DISTRICT SURVEY REPORT (DSR)

OF

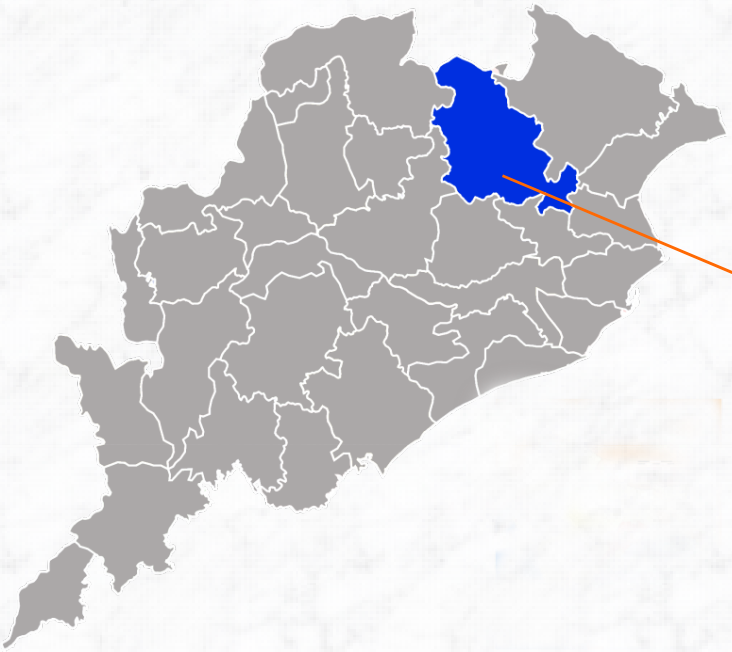
KEONJHAR DISTRICT, ODISHA

FOR

LATERITE SLAB

(FOR PLANNING & EXPLOITING OF MINOR MINERAL RESOURCES)

ODISHA



KEONJHAR

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

COLLECTORATE, KEONJHAR

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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 laterite slab mining has been prepared in accordance with Clause II of Appendix X of the notification. Every effort has been made to cover laterite mining locations, future potential areas and overview of laterite slab 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 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 for preparation for district survey report. 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

The Keonjhar district emerged as one of the districts of Odisha on 1st January, 1948. The district is bounded by Mayurbhanj district and Bhadrak district to the east, Jajpur district to the south, dhenkanal district and Sundargarh district to the west and West Singhbhum district of Jharkhand State to the north. Covering a geographical area of 8303 sq km, the Keonjhar district lies between 21° 1' N to 22° 10' N latitude and 85° 11' E to 86° 22' E longitude.

The whole District of Keonjhar was a princely state before its merger with Odisha. From the history it reveals that a part of the old Khijjinga territory with headquarters at Khijjinga Kota, identified with modern Khiching. It became a separate state with Jyoti Bhanja as its ruling chief sometime during the first half of the 12th century A.D.

The then State of Keonjhar comprised only the northern half of the modern district for a long time prior to the incarnation of Jyoti Bhanja as King. During the latter part of the 15th century the southern half of the district was occupied by King Govinda Bhanja under whose rule Keonjhar was extended

from Singbhum in the north to Sukinda in the South and from Mayurbhanj in the East to the borders of the States of Bonai, Pallahara and Anugul in the West.

During the rule of Pratap Balabhadra Bhanja (1764–1792 A.D.) two small areas of Tillo and Jujhpada were purchased from the Zamindar of Kantajhari and were added to the district. These were recognised as parts of Keonjhar in the Sanad granted by the East India Company to Raja Janardan Bhanja in 1804. Since then there had been no territorial changes of the district till its merger with the Province of Odisha. But after merger largely for the reasons of administrative expediency the areas of Tillo (7.51 sq.km) and Jujhpada (9.06sq.km.) were transferred to the districts of Balasore and Cuttack respectively, while a number of villages called Ambo group (14.84 sq.km.) of Balasore district were added to Keonjhar district.

Keonjhar is one of the major mineral producing districts of Odisha. Iron ore, Manganese ore, Chromite, Quartzite, Bauxite, Gold and Pyrophyllite are the major minerals found in this district.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

Minerals:

IRON ORE:

The main iron ore deposits are found along the classic Bonai-Keonjhar Horse Shoe shaped synclinorium which spared over an area of about 60KmX25Km.

Hematite is the chief mineral resource of this district. Important deposits were found in Thakurani, Bolani, Joda east, Khandbhanda, Sidhmath, Belkundi, Kasia-Barapada, Bolani, Kiribura, Gurudia, Jharibahal, Dubuna, Bamebari, Murga, Palsa, Jajang, Malangtoli, Chamakpura, Gandhamardhan, Daitari, Tomka, Inganijaran, Horomoto Guali and Uliburu. Iron ore bands occur in layered BIF bands along with volcano-sedimentary rock piles known as Iron Ore Super Group. Usually four types of ore are seen i.e. hard massive, laminated, lateritic and blue dust.

A total of 3142.70 million tonnes of iron ore resource of all categories have been assessed with 64-68% Fe in massive, 62-65% Fe in laminated, 65-68% Fe in powdery blue dust type of ore.

Besides, investigation of iron ore by the Directorate in Horomoto-Guali area has established a possible reserve of 46.75 million tonnes of iron ore of grade varying from 51.20% to 65.24% Fe.

MANGANESE: The Keonjhar manganese belt is a part and partial of Singhbhum Bonai belt and one of the most important manganese ore producing regions of India. this is confined to shale formation of Pre-Cambrian Iron Ore Super Group as stratiform, stratabound and lateritoid types.

Important deposits in the Keonjhar district are located in the areas of Roida-Bhadrasahi, Silijhora-Kalimati, Guruda, Chormalda, Sarkunda, Dubna Kolarudkela, Podadihi-Langini-Jharan, Lasarda, Pacheri, Balani, Baneikala, Kendudihi-Purulipada, Horomoto-Jajang, Katasahi, Joribahal, Joda west and Belkundi etc.

The reserve of manganese ore is estimated as 127.27 million tonnes.

The grade of the ore is variable from deposit to deposit as also from body to body within the same deposit. out of the total production, about 10% to 15% forms the High Grade (more than 46% Mn), 25% to 30% Medium Grade (36-45% Mn) and the rest Low (less than 30-35% Mn) and still lower (less than 30% on Mn)

CHROMITE: The chromite deposits of the district are associated with the ultramafic rocks of Nuasahi, Boula and Phuinjhorhuli area. The body extends for about 3Kms in an N-S direction. It is a dyke like body dipping steeply to the east and is widest in the centre and gradually tapering towards north and south. The ultrabasic occurs as intrusive in Precambrian metamorphites as well as differentiated layered igneous complex. It has a peridotite core with subordinate amount of chromite, peripheral pyroxenite and enstatite. the ultramafites include enstatite, bonzite, pyroxenite, serpentinised dunites, talc schist, silicified dunites and chromitites with chromite loads. The chrome ore available are mostly of lumpy type.

The estimated reserve is 11.43 million tonnes with Cr_2O_3 content varies from 40% to 45%.

BAUXITE: Industrial and chemical grade Bauxite occurs on Dholkata pahar area of the district. The area is represented by metavolcanites characterized by

metatholeiitic basalt. The different flows are separated by tuffaceous shale. Outcrops of metagabbro have been noticed to the east and south east of Dholkata pahar. Apart from these minor occurrences of bauxite in pockety or poddy nature has been reported along Keonjhar-Banai belt. The occurrences has been located around Kodalia, Khajurdi Pahar, east of Kasiara and Jaladihi area.

The Dholkata Bauxite is of high alumina, high iron, low silica and low titanium grade having 60 to 70% tri-hydrated as gibbsite and rest bohemite. the predominant iron minerals are goethite and hematite occurring as colloidal bands.

A total of 5.986 million tonnes of bauxite reserve has been estimated around Dholkata pahar area of the district.

VANADIFEROUS MANGANESE: Deposits of vanadiferous magnetite occur in association with gabbro-anorthosite suite of rocks in the Precambrian metamorphic. A deposit of vanadiferous magnetite is seen near Phulinjhorhuli in Anandapur subdivision. The mineral occurs in a band of ultabasic rocks about 4Km long.

GOLD: The occurrence of gold is reported in Telkoi and Banspal block of Keonjhar district. Several old workings of the gold in the shape of elongated trenches, deep circular pits, wells and tunnels have been recognised around Saleikena, Sirisbahal, Dublapal, Bangadiha, Odal, Gopur, Gajipur and Kusuguda etc. The area covering the gold deposits constitute the rock units belonging to Iron Ore Super Group comprising of basic lava, tuffites, basic intrusive, metagabbro, metadiorite, amphibolites, quartzite and chlorite schist. The granitic suites of rocks are intrusive into the above rock types and are represented by micro granites, fracture, shear zone and faults might have acted both as channel ways and receptacles for gold deposition in the vein quartz bodies.

Few important fire assay result done by Hutti Gold Mines shows gold values ranging from 1.8gm/tonne to 18.68gm/tonne in Gopur, traces to 5.3gm/tonne in Odal, traces to 2gm/tonne in Gajipur.

PYROPHYLLITE: The occurrences of pyrophyllite are stretched over a 90Km long belt extending from Rebna-Palasbahal in the south to Dhobakuchuda-Balabhadrapurr in the north. These are associated with the border area of Singhbhum Granite and quartzite hills such as Madrangajori, Macchakandana, Jodiaghat and south of Uchakabeda, eastern slope of Chantrabhangapahar, Dalimpur and Sidhamath area. The Pyrophyllite occurrences mentioned above are in the form of very fine

flakes, typically soapy feel and associated with pyrophyllite quartz schist, quartz tourmaline pyrophyllite rocks and quartz tourmaline pyrophyllite schist as irregular patches.

A total reserve of 12.28 million tonnes have been assessed in Keonjhar district. The average percentage of Al_2O_3 is 20-23%, SiO_2-65-75%, Fe_2O_3- 0.77% and LOI-3-4%.

QUARTZITE: High grade quartzite mining activities are continuing near Barapada, Barang, Paharpur, Parsala area of the district. Besides, cherty and massive quartzite with 99% SiO_2 are marked intermittently in the iron ore series near Rebna-Palaspal, Magarmuhan, Jaypur, Dalmaposi, Chauthia and Nawabeda area.

A total reserve of 45.68 million tonnes of quartzite has been estimated in the district. the average SiO_2 content varies from 95 to 99.66%.

CHINA CLAY: Pockets of china clay are encountered near Judiapahar, Tarreni pokhari, Aupura, Fakirpur, Padmakesharpur, Jaypur, Kankadajodi, Adakata, Govindpur area of the district. The clay is yellowish white, gritty and occurs as pocket type.

The reserve of china clay has been estimated as 1.41 million tonnes in the area. The Al_2O_3 content varies from 18.25% to 22.77%.

DIMENSION STONE: Singhbhum granite, dolerite dykes and ultrabasic rocks of the district are suitable for dimension stone/ decorative stones. The 150Km long Palaspanga dyke from Keonjhar to Chainbasa, the longest dyke in Asia is being used for the above purpose in veiw of its colour, texture, composition and hardness. These are quarried at number of places around Dhurpada and Keonjhar. A part of dyke to the east of Kaliaprasad village has been estimated to contain 500Cu.m. of dimension stone of block size 0.5mx0.5mx0.5m. Lower shale formations found near village Lunagothani was found to be suitable for decorative purpose. However 1606900Cu.m. of black granite, 18044200Cu.m. of Grey granite and 8379000Cu.m. of Green granite have been reported in the district.

TALC-SOAPSTONE: This is reported from the northern slope of hill ranges immediately south and west of Kendujhargarh and Dalimpur. The talc-schist occurs as gently undulating slabby layers underlying the Kolhan sandstone. The highly foliated talc-schist are traversed by veins of quartz as impurities. Besides these, soapstone occurrence is encountered near Dholkata, Dalangpur, NE of Sayedmulia,

Suramundi, Kuladhamkuni, Sapghosara, Pithagola, Alanga area. These are locally utilized for preparation of stone ware and statues. The MgO content varies from 11.397 to 22%.

PYRITE: Pyrite crystals have been recorded in dark grey shaly formation underlying the Kolhan sandstone west of Balibandha on the Keonjhar-Chainbasa road. The occurrence is of no economic importance.

GLASS SAND: Some of the Kolhan sandstones in the northern portion of the district(near Barangam) is suitable for glass industry.

BUILDING STONE & ROAD MATERIAL: Granite gneisses, aplites, dolerites and quartzite are being used as road metal and in concrete mixtures. Lateritite blocks are extensively used as a very common building material. All these materials are found in plenty.

OTHER MINERALS: A few occurrences of asbestos are encountered near Gopalpur and Ranki. Thin bands of slip fibres were marked in the peridotite body, but the economic aspect of this occurrence appears not to be viable. A patch of travertine limestone is also encountered near Asurkhol area.

The district is the major producer of iron and manganese ore of the state. 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:

Sl No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	85° 11' E to 86° 22' E
	Latitude	Degree	21° 1' N to 22° 10' N
2	Geographical area	Sq.Km.	8303
3	Sub-division	Numbers	3
4	Tahasils	Numbers	13
5	C D Blocks	Numbers	13
6	Municipalities	Numbers	4
7	NACs	Numbers	1
8	Police Stations	Numbers	25

9	Gram Panchayats	Numbers	297
10	Villages	Numbers	2123
	Inhabited	Numbers	2064
	Uninhabited	Numbers	59
11	Assembly constituencies	Numbers	6

b. Area and Population:

The district has an area of 8303 sq. km and 18.02 lakh of population as per 2011 census. The district accounts for 4.09 percent of the states territory and shares 3.03 percent of the state's population. The density population of the district is 217 per sq. kms. as against 270 person per sq. km. of the state.

c. Climate :

The climate condition of the district is generally hot and high humidity during April to May and cold during November to December. The monsoon generally breaks during the month of July, Average annual rainfall of last four years in the district was 1489.69 mm during 2017, which is slightly more than the normal rainfall 1487.7 mm.

d. Agriculture:

During the year 2017-18 the net area sown was 288 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	Sugarcane
Production in 000 MT	598.55	0.58	69.40	7.72	9.90	7.79	2.72	15.23	3.33	23.82	16.78	13.22

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	9185	3701	1725	14611	38.73

Power:

Consumption of electricity in the district during the year 2018-19 covers 136.03 million units and villages so far electrified as on 30.09.2019, 2067 revenue villages which constitute 97.4% to the total revenue villages of the district.

e. Transport & Communication:

Railway route length (14-15) km	158.06
No of Rly stations and PH(14-15)	16
Forest road (17-18) km	249.88
National Highway (16-17) km	341.30
State Highway (17-18) km	52.74
Major district road (17-18) km	34.29
Other dist road (17-18) km	885.98
Rural road(17-18) km	1945.90
Inter village road (16-17) km	3912.49
Intra village road (16-17) km	3143.74

f. Health:

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

No of Hospitals	21 No
Beds facilities	550 No
Homoeopathic dispensaries	48 No
Ayurvedic dispensaries	34 No

Detail of the Allopathic hospitals is as below:

Sl. No	Name of the Institutions	Bed Position	
		Sanctioned Strength	In-position
1	DHH Keonjhar	162	162
2	SDH Anandapur	88	88
3	SDH Champua	72	72
4	CHC Fakirpur	6	6

5	CHC Banspal	16	16
6	CHC Jhumpura	16	16
7	CHC Bhanda	16	16
8	CHC Siankul	16	16
9	CHC Ghatgaon	30	30
10	CHC Harichandanpur	16	16
11	CHC Salania	16	16
12	CHC Basudevpur	6	6
13	CHC Padampur	16	16
14	CHC Patna	16	16
15	CHC Udaypur	6	6
16	CHC Telkoi	16	16
17	CHC Barbil	16	16
18	CHC Joda	6	6
19	CHC Kesudurapal	6	6
20	CHC Bhagamunda	6	6
21	Urban PHC Keonjhar	2	2
		Total-	550

g. Tourist places:

Kushaleswar Temple, Kanjipani Ghati, Keshari Kunda, Murga Mahadev Temple, Gonasika Temple, Hadagada Reservoir, Handibhanaga, Ghagra & Gundichaghagi waterfalls are the tourist spots of the district.

h. Forest areas:

Category of forest	Area in sq km
Reserve Forest	1888.9
Protected Reserve Forest	150.00
Demarcated Forest	235.53
Village Forest (Notified)	30.79
Unclassified Forest	0.29
DLC Area	374.67
Total	**2680.18**

i. Education:

Primary School (2017-18)	No. of Schools	1779
	Enrolment (No)	187984
	Pupil Teacher Ratio	24.37
Upper Primary School 2017-18	No. of Schools	1040
	Enrolment (No)	100645
	Pupil Teacher Ratio	21.01
Gerneral College 2017-18	Junior	54
	Degree	34
Secondary School	No. of Schools	520
	Enrolment (No)	53393
	Pupil Teacher Ratio	20.93
Literacy Rate, 2011	Male	78.1
	Female	58.3
	Total	68.2

j. Culture & Heritage:

Keonjhar district is very much rich in its fairs and festivals like Sarhul, Sohrai, Karmapuja, Bodam, Chaitra parab or Uda parab, Makara sankranti, Nuakhai, Raja parab, Baruni jatra, Ratha jatra, Sivaratri etc. Famous folk dances are CHANGU, CHHAU, JUANG, HO etc.

4. GEOLOGY

The district can be broadly divided into seven geological units viz.: (i) The patchy occurrences of metamorphites belonging to older metamorphics of Archaean age (ii) Huge batholiths of Singhbhum Granite with swarms of newer dolerites dykes in the eastern part of the district, (iii) Metasedimentaries belonging to Gorumahisani Group of rocks of Archean age in the southwestern part of the district (iv) Volcano-sedimentary sequence intruded by Bonai granite belonging to Lower Bonai group of age ranging between Archean and Paleo Proterozoic in the southwest and on the north-west (v) Intrusives like chromiferous ultramafics, gabbro-anorthosite, dolerite and quartz veins of Archaean to Proterozoic age (vi) Sedimentaries and metasedimentaries belonging to Kolhan Group ranging in age from lower to middle Proterozoic (vii) Lateries of Cenozoic age and (viii)

Quaternaries represented by Kaimundi formation and un classified alluvium.

The Singhbhum granite shows wide variation from highly foliated biotite-epidote granodiorite to grayish white medium grained weakly foliated to nearly massive muscovite-biotite granodiorite. It contains enclaves of older metamorphics represented by hornblende schist, chlorite schist and meta gabbros. Gorumahisani Group consists of sheared pebbly quartzite, hornblende schist and BHQ. The Volcano-sedimentary rocks of lower Bonai Group comprises Basic Volcanic, BHQ, BHJ, ferruginous shale, quartzite, iron ore bodies and tuff with or without manganese. The chromiferous ultra-basics of Nuasahi and the mafic-ultramafic complex of Baula are rich in Cr-Fe-Ni and is probable locale for PGE. This is followed by late magmatic gabbro-anorthosite suite of rocks. The dolerite and gabbro occur as the younger intrusive. The Kolhan Group of rocks comprises conglomerate, sandstone, shale and quartzite. The insitu laterites are wide spread in the area. The Quaternaries are represented by Kaimundi formation consisting of sandy sticky clay impregnated with caliche and unclassified Quaternaries represented by black to brown clay and coarse to fine sand.

STRATIGRAPHY:

The geological succession in the district is as follows:

Age	**Formation/Group**	**Lithology**
Holocene		Alluvium
Late Pleistocene to Early Holocene	Kaimundi Formation	Clay with Calcareous concentration
Cainozoic		Laterite and lateritic bauxite (Lbx)
Palaeo to Meso Proterozoic	Kolhan Group	Conglomerate, sandstone and shale

Palaeo Proterozoic		Dangoaposi lava
Proterozoic (Undifferentiated)		Granophyre/ gabbro/anorthosite
Archaean to Proterozoic		Newer Ddolerite
		Ultramafic rocks+Chromite
Archaean to Palaeo Proterozoic	Lower Bonai Group	Basalt, tuff, meta gabbro
		Granite
		Shale, tuff and manganese
		BHQ, BHJ, ferruginous shale and quartzite
		Gritty sandstone, orthoquartzite, conglomerate
Archaean	Gorumahishani Group	Hornblende schist, chlorite schist, amphibolite and meta-gabbro
		Quartzite, quartz sericite schist, cherty quartzite, fuchsite quartzite and black chert
		Quartzite, chert
		BHQ, BMQ, BCQ, BJQ
		Ferrugineous shale, carbonaceous shale phyllite and mica schist
		Pebbly quartzite, gritty quartzite and quartzite
	Older Metamorphic Group	Singhbhum granite/ Hornblende Granite
		Pellitic schist, quartzite and amphibolite

5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like Baitarani, Kangira, Ardei, Khairibandhan, Kanjhari, Sita, Kusei, Salandi etc. 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) (Total length)
1	2	3	4	5
1	Baitarani	Gonasika	Longitude- 21^0-31'-00" N Longitude- 85^0-33'-00"E	240Km upto Anandapur
2	Kangira	Haladi Pokhari		40Km
3	Ardei	Sidha Matha	Longitude- 22^0-009'-00" N Longitude- 85^0-68'-00"E	72.40Km
4	Khairibandhan	Smimlipal R.F.	Longitude- 21^0-924'-00" N Longitude- 85^0-794'-00"E	152Km
5	Deo	Sidha Matha	Longitude- 21^0-804'-00" N Longitude- 85^0-826'-00"E	80Km
6	Kanjhari	Kanjharibani Pira	Longitude- 21^0-685'-00" N Longitude- 85^0-851'-00"E	60Km
7	Sita	Barabanki Hill	Longitude- 21^0-497'-00" N Longitude- 86^0-017'-00"E	26Km
8	Musal	Rebana R.F.	Longitude- 21^0-32'-00" N Longitude- 86^0-066'-00"E	60Km
9	Kusei	R. Bera R.F.	Longitude- 21^0-139'-00" N Longitude- 86^0-178'-00"E	80Km
10	Salandi	Banjhi Kusaghat R.F.	Longitude- 20^0-79'-00" N Longitude- 86^0-678'-00"E	144Km
11	Bhirol		Longitude- 21^0-606'-00" N Longitude- 85^0-945'-00"E	
12	Mermenda		Longitude- 21^0-958'-00" N Longitude- 85^0-775'-00"E	

6. LANDUSE PATTERN

Sl No	Landuse	Area in '000Ha
1	Forest Area	309
2	Misc. trees & Grooves	6
3	Permanent Pasture	20
4	Culturable Waste	26
5	Land put to Non Agril Use	70
6	Barren & Unculturable Land	93

7	Current Fallow	10
8	Other Fallow	0
9	Net Area Sown	288
10	Mining	7
	Geographical Area	830

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	4.0	0.60	1.48	0.3
Maximum	10.4	5.09	7.01	13.1

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 41.8^{0}C in the summer and up to 6.4^0 C during peak winter.

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

YEAR/ MONTH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	TOTAL
2015	64.40	52.92	197.56	319.21	167.32	114.26	27.14	0.16	22.71	20.72	14.58	8.52	1009.5
2016	2.34	137.14	145.02	270.37	348.52	166.20	58.26	4.03	0.00	1.69	53.95	23.71	1211.23
2017	15.13	117.45	162.00	320.52	230.52	161.25	160.06	24.98	0.09	0.92	0.0	35.42	1228.34
2018	133.26	95.75	185.79	360.55	375.08	351.53	113.38	0.25	49.55	0.0	0.0	0.83	1665.97
2019	59.64	116.61	143.27	232.23	327.32	353.60	161.64	-	-	-	55.20	40.18	1489.69

9. DETAILS OF MINING LEASES

Attached as Annexure I

10. DETAILS OF ROYALTY COLLECTED

Year-wise Calculation of Royalty (Rs)

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	**Ghasipura**	0	235518	240408	229320
2	**Hatadihi**	125864	144407	145563	0
	TOTAL	**125864**	**379925**	**385971**	**229320**

11. DETAILS OF PRODUCTION OF MINOR MINERAL

Yearwise Production of Laterite in cum

Sl.No	Name of Tahasil	2015-16	2016-17	2017-18	2018-19
1	**Ghasipura**	0	2081	2061	1272
2	**Hatadihi**	623	623	623	623
TOTAL		**623**	**2704**	**2684**	**1895**

12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

Attached as Annexure II.

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral reserve of laterite slab is 3,50,449 cum which may increase after detail investigation.

Details of the potential areas submitted as Annexure III.

15. QUALITY/GRADE OF MINERAL

Due to less content of Alumina, the laterite slabs of the district is suitable for construction of walls related boundary or houses after manual sizing of the slabs.

16. USE OF MINERAL

Laterite of the district is used mainly for construction of walls related to boundary or houses after manual sizing of the slabs.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand is to the tune of 50,000 cum of laterite slabs and is mainly supplied from different tahasils of the district and adjoining districts of Mayurbhanj and Dhenknal.

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

Eco-sensitive Zone has been identified around Hadagarh Wildlife Sanctuary and submitted to the Ministry of Environment & Forests and Climate Change, Govt. of India, New Delhi through Govt. of Odisha, Forest & Environment Department for final Notification which is being awaited. In absence of Notification of Eco-sensitive Zone as per Hon'ble Supreme Court of India direction the 10 km. radius from boundary of Hadagarh Wildlife Sanctuary is being treated as Eco-sensitive Zone.

Further, as per direction of the Hon'ble Supreme Court of India, no mining and quarry activities will be allowed within 1 km. radius of Hadagarh Wildlife Sanctuary.

Besides, there are two proposed Elephant Corridors in the district. These are-

1. Karo-Karmpada in Barbil Range, Length- 17.3 sq. kms.
2. Telkoi-Pallahara in Telkoi Range, Length- 13.24 sq. kms.

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 machines, 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 actives 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 it's 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:

- 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, if any 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, if required.
- Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off in case of big quarries.
- The mined out pits can 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, if required.
- Domestic sewage from site office & urinals/latrines, if any 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.
- 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 are to be undertaken for big QL areas to assess efficacy of adopted control measures.

Biological Environment

- Development of green belt/gap filling saplings in the safety barrier left around the quarry area/ cluster area, if the safety zone areas are barren.
- Carrying out thick greenbelt with local flora species predominantly with long canopy laves 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 retaning 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.

Details of occupational health issues in the district since last 5 years.

Incidence of Patients of Tuberculosis.

Year	Total TB Cases Notified
2015	2764
2016	3038
2017	2765
2018	2701
April 2019 to September,2019	1609

There is no case of Silicosis found in the district 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.

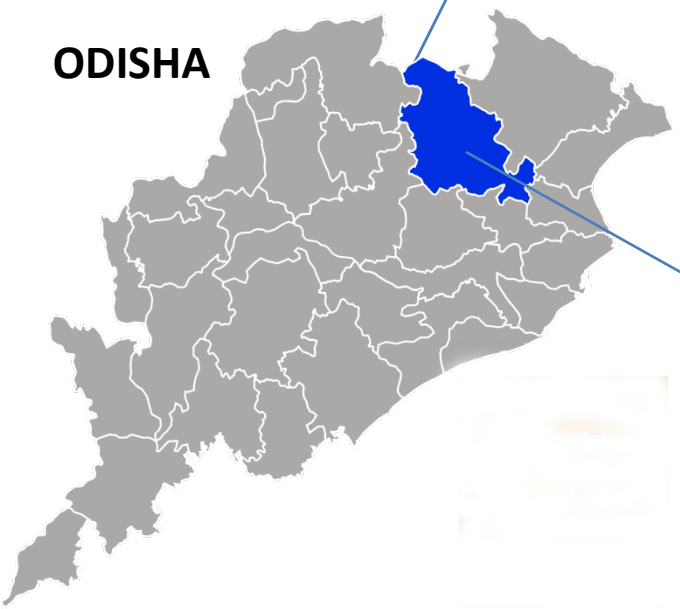
27. ANY OTHER INFORMATION

Nil.

PLATE NO- 1

INDEX MAP

ODISHA



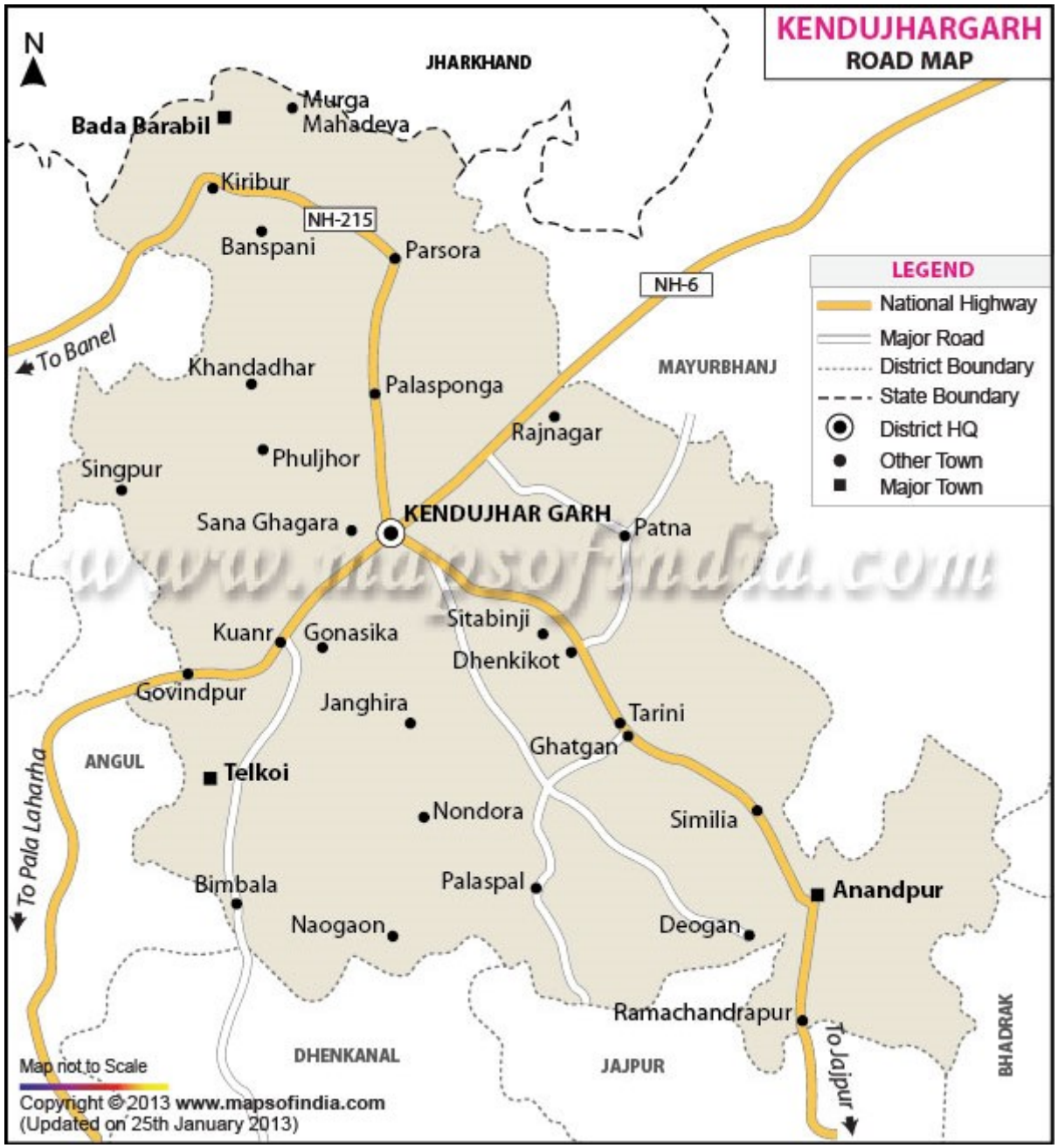
KEONJHAR

PLATE NO- 2

MAP SHOWING THE TAHASILS OF KEONJHAR DISTRICT

PLATE NO- 3

MAP SHOWING THE MAJOR ROADS OF KEONJHAR DISTRICT



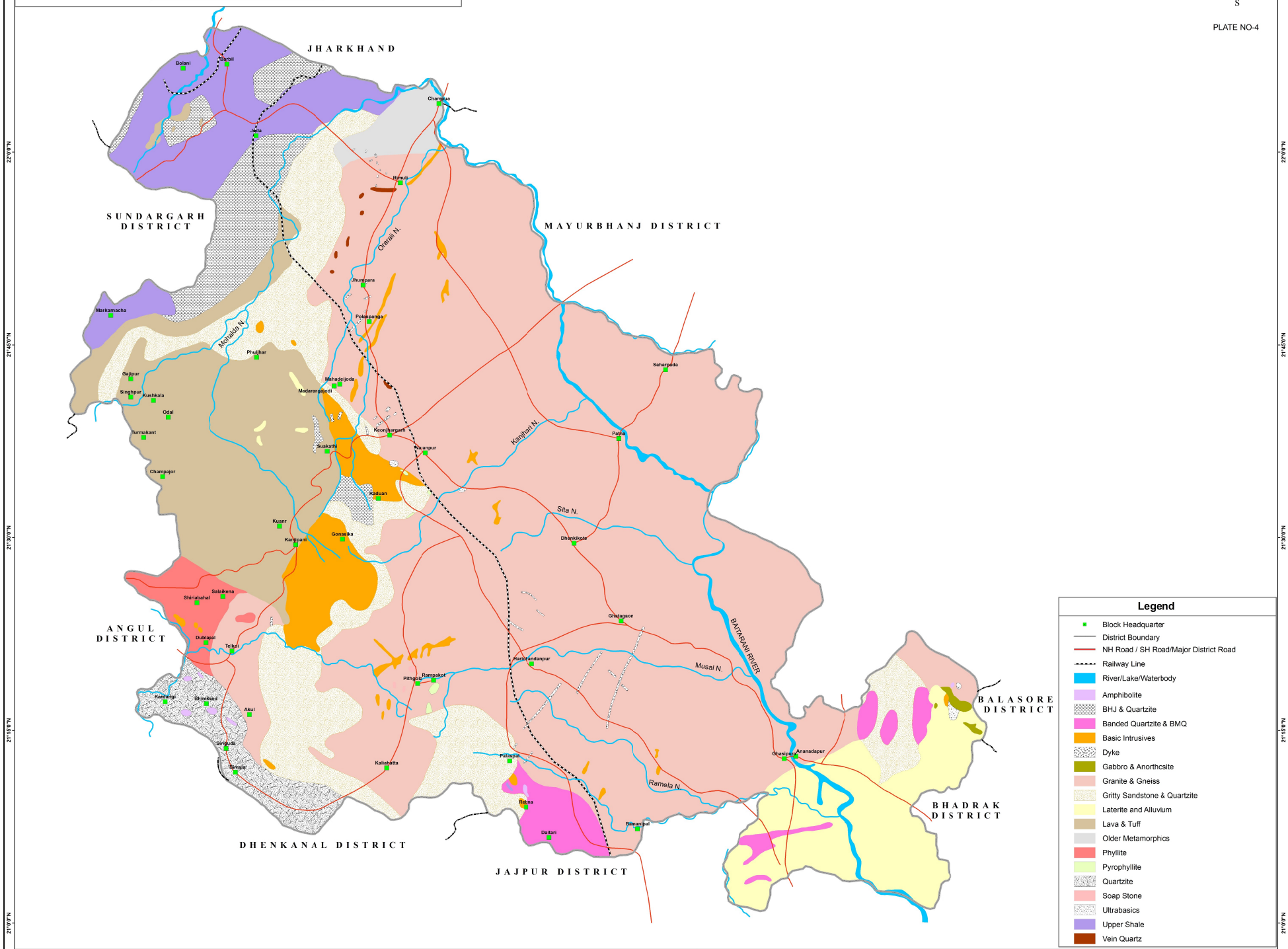
MINERAL MAP OF KEONJHAR DISTRICT

SCALE :- 1:180,000

Kilometers

0 2.5 5 10 15 20 25

PLATE NO-4



Legend

- Block Headquarter
- District Boundary
- NH Road / SH Road/Major District Road
- Railway Line
- River/Lake/Waterbody
- Amphibolite
- BHJ & Quartzite
- Banded Quartzite & BMQ
- Basic Intrusives
- Dyke
- Gabbro & Anorthcsite
- Granite & Gneiss
- Gritty Sandstone & Quartzite
- Laterite and Alluvium
- Lava & Tuff
- Older Metamorphics
- Phyllite
- Pyrophyllite
- Quartzite
- Soap Stone
- Ultrabasics
- Upper Shale
- Vein Quartz

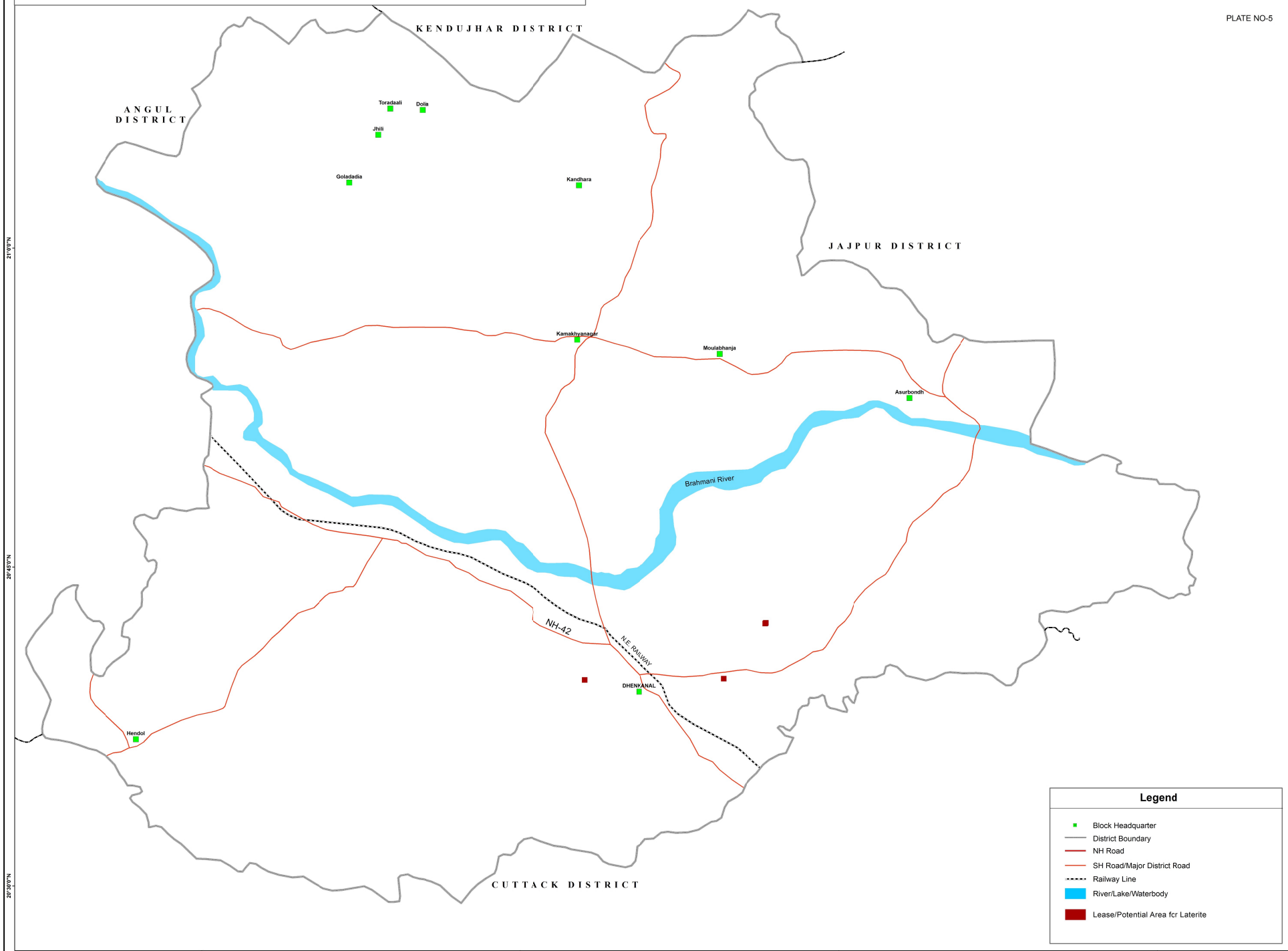
LEASE/POTENTIAL MAP OF LATERITE IN DHENKANAL DISTRICT

SCALE :- 1:110,000

Kilometers

0 2.5 5 10 15 20 25

PLATE NO-5



ANNEXURE I

LATERITE SAIRATS ALREADY LEASED OUT AND EXECUTED IN THE DISTRICT

Sl No.	Name of Tahasil	Name of Minor Mineral	Name of village	Name of lessee	Address & contact No of lessee	Mining lease grant order No & date	Period of QL		Date of commencement of minig operation	Status (working/ non-working	Captive or Non-captive	Lt No & date of grant of EC	Location of Resource (Khata & Plot No)	Latitude			Longitude			Method of mining	Area leased for mineral concession (in sq m)	Mineable mineral potential as per approved mining plan (in cum)
							From	To						Degree	Minute	Second	Degree	Minute	Second			
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*
1	Ghasipura	Dantia LT Quarry	Dantia	Rajendra Swain	At/P.O-Dantia Dist-Keonjhar 7894372595	Dt. 26.07.2016	2015-16	2019-20	Dt.26.07.2016	working	Noncaptive	3359/ 20.05.2016 DEIAA	DANITA K-141 P-15	21	6	47.9	86	4	34.9	OC	Ac.0.70	9915.014
2	Ghasipura	Madanpur LT quarry	Madanpur	Sudhansu Malik	At/P.O.-Dantia Dist-Keonjhar 9777641998	25.02.2016	2015-16	2019-20	25.02.2016	working	Noncaptive	701/ 30.01.2016 SEIAA	MADANPUR K-756 P-3364	21	7	263	86	5	54.0	OC	Ac.3.22	45609.07
3	Ghasipura	Jenapada LT Quarry	Jenapada	Suni Rout	At/P.o Nuagaon Dist-Keonjhar 9668384304	01.03.2016	2015-16	2019-20	01.03.2016	Non working	Noncaptive	244/ 4.01.2016 SEIAA	JENAPADA K-51 P-8	21	6	17.06	86	5	31.3	OC	Ac.12.35	174929.2
4	Hatadihi	Sangam Lt. Stone Quarry	Sangam, L.D. Date: 25.07.15	Taranisen Mallick	At/Po-Baranga	888/ Touzi, Dt. 11.3.15	2015-16	2019-20	25.07.15	Working	Noncaptive	3577/S EIAA, Dt. 04.07.2015	Khata N0-345 Plot N0-1548/2001	21	13	37.79	86	17	13.06	OC	Ac.0.95	3115

ANNEXURE II

LATERITE STONE SOURCES ALREADY AUCTIONED BUT NOT EXECUTED (LOI ISSUED) IN THE DISTRICT

Sl. No.	Name of Tahasil	Name of village	Name of Minor Mineral	Name of the Successful auction holder	Address & Contact No of Letter of Intent Holder	Letter of Intent Grant Order No. & date	Validity of LoI	Use (Captive/ Non-Captive)	Location of the Source recommended for mineral concession (Khata & Plot No)	Latitude			Longitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
										Degree	Minute	Second	Degree	Minute	Second		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
1	Hatadihi	Dhenka	Dhenka Lt. Stone Quarry Hc. 1.49	Baidhar Pahi	At/Po-Hatadihi	3225/ Dt. 27.9.16	2015-16 to 2019-20	N.C.	Khata No-484 Plot No-389, 390, 391,392	21	13	12.40	86	17	08.90	14900	33600

ANNEXURE III

POTENTIAL OF LATERITE IN THE DISTRICT

Sl. No.	Name of Tahasil	Name of village	Status	Name of Minor Mineral	Location of the Source (Khata & Plot No)	Latitude			Longitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
						Degree	Minute	Second	Degree	Minute	Second		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	Hatadihi	Sangam	Running	Sangam Lt. Stone Quarry	Khata N0-345 Plot N0-1548/2001	21	13	37.79	86	17	13.06	3844.60	13456.09
2	Hatadihi	Dhenka	LOI Issued	Dhenka Lt. Stone Quarry Hc. 1.49	Khata No-484 Plot No-389, 390, 391,392	21	13	12.40	86	17	08.90	14900	52150
3	Ghasipura	Dantia	Running	Dantia LT Quarry	DANITA K-141 P-15	21	6	47.9	86	4	34.9	2832.86	9915.014
4	Ghasipura	Madanpur	Running	Madanpur LT quarry	MADANPUR K-756 P-3364	21	7	263	86	5	54.0	13031.16	45609.07
5	Ghasipura	Jenapada	Running	Jenapada LT Quarry	JENAPADA K-51 P-8	21	6	17.06	86	5	31.3	49979.77	174929.2
6	Ghasipura	Patilo	Exiting / Not operational	Patilo LT Quarry	Patilo K- 190 P-1551,1563	-	-	-	-	-	-	12950.22	54390

DISTRICT SURVEY REPORT (DSR)

The District Survey Report for Laterite Slab (Minor Mineral) in respect of Keonjhar District in accordance with Appendix-X, Para-7 (iii) (a) of S.O. No.3611(E), dtd.25.07.2018 of Ministry of Environment, Forest and Climate Change, New Delhi is hereby approved for final publication.

Sub-Collector, Sadar,
Member Secretary,
DEIAA, Keonjhar

Dr. Banabehari Mishra,
Expert Member,
DEIAA, Keonjhar

DFO, Keonjhar,
Member,
DIEAA, Keonjhar

Collector & District Magistrate,
Chair Person,
DEIAA, Keonjhar