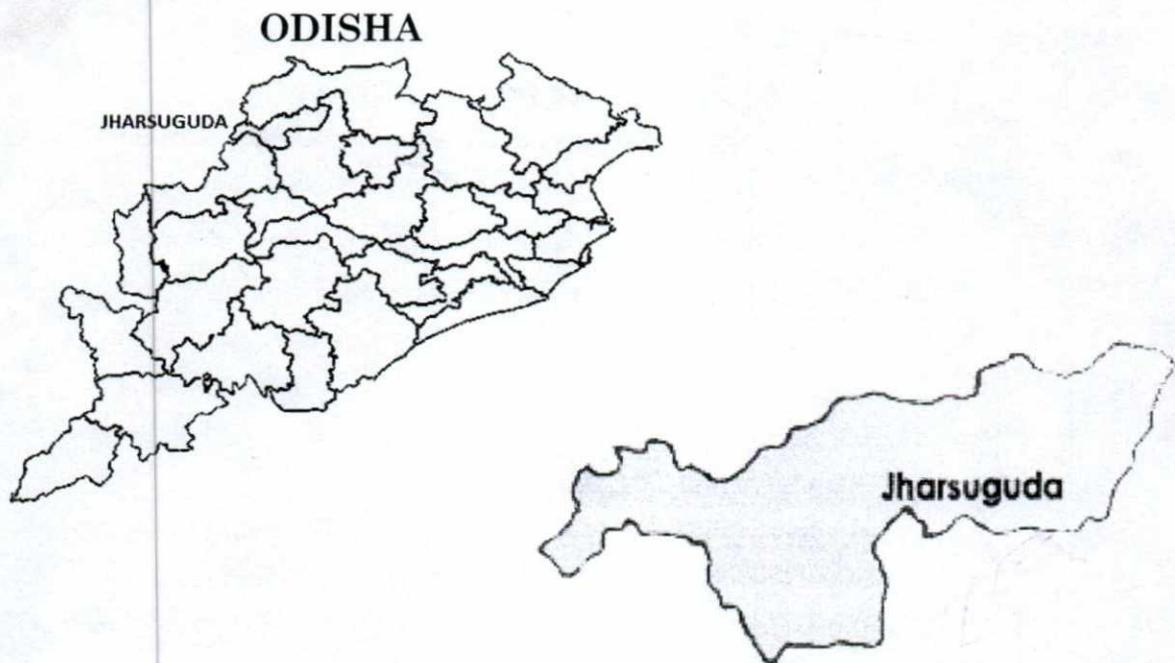




**DISTRICT SURVEY REPORT (DSR)
OF
JHARSUGUDA DISTRICT, ODISHA
FOR
QUARTZITE**

**(FOR PLANNING & EXPLOITING OF MINOR
MINERAL RESOURCES)**



As per Notification No. S.O. 3611(E) New Delhi,
25th July, 2018
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(MoEF & CC)

COLLECTORATE, JHARSUGUDA

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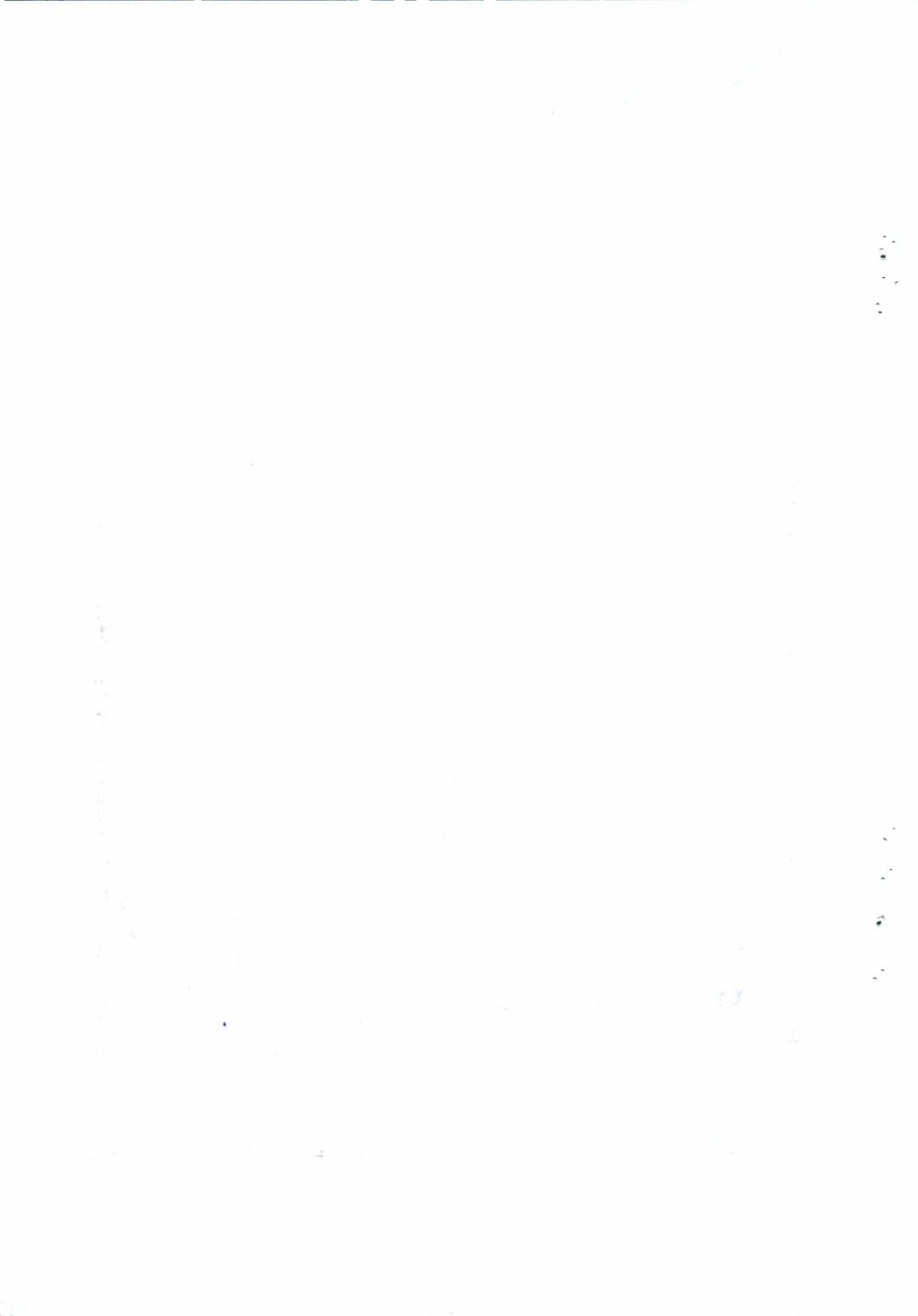
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DFO, Jharsuguda(T)
Member DEIAA
Divisional Forest Officer
Jharsuguda Forest Division

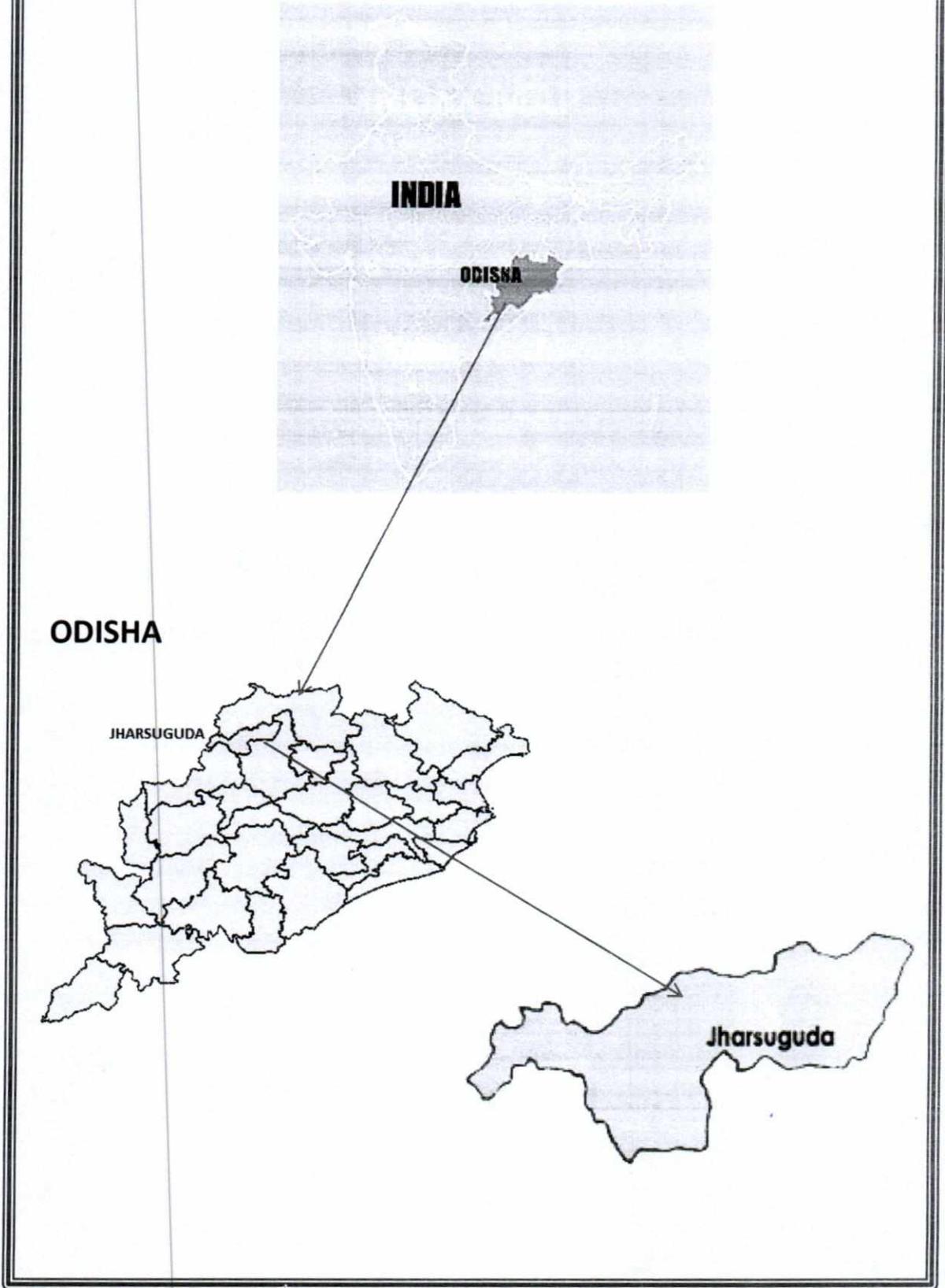

DR. Sarat Choudhary
Retd. Principal
Expert Member, DEIAA


SubCollector, Jharsuguda
Member secretary DEIAA


District Magistrate
& Collector, Jharsuguda
Chairman DEIAA

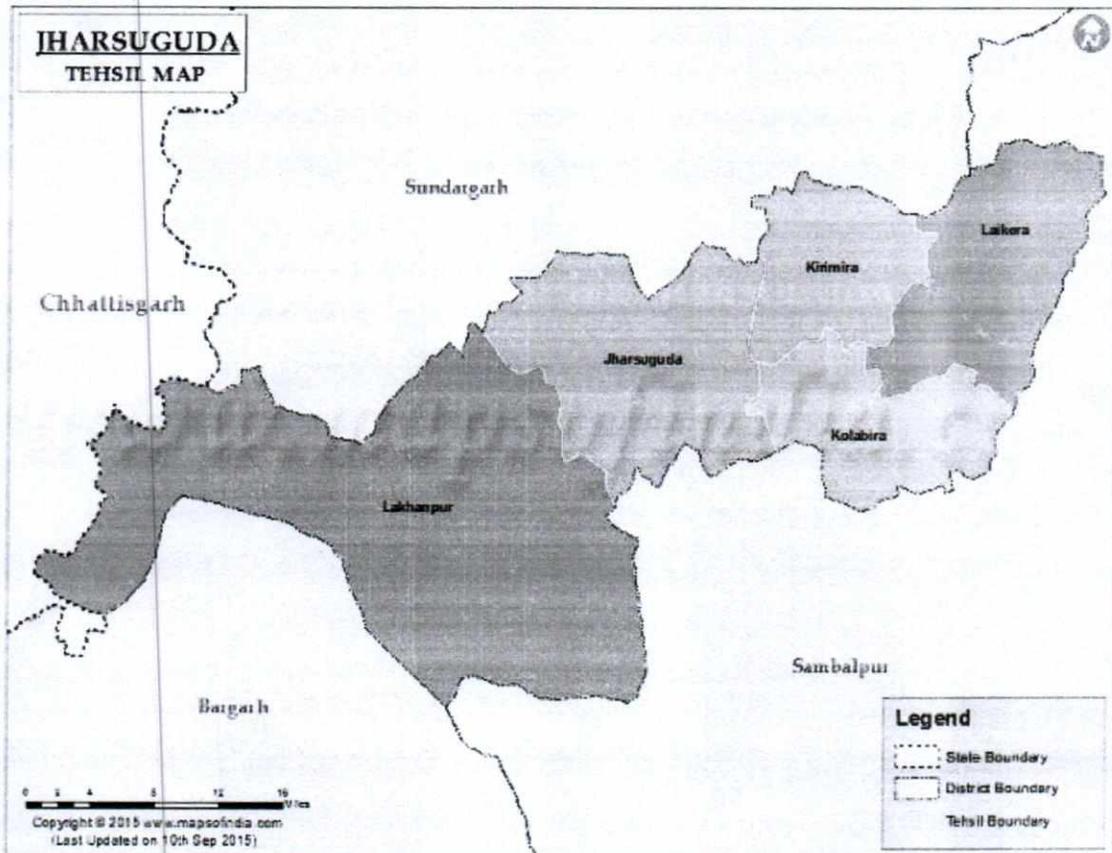


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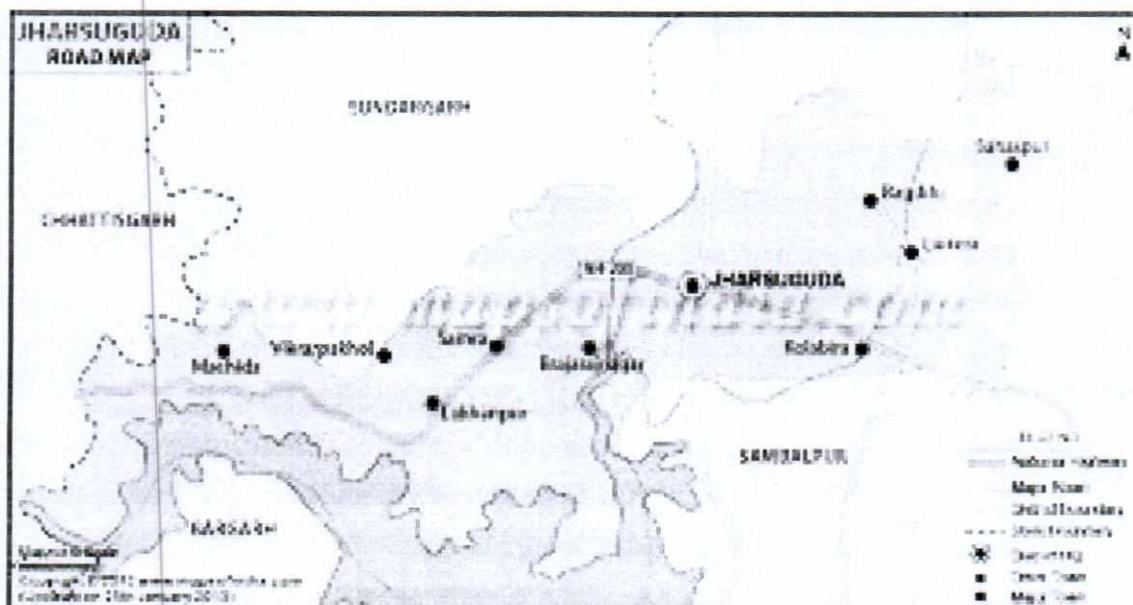


MAP SHOWING THE TAHASILS OF JHARSUGUDA DISTRICT





MAP SHOWING THE MAJOR ROADS OF JHARSUGUDA DISTRICT



PREFACE

In compliance to the notification issued by the Ministry of Environment and Forest and Climate Change Notification no. S.O.3611 (E) New Delhi dated 25-07-2018, the preparation of district survey report of Quartzite mining has been prepared in accordance with Clause II of Appendix X of the notification. Every effort has been made to cover Quartzite mining locations, future potential areas and overview of Quartzite mining activities in the district with all its relevant features pertaining to geology and mineral wealth. This report will act as a compendium of available mineral resources, geological set up, environmental and ecological set up of the district and is based on data of various departments like Revenue, Water Resources, Forest, Geology and Mining in the district as well as statistical data uploaded by various state Government departments. The main purpose of preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

1. INTRODUCTION

Jharsuguda is a district in Odisha, India with Jharsuguda town as its headquarters. Mineral rich district, Jharsuguda is one of the most industrially developed district of Odisha. Jharsuguda district was established on 1st January, 1994, before which it was a part of Sambalpur district. It was created by amalgamation of the erstwhile Jamindars of Rampur, Kolabira, Padampur and Kudabaga. The district is surrounded by Sundargarh district in the North, Sambalpur district in the East, Bargarh district in the South and Chattisgarh state in the West. Jharsuguda district is situated at a distance of 515 km from Kolkata, 616 km from Nagpur, 48 km from Sambalpur and 372 km from state capital Bhubaneswar. Jharsuguda district covers a total area of 2,081 sq km. The district once had an airport during World War II. This region is rich in coal and other mineral reserves. Of late, many small and medium scale iron and steel units have been set up in the vicinity of Jharsuguda town, giving impetus to the industrial growth of the district.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

Coal : Coal, the major mineral resources of the district is confined to Ib-river coal field which was brought to light towards the later part of the last century and now it is supposed to be one of the major coal fields in India. Both Barakar and Karharbari formations of this coal field are major coal bearing horizons. Surface and sub-surface data reveal one coal seam in Karharbari and four coal seams in Barakar with a number of local seams. The coal seams are highly interbanded with high moisture and ash contents. A total reserve of 9361.26 million tonnes of power grade coal has been estimated for the district.

In Jharsuguda district Coal extraction is done by Mahanadi Coalfields Limited (MCL.) a subsidiary of Coal India Limited. There are five numbers of Opencast Projects and nine numbers of underground leases in operation by MCL. The total area held by MCL for Mining Operation is 9255.267Hectare in the district. Major Consumers of the IB Valley Area Coal across the Country are like NALCO, NTPC, Tamilnadu Electricity Board (TNEB), West Bengal Power Development Corporation (WPDCL), Aravali Power Co.(P) Ltd. T.P.P. Hariyana, Talwandi Saboo Power Ltd. Punjab, Tata Electric Power, Jharkhand, Vendanta Pvt. Ltd., OPGC Odisha, Mahagenco Akola, Maharashtra, Gopani Iron & Power , Chandrapura, Maharashtra, etc. The State Govt is earning revenue of 550-600 crores as royalty & around 150 crores as DMF from the district.

Fire Clay: Several occurrences of fire clay have been encountered within the Kamthi and Barakar formations of Ib-river coal field associated with coal seams. The important occurrences are located around Belpahar, Jurabag, Darliapali ,Lakhanpur and Bholamal. The fire clay is very hard, fine grained with good plasticity, dirty white in colour and when burnt it neither cracks nor fuses at 1400°C. The fusion point varies from 1600° to 1640°C. A total reserve of 0.674 million tonnes of fire clay has been estimated for the district. Tata Refractories Ltd. (TRL) is a major refractory plant in the state which thrives on the produce of the Belpahar fireclay mine. Other occurrences are reported in the village Chandli, Soldia, Ganga, Belout, Bhatlaida, Bonaroi, Khinda & Talabira.

Quartz & Quartzite: The quartz deposit of Bhatlaira, Bonereai & quartzite of Kanjhaharan are amongst the notable ones. Besides, refractory / glass grade

quartz occurs around Laikera, Pandrimal, Jhargaon – Kadamghat, Kolabira, Jangapera, Bhikhampur, Beldungri & Harpidungri.

Besides above mentioned coal mines, there are two numbers of Quartzite mines operating in the district. One is Chuinpali Quartzite mines of M/s TRL Krosaki Refractories Limited over 102.123 Hectare area situated at Chuinpali Village of Lakhanpur Tahasil and the other is Bhikampali Quartzite Mines of M/s OCL India Ltd. over 4.897 Hectare in Bhikamplai Village of Lakhanpur Tahasil of Jharsuguda District.

Red Oxide / Red Ochre: An important deposit of red oxide occurring within Gondwanas is located in Patrapali – Malda and is under active exploitation.

Gemstone: Gem quality green tourmaline occurrences in the zoned pegmatites have been encountered within porphyritic granite gneiss, amphibolite & schists around Bagdihi. Incidences of semitransparent aquamarines have been reported from colluvial zone of the pegmatite body, located east of Pandrimal.

Dolomite: The river Sapai, flowing along the boundary of Sundargarh and Jharsuguda districts exposes sporadic occurrences of dolomite. These occurrences appear to be extension of limestone and dolomite deposits of Gangpur Synclitorium. The estimated reserve of dolomite along the Sapai river section in both Jharsuguda and Sundergarh district is 5.4 million tonnes.

Other Minerals: Minor occurrences of minerals like kyanite of Titheimal, sillimanite of Bhuliadihi, opaque beryl of Pandrimal and Kolabira, tourmaline of Kolabira, columbite –tantalite of Kolabira, feldspar of Bhatlaira and the Pyroxene granulites of Pandrimal area for dimension stone have also been reported.

Other than the above mentioned minerals, minor minerals such as river sand, laterite slabs, building stone/black stone/road metals, morrum, brick earth etc. are also available in the district.

3. GENERAL PROFILE

a. Administrative set up:

SI No	Item	Unit	Magnitude
1	Location		

	Longitude	Degree	84°01' East
	Latitude	Degree	21° 82' North
2	Geographical area	Sq.Km.	2114
3	Sub-division	Numbers	1
4	Tahasils	Numbers	5
5	C D Blocks	Numbers	5
6	Municipalities	Numbers	3
7	NACs	Numbers	-
8	Police Stations	Numbers	11
9	Gram Panchayats	Numbers	78
10	Villages	Numbers	351
	Inhabited	Numbers	347
	Uninhabited	Numbers	4
11	Assembly constituencies	Numbers	2

b. Area and Population:

Jharsuguda district covers a total area of 2, 081 sq km. The district lies between 21.82 degree north latitude and 84.1 degree east longitude.

Total population of the District is 579505 consisting of 351 villages. Urban Population is 231165 and rural population is 348340. Total male population of the District is 296690 and female population is 282815. The District consists of total 104620 SC population and 176758 ST population. The total literacy rate of the District is 78.86% comprising 86.61% male literacy rate and 70.73% female literacy rate.

c. Climate :

The district of Jharsuguda is characterized by a hot dry summer. The temperature in the month of May is 42 degree at the maximum. The average rainfall of the district is 1500 millimeter. From April to August the wind blows from south and southwest whereas from September onwards wind blows from North West.

d. Economy:

The economy of the Jharsuguda district can be judged through its natural resources. The District is rich in minerals like coals, quartzite and fire clay. Besides deposit of limestone, granite, white sand stone and laterite stone are also found in several places of Jharsuguda district that add to economy of the District. Several industrial units like Vendanta Alumina, Bhusan Steel and Power, TATA Refractories are operating in the district those contribute to the economic growth of the district. There are also some major forest products like Kendu leaves, wood, rice and leather that also contribute significantly to the economy of Jharsuguda district.

e. Industry:

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
1517	12335.47	463	466	2921	3850	151

f. Agriculture:

During the year 2017-18 the net area sown was 60 thousand hectares against 5356 thousand hectares of the state. The production of was as below:

Name	Paddy	Wheat	Maize	Mung	Biri	Kulthi	TILL	Groundnut	Mustard	Potatoes	Jute	Sugar cane
Production in 000 MT	116.52	0.15	2.87	0.69	0.39	1.37	1.22	1.00	1.24	0.00	4.80	27.04

During 2017-18, the total fertilizers used in the district was about

Type of fertiliser	Nitrogenous	Phosphatic	Pottasic	Total	Consumption per Ha
Quantity in MT	3372	1401	722	5495	67.27

g. Power:

Consumption of electricity in the district during the year covers 82 million units per month and villages so far electrified as on 30.08.2019 is 333 which constitutes almost 95% to the total villages of the district.

h. Transport & Communication:

Railway route length (14-15) km	66.62
No of Rly stations and PH(14-15)	9
Forest road (17-18) km	23.00
National Highway (16-17) km	105.60
State Highway (17-18) km	106.16
Major district road (17-18) km	40.37
Other dist road (17-18) km	942.75
Rural road(17-18) km	323.41
Inter village road (16-17) km	1024.64
Intra village road (16-17) km	1025.57

i. Health:

The medical facilities are provided by different agencies like Govt., Private individuals and voluntary organizations in the district.

Allopathic Govt medical institutions	93 No
Beds facilities	DHH- 300 beds- 1No CHCs- 60 beds- 6 Nos OH- 10 beds- 1No
Homoeopathic dispensaries	7 No
Ayurvedic dispensaries	9 No

j. Tourist places:

Jharsuguda is one of the popular tourist destinations. The district is decorated with many tourist places. Koilighugar waterfall (Lakhanpur) and Adyaswambhu are the picnic spots that attract lots of tourists every year. Likewise there are several places of historical importance like ruins of Hill Forts of Ulapgarh, rock painting and lithography of Bikramkhol, Ushakothi cave and Kolabira Fort. The district has number of temples namely Padmasini Temple of Padampur, Ancient Shiva Shrine of Jhadeswar Temple, Ramchandi, an ancient Shaktipitha, Shree Pahadeswar Temple, Shiva Shrine of Mahadebpali.

k. Forest areas:

Category of forest	Area in sq km
Reserve Forest	35.53
Unclassified Forest	0.04
Demarcated Protected Forest (DRF)	109.97
Undemarcated Protected Forest	0
Other forest under Revenue Dept	56.9
Total	202.44

l. Education:

Primary School (2017-18)	No. of Schools	393
	Enrolment (No)	47042
	Pupil Teacher Ratio	20.50
Upper Primary School 2017-18	No. of Schools	323
	Enrolment (No)	28349
	Pupil Teacher Ratio	14.52
General College 2017-18	Junior	21
	Degree	10
Secondary School	No. of Schools	137
	Enrolment (No)	15858
	Pupil Teacher Ratio	21.60
Literacy Rate, 2011	Male	86.6
	Female	70.7
	Total	78.9

m. Culture & Heritage:

Jharsuguda district is very much rich in its cultural heritage. Various fairs and festivals are celebrated round the year that indicates its richness in culture and religion. There are many common fairs and festivals that are celebrated in the state. But there are few distinct and special festivals that are celebrated in the District like Ranjta Festival, Ratha Jatra of Kukurjunga, Famous Gokulastami Jatra of Rajpur and Makar Ratha Jatra of Belpahar.

The District is a beautiful diaspora of different origins of people from across India which makes it unique & different from other cities in Odisha.

Sambalpuri is the mother tongue of the district. Besides some ethnic groups have their own languages like Agrias, Lairias, Mundas, Kishans, Khadis and Turis.

4. GEOLOGY

The district exposes a wide spectrum of rock types. The Peninsular Gneiss comprising augen gneiss and migmatite represent the oldest rocks of Archaean to Lower Proterozoic age in the area. They occupy a gently undulating terrain east of Jharsuguda. A small body of massive granite, the Tamparkola granite, of Lower Proterozoic age occurs as an isolated exposure near Dulesra. A narrow linear strip of metasedimentary rocks consisting of quartzite, quartz-sericite schist, phyllite and mica schist occurring near Laikera belongs to Upper Bonai Group of Lower Proterozoic age. Well consolidated, soft and foliated rocks of Gangpur Group of Lower Proterozoic age comprising phyllite and mica schist are well exposed here. An unmetamorphosed sedimentary sequence of rocks occur near the western corner of the district. This sedimentary sequence can be broadly divisible into a sequence of shale, calcareous shale and quartzite forming the Raipur Group and coarse sandstone and quartzite forming the Chandarpur Group of the Chattisgarh Super Group. The Gondwana Super Group of sedimentary rocks are confined to fault bounded basin and occur in the central part of the district around Belpahar, Brajarajnagar areas. Among Talchir and Barakar Formations of Lower Gondwanas, the latter is the store house of 'bituminous coal' in the region. Kamthi Formation consisting of conglomerate, sandstone, shale, red clay etc. represents the Upper Gondwanas in the area. Soil, alluvium and laterite are the younger formations in the area. Laterite occurs in small, isolated, irregular outcrops, spread almost all over the above rock types. The unclassified soil/alluvium of the Quaternaries occupies large area in the Mahanadi river valley and over the gneissic country, east of Jharsuguda.

STRATIGRAPHY:

The geological succession in the district is as follows:

AGE	GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to Recent	Quaternary	Soil and alluvium
Cainozoic		Laterite
Permian to Triassic	Gondwana Super Group	Kamthi Formation Conglomerate, sandstone shale, red clay
Permian		Barakar Formation Sandstone, shale with coal seams
Carboniferous (?) Permian		Talchir Formation Green sandstone, needle shale, boulder bed
Upper Proterozoic		Gangpur granite
Middle to Upper Proterozoic Lower Proterozoic	Chattisgarh Super Group	Raipur Group Shale, calcareous shale, quartzite
		Chandarpur Group Coarse quartzite, sandstone
		Gangpur Group Phyllite, mica schist
Lower Proterozoic		Tamparkola granite
	Upper Bonai Group	Shale, phyllite, mica schist Quartzite, quartz-sericite schist
Archaean to Lower Proterozoic	Lower Bonai Group	Metabasics
	Peninsular Gneiss (Younger phase)	Augen gneiss and migmatite
Archaean	Peninsular Gneiss (Older phase)	Medium grained biotite granite gneiss

5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like IB & Bheden. Detail of the river system is narrated below.

Sl.no	Name of the River	Place of origin	Altitude at origin	Total length in the district (in km)	Area drained (sq km)	% area drained in the district	Process on deposition of sediments	Volume of sand deposited in last four years(Year wise)	Any important note related to leasing of sand quarry within the river
A	B	C	D	E	F	G	H	I	J
1	River IB	Pandarapat Raigarh	21°51'N 83°56'E	52Km	12447sq km	14Km	Sediments get deposited along with sand after receding of flood water.	35,00,000 Cum(Approx.)	-
2	River Bheden	Bamara	21°46'7" N 84°14' 40"E	50Km	2120 sq km	50Km	-do-	50,00,000 Cum(Approx.)	-

6. LANDUSE PATTERN

Sl No	Landuse	Area in '000Ha
1	Forest Area	20
2	Misc. trees & Grooves	6
3	Permanent Pasture	20
4	Culturable Waste	15
5	Land put to Non Agril Use	19
6	Barren & Unculturable Land	27
7	Current Fallow	28
8	Other Fallow	3
9	Net Area Sown	60
10	Mining	10
	Geographical Area	208

7. SURFACE WATER & GROUND WATER SCENARIO

The drainage systems i.e. rivers of the district gets filled with water during the monsoon and the gradually it decreases from the month of January to June of each year. In the summer season all rivers become almost dry excepting narrow flow of water within the basin.

The variation of ground water table in the district is as follows:

Depth of water level (mbgl)/ Period	April	August	November	January
Minimum	2.25	0.85	1.35	2.2
Maximum	7.75	6.35	5.85	8.2

8. RAINFALL & CLIMATIC CONDITION

The district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July and continues till end of October. The temperature goes as high as up to 46°C in the summer and up to 7^o-8^o C during peak winter.

The rainfall statistics of the district for last four years is given below:

Year/ Month	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	TOTAL
15-16	40.86	7.4	199.1	480.9	441.9	271.78	7.04	0	26.32	0	24.06	16.26	1515.66
16-17	0	22.44	85.72	259.2	406.1	253.24	43.88	0	0	7.5	0	4.69	1082.75
17-18	1	64.48	228.4	442.3	300.8	245.84	94.06	0	0	0	0	1.64	1378.6
18-19	27.94	113.8	176.1	421.2	399.5	122.26	6.6	0	90.54	0	44.04	13.9	1415.96
AVG	17.45	52.03	172.3	400.9	387.1	223.28	37.895	0	29.22	1.875	17.03	9.1225	1348.24

9. DETAILS OF MINING LEASES

Two leases at present exist within the district. Details are given below:

Sl. No.	Name of the Concession	Type of concession (PL/ML/Composite)	Status (Running / Temp Closed)	Name of Concession Holder	Village & Tahasil	Resource in MT	Co-ordinates of all Boundary points						Area (Ha)	Reserve	Validity of concession	
							Latitude			Longitude					From	To
							Deg	Min	Sec	Deg	Min	Sec				
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	OM MC Rule, 2016	ML	Working	TRL Krosaki Refractions Ltd.	Chuinpali, Tahasil-Lakhanpur	238,68,643 MT as per latest mining scheme	21	46	25.50051N	83	34	01.71936E	102.12	229,15,163 MT as per latest mining scheme	22.05.2000	21.05.2020
2	OM MC Rule, 2016	ML	Working	OCL India Ltd.	Bhikampali, Tahasil-Lakhanpur	1993510.041 MT as per latest mining scheme	21	46	53.6	83	33	34.3	4.897	1351214.09 MT as per latest mining scheme	27.02.2001	26.02.2031

10. DETAILS OF ROYALTY COLLECTED (Rs)

Sl. No.	Name of Concession Holder/ Village & Tahasil	FY	Collection of Royalty (Rs)	Collection of Other Revenue (Rs)	Production (Ton)
1	TRL Krosaki Refractions Ltd. Chuinpali, Tahasil-Lakhanpur	15-16	1445988	102123	18470
		16-17	1172737	36764	24840.7
		17-18	4029667	36765	30490
		18-19	3263452	201473	34168.8
2	OCL India Ltd. Bhikampali, Tahasil-Lakhanpur	15-16	129868	7346	1847
		16-17	197474	7346	787
		17-18	68837	0	1327
		18-19	338133	1644	3925
TOTAL			10646156	393461	115855.5

11. DETAILS OF PRODUCTION OF MINOR MINERAL

Please refer the above table.

12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

Not applicable

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral resource of quartzite is 258,62,144 T or 25.8 million tons estimated for the two running mining lease areas described above. This will certainly be increased for the district after detail geological investigation.

15. QUALITY/GRADE OF MINERAL

The cut-off grade for refractory grade quartzite in general can be taken as +98% SiO₂. This quartzite is used by the lessees in their Refractory plants for making of refractory bricks.

Similarly, quartzite having 97 % to 98% SiO₂ can be categorized as steel grade quartzite used in steel plants as flux.

Quartzite having <97% SiO₂ has no metallurgical use at present and can be used as road metal.

16. USE OF MINERAL

Quartzite having +98% SiO₂ is used in Refractory plants for making of refractory bricks.

Quartzite having 97 % to 98% SiO₂ is used in steel plants as flux.

Quartzite having <97% SiO₂ has no metallurgical use at present and can be used as road metal.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand of quartzite both for steel grade and refractory grade is to the tune of 1.5 lakh cum and is mainly supplied from the existing two mining leases of the district and from adjoining quartzite mines of Chhatisgarh.

18. MINING LEASES MARKED ON THE MAP OF THE DISTRICT.

Attached as Plate No 5.

19. DETAILS OF AREAS WHERE THERE IS A CLUSTER OF MINING LEASES

Not applicable

20. DETAILS OF ECO-SENSITIVE AREA

Part of Eco-Sensitive Zone of Debrigad wildlife Sanctuary is located within the district.

21.IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL FLORA & FAUNAL , LAND USE , AGRICULTURE, FOREST ETC.) DUE TO MINING

Activities attributed to Mining:-

Generally, the environment impact can be categorized as either primary or secondary. Primary Impacts are those, which are attributed directly by the project. Secondary impacts are those which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impact has been ascertained for the project assuming that the pollution due to mining activity has been completely spelled out under the base line environmental status for the entire ROM which is proposed to be exploited from the mines.

Impact on Ambient Air

Mining operation are carried out by opencast manual, semi mechanized/ mechanized methods generating dust particles due to various activities likes, excavation, loading, handling of mineral and transportation. The air quality in the mining areas depends upon the nature and concentration of emissions and meteorological conditions.

The major air pollutants due to mining activities include:-

- Particulate matter (dust) of various sizes.
- Gases, such as sulphur dioxide, oxides of nitrogen, carbon monoxide etc from machine & vehicular exhaust.

Dust is the single air pollutant observed in the open cast mines. Diesel operating drilling machines, blasting and movement of machineries/ vehicles produce NOx , SO2 and CO emissions, usually at low levels. Dust can be of significant nuance surrounding land user and potential health risk in some circumstances.

Water Impact

Sometimes the mining operation leads to intersect the water table causing ground water depletion. Due to the interference with surface water sources like river, nallah etc drainage pattern of the area is altered.

Noise Impact

Noise pollution mainly due to operation of machineries and occasional plying of machineries. These activities will create noise pollution in the surrounding area.

Impact on Land environment

The topography of the area will change certain changes due to mining activity which may cause some alteration to the entire eco system.

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics.

Mining activities generally result in the deforestation, land degradation, water, air and noise pollution which directly or indirectly affect the faunal and flora status of the project area.

However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved.

22. REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT:-

Air

Mitigation measures suggested for air pollution controls are to be based on the baseline ambient air quality of the project/cluster area and would include measures such as:

- Dust generation shall be reduced by using sharp teeth of shovels.
- Wet drilling shall be carried out to contain the dust particles.
- Controlled blasting techniques shall be adopted.

- Water spraying on haul roads, service roads and overburden dumps will help in reducing considerable dust pollution.
- Proper and regular maintenance of mining equipment's have to be undertaken.
- Transport of materials in trucks are to be covered with tarpaulin.
- The mine pit water can be utilized for dust suppression in and around mine area.
- Information on wind diction and meteorology are to be considered during planning, so that pollutants, which cannot be fully suppressed by engineering techniques, will be prevented from reaching the nearby agricultural land, if any.
- Comprehensive greenbelt around overburden dumps and periphery of the mining projects/clusters has to be carried out to reduce to fugitive dust transmission from the project area in order to create clean & healthy environment.

Water

- Construction of garland drains and settling tanks to divert surface run –off of the mining area to the natural drainage.
- Construction of checks dams/ gully plugs at strategic places to arrest silt wash off from broken up area.
- Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off.
- The mined out pits shall be converted in to the water reservoir at the end of mine life. This will help in recharging ground water table by acting as a water harvesting structure.
- Periodic analysis of mine pit water and ground water quality in nearby villages are to be undertaken.
- Domestic sewage from site office & urinals/latrines provided within ML/QL areas is to be discharged in septic tank followed by soak pits.

NOISE

- Periodic maintenance of machineries, equipments shall be ensured to keep the noise generated within acceptable limit.

- Development of thick green belt around mining/cluster area, haul roads to reduce the noise.
- Provision of earplugs to workers exposed to high noise generating activities like blasting, excavation site etc. Worker and operators at work sites will be provided with earmuffs.
- Conducting periodical medical checkup of all workers for any noise related health problems.
- Proper training to personnel to create awareness about adverse noise related effects.
- Periodic noise monitoring at locations within the mining area and nearby habitations to assess efficacy of adopted control measures.
- During blasting optimum spacing, burden and charging of holes will be made under the supervision of competent qualified mines foreman, mate etc.

Biological Environment

- Development of green belt/gap filling saplings in the safety barrier left around the quarry area/ cluster area.
- Carrying out thick greenbelt with local flora species predominantly with long canopy leaves on the inactive mined out upper benches.
- Development of dense poly culture plantation using local floral species in the mining areas at conceptual stage if the mine is not continued much below the general ground level.
- Adoption of suitable air pollution control measures as suggested above.
- Transport of materials in trucks covered with tarpaulin.

23. RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN) :-

As per statute all mines/quarries are to be properly reclaimed before final closure of the mine. Reclamation of exhausted mines are planned to be undertaken in below three possible means:

1. If, substantial amount of waste is there, the exhausted quarry can be fully or partly backfilled using the stored waste. The backfilled areas are to be brought under plantation of local species.

2. If the generation of waste is much less as in the case of minor mineral mining, the exhausted quarries can be reclaimed by
 - a. Plantation on the broken up surface if the depth of quarry is not much below the surrounding surface level.
 - b. Converted to water reservoir after stabilization of the slopes if the exhausted quarry continues much below the surrounding surface level. It is preferred to cordon the water reservoir either through wire fencing or retaining wall with plantation from the safety point of view.

Most of the quarry/mining lease areas are yet to be exhausted from ore point of view. Hence, reclamation would be taken up only after exhaustion of the ore/mineral content from these areas. The exhausted minor mineral quarries of the district have been converted to water reservoirs.

24. RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The only risk involved related to mining of minor mineral excepting natural calamities is slope failure and probable accidents due to high and ill maintained bench walls. This can only be addressed through making of regular benches and undertaking mining in benching pattern.

The disaster management plan (DMP) is supposed be a dynamic, changing, document focusing on continual improvement of emergency response planning and arrangements.

The disaster management plan is to be aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and savage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated through rehearsal/induction conducted by the respective department from time to time .

General responsibilities of employees' during an emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the worker in charge, should adopt safe and emergency shut down and attend to any prescribed duty. If no such responsibility is assigned, the workers should adopt a safe course to assembly

point and wait instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

Co-ordination with local authorities:

The Mine Manger who is responsible for emergency will always keep a jeep ready at site. In case of any eventuality, the victim will be taken to the nearby hospitals after carrying out the first aid at the site. The Manger should collect and have adequate information of the nearby hospitals, fire station, police station, village panchayat heads, taxi stands, medical shops, district revenue authorities etc. and use them efficiently during the case of emergency.

25. DETAILS OF THE OCCUPATION HEALTH ISSUES IN THE DISTRICT. (LAST FIVE- YEAR DATA OF NUMBER OF PATIENTS OF SILICOSIS & TUBERCULOSIS IS ALSO NEEDS TO BE SUBMITTED):-

As per the guidelines of the Mine Rules 1995, occupational health safety has been stipulated by the ILO/WHO. The proponent's will take necessary precautions to fulfil the stipulations. Normal sanitary facilities have to be provided within the lease area. The management will carry out periodic health checkup of workers.

Occupational hazards involved in mines are related to dust pollution, noise pollution, blasting and injuries from moving machineries & equipment and fall from high places. DGMS has given necessary guidelines for safety against these occupational hazards. The management has to strictly follow these guidelines.

All necessary first aid and medical facilities are to be provided to the workers. The mine shall be well equipped with personal protective equipment (PPE). Further, all the necessary ported equipments such as helmet, safety goggles, earplugs, earmuffs ets are to be provided to mine workers as per Mines Rules. All operators and mechanics are to be trained to handle fire fighting equipments.

TUBERCULOSIS DATA RNTCP KHORDHA

YEAR	No of Tuberculosis patients
15-16	763
16-17	796
17-18	715
18-19	831
Upto June 2019	370

There is no case of Silicosis found in Jharsuguda within the time frame mentioned above.

26. PLANTATION OF GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT

As most of the minor mineral mines/quarries of the district are yet to be exhausted of their mineral content no sort of reclamation measures including plantation has been undertaken excluding gap plantation of local species in the peripheral safety zones of the quarries/ clusters and in some of the haul roads.

27. ANY OTHER INFORMATION

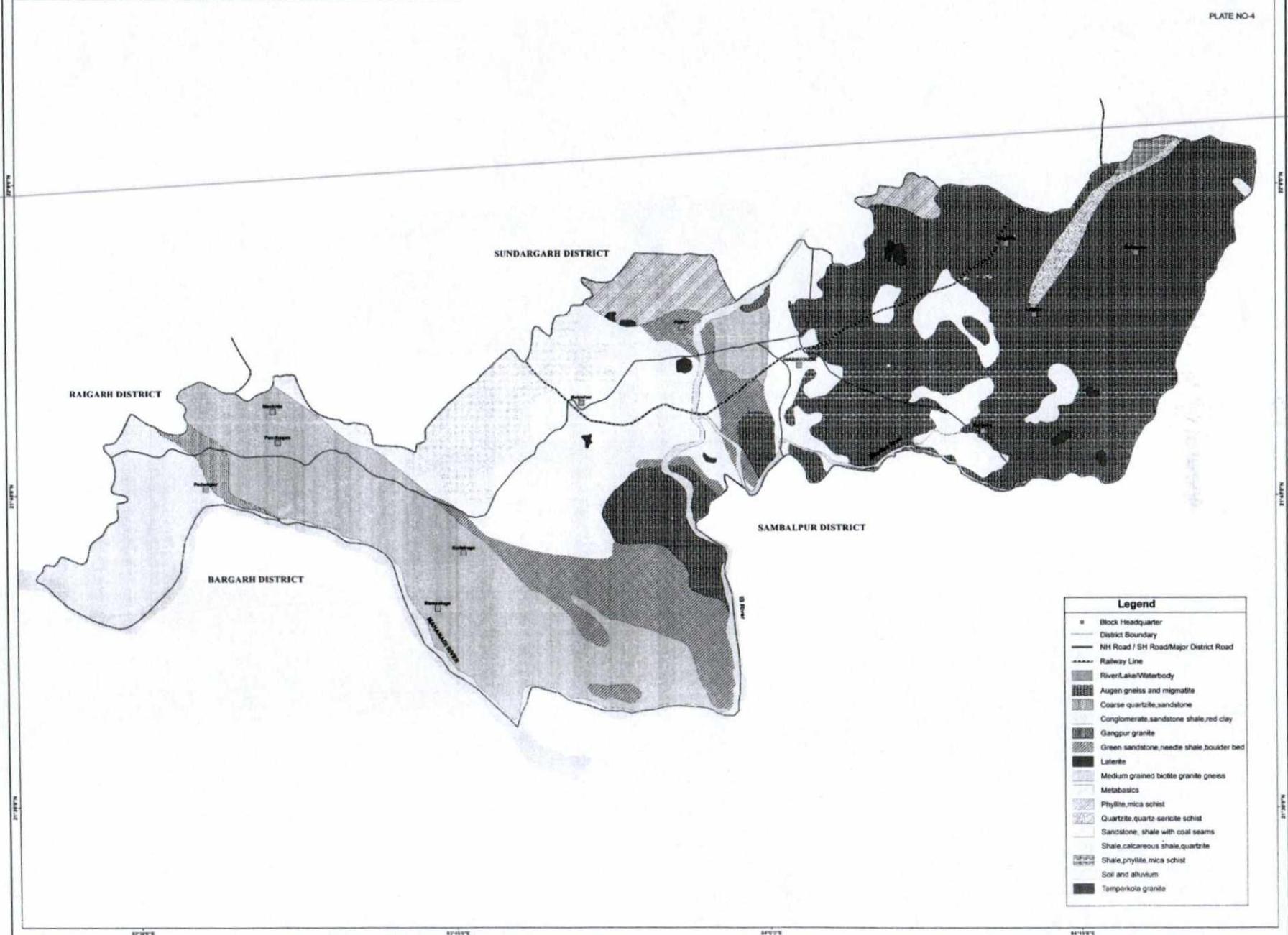
Nil

MINERAL MAP OF JHARSUGUDA DISTRICT

SCALE - 1:110,000



PLATE NO-4



Legend	
	Block Headquarter
	District Boundary
	NH Road / SH Road/Major District Road
	Railway Line
	River/Lake/Waterbody
	Augeu gneiss and migmatite
	Coarse quartzite, sandstone
	Conglomerate, sandstone, shale, red clay
	Gangpur granite
	Green sandstone, needle shale, boulder bed
	Laterite
	Medium grained biotite granite gneiss
	Metabasics
	Phyllite, mica schist
	Quartzite, quartz-sericite schist
	Sandstone, shale with coal seams
	Shale, calcareous shale, quartzite
	Shale, phyllite, mica schist
	Soil and alluvium
	Temperkola granite

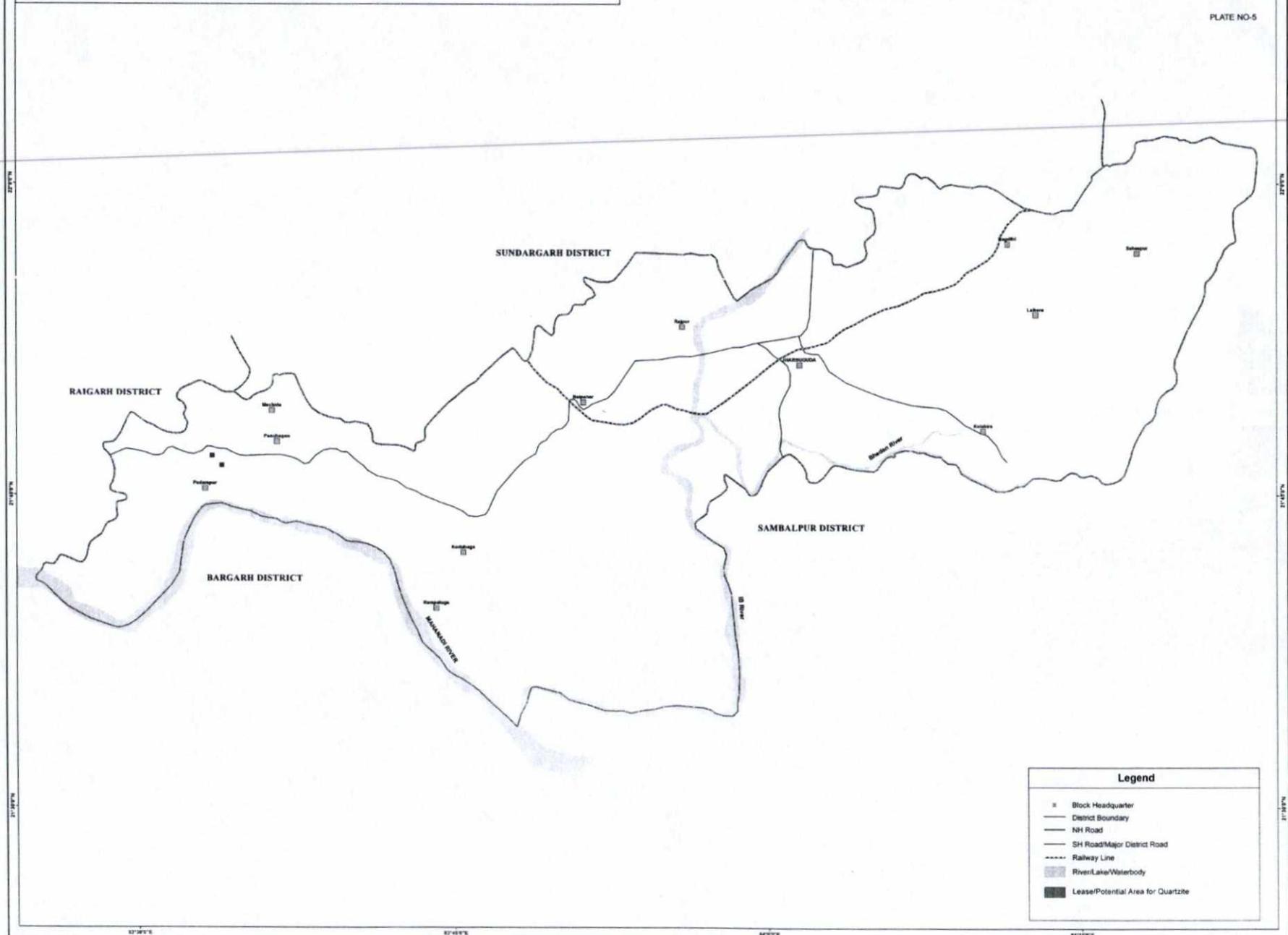


LEASE/POTENTIAL MAP OF QUARTZITE IN JHARSUGUDA DISTRICT

SCALE: 1:1110,000



PLATE NO-5



Legend	
⊠	Block Headquarter
—	District Boundary
—	NH Road
—	SH Road/Major District Road
----	Railway Line
▨	River/Lake/Waterbody
■	Lease/Potential Area for Quartzite

✓
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