CHAPTER FOUR: DIFFERENT ENVIRONMENTAL EFFECTS DUE TO COAL EXTRACTION
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DIFFERENT ENVIRONMENTAL EFFECTS DUE TO COAL EXTRACTION IN RANIGANJ

Mining activity in the Raniganj coal field over the past two centuries has caused enormous change in the established agro-economic system of the region. It has converted many a green agricultural field into barren rugged terrain comprising large areas of subsided land, unsightly heaps of debris and big open excavation of opencast mines and dilapidated buildings and abandoned sites.¹

In general coal mining activities are accompanied by a variety of environmental problems. This process of environmental degradation, which starts with the extraction of coal resulting in land degradation, and addition of pollutants to air and water, continues as the mineral is beneficiated and further processed. The severity and extent of these problems can be ascertained only if sufficient data regarding the environmental impacts of mining are available. Unfortunately, no efforts have been made in India, in the past to collect the relevant data.²

The ecological and environmental problems in mining areas are summarised in the following table.³
TABLE 4.1 ECOLOGICAL AND ENVIRONMENTAL PROBLEMS IN MINING AREA

<table>
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<th>Land Damage</th>
<th>Ecological and Environmental Problems in Mining Areas</th>
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<tr>
<td>Subsidence</td>
<td>Land degradation of waste minerals and rocks</td>
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<td>mine fires</td>
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<td>Landslides</td>
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Removal of settlements, damages to landscape, loss of vegetation and forests, change in atmospheric temperature and moisture condition, loss of productivity of soil, problem of land reclamation.

Contd..
### TABLE 4.1 ECOLOGICAL AND ENVIRONMENTAL PROBLEMS IN MINING AREAS (CONTD.)

<table>
<thead>
<tr>
<th>Ecological and Environmental Problems in Mining Areas</th>
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<tr>
<td><strong>Air Pollution</strong></td>
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<td>Dust and particulate matter due to blasting</td>
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<td>Smoke $CO_2, CO$</td>
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<td>Oxides of nitrogen, sulphur etc.</td>
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<td><strong>Noise and Vibration due to</strong></td>
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<tr>
<td>Gaseous</td>
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</table>

Effect on health of persons. Effect on flora and fauna.
Coal mining, in short, contains inevitably the seeds of pollution, if unchecked they will grow and spread, widely or sparsely as the case may be. The main environmental impact of mining depends on whether the operation is underground or above ground.

Accelerated demand for coal has resulted in rapid intensification of mining activity in Raniganj coalfield and these are mostly confined to areas occupied by the two coal measures, Barakar and Raniganj formations vast areas which were involved in intense mining in the past have turned derelict. Man-made landscape manifested by derelict fans and depressions arising out of the abandoned quarries and the overburden dumps in places over slightly undulating plain topography develops. In some areas nalas and water courses are partially blocked, while in some other places they are diverted from their original courses to facilitate the opening up of opencast mine. Large areas of forested and agricultural lands have been sacrificed due to opening of new quarries or as a result of land subsidence. The problems of environmental degradation as encountered in Raniganj coalfield, which has been selected for studying the overall problem of coal mining, are described in the following pages.
References


4.2 DEGRADATION OF LAND

Both underground and opencast methods of mining have destroyed valuable agricultural land and land with vegetation cover of this coalfield.

A. Land Damage due to Opencast Mining - The most common problem of opencast mining in this area is defacing land-forms by development of depressions and elevations on a totally flat terrain. These have been created by the abandoned as well as working quarries and the associated overburden dumps. The abandoned quarries have mostly been left in unreclaimed condition. Most of the mining authorities show little concern for maintaining the quality of the environment and their only aim is to maximise the profit.

In the past, only 10% of coal was produced by open-cast method of mining and all these mines were worked manually. These mines are mostly located in the western part of the coalfield (in Salanpur area). In view of manual working, backfilling after quarrying was very much restricted and the abandoned quarries have turned into perennial or seasonal water pools in most cases. Some of these water pools are used as main source of water for local villagers. The quarries and spoil dumps vary widely in sizes, shapes and other physical characteristics. The overburden (OB) dumps are mostly barren or have wild vegetation covers in some cases. On a tentative estimate done recently it has been observed that in this area there are 220 abandoned quarries
which cover nearly 12 sq.km. of excavated area with a total
void of about 100 m.cu.mt. Volume of OB available in and
around these quarry excavations is tentatively estimated to
be about 40 m.cu.mt. with heights varying from 10 to 15 m.
These dumps cover about 8 to 10 sq.km. of surface area.
Thus due to opencast working the total quantity of land
affected amounts to above 20 sq.km. of the total coal burning
area.

Since nationalisation most of the opencast workings
have now been mechanised and quite a number of new opencast
mines have been started. Contribution of production of
coal from opencast mines has now increased to nearly 25% of
the total coal production.

On the basis of the physical characteristics and time
of working of the quarries they have been divided in to the
following categories : (Fig.11)

(1) Quarries and associated overburden dumps which were
abandoned more than ten years ago

This group consists of the quarries and OB dumps
which were abandoned long ago. The characteristic features
of these quarries are their sizes ranging between 10 to 15
mts. in diameter, depth usually ranges 10 to 30 mts. though
majority have a depth upto 15 mts. and have various shapes —
linear, wsquare, rectangular, etc. These are small manually-
operated quarries under private ownership. Some quarries of
LOCATION OF OPENCAST QUARRIES & ASSOCIATED OVERBURDEN DUMPS IN RANIGANY COALFIELD

INDEX:
1. Old abandoned quarries with stable overburden dumps
2. Recently abandoned quarries with partially unstable overburden dumps
3. Presently active quarries with unstable overburden dumps

Fig. 11
this group are now filled up with water. The villagers use water from these artificial tanks for domestic purposes.

Overburden dumps usually became stable, having gentle slopes with heights not more than 12 mt. The OB dumps mainly consist of sandstone and shale and sandy soil and usually extending along the length of the quarry depression. The height of these dumps rise upto 15 mts. The slopes of these dump surfaces are very gentle. Thick bushes, and grass have grown on most of the dumps. Even at some places big trees have grown. Land having such quarries and depressions now exists as derelict land and no effective efforts of reclamation or afforestation have been made anywhere.

This group of quarries and OB dumps altogether occupy about 12 sq.km. of land in this district. Some abandoned opencast mines have a number of small quarries, often looking like a chain of depressions, e.g., the quarries of Nimcha-Searsol area, Bahula-Parasia area, near Chapataria and Banbirdih area. There are a few big quarries in the Chapui-Ratibati-Sripur area. Waterlogged quarries are found at Baktarnagar, Alkusa, Banbirdih, Chaptaria-Barrira, Diguli, Pathargora area. On the other hand, dry quarries are present in Bahula, Parasia, Nimcha, Harabhanga, Chapui, Dabar, Amulia and Salanpur.

Most of the overburden dumps associated with the quarries of these category are of low height except the OB
dumps found at Baktarnagar-Ghanashyampur, area. At Bahula, Parasia, Paraskhol, Banbirdih area, OB dumps are covered with thick bushes and grass. The OB dumps are used for eucalyptus plantation in Diguli-Gaurangdih area. Bushy vegetation cover on dump is common at Chapui. At Pathargora area the OB dumps of a few small quarries have blocked the course of Nunia nala. In this place, the dumps created an impression of natural hill. Illegal extraction of left-over coal from abandoned quarry is going on at Chapataria-Barrira, Chapui-Nimcha area by the poor people of the nearby areas.

(2) Quarries and associated overburden dumps abandoned recently

This group consists of the quarries which have been declared abandoned by stopping operation in recent past. The quarries coming under this category have medium to large size, subrounded or irregular-shaped. They are very often elongated, parallel to the strike of the coal seams. The average depth of the quarries vary from 10 to 30 mt. As many of these quarries were fully mechanised 'opencast projects' they are deep and have sub-vertical sides. Fully water covered quarries are common at Searsol-Mahabir, Kumardihi and partly waterlogged at Chaitaldanga-Babuisol, Bhagran, New Damaguria, Ratibati, Tara-Dishermohan area. People from nearby villages and colonies use the water for drinking and other domestic purposes.
OB dumps beside the quarries are partly stable to unstable in character. Average heights of the dumps vary between 15 and 20 mt. and the slopes are often very steep ranging between 70° and 75°, such as in Bhangran quarry in the north. A number of water gullies have formed along the slopes of the dumps in most of the localities. At Babuisol and Ratibati, soil erosion along marginal cracks at the peripheries of the quarries have been noted. Pilferage of left-over coal in abandoned quarries is going on the Tara-Dishermohan area. Blockade of nala course by OB dumps of a quarry is noticeable near Alkusa village.

Two quarries, one in Dalurband area and another in Dishermohan colliery, have now filled up with OB. Almost four sq.km. of land has become derelict because of the presence of the quarries and OB dumps of this category. Coal dumps near the abandoned quarries are present near Gaurangdih, Amdiha locality.

Nega seam was under fire at Nimcha-Searsol area a few years ago. There are a number of abandoned quarry and pit mouth of underground mines within the fire area. During work of the Fire Fighting project of ECL in this particular area to control Nega seam fire, earth filling was done repeatedly. As a result, all the quarries depressions present in the past are now filled up with earth and the entire area has become a flat terrain.
3) Working quarries and associated overburden dump

In the recent past large mechanised quarries were opened to enhance the coal production. The important ones include New Damaguria, Benjemehari, Dalmia, Gopalpur, Dabar. Sangramganj OCP, Ghanashyampur OCP II, Dhandardihi OCP, Parasia OCP, Purushottampur OCP, Kumarkhola OCP, Kaithi OCP, Gopalpur, Mohanpur and West Barabani quarries which are manually operated while all other mentioned OCP's are either fully or partially mechanised. These large opencast projects and quarries occupy over 4 sq.km. of land in the district. Most of such quarries are big (100 to 150 mt. to about 500 m to 200 mt. in diameter). The depths of the quarries vary between 20 and 30 mt.

The OB dumps around all these active quarries and OCP's are made up of loose unconsolidated rocks, boulders and soil. The dump heights rise upto 30-35 mts. and their shapes, sizes and even positions change quite frequently with the progress of quarry operations. The gradients of the dump are generally very steep (40° to 60° angle) and unstable. A number of water gullies have formed on the dump surfaces along which erosion takes place rapidly particularly in rainy season at many places. OB dumps of Ghanashyampur Opencast Project - II advances upto the Singaran nala course. The greatest environmental impact created by these recent quarries and OCP's and associated spoil dumps is a contrasting visual intrusion within the conventional rural landscape.
Efforts of filling up of the abandoned portions of the quarries with the OB dump materials are rare except in Kaithi and New Damaguria areas. In the Parasia OCP some reclanation has been done by the process of backfilling in the portion of the quarry worked earlier. But no sequence of soil, rock etc. has been maintained and all the materials like soil, rock boulders, sand get mixed up in the reclaimed portions. This reclaimed portion could not be used immediately for any effective use like cultivation.

The annual production of paddy in this part of the country is approximately 2400 quintals per sq.km. It may be estimated that a maximum amount of 48,000 quintals of paddy could have been produced in the 20 sq.km. land which has become unusable for opencast mining.

B. Land damage due to underground mining

In the past 90% of the coal production was obtained from underground mines. The most prevalent method adopted is the bord and pillar method. Longwall method is adopted only occasionally. Land damage due to this method of mining is not apparently as significant as that of opencast mining. Subsidence of land mass and mine fire are the two main effects of underground mining on land.

1) Subsidence of land surface

In view of prevalent B&P system of coal extraction by caving caused irregular subsidence on the surface at a
large number of places over the underground goaf areas scattered all over the coalfield. The extent of subsidence due to extraction of many of the thick seams in this coalfield is as high as 2 to 4 mt. It has been estimated that nearly 50 sq.km. of surface area i.e. about 3% of the coal-bearing area has been affected by underground subsidence. The volume of surface void due to subsidence amounts to about 30 mill cu.mt. In majority of these cases such areas affected by subsidence are not being used for any purpose. A large number of surface cracks, caves-in, abandoned mine-opening and shallow abandoned surface workings are common within the subsided fallow lands. Generally thick bushes cover these areas.

In all the subsided areas large or small, rounded or sub-rounded 'caves-in' with vertical or sloping walls associated with tension cracks, are commonly observed. These caves in or voids vary in size and have been measured upto 10 mt. in diameter and depth upto 5 mt. The sides of the troughs are sometimes gently sloping and sometimes vertical. These do not normally contain water as the surface run off always tries to percolate into the hollow spaces underground through cracks and fissures. The depressions are usually covered with thick bushes. The surface cracks in these zones are of considerable length and width. At some places smoke and gases emanate through these cracks or the abandoned pit heads indicating the existence of mine fires within the underground goaf. Many small old quarries,
OB dumps, mine installations like mine head gears, pits, inclines are found within vast stretches of subsided land. Agricultural practices on such lands are seldom seen.

Some of the major subsided zone of the broad study area are described below: (Fig.12)

Nimcha area: Around the village Nimcha, an area covering about 8 sq.km., is one of the most subsidence prone areas. The area having evidences of intensive underground and opencast mining activities is one of the worst-affected subsided zones located in the east. Numerous abandoned pits, inclines shallow and small quarries, OB dumps, surface cracks and pot holes are prevalent all over the area. Moreover, smoke from underground fires emanated through surface cracks a few years ago. The cross profile over this area gives a clear idea about the terrain condition of this damaged land. The whole area is now left as derelict useless land. Only bushy vegetation grows over the area. Nimcha village, located almost at the centre of the subsided lands, is in a terrible shape. Illegal mining of coal from the left over quarries or pits/shafts are carried on by the local people. As a result, very often upper land surfaced breaks down causing frequent accidents.

Sripur area: Towards north east of the Asansol town a large area measuring about 9 sq.km., which is located in between Koithi-Jamuria and Sripur, has been demarkated
as subsided lands. In this area underground method of coal extraction was started long ago and almost the total reserve of coal has been extracted by depillaring. Large tension cracks and large caves-in (voids) have been developed. There are a number of colliery colonies and 'coolin dhowrah' (workers' dhowras) are presented in this area. Almost the whole of the land has now become derelict. Only a minor amount of land is still under cultivation.

Kalipahari area: On the either side of the Nunia nala around Kalipahari there is a zone of subsided lands measuring approximately one sq.km. Several pot holes, surface cracks and abandoned pit heads are present along with dense bushes which have grown over these places. The areas are recently converted into fallow lands.

Chapui-Chalbalpur area: In this area, a subsided zone covering about 0.25 sq.km. is present. Potholes having diameter 2 to 3 meter covered with bushes, and surface cracks are common.

Babuisol-Palashbon area: A small subsided area measuring approximately 0.05 sq.km. is situated on the north of Palasbon village. In this place, a number of pot holes and cracks of considerable sizes are present. The area appears to be very dangerous for grazing purposes.

Ukhra area: In the Ukhra-Bankola area a number of subsided land and affected houses have been noted.
Subsided area of this locality has a very little area coverage.

Kankaradanga area: An area about 4 sq.km. near the villages Kankaradanga and Egara on the south-west of the Raniganj town has subsided. Wide depressions on the land surface indicating subsidence have been observed in many places within the area. Some parts of this subsided lands are cultivated. Smoke is seen coming out from some cracks near the Amritnagar and Damoda colliery colonies. Incidentally in this locality mining of the Raniganj coal was first carried out in the early part of the nineteenth century.

Barrira-Tentuljhora area: Around these two villages there is one area measuring 0.25 sq.km. approximately while is considered as a subsided area. It is surrounded by fallow lands where a number of small disused quarries are present.

Around Niamatpur approximately 2 sq.km. of subsided lands are located. Several caves-in, surface cracks, abandoned pits and inclined shafts associated with mine installations, a few shallow abandoned quarries and associated OB dumps are covered with occasional thorny bushes. Some private brick kllns are in operation in this area.

Isolated patches of subsided lands occupying a total area about 0.44 sq.km. are found around the villages Sodepur, Bartaria, Phatepur and Radhanagar west of Asansol.
In addition to the above subsided areas, there are several other localities including residential areas, villages and townships have been declared unsafe as these stand on old, abandoned underground mines, plans of which are in most cases not available and may be subjected to subsidence at any time.

On 9th June, 1985, four towns namely Raniganj Barakar, Asansol and Jamuria Bazar and thirtytwo villages in this coalbelt have been declared unsafe due to the possibility of soil subsidence by the Director General of Mines safety (DGMS). The thirtytwo unsafe villages/localities are named in the following : (Fig.13)

1) Barachak at Nag's Ramjibanpur colliery;
2) Chatirdanga village in Rana, Pit Number - 6 mine;
3) Dharabagan village and Kuchta Road at Sanctoria
4) Hirapur village at Hirapur;
5) Harsadanga village at Central Jamuria and New Jamuria;
6) Janakpur 'bustee' at Victoria - west colliery;
7) Nandigram at Poniati mine ;
8) Shibpur village in Shibpur colliery;
9) Jamuria Bazar at Jamuria Pit Number 5 and 6;
10) Kendua Bazar and village at Kendua (New Ramnagar);
11) Barakar town at Begunia, Victoria west and Ramnagar;
12) Jemehari Khas East colliery and adjoining Santal 'bustee' at Jemehari Khas East colliery;
UNSAFE RESIDENTIAL LOCALITIES AND FIRE IN RANIGANJ COALFIELD
13) Central Kenda village at Central Kenda colliery;
14) Khoyradanga and Jogibagan 'bustee' at Searsol;
15) Bhatmen 'bustee' area at Mahabir;
16) Fatepur village of Fatepur colliery;
17) Bhutdoba dwelling near Kalipahari;
18) Pankiyari village at Dishergarh colliery;
19) Barachak and Aluthia village at Patmohana and adjacent Barachak area;
20) Belrui village and area between Sitarampur railway station and the G.T. Road near Dishergarh;
21) Kuardi village at Kuardi;
22) Dumurkund village at Laikdih colliery;
23) Santal 'bustee' of East Jemehari colliery;
24) Palashbon village at Ghanashyampur colliery;
25) Sanctoriya village at Sanctoriya colliery;
26) Chhota Dhemo Main village at Chhota Dhemo Main coal mine;
27) Raniganj township area;
28) Pariharpur village located around Bansimulia pit Number 11 and 12;
29) D.B. Road and Domohani of Asansol at New South Barabani mine;
30) D.B. Road/Pandaveswar - Ukhra and railway siding of Darula-Mandarbani at South Samla
31) D.B. Road around Babuisol;
32) D.B. Road near Balsukh Ceramic Works and Banbirdih village of Salanpur.

2) Mine fire

It is a problem associated with underground mining
activities. This takes place due to interaction of coal and air under most favourable conditions. Old mine fire in underground goaves or abandoned coal pillars very often exist over years together and come through surface cracks in the subsided areas. Old mine fires of this coal field are observed in some localities namely around Nimcha, Kankardanga (Jaykay Nagar and Amritnagar fire). Smoke and gas come out from this cracks and they make the area a barren one because the heat singe away the surface vegetation. A fire-fighting project has been started a few years ago to extinguish the vigorous fire occurrence around Nimcha village. In the new Damaguria quarry fire was noticed in the left over coal within the spoil dumps in recent past.

C. Formation of slag dumps from factory waste

Factory slag heaps of over 25 mt. are present at some places of the coalfield like Jaykay Nagar, Kulti and Burnpur.
References


4.3 IMPACT OF COAL MINING ON SURFACE DRAINAGE SYSTEM AND UNDERGROUND WATER TABLE

An investigation on the hydrological condition in the Raniganj coal belt was conducted to study the impact of coal mining on the ground-water regime by the geohydrologists of the Geological Survey of India in 1967-68 and 1982-83 session. The depths to water (DTW) were measured where earlier data of the same were available from previous records. The ground water measurements were mostly taken in intensely mined areas.

Continuous pumping out of water in the running underground mine and the existing deep goaves are the reasons behind the recession of ground water level. Over a period of sixteen years, ground water level fluctuated in most cases with a majority of measurements showing recession of water level. (Fig.14)

A clear categorisation of this fluctuation was made by G.S.I. scientists. These categories include -

i) Recession of ground water table by about 10 mt. has been noticed around the Sanctoriya-Sitarampur-Purushottampur-Barachak-Manaharbahal-Chelad-Tirat and Damalia-Kankardanga-Narainjuri areas. This has possibly resulted due to extensive pumping out of water from the underground mines and the presence of deep goaves below the ground surface.
Fig. 14
ii) The measurements taken in Ethora-Kelejhora-Domohani-Kalajharia-Harishpur-Asansol-Ningha areas show recession by about 5 mt. to upto 10 mt. The areas are underlain by the rocks of Barren Measures or Panchet Formation and remained free from mining activities. The reason may be due to seasonal fluctuations and domestic over-use.

iii) The measurements in the areas around Damodarpur-Baraboni-Satgram-Mangalpur, Jamsol-Basul show elevation of water table.

Impact of coal mining on the natural drainage system

To facilitate the mining activity of coal by open-cast method, nala courses have been diverted into artificially cut channels like Singaran nala at Ghanashyampur opencast projects. At some places the OCPS and quarries are located near some major water courses. The OB dumps or such open excavations almost always extend upto the banks of those nalas. Washed out materials from the dumps very often make partial blockade of nala courses. Near the village Pahargora, a part of Ninia nala has been partially blocked by the adjacent old overburden dumps. During rainy season, OB materials, perhaps washed out, fall into Singaran nala from Dhandardihiti and Ghanashyampur opencast projects.
4.4 WATER POLLUTION DUE TO COAL MINING ACTIVITY

Major part of the discharged water from the mines is used within the colliery for industrial purpose or for domestic consumption. The balance quantity is usually discharged into adjacent tributaries of Ajay and Damodar.¹

Water pollution is caused due to discharge or polluted mine water carrying coal cust, effluents from coal handling plants, soft cake 'bhattas' etc. This pollutes the water of the nearby nalas which is the main source of water supply to coalfield towns. Pumped out water reaches in some of the mines upto 1 to 2 million gallons per day.²

Water samples collected from various mines show mostly normal pH value and other chemical contents are also observed to be well within ISI tolerance limit. However, the water samples of Mahabir and Amritnagar show exceptionally hard water with higher content of $SO_4$ (sulphate). Concentration of trace elements in the water sample from the colliery belt is generally within the potable limit with a few exceptions, like Mahabir and Amritnagar colliery areas.³
References


4.5 ATMOSPHERIC POLLUTION DUE TO COAL MINING

The various sources of atmospheric pollution are enumerated as follows:

1) Dust is generated in different stages of mining operation such as coal extraction, transport within the mine, surface coal handling plants, despatch by rail or roads, etc. In opencast mines dust is also generated due to drilling, heavy blasting, plying of earth moving vehicles, etc.

Airborne dust causes pneumoconiosis or coal miners' lung disease. A survey done in 1960 showed incidence of 18% of pneumoconiosis amongst coal miners of Raniganj coalfield.

There is serious problem of air pollution due to burning of coal in colliery boilers, domestic ovens of employees who get free domestic coal. Nearly 3,000 tonnes of coal are used for domestic consumption by nearly 2 lakh (1.8 lakh) employees. In addition, coal is converted to soft coke in Salanpur area in the north-western part of the coalfield. Dense smoke created by burning of all these coals are familiar sight in this coalfield, especially during winter.

Volume of transport of coal and sand within the coalfield has greatly increased in past few years which creates air pollution due to smoke from diesel exhaust and dust. Transportation of coal in trucks to outside consumers amounts
General view of Raniganj Coalfield.
Photograph 2

Land with rock outcrop.

Photograph 3

An abandoned colliery site with mine head gear, waterlogged quarry, colliery office, pit mouth etc.
Abandoned quarry now transformed into a big pool of water.

OB dump kept along Nunaia nala.

A few big trees still present around a village.
Photograph 7 View of an large mechanised opencast quarry.

Photograph 8 Underground mine entry through vertical shaft.

Photograph 9 Underground mine entry through inclined shaft.
Photograph 10

Working quarry depression and associated overburden dump of an OCP.

Photograph 11

View of an abandoned dry opencast quarry with overburden dump.
Vast stretches of subsided land mass.

Smoke and gas emanate through surface cracks within a subsided land.
Photograph 14
Smoke billowing from a surface crack few yards away from Damoda colliery quarter.

Photograph 15
An abandoned house of Nimcha village located at the bordering zone of Jaykay Nagar Fire area.

Photograph 16
Work of Jaykay Nagar Fire Fighting Project of ECL is going on in 1986.
Photograph 17

Weekly coal distribution among the workers of ECL.

Photograph 18

Dust is generated during coal despatch by road.
to over 10,000 tonnes per day and sand transport to different collieries amounts to nearly 10,000 cu.m. per day.

A study done by Central Mine Research Station Dhanbad about atmospheric pollution in this region over different seasons show that during summer and winter months there is considerable increase in dust fall. Very high dust fall has been observed in Sodepur-Dishergarh region due to presence of thermal power station of Dishergarh Power Supply (DSP) as the low chimney's emission causes heavy coal dust and ash dispersion in atmosphere. It goes beyond 80 tons per sq.km. per month in summer and winter months and goes down to the level of 40 tons per sq.km. per month during rainy season. In the remaining areas of the coalfield, dust fall rate generally varies from 10 to 30 tons per sq.km. per month and is slightly less during the rainy season.

NOISE POLLUTION

High level of noise is created by mechanised ventilators, large size dumpers, heavy blasting in mechanised blasting etc. where the noise levels are beyond the tolerance limit or 85 per decibel (db). Continuous movement of vehicles along the G.T. Road which passes through the heart of the coalfield create major noise pollution. Blasting in coal mines create ground vibration apart from noise.
Sand dumping ground often causes dust hazard specially in dry weather.

Dust is generated in every phase of coal extraction in mechanised OCP.
Photograph 21

Standard colliery quarters for workers of ECL.

Photograph 22

Non-standard colliery quarters for ECL workers.
References

4.6 CHANGE OF LAND-USE PATTERN AND PROBLEM OF HUMAN SETTLEMENT DUE TO COAL MINING ACTIVITY

Due to rapid growth of mine over the last few years large scale deforestation and loss of agricultural land have taken place. A comparative study of land-use map of 1923-27 (Fig.15) and the recent land-use map (1982-83) reveals radical changes in this coal belt. (Fig.16) The areas covered by collieries have increased by about four times within this period. Significant change in land-use pattern has also been noted. A number of allied industries, brick kilns, soft coke bhatas, small stone crushing plants have grown along with a number of unplanned settlements. Vegetation and cultivated lands have been sacrificed for opening opencast projects, for building colliery offices, quarters, mine head gears, inclines, pits etc. Land required for construction of residential colony, roads, office, industrial complex, etc., constitutes 10% of the overall requirement of land.

Andal Police Station records a remarkable decrease in forest cover and pasture land within a time span of ten years. Net cultivable land in Jamuria I, Asnasol and Kulti police stations has decreased notably in last ten years.

Human Settlement

Prior to nationalisation only about 15% of the total of about 1.8 lakhs workers were provided with residential quarters (excluding 'dhowrahs') and the present level of
Fig. 15

DISTRIBUTION OF TOWNS, VILLAGES AND COLLIERY COLONIES IN RANIGANJ COALFIELD DURING 1923-1927

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Villages

Towns

Colliery colonies

Fig. 15
housing satisfaction is only 23%. Since majority of the workers have come from outside this coalfield, the rest of the workers (77%) have settled down in and around their working collieries. The ill-built hutments giving rise to development of slums scattered all over the coalfield. Mounds of burnt ash, dust, garbage etc., around these is a common sight and colonies give a very haggard look to coalfield area. Due to close-packed houses, communicable diseases spread rapidly.

With rapid industrialisation in this coalfield area, large commercial towns like Asansol, Raniganj, Barakar and a large number of urban agglomerations have come up. Growth rates of urban population of these urban areas have been as high as 60% for the last two decades as compared to overall average of about 30% for the state of West Bengal. These towns are developing very fast in haphazard and unplanned manner and enhance the problem of coal belt. It has been estimated that the residential localities of coalfield cover more than 140 sq.km. approximately which covers 3000 mt. of coal reserves.

Four major towns and thirtytwo other residential areas have come up over old abandoned mine workings which have been declared unsafe by Directorate General of Mines Safety. About one million people and their property estimated at 500 hectares, are affected. In Raniganj coalfield there are a few deep mines where problems of
excessive heat and humidity and gas are encountered. An explosion in the Chinakuri coal mine, deepest mine of the Raniganj coal field in 1958, was caused by the use of explosives in underground mine despite of the presence of methane.  

In gassy mines (there are some degree III gassy mines in Raniganj) high capacity ventilation fans are being planned to be installed along with suitable steps for controlling other noxious gases. Suitable measures for suppression of dust at the coal faces may also be taken. Excessive exposure to dust has caused a disease named "silicosis" to the miners.

Vibration due to heavy blasting are being carried out by mines affect the neighbouring residential areas where such mines are in operation in close proximity to the residential areas.

There is huge consumption of timbers in the underground coal mines for roof support. Although timbers are supplied from the areas outside the coal belt, yet other materials like steel props, hydraulic or friction props, roof bolting may be used in view of preservation of fast diminishing forest resources of our country.

The extraction of huge quantity of sand from the river beds in the Damodar and Ajay for sandstowing in
underground mines has resulted in significant changes in the morphology of the river.

With increasing coal mining activity there will be increase in various environmental problems in this region. Therefore, there is need for preparation of long-term plan to effectively solve the environmental problems arising out of mining activity and to control the ecological imbalance of the area.
References

1. The State of India's Environment - The Second Citizen's Report, 1984-85; Centre for Science and Environment, Delhi, p.240.