

CHAPTER-IV

ENVIRONMENTAL BASELINE STUDY

4.0 INTRODUCTION

The main objectives of environmental baseline study are (i) to assess present environmental quality and the environmental impacts and (ii) to identify environmentally significant factors that could preclude project development. The chapter contains information on existing environmental scenario for the following parameters.

1. Water Environment.
2. Micro - Meteorology.
3. Air Environment.
4. Noise Environment.
5. Soil Environment.
6. Land Environment.
7. Biological Environment.
8. Socio-economic Environment.

To achieve these objectives, our team monitored the environmental parameters within the core zone and buffer zone (10 km. radial distance) from the mine site accordance with the Guidelines for EIA issued by the Ministry of Environment & Forests, Govt. of India.

This chapter and the related discussions contain the results of field studies /monitoring carried out during the summer Season –2005 (March to May-2005).

4.1 STUDY AREA AT A GLANCE

The study area is the 10 km radius known as buffer zone has been measured from the boundaries of the mining lease area in every direction

and also includes mining lease area. The buffer zone area falls in Umrangshu Tehsil of N.C. Hills District of Assam state.

1. General Particulars:

- Location : Latitude 25°31'33" to 25°32'33" (North)
Longitudes 92°47'40" to 92°49'20" (East)
- Tehsil H.Q. : Umrangshu
- District H.Q. : North Cachar Hills
- State : Assam

2. Demography (within study area)

- Total Population : 20713 (as per census)
- Literates : 24%

3. Land use Pattern (10 Km. Radius study area)

- i) Irrigated Area : 10.22 %
- ii) Un-irrigated Area : 17.11 %
- iii) Cultivable waste land : 36.03 %
- iv) Area not available for Cultivation : 06.30 %
- v) Forest : 30.34 %

4. Climatology (During study period – March to May 2005)

- i) Rainfall annual : 1673 mm
- ii) Monthly Maximum Temperature (March): 36.6°C
- iii) Monthly Minimum Temperature (March) : 15.6°C
- iv) Relative Humidity (Mean)
 - At 8.30 hours : 66% to 96%
 - At 17.30 hours : 34% to 98%

4.1.1 Land use pattern of Mining Lease Area

The total mining lease area is 417.5 hectares and the land comes under unclassified mixed forestland. The land use pattern of lease area is given below:

- The area is sloping Rugged Hilly Terrain covered with degraded forest.
- Within lease area one Amarang Nallah flows in south Eastern direction dividing the area into 2 separate zones.
- From Nallah & Tributary of Amrang Nallah flows north to south joining Amrang Nallah creating a separate zone in northwest part of mining lease area.
- There is no agriculture land in the area and hence no human habitation also.

4.2 TOPOGRAPHY AND DRAINAGE

The limestone belt of the Kopili valley area constitutes the south eastern flank of the Shillong plateau and comprises of small flat topped hillocks with elevation varying from 580 m to about 840 m above mean sea level (MSL). The highest altitude (837.29 m) in the region has been observed at Khandong, about 12 Km west of New Umrangshu. The proposed lease area is part of N, NW – S, SE trending ridge in the hilly terrain of the region.

In the New Umrangshu area the highest altitude of about 437 MSL is located in the extreme Northeastern part while the lowest altitude of about 250 m is present in the valley of Amrang nalla flowing down in the Southeastern part.

The Amrang nalla flows through the central part of the New Umrangshu block in a Southeastern direction dividing the area into two separate zones. In the northern part of the lease area a tributary of the Amrang nalla, flowing north to south, join Amrang nalla creating a separate zone in

the Northwestern part of the M.L. Area. In eastern side of the Amrang nalla the land rises from about 260 m to a height of 430 m while in the western side of the nalla the ground level rises from 270 m to 420 m. Thus the Amrang nalla with its tributary broadly divided the limestone bearing area of the New Umrangshu lease into eastern, western and northern sectors. The Amrang nalla with its tributaries constituted the geomorphological disposition of the local terrain.

The drainage of the area is collected through many nallahs discharging in the Amrang nalla and Langyen nalla. Both side these nallas join in the south eastern side of the area, near the Langyen basti and flows in a south eastern direction with the name of langyen nalla, which ultimated flows in the Kopili river. The local nallas generally carry meager drainage during dry season. While in rainy season their water level may rise considerable from the bottom for short period of heavy rains. The Amrang nalla being typical hilly terrain drainage cuts through the high ground creating gorges.

The master drainage of the region is thus controlled by the Kopili River. Near Garampani the Kopili river system had been harnessed to create a multipurpose hydel power project, which generated 150 MW power. Kopili reservoir is the source of water for agriculture and industrial area.

4.3 WATER ENVIRONMENT

The area comprises part of the regional drainage system of the Kopili river valley in its northern higher reaches. As the mining lease is in southerly slopping hilly terrain, there is hardly any perennial water source in the area. However, many seasonal watercourses cutting across the hilly terrain carry the heavy surface water flow during the rainy season creating deep gullies and gorges in their course.

In the central part of the lease area, the Amrang nalla cut across in a Southeasterly direction often with steep banks on both sides forming escarpments.

The Amrang nalla joins Langyen nalla, a tributary of the Kopili River, in the Southeastern side. Thus the micro drainage of the area is controlled by the Langyen nalla while macro drainage is a part of the Kopili River master basin.

Though the area is in a high rainfall region, most of the precipitation constitute "run off" with very meager scope of infiltration. Therefore ground water is not available in the hilly terrain.

4.3.1 Water Quality

It appears that the lease area is devoid of any ground water as is also supported by the fact that during drilling no ground water was encountered. The quality of water has been ascertained from the physico-chemical analysis results of water samples collected from streamlets and nallahs at fix sampling stations Proposed Mine Site, Langchure village, New Umrangshu, Tunkrang Village, Chinglama and Langmeclo. The range of different chemical constituents in the water is given below: -

Water samples were collected from different stations and the analysis of the samples shows that the concentration of total dissolved solids ranges between 158 mg/l to 212 mg/l, pH varies from 7.2 to 7.4 and total Hardness from 58 mg/l to 128 mg/l.

Fluorides and nitrates are within the permissible limits.

TABLE-4.3.1
WATER ANALYSIS
(Summer Season March to May –2005)

S. No.	Parameters	Locations						
		Mine Site	Langchure Village	New Umrangshu	Tungkrang Village	Chinglama	Langmeclo	Permissible limits as per IS: 10500
01.	pH	7.4	7.2	7.1	7.4	7.3	7.2	6.5 – 8.5
02.	Colour	Clear	Clear	Clear	Clear	Clear	Clear	Colorless
03.	Turbidity	Nil	Nil	Nil	Nil	Nil	Nil	5 NTU
04.	TDS (mg/L)	198	204	168	172	158	212	500 (Max. 2000)
05.	Total Hardness as CaCO ₃ (mg/L)	81	89	66	58	78	128	300 (Max. 600)
06.	Calcium as Ca (mg/L)	25	19	10	13	16	28	75 (Max. 200)
07.	Magnesium as Mg (mg/L)	13	11	8	8	12	15	30 (Max. 100)
08.	Chloride as Cl (mg/L)	22	19	13	18	14	12	250 (Max. 1000)
09.	Fluoride as F (mg/L)	0.6	0.7	0.8	0.6	0.7	0.6	1.0
10.	Sulphate as SO ₄ (mg/L)	25	19	32	28	23	30	200 (Max. 400)
11.	Nitrates as NO ₃ (mg/L)	13	11	17	16	21	19	45
12.	Iron as Fe (mg/L)	0.01	Nil	Nil	Nil	Nil	Nil	0.3 (Max. 1.0)
13.	Total Alkalinity (as CaCO ₃)	35	31	28	33	49	83	200 (Max. 600)

Drinking water is arranged from Amrang nalla and for irrigation purpose villagers mainly depend on water from various streamlets and Nallahs.

4.4 METEOROLOGY

Meteorology plays a vital role in affecting the dispersion of pollutants, once discharged into the atmosphere. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. Such source of data is the Indian Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations. The nearest IMD station to the study area is located at Silchar. The meteorological parameter recorded from this

station is temperature, humidity, rainfall, wind speed, and wind direction, recorded at two synoptic hours i.e. 8.30 and 17.30 hours.

4.4.1 Climate

The climate of the district of N.C.Hills is fairly diverse climate with an average annual precipitation of around 1500 mm to 2000 mm with average of 1673 mm and 40 to 90% relative humidity. The coldest month is January and the hottest month is May. The rainfall is mostly distributed between the months of July and September.

The micro meteorological conditions at the mine site determine the transport and diffusion pattern of air pollutants released into atmosphere. The principle variables include horizontal connective transport (average wind speed and direction) vertical convective transport (atmospheric stability) and topography of the area.

The data on various meteorological parameters at the mine site were collected with the help of a semi-automatic weather station installed at site during ambient air monitoring period. Meteorological data such as wind speed, wind direction, temperature, and relative humidity were recorded simultaneously recorded at two synoptic hours i.e. 8.30 and 17.30 hours.

The meteorological data from IMD station, Silchar regarding the maximum and minimum temperatures, relative humidity, wind speed and wind direction for the March 2005 – May 2005.

4.4.2 Rainfall

The annual rainfall of the area is around 1500 mm to 2000 mm with the average rainfall as about 1673 mm per year. About 90 percent of the annual rainfall is received during the period June to September, July and August being the rainiest months. The variation in annual rainfall from year to year is very large. During the North-East monsoon season, the relative humidity is generally over 90 percent.

4.4.3 Micrometeorology at Site

Meteorological station was set-up at site, to record surface meteorological parameter, during summer season - 2005 (March to May 2005).

TABLE 4.4.3
MICRO-METEOROLOGY AT SITE DURING STUDY PERIOD
SUMMER SEASON (MARCH TO MAY 2005)

Date					Wind speed & direction			
	Temperature °C		Relative humidity %		8.30 Hrs.		17.30 Hrs.	
	Max.	Min.	8.30 Hrs.	17.30 Hrs.	Direction	Speed km/hr.	Direction	Speed km./hr.
02.03.2005	32.2	18.5	70	34	NE	04	SW	04
03.03.2005	33.3	15.6	74	38	E	02	SW	04
09.03.2005	32.6	16.8	75	42	E	04	SW	02
10.03.2005	23.1	19.9	88	96	E	05	SW	04
20.03.2005	24.6	19.2	84	73	E	04	W	04
21.03.2005	33.0	22.0	96	70	NW	02	W	06
29.03.2005	36.6	22.6	71	59	NE	04	CALM	00
30.03.2005	34.3	20.2	73	62	W	06	N	04
06.04.2005	28.2	21.6	92	74	CALM	00	E	02
07.04.2005	28.0	23.1	80	78	S	04	E	04
14.04.2005	25.3	20.5	95	84	NE	04	NE	03
15.04.2005	27.9	21.6	90	94	NE	06	N	04
21.04.2005	33.2	22.5	86	64	E	02	SW	02
22.04.2005	32.6	22.8	80	74	SE	04	CALM	00
29.04.2005	32.4	24.5	74	83	E	04	NE	03
30.04.2005	30.2	23.5	89	84	S	02	CALM	00
06.05.2005	35.7	25.3	70	69	S	04	CALM	00
07.05.2005	36.0	24.1	66	64	NE	05	N	04
13.05.2005	28.2	25.5	92	93	E	02	CALM	00
14.05.2005	30.2	23.8	95	90	E	05	E	04
20.05.2005	31.1	25.2	78	98	E	04	SE	06
21.05.2005	29.4	24.2	95	84	SE	05	CALM	00
28.05.2005	34.0	25.7	87	70	NE	04	CALM	00
29.05.2005	32.1	27.3	81	76	N	04	E	04

4.5 AIR ENVIRONMENT

Ambient air monitoring is carried out regularly twice in a week for the surrounding areas of mining project to know the ambient air quality at the source itself. Ambient air quality has been summarized in table 4.5.1. The results show that the air qualities of the immediate surroundings of the mining project area are well within the permissible limit.

However, to know the ambient air quality at a larger distance i.e. in the buffer zone of 10 km. radius, air quality survey has been conducted at 10 locations over a period of three months in summer season i.e. during the period of March, April & May - 2005.

The ambient air quality monitoring stations were set up at the following locations:

LOCATIONS OF AAQ MONITORING STATIONS (SUMMER SEASON MARCH TO MAY 2005)

Station	Sampling Location	Direction from the mine site	Aerial distance km. from center of the mine site (Approximately)
SA1	Mine Site	–	Center of the core zone
SA2	Langchure Village	SW	3.0 km
SA3	AIDC Mines Colony	SW	2.0 km
SA4	Tumbung	E	7.0 km
SA5	Lansarkat	NE	8.5 km.
SA6	New Umrangshu	WNW	1.0 km.
SA7	Chinglama	N	2.0 km.
SA8	Tangkang	ESE	5.0 km.
SA9	Langri	ENE	6.5 km.
SA10	Langmeclo	NNW	3.5 km.

4.5.1 Sampling Programme

As stated earlier the sampling at the 10 above stations was carried out during summer season. The sampling frequency was twice a week for 24 hours for a period of one season.

Table 4.5.1 shows the maximum and minimum values of the pollutant monitored.

The stations are selected and located with due consideration to the meteorological conditions of the region. Major air pollutants viz, Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO_x), representing the basic air pollutants in the region were identified for Ambient Air Quality Monitoring (AAQM). The samples were collected as per the CPCB norms during study period. Gaseous pollutants viz, SO₂ and NO_x were collected on 8-hour basis three times a day through the respective absorbing media. SPM and RSPM were collected as 24 hours average through Wattman glass micro fiber filter paper (GFA grade). The samples for gaseous pollutants as well as for SPM were collected as per the prescribed standard procedures.

PROCEDURE FOR DETERMINING VARIOUS AIR QUALITY PARAMETERS

Parameters	Testing Procedure
SPM & RSPM	Gravimetric Method using Respirable Dust Sampler Envirotech RDS-APM 460 IS: 5182 (Part-IV)
No_x	Absorption in dil. NaOH and then estimated calorimetrically with sulphanilamide and N (I-Nephthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
SO₂	Absorption in Potassium Tetra Chloromercurate followed by Chlorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).

The ambient air quality data for the aforesaid locations are summarized in table 4.5.1

TABLE - 4.5.1
Back Ground Air Quality
(Summer Season March to May 2005)

(Unit $\mu\text{g}/\text{m}^3$)

Station	Sampling Location	SPM		SO ₂		NO _x		RSPM	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
SA1	Mine Site	165	106	13	10	16	12	49	38
SA2	Langchure Village	158	109	12	9	18	13	55	40
SA3	AIDC Mines Colony	162	104	15	11	15	11	61	49
SA4	Tumbung	160	112	13	10	13	10	55	38
SA5	Lansarkat	153	103	12	9	13	9	50	40
SA6	New Umrangshu	161	113	14	8	16	10	55	39
SA7	Chinglama	163	117	15	9	17	10	50	38
SA8	Tangkang	159	106	13	8	15	12	49	39
SA9	Langri	151	115	12	8	17	10	51	40
SA10	Langmeclo	166	118	14	11	16	12	52	38

4.5.1.1 Result

The concentration of SPM for all the 10 AAQM stations ranges between $103 \mu\text{g}/\text{m}^3$ to $166 \mu\text{g}/\text{m}^3$. The concentration of RPM is $38 \mu\text{g}/\text{m}^3$ to $61 \mu\text{g}/\text{m}^3$.

As far as the gaseous pollutants SO₂ and NO_x are concerned, the promulgated CPCB limit of $80 \mu\text{g}/\text{m}^3$ for residential and rural areas was never exceeded at any station. The SO₂ concentrations are in the range of $8 \mu\text{g}/\text{m}^3$ to $15 \mu\text{g}/\text{m}^3$ and the NO₂ concentration in the range of $9 \mu\text{g}/\text{m}^3$ to $18 \mu\text{g}/\text{m}^3$ for all the 10 AAQM stations.

4.6 NOISE ENVIRONMENT

Noise often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, disturb sleep, thus deteriorating quality of human environment. Noise pollution survey has therefore been carried out. Noise levels were measured at 10 locations in the study area to establish present scenario.

There are several sources in the 10 Km. radius buffer zone, which contributes to the local noise level of the area. Traffic, cement factory as well as activities in mines and near by villages add to the ambient noise level of the area.

4.6.1 Base Line Data

Noise pollution survey has therefore been carried out. Noise levels were measured at 10 locations in the study area to establish present scenario.

Noise monitoring data is presented in Table 4.6.1 along with relevant standards.

TABLE – 4.6.1
AVERAGE NOISE LEVELS
(SUMMER SEASON MARCH TO MAY 2005)

Sample Code	LOCATIONS	NOISE LEVEL Leq. dB (A)	
		Day Times (6.00 a.m. to 10.00 p.m.)	Night Times (10.00 p.m. to 6.00 a.m.)
SA1	Mine Site	54	48
SA2	Langchure Village	52	43
SA3	AIDC Mines Colony	54	40
SA4	Tumbung	53	45
SA5	Lansarkat	51	44
SA6	New Umrangshu	50	46
SA7	Chinglama	53	47
SA8	Tangkang	49	39
SA9	Langri	51	40
SA10	Langmeclo	50	38

CPCB NOISE STANDARDS

AREA CODE	CATEGORY OF AREA	LIMITS IN dB (A)	
		DAY TIME	NIGHT TIME
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zone	50	40

4.7 SOIL ENVIRONMENT

4.7.1 Baseline Data

The soils of the district vary from non-laterised red soil to laterised red soil ranging from sandy loam to clayey loam in texture. The non laterised red soils occupy a relatively less area along a strip in southern part of the district. The soil in the study area are red in colour may be due to the presence of Iron oxide.

Soil is the media for supplying the nutrients for plant growth. Nutrients are available to plants at certain pH and pH of soils can reflect by addition of pollutants in it either by air, or by water or by solid waste or by all of these. In order to establish the baseline status of soil characteristics soil samples were collected at five sampling sites were selected. Samples collected from identified locations indicate that the soil is acidic, pH value ranging from 5.1 to 6.3 with organic matter from 0.50 % to 0.72 %. Soil texture is sandy loam to clay loam. Conductivity of the soil samples ranges from 545 $\mu\text{mho/cm}$ to 986 $\mu\text{mho/cm}$.

TABLE – 4.7.1
SOIL ANALYSIS
(SUMMER SEASON MARCH TO MAY 2005)

S.NO.	PARAMETERS	LOCATIONS				
		MINE SITE	LANGCHURE VILLAGE	NEW UMRANGSHU	TUNKRANG VILLAGE	CHINGLAMA
01.	pH	6.3	6.0	6.2	5.1	5.7
02.	Bulk density, gm/ml	1.32	1.65	1.82	1.77	1.46
03.	Moisture content	13.98	12.45	9.66	15.78	16.24
04.	Water holding cap. (WHC) in%	40	33	37	35	30
05.	Soil Texture	Sandy Loam	Clay Loam	Sandy Loam	Clay Loam	Sandy Loam
06.	Soil Colour	Fume red	Fume red	Fume red	Fume red	Fume red
07.	Nitrogen as N Kg/ha	124	120	114	98	100
08.	Phosphorus Kg/ha	61	53	55	42	58
09.	Potassium as K Kg/ha	208	228	246	285	200
10.	Conductivity ($\mu\text{mho/cm}$)	755	986	740	545	676
11.	Organic matter (%)	0.55	0.64	0.72	0.50	0.56

4.8 LAND ENVIRONMENT

4.8.1 Introduction

Land use planning is aimed at minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface values at the end of mining activities in the area. This needs detailed study of the area from various angles before starting of the mining project as well as during the mining operation for collecting baseline data and analysis of possible environmental impact. Based on the baseline data and environmental impact assessment, a detailed environmental management plan helps in minimizing the impact of mining activities on its surrounding. This also helps in reclamation and restoration of the area when mining activity in the area is over.

4.8.2 Present Land Use Pattern of the Study Area

For collecting base line data / information about the mining lease area and its surrounding, various survey works i.e. topographical, geological, meteorological, ecological, occupational & land use pattern of the area have been carried out. Based on these informations, environmental impact assessment & management plan have been prepared.

The mine site and the area within a 10 km. Radius of the site falls under the Umrangshu revenue circle of Distt. N.C. Hills.

A macro level study was conducted to find out the land use pattern within 10 Km. buffer zone. Small villages are found scattered in the area. The area of agriculture land is less as compared to other land. Land use pattern of the study area (within 10 km radius) are given below in table 4.8.2.

TABLE 4.8.2
LAND USE PATTERN (within 10 km radius study area)

S.No.	Particulars	Area
01.	Forest	30.34%
02.	Irrigated Area	10.22%
03.	Unirrigated Area	17.11%
04.	Culturable Waste	36.03%
05.	Area Not Available For Cultivation	6.3%

(Source – As per Census records)

4.9 CROPPING PATTERN

Due to the limited aerial coverage of the Rabi crops the only area that could be identified on the imagery of March 1989 is that occurring near Diyangmukh. Paddy pulses, rape, mustard, castor etc. are the main Rabi crops grown in the district. The total area estimated under this category is 1750 hectares.

SHIFTING CULTIVATION (Jhoom Cultivation)

This is a system of cultivation practiced in the hilly districts of Assam whereby large areas under forest or vegetation are cleared for the purpose of cultivation. This is one of the major categories of land use in the district with area coverage of about 29519 hectares. Only those areas where intensive jhoom is carried out has been identified and mapped. Other areas where some kind of regeneration in the form of shrubs, bushes etc. has taken place have been placed under the category of Scrubland.

The cropping season of Shifting Cultivation extends from March to November. From January to March generally clearing and burning is carried out. This is clear on the imagery of March by the black tone representing the burnt ashes. The main crops grown under shifting cultivation include paddy, maize sesame, cotton and vegetables.

TABLE – 4.9.1
AREA & PRODUCTION OF THE MAIN CROPS
(NORTH CACHAR HILLS DISTT)

Crop		Area (In Hectares)	Production In Tonnes
A.	CEREALS:		
1.	AUTUMN RICE	5815	6661
2.	WINTER RICE	7480	11899
3.	SUMMER RICE	28	44
4.	WHEAT	53	66
5.	MAIZE	1260	823
6.	OTHER CEREALS AND SMALL MILLETS	53	24
B.	PULSES:		
1.	TUR	210	168
2.	GRAM	21	7
3.	BLACK GRAM	900	365
4.	LENTIL	69	33
C.	OIL SEEDS		
1.	LINSEED	1	0.5
2.	CASTOR	97	45
3.	SESAMUM	416	211
4.	RAPE & MUSTARD	2118	578
D.	FIBRE CROPS		
1.	JUTE	110	997
2.	MESTA	10	43
3.	COTTON	778	389
E.	MISCELLANEOUS CROPS		
1.	SUGARCANE	875	30003
2.	TAPIOCA	44	220
3.	POTATO	289	2092
4.	SWEET POTATO	20	138
5.	TOBACCO	32	25
F.	PLANTATION CROPS		
1.	BANANA	390	4875
2.	PAPAYA	4515	69628
3.	ORANGE	4569	45996
4.	PINEAPPLE	12129	177594
5.	ARECANUT	320	244
6.	COCONUT	20	136
G.	SPICES		
1.	CHILLY	244	142
2.	ONION	7	
3.	TURMERIC	246	127

SOURCE – DEPARTMENT OF AGRICULTURE, ASSAM

4.9.1 Cropping Pattern of the Study Area

The study area presents a hilly topography. A small proportion of the area falls under the category of agricultural land hence there are less agricultural activities in the surroundings of villages. Out of the total area of the district the agricultural land is 6300 Hectares. Base line data is collected from Agriculture Department, Haflong and it is observed that area around the 10 km radius from the mine site has the following main crops.

Kharif Crops: - The areas appear in distinct red colour and smooth texture on the image. Paddy is the Kharif crop grown in the district. Cotton and Jute are grown in limited areas.

Rabi Crops: - Paddy pulses, rape, mustered, castor etc. are the main Rabi crops grown in the district.

Cropping pattern of the area depends upon the climatological conditions and need of the local population of the area. Sometimes cropping pattern may get changed during construction and operational phase because of particular requirement of specified anthropogenic activities.

Besides the above-mentioned crops Bamboo, pineapple, ginger, jackfruit, etc. are also grown in the area. Tea is the major cash crop of the area and it is grown in N.C.Hills but on a scale.

4.10 FLORA AND FAUNA

The New Umrangshu Limestone Mine area is located in a landform, which is surrounded by hills. This area is relatively calm and there is no source of high noise level. A team of scholars of Zoology carried out a casual survey. The preliminary survey revealed that the following animals could be observed on a casual visit.

TABLE – 4.10.1
FAUNA OF THE STUDY REGION

Zoological Name	Common Name
Pyenonotus cafer	Red vented bulbul
Corvus splendens	House crow
Corvus maerorhynchos	Jungle Crow
Cuculus micropterus	Indian cuckoo
Streptopelia decaocto	Indian ring dove
Streptopelia sevegolensis	Senegal dove
Columba livia	Common pigeon
Grus antigone	Sarus crane
Passer domesticus	House sparrow
Acridotheres tristis	Common Myna
Psittacula krameri	Rose ringed parakeet
Francolinus pondicerianus	Grey partridge
Venellus indicus	Redwattled Lapwin
Asio flammeus	Owl
Psittacula krameri	Parrot
Pavo cristatus	Peacock
Ceentropus sinensis	Crow Pheasant
Gyps bengalensis	Vulture
Herpestes edwardii	Mongoose
Rattus rattus	Rat
Muntiacus muntjak	Barking Deer
Sus scrofa	Pig

Core zone - no wild animal.

An inevitable developmental activity may be undertaken with all the precautionary measures of ecological sustainability e.g. controlled noise level, controlled air pollution and green belt development.

A pilot survey was carried out around the New Umrangshu Limestone mine. The preliminary survey of this ecosystem revealed that the dominating plant species are ephemeral and annual. The structure of this ecosystem comprises very common plant species of tropical area. Following plant species are recorded from the given area.

TABLE – 4.10.2
FLORA OF THE STUDY REGION

S.No.	Local Name	Botanical Name
1.	Gamari	Gamolina arborea
2.	Bogipoma	Chirassia tabularia
3.	Bhelu	Tettramalia nudiflora
4.	Hilika	Terminalia chedula
5.	Badam	Mansonia dipikae
6.	Khokon	Duabanga sonnerationdes
7.	Sundi	Michelia chapace
8.	Sam	Atrocarpus Chaplasa
9.	Amra	Ammora wallichil
10.	Koroi	Albizia procera
11.	Aldu	Adina cordifolia
12.	Sida	Lagaertroamia parviflora
13.	Bonsum	Phoebe goalperendia
14.	Bohera	Terminalia belerica
15.	Ghogra	Schima wallichil
16.	Dhuna	Canarium spp.
17.	Parauli	Sterosperrmum Chelonides
18.	Uriam	Bischofia javanica
19.	Teak	Tectona grandis
20.	Ashoka	Polyalthia longifolia
21.	Mango	Mangifera indica
22.	Neem	Azadirachta indica
23.	Amaltas	Cassia fistula
24.	Silver oak	Gravalia robusta
25.	Banana	Musa pudica
26.	Guava	Psidium guava
27.	Lemon	Citrus lemon
28.	Thuja	Thuja spp.
29.	Peepal	Ficus religiosa

4.11 SOCIO-ECONOMIC ENVIRONMENT

Socio-economic study of an area gives an opportunity to assess the socio-economic conditions of an area. By this study the changes likely to occur in living and social standards of the particular area due to existence of New Umrangshu Limestone Mine (AIDC) can also be assessed. It can undoubtedly be said that due to the existence of this mine the economic status of the area will increase substantially. This will provide direct and indirect employment and improve the infrastructural facilities and standards of living of the area.

An integral part of environmental study, which deals with the total environment, is socio-economic environment incorporating various facts related to socio-economic condition in the area. These includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the likely impact depending upon the nature and magnitude of the project.

There is no habitat within core zone. In buffer zone of the study area main workers are 40.43% and marginal workers are 4.72% resulting into 54.85% non-workers indicating at chronic unemployment problem. Total literates are 45.98%. Amenities available in the villages have also been studied. Apart from drinking water which is available in all the villages of this hill district considered to be the most backward, the amenities of education, medical, post and telegraph, market / hat, communications, approach by pucca road and power supply are not available in all the villages. There is no historical place or monuments in study area of 10 km radius. The activities of existing VCL plants have improved the economic status of the area.

The recent industrial development of the region is offering opportunity for people of other parts of the country to come for job. Thus demographic pattern is sure to be changed further in future.

The occupational pattern of the people in Umrangshu town is approximately as under

Mining	-	10%
Trade	-	12%
Agriculture	-	1%
Industry	-	77%

4.11.1 Demography

Total population in the study as per 2001 census records is 20713. Analyzing the dispersal of rural scheduled caste population in the study area, it is evident that the concentration of SC is found to be 1.8% and concentration of ST is 6.6%.

4.11.2 Sex - Ratio

The population of females in the population of the district as a whole has always been on the lower side as compared to males. A study of the pattern of sex ratio would reveal that there are 1:1.

4.11.3 Basic Amenities

Amenities whether in the towns or villages are the requisites of a happy and comfortable life. Their availability is an indicator to development and progress.

There will be established one dispensary at the mine site,

Apart from drinking water which is available in all the villages of this hill district considered to be the most backward, the amenities of education, medical, post and telegraph, market / hat, communications, approach by pucca road and power supply are not available in all the villages and except education, in the majority of the villages.

Educational Status of the area is satisfactory primary schools are present in almost all the villages. Water is made available from the surface water sources i.e. Streamlets etc. This water is collected in small reservoirs that are constructed at the mine site and then utilized for drinking and other purposes. Power is made available from the Assam State Electricity Board (A.S.E.B). Post and telegraph facilities are also available in Umrangshu town.

