bin, New Dry Circuit Material Plant and to other installations. Cost of this new ultra- modern plant is Rs 80 lakh. The new plant based on Active Flow Raw Water Clarification System to be run by Microsand Ballastate Technology (MBT). The plant would do microbes removal, heavy metal and Iron removal and fast response time of turbidity removal resulting in high rise rate. The capacity of this new plant will be 155 meter per hour.

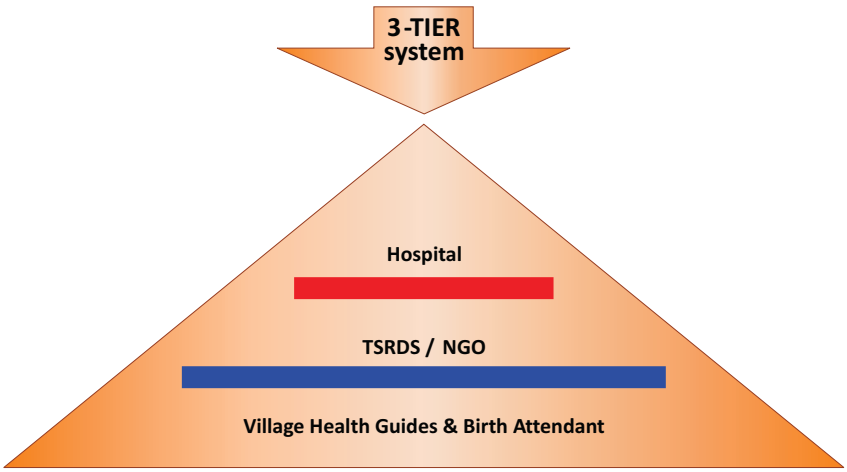
Maximise Value Addition: Country's first automated Jigging Plant for Iron ore fines, with an approximate capacity of about 300 tonnes per hour or 1.6 MTPA throughput was installed at a cost of Rs 25 crore on 8th May 2006 at Noamundi. This was one of the steps taken by TATA STEEL to upgrade the quality of Iron ore fines otherwise not so good, which will help in reducing Coke consumption and increase in productivity of blast furnaces. The Hydro-cyclone Plant installed at a cost of about Rs 7 Crores would help in recovering iron values from the slime being discharged from the Washing Plant.

Rural Development: By virtue of being a signatory to UN – Global Compact, founder member of the Global Business Coalition on AIDS, member of the CII-Social Development Community Affairs Committee, member of International Iron & Steel Institute Project Group on Sustainability indicator for Steel, member of the Global Reporting Initiative Board, and a member of Corporate Roundtable on Environment & Sustainable Development – TERI and having adopted a CII-UNDP social code, TATA Steel has demonstrated a strong leadership commitment to International and National corporate sustainability initiatives. Through the TATA Steel Rural Development Society, benefits to villages around its operations have resulted in economic uplift of the community and improvement in health, hygiene, empowerment and income generation. Rural Community Development Programmes are designed to eliminate the socio-economic imbalances in the nearby areas of the mines. These are taken care of by Tata Steel Rural Development Society (TSRDS). This Society helps people in the villages around the mines in a number of ways. Rural Skill Development, Income Generation Schemes, Medical and Health Camps, Agricultural Extension Programmes, formation and promotion of Save Forest Groups, etc. are some of the specialised areas of work by this Society. The Society has won the confidence of the beneficiary population and also the accredition from national and international forums working in the field of tribal welfare. TSRDS was instituted in 1979 with the noble intention of reaching out to people residing in the vicinity of Tata Steel units.It was later extended to mining sites in 1982.It conducts opinion surveys to assess the felt-needs of the community to be served. It ensures participation of the beneficiaries in all its projects and that the implemented projects are sustained.

A typical community concern is given:

Community	Concern	Services
Community level	Drinking water Irrigation Infrastructure Health	❖ Tube wells ❖ Check dam, ponds ❖ School, club house ❖ Clinic, referal service
Poor family	Raising income	❖ Agro based activities
Unemployment youths	Gainful employment	❖ Farm/ non farm small activity
Women	Health & contribution to family income	❖ MCH care, Formation of SHG's & linkage with bank
Children	Health & schooling	❖ Treatment, MCH care

Community Based Primary Health Care
A Unique Approach



Tata Steel Hospital

With an annual spent of Rs 20 crore and cumulative Out Patient Department (OPD) footfall of more than one lakh persons per year, the Tata Steel Hospitals at Noamundi and Joda both equipped with ICU cater to the mass and cares for the poorer section of the society. These hospitals situated within a radius of 35 km in Jharkhand and bordering state of Orissa is the mainstay for people living within 500 km radius. The hospitals are equipped with modern gadgets and machines and have Blood bank also.

Medical Care: Tata Steel hosted 15th Lifeline Express medical camps and treated 67806 patients (from 1991 to 2009). Each life line express costs about Rs. 3 Crore

Promotion of Rural Artisans

Artisans from West Bokaro Collieries area are trained in Dokra, Bamboo Craft and Terracotta under Ambedkar Hastshilp Yojana and we have also insured artisans. Gramshree Mela are also orgainsed every year for these artisans in our mines and collieries. Some figures of Gramshree Mela are presented below:

17th Gramshree Mela at Jamshedpur

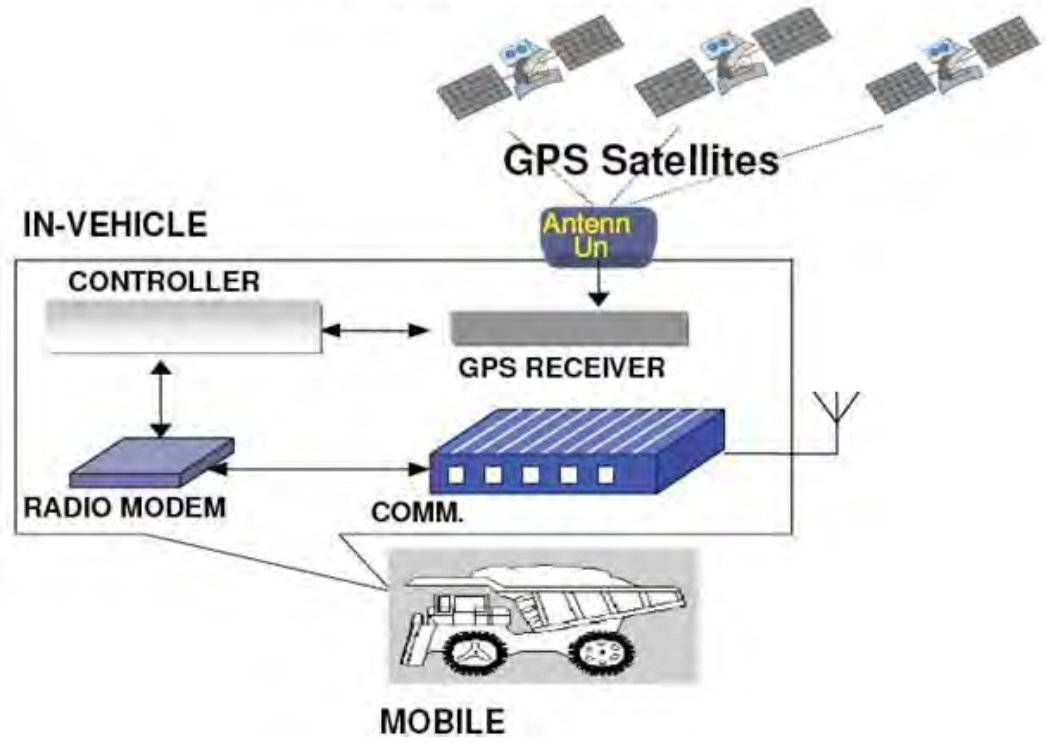
- Total Sale :Rs. 82.15 lakhs
- Total Stalls : 209
- States covered : 20

Interstate Grameen Mela at Jamadoba

- Total Sale : Rs. 13 lakhs
- Total Stalls : 65
- States Covered : 06

Information Technology in Mining Operation for Fuel Conservation: Tata Steel is the first to adopt GPS based Truck Dispatch System in Iron Ore Mines in India. GPS based Truck Dispatching system was introduced in 2004 at Noamundi Iron Mine for automatic monitoring of mobile equipment in the mine. Management Information System is undertaken through SAP – a unique ERP system for detailed monitoring and management review.

Overview of GPS at Noamundi Iron Mine



Resource Conservation: The system aimed at plugging even minor losses of resources, as the latest realisation in pollution control being that pollutants are nothing but process losses. This helped in reduction in the consumption of lubricant oil, electrical energy, fuel, water and in reduction of ore spillages. As a result, better standard of cleanliness and pollution control have been achieved. The targets are being revised by implementing Environmental Management Programmes at work sites.

Improved Operational Practices: Identification of environmental aspects and assessment of their impacts are done in each operation area periodically. It is underlined that the statutory environmental limits have to be adhered to and better standards of environmental performances achieved through continual improvement as per modified objets and targets. Operational procedures are laid out to preserve the achieved environmental standards. Also emergency situations identified and procedures are drawn to combat them adequately. Environmental Management Programmes are prepared to achieve the objectives and targets in a phased manner for continual improvement.

Training and Awareness: Well laid out procedures are followed to ensure complete coverage of all personnel and to ensure that competence levels match the requirements. These structured training programmes ensure that the employees are able to effectively contribute to enhancing the environmental standards of the mines.

Adoption of 4Q method of training in 2006: identification of critical skills, mapping employees on 4Q methodology, training as per proficiency level, measuring training effectiveness

Till 1999	1999 - 2005	2006 onwards
SKILL	**MULTI-SKILLING**	**PROFICIENCY ASSESSMENT**
Measure: Man-days fulfilment / employee	**Measure:** Per-capita skill enhancement	**Measure:** 4 Q scores (Improvement in proficiency level)
Merits • Focus on Training & development of employees • Preparation of training need survey for positions • Training of employees for specified man days. **Demerits** • No Multi-skilling • Forced training to meet man-days requirement	**Merits** • Increase in per-capita skills (Multi-skilling) • Training linked to skill gap and business requirements. Demerits • Training not prioritized for critical skills • Training effectiveness and improvement in proficiency level of employees not measured	**Merits** • Identification of critical skills • Focused training on critical skills • Opportunity to revisit the existing training module. • Providing more flexibility within cluster by making more people available in critical skills • Training effectiveness measured based on improvement in proficiency level of employees **Demerits** • Focus on existing organisation

Tata Steel has taken a unique initiative called Tejaswini for empowering the women in Industry. Women employees who were doing menial jobs earlier were selected and trained for skilled jobs. Some of women employees are seen with President of India.

Awards and Accolades

Tata Steel efforts have been recognised and the list of awards and accolades speak about them

Sijua Colliery, Jharia

- Winner (2005, 2007) - National Safety Award for longest accident free period by president of India.
- Best Mine Manager (2007) – Mr. S B Ghosh

Bhelatand Colliery, Jharia

Winner (2006) - National Safety Award for longest accident free period by president of India.

West Bokaro Colliery

- Winner (2006, 2007) - National Safety Award for Lowest Injury frequency rate.
- Runner (2006) - National Safety Award for Lowest Accident rate.

OMQ:

- Annual Greentech Environment Excellence Gold Award 2009 and 2010 in the metal & mining sector
- Best Practices in ES&H (Environment Safety & Health) award in 2009 , Tata Steel by CII, Orissa
- **Mr. Suresh Prasad**, Charge Hand of Joda East Iron Mine: **"Prime Minister's Shram Vir Award" for the year 2007.**

NaturalGist

- *Environmental and social responsibilities have been integrated in the business of Tata Steel since the beginning of the industry in India.*
- *Use of scientific mining techniques including conservation and sustainable use of minerals and also timely mitigation measures for impacts throughout the Mine Life Cycle are key features of the corporate strategy.*
- *Diverse departments within the company deal with these issues and continue to research new better techniques.*
- *Several innovative measures are taken for involvement and betterment of society, well beyond the impacted zone.*
- *Over a century, the company has demonstrated commitment towards improvement of environment and society in general and will continue to do so as company policy in future too.*

EMP	Environmental Management Planning	DMF	District Mineral Foundation
EIA	Environmental Impact Assessment	JFM	Joint Forest Management
BIA	Biodiversity Impact Assessment	FIMI	Fedrations of Indian Mineral Industries
SIA	Social Impact Assessment	POSCO	Pohang Steel Company
ICMM	International Council on Mining and Metals	SDF	Sustainable Development Framework
MOEF	Ministry of Environment and Forests	MBT	Micros and Ballastate Technology
NSDP	Net State Domestic Product	TSRDS	Tata Steel Rural Development Society
IUCN	International Union for Conservation of Nature	ES&H	Environment Safety & Health
CBD	Convention on Biological Diversity	NEST	Nature, Environment, Society and Transformations
WPA	Wildlife Protection Act	NEERI	National Environmental Engineering Institute
MMDR	Mines and Minerals (Development and Regulation) Act, 1957	GOAMAP	Goa Fedration of Mines Affected People
CSR	Corporate Social Responsibility	PTG	Primitive Tribe Group
LEWWAC	Land, Energy, Water, Waste, Air & Carbon	NTFP	Non-Timber Forest Products
PAT	Performance Achieve and Trade	PCP	Public Consultation Process
NPV	Net Present Value	GSI	Geological Survey of India
BTFF	Balipara Tract and Frontier Foundation	USF	Unclassed State Forest
PCB	Pollution Control Board	CCA	Community Conservation Areas
PBR	People Biodiversity Register	NDDP	Net District Domestic Product
MCRP	Mine Closure Reclamation Plan	IBM	Indian Bureau of Mines
IBM	Indian Bureau of Mines	EUETS	European Union Emissions Trading System

Ranjit Barthakur, Founder and Trustee, Balipara Tract and Frontier Foundation (BTFF) Ranjit heads the overall operations of the Balipara Foundation and brings over 30 years of successful experience in managing and leading companies in a wide range of industries, including FMCG, telecommunications, tourism, technology, outsourcing and healthcare.

Balipara Tract and Frontier Foundation. Sonitpur, Assam.

Shri. Rameshwar Das Indian Forest service officer of Tripura cadre. He is officiating as a Director, Institute of Forest Productivity, Ranchi. He has vast experience in joint forest management and community based natural resources conservation. Forestry, Bamboo and medicinal plants and biodiversity are his fields of interest. He has co-authored many books related to bamboo and medicinal plants. He has also authored many research articles.

Institute of Forest Productivity, NH-23, Lalgutwa, Ranchi

Dr. Utpal Kumar De, is Ph.D. in Economics from Burdwan University; currently an Associate Professor of Economics, North-Eastern Hill University, Shillong, India; Teach Econometrics, Environmental & Resource Economics at post-graduate level for last 17 years. He has written over 40 Research Articles; completed 5 research projects and 4 other books; and his research interests are Agricultural Economics, Issues on Environmental & Natural Resource Management, Valuation Techniques, and Empowerment of Women.

Department of Economics, North Eastern Hill University, Shillong – 793022

Degin Dorjee is teacher by profession at Zemithang and has been actively associated with WWF-India since 2007 in mobilising local communities of Zemithang Valley to ensure conservation and protection of forest area under their control.

WWF-India, Western Arunachal Landscape Programme, Tezpur

Pijush Kumar Dutta is M.Sc. Gold Medalist in Ecology from Assam University Silchar and heading WWF-India Arunachal Pradesh Programme since 2001. Mainly working with local communities and for conservation for forest, wildlife and high altitude wetland ecosystem by ensuring economic benefit to local communties.

WWF-India, Western Arunachal Landscape Programme, Tezpur

Dr. Asish K. Ghosh, Dr. Asish Ghosh, Founder-Director for Center for Environment and Development, Kolkata, had his education at the University of Calcutta and University of Wisconsin, Madison, USA. A Fulbright scholar and Rockfellor Foundation Grantee, Dr. Ghosh is recipient of several international visitorships to Europe, North & South America, Dr Ghosh has 50 years of professional experience in India and abroad. He has written extensively on the subject of natural resource management and on all dimensions of environment and development. Between 1992 -1996, he has led Indian Delegation to the Ramsar Convention in Japan acted as a member of Indian Delegation to the Asian Wetlands Conference to Malaysia, Indo Russia Forest Meet to Russia, IUCN General Assembly to Argentina and other International Meets in Kenya, China and Mexico. He was invited to Chair UNEP-CBD meet in Paris in 2009. He has published more than 350 papers from 10 countries, including 25 monographs and books. He has acted as a

guest faculty in many reputed institutes like IIM-C, WBNUJS, West Bengal State University, Indian Maritime University, IISWBM and currently serving as a Guest Faculty in The University Of Calcutta, Jadavpur University. He has served as a member of the National Biodiversity Authority, Government of India (2003-2010), and has also served as a Member of the Working Group for the Eleventh Five year Plan on Environment & Biodiversity, Planning Commission, Government of India. He has served as a consultant to the projects of The World Bank, UNDP, UNEP-GEF & DFID and many others.

Dr. Archana Godbole, Community conservation specialist , Director, Applied Environmental Research Foundation and helping communities to use biodiversity of forests as tool against destructive projects like mining. Editor of Sakav since 2004.

Sakav is a Marathi annual issue published by AERF .Sakav deals with north western Ghats-coastal Maharashtra and covered the themes from Industrial development , Agriculture, Water management Biodiversity to Mining in current issue . Sakav is freely distributed to individuals and civil society organisations working for conservation in the region. Sakav is the traditional bridge from the region .It signifies the community work and importance of biodiversity. Similarly Sakav could be bridging the gap between environment & Development in the region.

Applied Environmental Research Foundation (AERF) C-10, Natya Chitra Co-op Hsg. Soc. Bhusari Colony, Kothrud, Pune 411 052.

Jeetendra Nath Mishra is a Sr. Project Assistant under UNDP sponsored Biodiversity Conservation through community based Natural Resources Management Project at Institute of Forest Productivity, Ranchi. He has been active in Environmental Impact Assessment studies in past 10 years. Sri Mishra is prolific writer and his articles have frequently been published in National media. His areas of interest include socio economic & environmental impact of developmental projects and prescription of management plans especially in the mining sector.

Institute of Forest Productivity, NH-23, Lalgutwa, Ranchi - 835303

Dr. Rajiv Pandey has obtained post graduate in Forestry Statistics as a recipient of Junior Research Fellowship of ICAR, New Delhi and Doctorate in Forest Management from FRI University, Dehradun. His PhD thesis has been recognized by the National Social Science Documentation Center (NSSDC), ICSSR, New Delhi in 2008 and kept as record. He was co-opted member for Working Group on Forestry and Carbon Sequestration for Low Carbon Strategy for Inclusive Growth: India of Planning Commission, GOI, New Delhi 2010, under the chairman ship of Dr Kirti Parikh. Presently working in “Biodiversity and Climate Change Division” of ICFRE, Dehradun, he has published 54 research papers, 3 articles, and contributed 2 chapters to the books besides a book on “Data Analysis of Forestry Experiments with Applications”. His area of interest include developmental perspectives with socio-economic context particularly community interactions, carbon sequestration and climate change mitigations.

Indian Council of Forestry Research and Education, P.O New Forest, Dehradun – 248006

Sandeep Pattnaik works with National Centre for Advocacy Studies since 2000. In 2007, he participated in the Human Rights Advocacy Programme (HRAP) at Columbia University's Center for the Study of Human Rights (CSHR) in New York. Presently, he is looking after NCAS desk in Orissa.

National Centre for Advocacy Studies, Serenity Complex, Ramnagar, Colony, Pashan, Pune – 411 021

Sanjay Pattnaik serves as Chief, Raw Material Strategy Group at Tata Steel Limited. Mr. Pattnaik serves as a Director of Kalinga Aquatics Ltd. Mr. Pattnaik served as a Non Executive Director of Tata Sponge Iron Limited since July 28, 2003 until August 2009. He served as a Director of Tata Refractories Ltd. since July 21, 2009. He holds a B.E. in Mining Engineering from Osmania University, Advanced Management Program from CEDEP/INSEAD, France and Strategic thinking & implementation Program from Indian School of Business, Hyderabad.

D.B. Sundara Raman joined Tata Steel as a Graduate Trainee in 1990 after completing his B.Sc. Engineering in Mining discipline from R.E.C. Rourkela. He has worked in various capacities in Coal & Iron ore mines of Tata Steel for the last 21 years. He holds a First Class Mine Manager's Competency Certificate in Coal from DGMS.

Subsequently, he has completed a Management program from XLRI, Jamshedpur. Besides various internal training programs conducted within India, he has also attended the following programmes, abroad: Tata Group Executive Leadership Development Program at UK, Training program at Sustainable Mineral Institute at Brisbane, Australia, Sr Executive Management Prgramme at CEDEP, France

He is Chairman of IMEA of Badajamda chapter. He is a member in Institute of Engineers, Jamshedpur Chapter and the Indian Mining and Engineering. He has visited the following countries during his tenure at Tata Steel: Israel, Australia, Japan, UK, Chile, Egypt, Turkey etc. Presently he is working as General Manager (OM & Q), Tata Steel.

Sebastian Rodrigues is a well known civil society activist Works with MANDGOA: an adivasi-rights research and resource centre. An initiative of Gawda, Kunbi, Velip and Dhangar Federation (GAKUVED). Has written and documented many social and environmental problems of Goa mining.

An adivasi-rights research and resource centre,An initiative of Gawda, Kunbi, Velip, and Dhangar Federation (GAKUVED), "Hari Smriti"381, Dhulapi, Corlim, Goa. 403 110

Dr. Sanjay Singh is Senior Scientist and Head, Botany, Silviculture and Non Wood Forest Produce Division at Institute of Forest productivity, Ranchi; is recipient of UP State Merit Scholarship, World Bank-ICFRE Research Fellowship, Indian Forester Prize and Prf. K. K. Nag Foundation Young Scientist Gold Medal. He has obtained BSc (University of Allahabad), MSc (Kumaun University, Nainital) and PhD in Forest Botany (FRI University, Dehradun). Pursuing research in the field of tree physiology, molecular biology and clonal forestry in past 15 years, he has published 75 research papers, 10 technical bulletins and 4 books. Dr. Singh has been actively involved in EIA studies and evaluation of afforestation and JFM programmes in eastern India. Dr. Singh has been instrumental in establishment of International Organization Foundation for Scientific Forestry and engaged as executive editor of journal Scientific Forestry and DFRI Newsletter.

Institute of Forest Productivity, NH-23, Lalgutwa, Ranchi - 835303

Pema Wange is resident of Thembang village of West Kameng district and has been working with WWF-India CCA Project since 2007. He has been actively involved mobilizing the local communities to ensure protection and conservation of forest and wildlife under their jurisdiction.

WWF-India, Western Arunachal Landscape Programme, Tezpur

Dr. Aparna Watve heads BIOME which provides consultancy for biodiversity research. She is an ecologist and has worked on specialized rocky habitats diversity in India.

Biome, 34/6, Gulawani Maharaj Rd., Pune 411004.

TATA Institute of Social Science(TISS)

- Tata Institute of Social Sciences (TISS) is a social sciences institute based in Deonar, Mumbai, India.
- TISS was established in 1936, as the Sir Dorabji Tata Graduate School of Social Work, the first school of social work in India.
- In 1944 the school was renamed to its current name. It was recognized as a Deemed University in 1964.
- Most of the programmes offered by TISS are postgraduate (PG) programmes. TISS offers programmes in Master of Health Administration, Master of Public Health, Master of Hospital Administration, and about ten other M.A. programmes.

TISS, Main Campus
Deonar Bus Depot, V.N. Purav Marg,
P.O. Box 8313,
Deonar,
Mumbai 400 088.

Tel: +91-22-25525000 (Board Number)

Website: http://tiss.edu/

International Union for Conservation of Nature

- The International Union for Conservation of Nature and Natural Resources (IUCN) is an international organization dedicated to finding "pragmatic solutions to our most pressing environment and development challenges.
- The IUCN supports scientific research, manages field projects all over the world and brings governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy, ws and best practice

IUCN India,
20 Anand Lok, 2nd Floor, New Delhi - 110049
India

Tel: +91-99-4605 2583

Website: www.iucn.org/

Development Alternatives

- The Development Alternatives Group is a premier research organization, with a deep understanding of the rural market and a strong presence in the Indian heartland. Its existence has been a credible and visible one – nationally and internationally in addressing poverty challenges in a climate sensitive environment.
- The organization works to create a world where every citizen can live a secure, healthy and fulfilling life, in harmony with nature.

Development Alternative, HQ
B-32, TARA Crescent,
Qutub Institutional Area
New Delhi - 110 016,
India

Tel: 91 (11) 26134103

Website:
www.devalt.org

Society for Promotion of Wasteland Development

- SPWD focused on identification of needs of the local communities on one hand, documentation of technologies in the field and development of appropriate institutional mechanisms to deal with the concrete issues emerging on the ground.
- The diversity of initiatives spawned has led SPWD to develop its understanding on issues relating to ecology and livelihoods on the one hand and a concrete study of governance structures appropriate for multi layered, multi nested natural resources on the other

SPWD, Head Quarters,
14-A, Vishnu Digamber Marg, Rouse Avenue Lane, New Delhi - 110002

Ph: +91 11 23236440

Website:
www.spwd.org/

Indian Council of Forest Research and Education

- The Council deals with the solution based forestry research in tune with the emerging issues in the sector, including global concerns such as climate change, conservation of biological diversity, combating desertification and sustainable management and development of resources.

ICFRE,
P O IPE,
Kaulagarh Road,
Dehradun- 248195,
Uttarakhand, India

Tel: +91 135 2751826

Website: www.icfre.org

Obituary

Dr. Ram Dayal Munda

1939 – 2011

It is with great sadness that we announce the peaceful passing of Dr. Ram Dayal Munda, on 30th September 2011, a former Vice-Chancellor of Ranchi University and member of the Upper House of Indian Parliament.

Dr. Ram Dayal Munda, has participated in a National level consultation of Biodiversity Conference 'Optimizing Biodiversity & Social Security in Indian Mining Areas – An earthy vision' held at Tezpur, Assam on 3rd December, 2010.

Balipara Tract & Frontier Foundation team greatly appreciates his valuable contribution towards making a Biodiversity Conference a true success.

May his Soul Rest in Peace.

A Brief Profile of Dr. Munda follows:-

He obtained Ph.D. from the University of Chicago for specializing on Indic group (Santali, Mundari and others) of the Austro-Asiatic Languages and was subsequently appointed in the faculty of Department of South Asian Studies.

Later, he was offered a position to start a Department of Tribal and Regional Languages. He was appointed as Vice-Chancellor of Ranchi University in 1985.

Dr. Munda retired from active teaching in 1999 but his involvement with the cultural mobilization of the people continued which also included his active policy making at the UN Working Group on Indigenous People at Geneva and the UN Forum of Indigenous Issues in New York, in the capacity of a senior official of the ICITP, an all India tribal led and managed movement.

Dr. Munda authored several books and was a consultant and participant in important issues of the Adivasi people of the country. He represented his country in the Festival of India in the USSR, and other cultural events in China, Japan and the South East, besides participating at the World Social Forum conferences in India.

Dr. Munda was honoured by the Sangeet Natak Akademi (for the year 2007) in recognition of his contributions. President of India, Pratibha Patil, had nominated him to the Rajya Sabha, based on recommendations made by the Union cabinet.