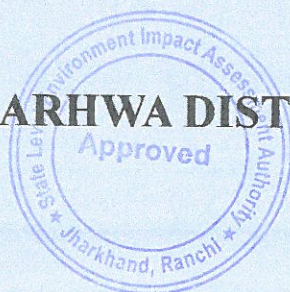


DISTRICT SURVEY REPORT
FOR
MINOR MINERAL
[OTHER THAN SAND MINING OR RIVER-BED MINING]
IN
GARHWA DISTRICT OF JHARKHAND STATE






CERTIFICATE

The District Survey Report (DSR) for Minor mineral (Stone) other than Sand Mining or River-bed Mining in Garhwa District of Jharkhand State has been prepared by sub-divisional committee of Garhwa district administration.

District Survey Report for Minor mineral (Stone) other than Sand Mining or River-bed Mining in Garhwa District is prepared under;

- MoEF & CC, GoI Notification No. - S.O. 3611 (E) dated 25/07/2018.

The information mentioned in the District Survey Report for Minor mineral (Stone) other than Sand Mining or River-bed Mining in Garhwa District of Jharkhand State are correct to the best of our knowledge.


18.10.2023

Authorized Signatory



District Survey Report for Minor Minerals other than Sand Mining or River-bed Mining for Garhwa District, Jharkhand.



The Deputy Commissioner through its letter 575/M, Garhwa, dated 06/05/2023 had constituted the sub-divisional committee to prepare the District Survey Report. List of the members of the sub-divisional Committee is shown below:

क्र.स.	पदाधिकारी	हस्ताक्षर
1	अनुमंडल पदाधिकारी गढ़वा ।	
2	कार्यपालक अभियंता, लघु सिंचाई विभाग, गढ़वा।	
3	क्षेत्रीय पदाधिकारी J.S.P.C.B राँची।	
4	वनो के क्षेत्र पदाधिकारी, प्रक्षेत्र गढ़वा ।	
5	सहायक निदेशक, भूतत्व, जिला भूतात्विक कार्यालय, मेदिनीनगर पलामू।	
6	जिला खनन पदाधिकारी, गढ़वा ।	

Approved by,



Deputy Commissioner
Garhwa

29/10/2023
Member
State Level Environment Impact
Assessment Authority, Jharkhand

SEIAA, Jharkhand

Member Secretary
State Level Environment
Impact Assessment Authority
Jharkhand

Chairman
State Level Environment Impact
Assessment Authority, Jharkhand



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1 PREFACE

The need for District Survey Report (DSR) have been necessitated by Ministry of Environment, Forest and Climate Change (MoEF & CC) vide their Notification No. - 125 (Extraordinary, Part II Section 3, Sub-section ii), S.O. - 141 (E), dated 15th January 2016. The notification was addressed to bring certain amendments with respect to the EIA notification 2006 and in order to have a better control over the legislation, District level committees have been introduced in the system. As a part of this notification, preparation of District Survey Report has been emphasized. Subsequently, MoEF & CC has published Notification No. - 3611 (E), dated 25th July 2018 regarding inclusion of the format of District Survey Report (DSR) for "Minor minerals other than Sand Mining or River-bed Mining". This DSR has been prepared in conformity with the Notification No. - S.O. - 141 (E), S.O. - 3611 (E) and other Sand mining guidelines published by MoEF & CC time to time.

The main purpose of DSR is to identify the mineral potential areas to develop the mining activities along with relevant current geological data of the district where mining can be allowed; and also, to distinguish the areas where mining will not be allowed due to proximity to infrastructural structures and installations. The District Survey Report shall guide for systematic and scientific utilization of natural resources, so that present and future generation may be benefitted at large.

The occurrence of Minor minerals in the district have been established by Department of Mines and Geology, Government of Jharkhand and others in previous instances. It requires further systematic and scientific approach to quantify the resource along with their grade assessment. This report also recommends to undertake detailed exploration program to assess the Minor mineral occurrences in the district and should have a proper development and production plan for the specified minerals so as to satisfy the demand and supply gap of Minor minerals in the district.





2 INTRODUCTION

The District Survey Report of Garhwa District has been prepared as per the guide line of Ministry of Environment, Forests & Climate Change (MoEF & CC), Government of India vide Notification S.O.-1533(E) dated 14th Sept, 2006 and subsequent MoEF & CC Notification S.O. 141(E) dated 15th Jan, 2016. This report shall guide systematic and scientific utilization of natural resources, so that present and future generation may be benefitted at large. Further, MoEF & CC published a notification S.O. 3611(E) Dated 25th July, 2018 and recommended the format for District Survey Report Report for Minor minerals other than Sand Mining or River-bed Mining.

The objectives of the District Survey Report are as following:

1. Identification and Quantification of mineral resource and its optimal utilization.
2. To regulate the Minor mineral's mining in the Country, identification of site-specific end-use consumers and reduction in demand & supply gaps.
3. Use of information technology (IT) & latest scientific method of mining for surveillance of the Minor mineral's mining at each step.
4. District Survey Report shall enable Environmental Clearance for cluster of Minor minerals. Its hall assists concerned Department during post environmental clearance monitoring.
5. To control the instance of illegal mining.
6. To maintain the livelihood of nearby village's peoples.
7. To keep accumulated data records viz. Details of Mineral Resource, Potential area, Lease, Approved Mining Plan, Co-ordinates of a District at one place.
8. To maintain the records of Royalty/Revenue generation.
9. A concise guideline can be framed considering the point discussed in the DSR for Minor mineral's mining in the district.

The District Survey report (DSR) is comprised of secondary data published and endorsed by various departments and websites about geology of the area, mineral resources, climate, topography, land form, forest, rivers, soil, agriculture, road, transportation, irrigation etc. Data on lease and mining activities in the district, revenue etc. is collected and collated from concerned District Mining Office.



2.1 Statutory Framework

Evolution of the Environmental Regulatory Framework:

The below table has mentioned the requirement of District Survey Report and its year wise modification;

Table 2-1: Requirement of District Survey Report & its year wise modification of Guidelines

Year	Particulars
1994	The Ministry of Environment, Forest & Climate Change (MoEF & CC) published Environmental Impact Assessment Notification 1994 which is only applicable for the Major minerals having mining lease area more than 5 Ha.
2006	In order to cover the minor minerals also into the preview of EIA, the MoEF & CC issued EIA Notification SO 1533 (E), dated 14th September 2006, made mandatory to obtain environmental clearance for both Major & Minor Mineral more than 5 Ha.
2012	Further, Hon'ble Supreme Court wide order dated the 27th February, 2012 in I.A. No.12- 13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc., ordered that "leases of minor minerals including their renewal for an area of less than five hectares be granted by the States/Union Territories only after getting environmental clearance from MoEF"; and Hon'ble National Green Tribunal, order dated the 13th January, 2015 in the matter regarding sand mining has directed for making a policy on environmental clearance for mining leases in cluster for minor Minerals.
2016	The MoEF & CC in compliance of above Hon'ble Supreme Court's and NGT's order has prepared "Sustainable Sand Mining Guidelines (SSMG), 2016" in consultation with State Governments, detailing the provisions on Environmental Clearance (EC) for cluster, creation of District Environment Impact Assessment Authority, preparation of District Survey Report and for proper monitoring of minor mineral. Thereby issued notification dated 15.01.2016 for making certain amendments in the EIA Notification, 2006, and made mandatory to obtain EC for all minor minerals. Provisions have been made for the preparation of District Survey Report (DSR) of River-bed material and other minor minerals



Year	Particulars
2018	MoEF & CC published a notification S.O. - 3611(E) Dated 25th July 2018 and recommended the format for District Survey Report for Minor minerals other than Sand mining or River-bed mining. The notification stated about the objective of DSR, i.e. "identification of the mineral potential areas to develop the mining activities along with relevant current geological data of the District where mining can be allowed; and also to distinguish the areas where mining will not be allowed due to proximity to infrastructural structures and installations.

The Ministry of Environment Forest & Climate Change formulated the format of District Survey Report for Minor minerals other than Sand Mining or River-bed Mining which focuses on the management of Minor mineral's mining in the country. But in the recent past, it has been observed that apart from management and systematic mining practices there is an urgent need to have a guideline for effective enforcement of regulatory provision and their monitoring. Section 23 C of MMDR 1957 empowered the State Government to make rules for preventing illegal mining, transportation and storage of minerals but in the recent past, it has been observed that there was large number of illegal mining cases in the Country and in some cases, many of the officers lost their lives while executing their duties for curbing illegal mining incidence. The illegal and uncontrolled illegal mining leads to loss of revenue to the State and degradation of the environment.

2.2 Methodology of DSR Preparation

The data related to district profile, geology, mineralization, and mining activity are sketchy and disjointed. There are multiple data sources, which are in the public domain, as well as in Government website. To prepare District Survey Report, need to collate all the available databases on these iron regards. A comprehensive and a meaningful interpretable database created, which would be necessary to demonstrate the district overview. Workflow for the DSR job is as follows.





Data source Identification: District Survey Report has been prepared based on the primary data base and secondary data base collated from different sources. This is very critical to identify authentic data sources before collating the data set. The secondary data sources which are used in DSR are mostly based on Government published data or the published report in reputed journal. District profile has been prepared based on the District Census 2011. Potential mineral resources have been described based on GSI or any other Govt. agencies work done. Mining lease details and the revenue generated from Minor minerals has been prepared based on available data from District Mining Office of the district. Satellite image has been used for map preparation related to physiography and land utilization pattern of the district.

Data Analysis and Map Preparation: Dataset which are captured during the report preparation are gone through detail analysis work. District Survey Report involves the analytical implication of captured dataset to prepare relevant maps. Methodology adopted for preparation of relevant maps is explained below.

Land Use and Land Cover Map: Land Use and Land Cover classification is a complex process and requires consideration of many factors. The major steps of image classification may include determination of a suitable classification system via Visual Image Interpretation, selection of training samples, Satellite image (FCC-False Colour Composition) pre-processing, selection of suitable classification approaches, post-classification processing, and accuracy assessment.

Here LISS-III satellite Imagery has been taken for Supervised Classification as supervised classification can be much more accurate than unsupervised classification, but depends heavily on the training sites, the skill of the individual processing the image, and the spectral distinctness of the classes in broader scale.

According to the Visual Image Interpretation (Tone, Texture, Colour etc.) training set of the pixel has been taken.





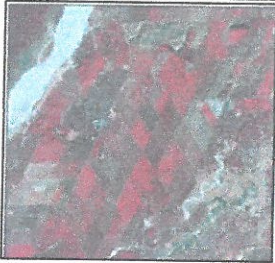
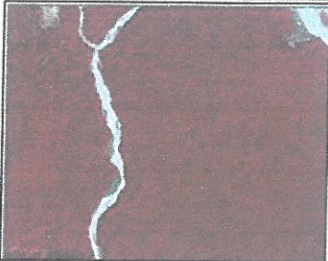

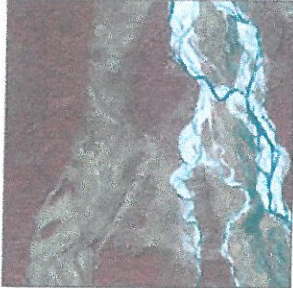

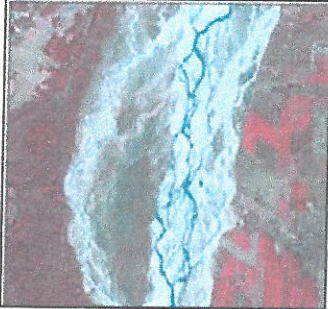
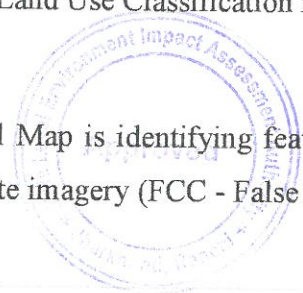
	
<p>Agricultural Land - Based on their Geometrical shape, Red and Pink colour tone, Agricultural Land has been identified.</p>	<p>Vegetation Covered Area - Based on their continuous Red colour tone, Vegetation Covered Area has been identified.</p>
	
<p>Agricultural Fallow Land - Based on their Geometrical shape, Light and dark cyan with light pink colour tone, Agricultural Land has been identified.</p>	<p>Bad Land Topography- Light Yellowish mixed with cyan colour has been identified as Bad Land Topography.</p>
	
<p>Settlement – Area with Cyan Colour including geometrical shape has been recognised as Settlement Area.</p>	<p>Water Bodies – Dark blue colour has been classified as Water Bodies.</p>

Figure 2-1:- Pictorial description of Land Use Classification methods

Geomorphological Map:

The major steps of preparing Geomorphological Map is identifying features like – Alluvial Fan, Alluvial Plain, Hilly region etc. from Satellite imagery (FCC - False Color Composition)



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via Visual Image Interpretation and then digitization has been taken into the consideration to prepare map including all the Geomorphological features according to their location.

Physiographical Map:

The major step of preparing Physiographical Map is generating contour at a specific interval to show the elevation of the area using Cartosat DEM.

Block Map:

- Raw Data collected from **National Informatics Centre (NIC Website)**.
- Data has been geo-referenced using GIS software.
- Digitization of block boundary, district boundary, state boundary and district headquarter, sub –district headquarter, places, road, railway, river, nala etc.
- Road name, River name, Railway name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Transportation Map:

- Raw Data collected from **National Informatics Centre (NIC Website)**.
- Data has been geo-referenced using GIS software.
- Digitization of block boundary, district boundary, state boundary and district headquarter, sub –district headquarter, places, road, railway, river, nala etc.
- Road name, River name, Railway name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Drainage Map:

- Raw Data collected from **National Informatics Centre (NIC Website)**.
- Data has been geo-referenced using GIS software.
- Digitization of block boundary, district boundary, state boundary and district headquarter, sub –district headquarter, places, road, railway, river, nala etc.
- Road name, River name, Railway name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Seismic Map:

- Raw data collected from **Ministry of Earth Science**.
- Data has been geo-referenced using GIS software.



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- Digitization of Earthquake zone and superimposed it over Block Boundary.
- Zone name has been filled in attribute table of the Layers
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Soil Map:

- Raw data collected from **National bureau of soil survey and land use planning.**
- Data has been geo-referenced using GIS software.
- Digitization of Soil classification zone and superimposed it over District Boundary.
- Soil classification has been filled in attribute table of the Layers.
- Final layout has been prepared by giving scale, legend, north arrow, etc.

Wildlife Sanctuary and National Park location Map:

- Raw data collected from **ENVIS Centre on Wildlife & Protected Areas.**
- Data has been geo-referenced using GIS software.
- Digitization of Wildlife Sanctuary & National Park and superimposed it over Block Boundary.
- Wildlife Sanctuary & National Park name has been filled in attribute table of the Layers

Final layout has been prepared by giving scale, legend, north arrow, etc.

Primary Data Collection: Although, field data collection is an integral part of DSR preparation. This report has been prepared with the holistic approach and data provided by District Mining Office. The DSR with all updated data has been prepared.

Report Preparation: District Survey Report has been prepared to fulfil the purpose of identification of mining area for Minor mineral and their impact on environment. Report provides details of the mineral potential zones. Assessing mining prospect with respect to minor minerals, List of Letter of Intent (LOI) incorporated in this report. Report also provides the socio environmental study for establishing mines of Minor minerals in the district.





3 OVERVIEW OF MINING ACTIVITY IN THE DISTRICT

The State stretches over 79,714 km² geographical areas with 29.61% forest area and owns about 40% of total mineral resources of India. The State occupies 1st position in coal reserves, 2nd position in Iron, 3rd position in copper ore reserve and 7th position in Bauxite reserve and is the sole producer of prime coking coal. Limestone, Dolomite, Manganese, Mica, China Clay, Graphite, Soap stone, Fire Clay, Coal Bed Methane, Uranium, Phosphorite, Apatite, Quartz, Feldspar, Gold and Pyroxenite are the other important minerals available in huge quantities in State.

The district is surrounded by river Sone in the north; Palamau district and area of Chhattisgarh in the south; Palamau district in the east and Sarguja district of Chhattisgarh and Sonebhadra district of U.P. in the west. Garhwa district is a part of Palamau Commissionery consisting of 20 blocks and three subdivisions namely Garhwa, Ranka & Nagar-Untari.

The main mineral resources found in Garhwa district are Coal, Limestone, Graphite, Dolomite, building & road construction Stones, China Clay, Granite, Phosphite (Potassium (K) rich Shale), Soil/Clay etc. The mining in these leases is regulated as per different mineral concession rules of Jharkhand. At present, 07 leases of Stone are operational in the Garhwa district.

Table 3-1:- Minor mineral's Leases in Garhwa District

Sl. No.	Name of Mineral	Total No. of Leases in Garhwa District
1	Stone	Working Leases - 07

Presently, there are no working/running mining leases of major mineral.



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4.2 Administrative Setup of District

Garhwa district has 3 Subdivisions (Garhwa, Ranka & Nagar Untari). There are 20 blocks in Garhwa district. There are 189 Gram Panchayats and 915 revenue villages in this district. Garhwa Sadar, Meral, Ramna, Banshidhar-Nagar, Bhawanathpur, Bardiha, Bhandaria, Chinia, Ranka, Ramkanda, Dhurki, Bishunpura, Manjhiaon, Kandi, Kharaundhi, Danda, Dandai, Bargarh, Ketar & Sagma.

The Deputy Commissioner is the administrative head of the district. Whereas Superintendent of Police heads the Police administration. Judicial Commissioner heads the Judiciary in the district. Sub-divisional Officer is responsible for running the administration of the sub-division under the control and supervision of the Deputy Commissioner. Each Community Development Block is headed by Block Development Officer. The Block Development Officer functions under the direct control and supervision of the sub-divisional officer.

Administrative Setup of Garhwa Includes:

- Collectorate
- Subdivision
- Blocks
- Panchayats



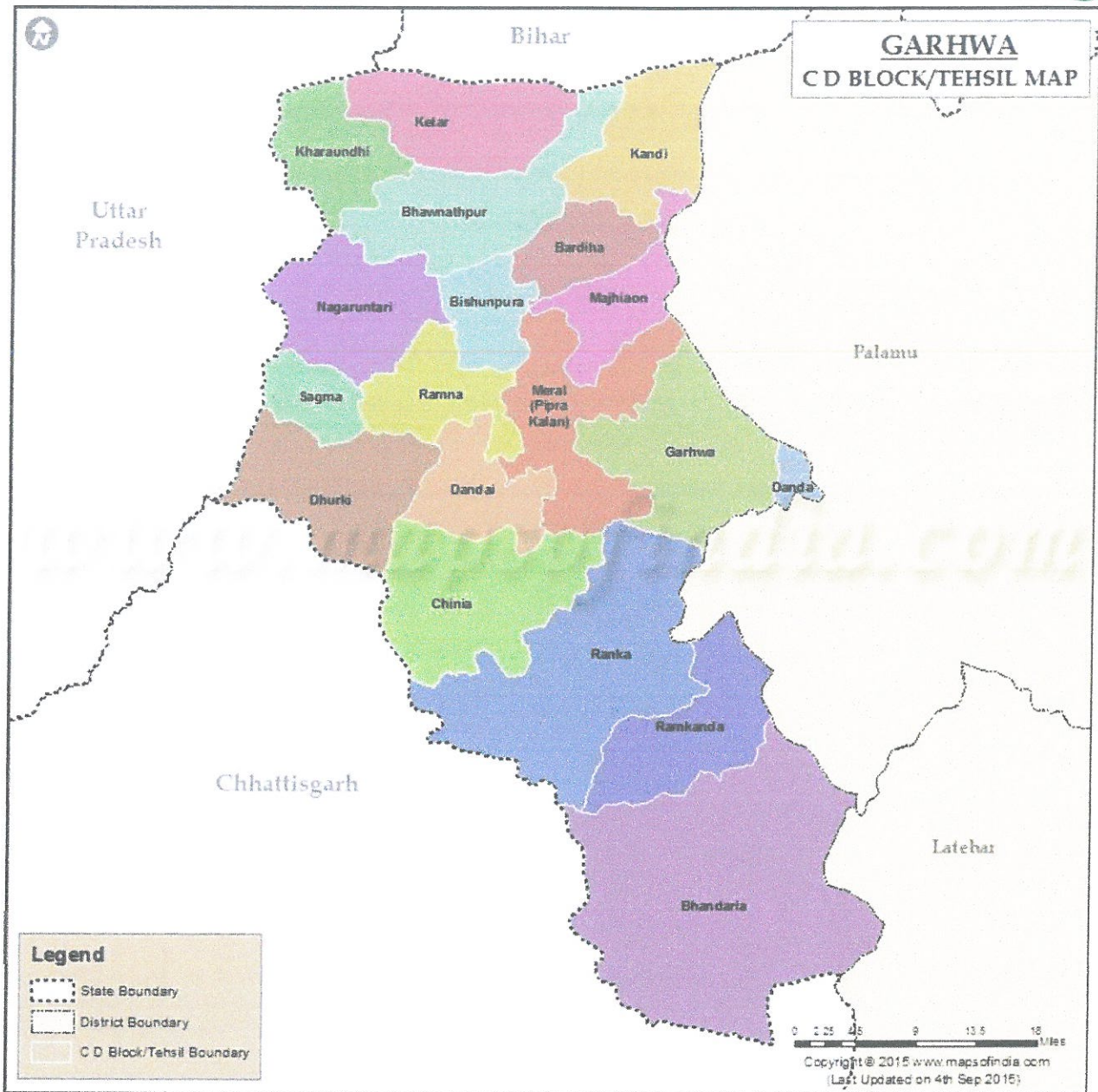


Figure 4-2:- Block map of Garhwa District, Jharkhand

Table 4-1:- Details of Block of Garhwa District

Sl. No.	Block Name	Area in sq.km.
1	Garhwa Sadar	258
2	Meral	272
3	Ramna	121
4	Banshidhar-Nagar	197



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5	Bhawanathpur	249
6	Bardiha	89
7	Bhandaria	693
8	Chinia	281
9	Ranka	448
10	Ramkanda	217
11	Dhurki	234
12	Bishunpura	97
13	Manjhiaon	135
14	Kandi	191
15	Kharaundhi,	151
16	Danda	32
17	Dandai	140
18	Bargarh	6.94
19	Ketar	183
20	Sagma	106

4.3 Topography

Garhwa district spreads over widely scattered hills. The average elevation of this district is about 1200 feet above the mean sea level. There are low lands in northern and western parts of the district which is suitable for agricultural purposes. The general line of drainage is from south to north towards the river Koyal and Son. Koyal forms the eastern boundary and Son forms northern boundary of the district. Other important rivers of the district are Danro, Sarsatiya, Tahale, Annaraj, Urea, Bai Banki, Bellaiti, Pando, Biraha, and Sapahi. Other notable river is Kanhar which forms south eastern boundary of the district for about 80 km. Due to its geographical formation Garhwa District is rich in water resources.



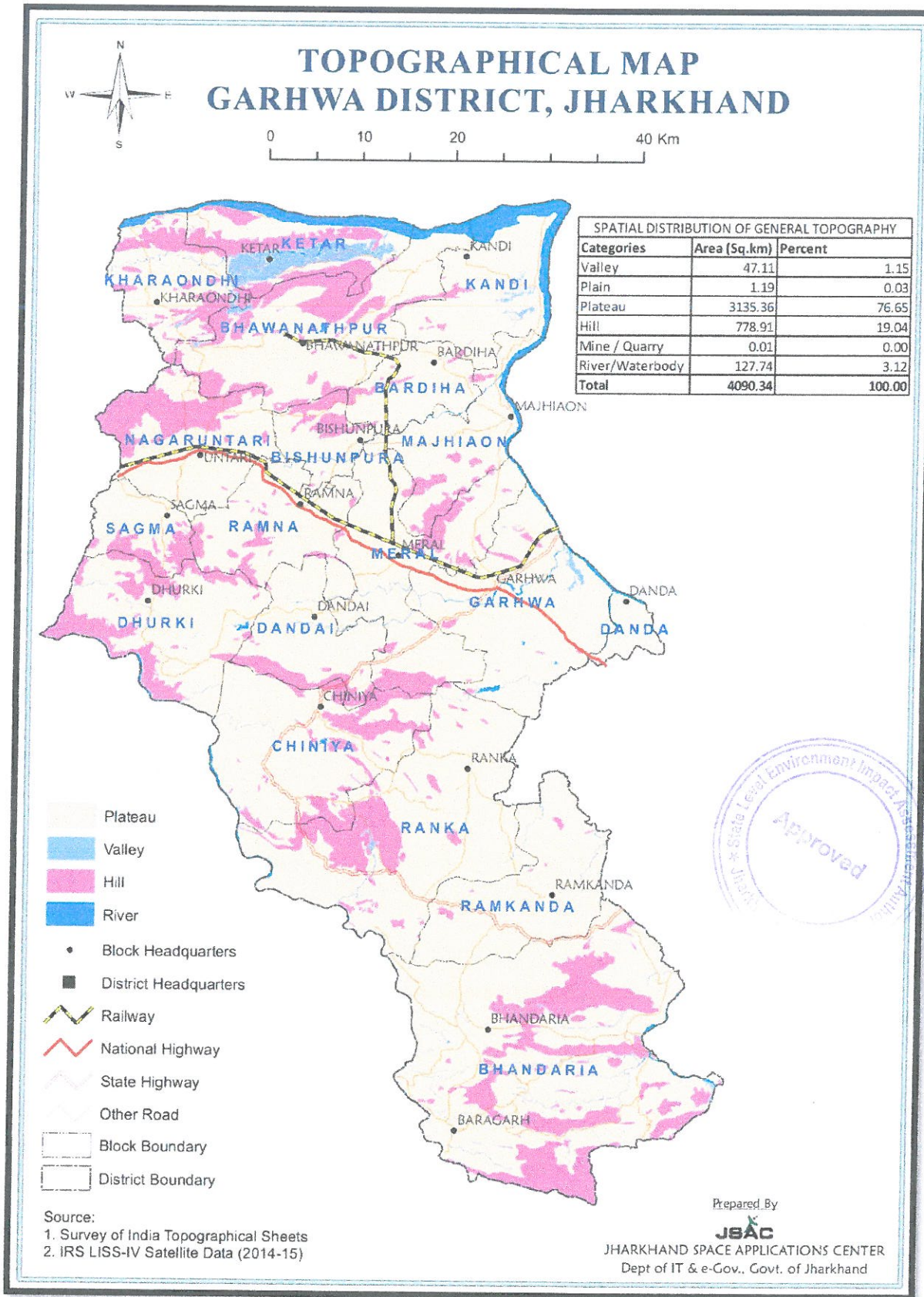


Figure 4-3:- Topographical Map Garhwa District Jharkhand



4.4 Demography

According to the 2011 census, Garhwa district has a population of 1,322,387 with which 683,984 male population and 638,403 female population. The district has a population density of 327 inhabitants per square kilometre (850 /sq mi). Its population growth rate over the decade 2001-2011 was 27.71%. Garhwa has a sex ratio of 933 females for every 1000 males, and a literacy rate of 62.18%. The district headquarter is Garhwa. Garhwa has a sex ratio of 933 females for every 1000 males, and a literacy rate of 62.18%.

Table 4-2:- Demography Garhwa District

DISTRICT CENSUS HANDBOOK: GARHWA									
DISTRICT PRIMARY									
Location code number	District/ CD Block/ Town	Total Rural/ Urban	Total population (including institutional Number of and_houseless population) households Persons Males Females				Population in the age-group 0-6 Persons Males Females		
			4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
346	Garhwa - District	Total	2,54,697	13,22,784	6,83,575	6,39,209	2,39,664	1,22,305	1,17,359
		Rural	2,41,464	12,53,114	6,46,947	6,06,167	2,29,136	1,16,898	1,12,238
		Urban	13,233	69,670	36,628	33,042	10,528	5,407	5,121
0001	Kharaundhi	Total	10,596	51,479	26,498	24,981	9,511	4,872	4,639
		Rural	10,596	51,479	26,498	24,981	9,511	4,872	4,639
		Urban	-	-	-	-	-	-	-
0002	Bhawnathpur	Total	16,804	85,319	44,673	40,646	15,457	7,974	7,483
		Rural	15,742	80,057	41,872	38,185	14,753	7,612	7,141
		Urban	1,062	5,262	2,801	2,461	704	362	342
347181	Sinduria (CT)	Urban	1,062	5,262	2,801	2,461	704	362	342
0003	Ketar*	Total	9,939	50,821	26,518	24,303	8,745	4,482	4,263
		Rural	9,939	50,821	26,518	24,303	8,745	4,482	4,263
		Urban	-	-	-	-	-	-	-
0004	Kandi	Total	14,890	81,521	42,541	38,980	13,031	6,662	6,369
		Rural	14,890	81,521	42,541	38,980	13,031	6,662	6,369
		Urban	-	-	-	-	-	-	-
0005	Majhiaon	Total	9,621	52,586	27,426	25,160	8,933	4,641	4,292
		Rural	9,621	52,586	27,426	25,160	8,933	4,641	4,292
		Urban	-	-	-	-	-	-	-
0006	Bardiha	Total	7,047	37,930	19,527	18,403	7,043	3,593	3,450
		Rural	7,047	37,930	19,527	18,403	7,043	3,593	3,450
		Urban	-	-	-	-	-	-	-
0007	Ramna	Total	13,345	70,584	36,556	34,028	12,969	6,717	6,252
		Rural	13,345	70,584	36,556	34,028	12,969	6,717	6,252
		Urban	-	-	-	-	-	-	-
0008	Bishunpura	Total	6,187	32,242	16,669	15,573	5,622	2,787	2,835
		Rural	6,187	32,242	16,669	15,573	5,622	2,787	2,835



		Urban	-	-	-	-	-	-	-
0009	Nagaruntar i	Total	19,347	1,02,772	53,246	49,526	18,426	9,397	9,029
		Rural	19,347	1,02,772	53,246	49,526	18,426	9,397	9,029
		Urban	-	-	-	-	-	-	-
0010	Dhurki	Total	10,616	55,469	28,544	26,925	11,244	5,704	5,540
		Rural	10,616	55,469	28,544	26,925	11,244	5,704	5,540
		Urban	-	-	-	-	-	-	-
0011	Sagma	Total	5,892	30,396	15,798	14,598	5,553	2,797	2,756
		Rural	5,892	30,396	15,798	14,598	5,553	2,797	2,756
		Urban	-	-	-	-	-	-	-
0012	Dandai	Total	12,300	63,665	32,558	31,107	12,066	6,210	5,856
		Rural	12,300	63,665	32,558	31,107	12,066	6,210	5,856
		Urban	-	-	-	-	-	-	-
0013	Chinia	Total	7,669	38,833	19,761	19,072	7,931	3,966	3,965
		Rural	7,669	38,833	19,761	19,072	7,931	3,966	3,965
		Urban	-	-	-	-	-	-	-
0014	Meral (Pipra Kalan)	Total	24,906	1,30,308	67,253	63,055	23,207	11,916	11,291
		Rural	24,906	1,30,308	67,253	63,055	23,207	11,916	11,291
		Urban	-	-	-	-	-	-	-
0015	Garhwa	Total	30,623	1,55,568	81,122	74,446	26,884	13,714	13,170
		Rural	30,623	1,55,568	81,122	74,446	26,884	13,714	13,170
		Urban	-	-	-	-	-	-	-
0016	Danda	Total	3,521	17,856	9,195	8,661	3,258	1,638	1,620
		Rural	3,521	17,856	9,195	8,661	3,258	1,638	1,620
		Urban	-	-	-	-	-	-	-
0017	Ranka	Total	17,845	90,483	45,783	44,700	18,275	9,179	9,096
		Rural	17,845	90,483	45,783	44,700	18,275	9,179	9,096
		Urban	-	-	-	-	-	-	-
0018	Ramkanda	Total	8,232	44,452	22,525	21,927	8,796	4,436	4,360
		Rural	8,232	44,452	22,525	21,927	8,796	4,436	4,360
		Urban	-	-	-	-	-	-	-
0019	Bhandaria	Total	13,146	66,092	33,555	32,537	12,889	6,575	6,314
		Rural	13,146	66,092	33,555	32,537	12,889	6,575	6,314
		Urban	-	-	-	-	-	-	-

(Source: District Census Handbook, Garhwa)

4.5 Connectivity in Garhwa District

Garhwa district bordered by river Sone on the north, Palamau district of Jharkhand state on the east, Surguja district of Chhattisgarh state on the south, and Sonebhadra district of Uttar Pradesh on the west. The district of Garhwa is well served by a network of roads. Road & Railway communication is the main mode of transportation in this district. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. Garhwa district is connected to Ranchi in Jharkhand by National Highway No. 75.



There are 210 km of state highway, 55 km of national highway (NH-75) and 96.95 km of district roads.

Garhwa Railway Station is a major railhead of the Eastern Railway zone. The nearest Railway Junction is Garhwa Road Junction.

The nearest airport is Varanasi Airport in of U.P State at a distance about 140 Km and Ranchi Airport is at a distance of about 208 Km.





Figure 4-4: Road Map Garhwa District

(Source: <https://www.mapsofindia.com/maps/jharkhand/roads/Garhwa.htm>)



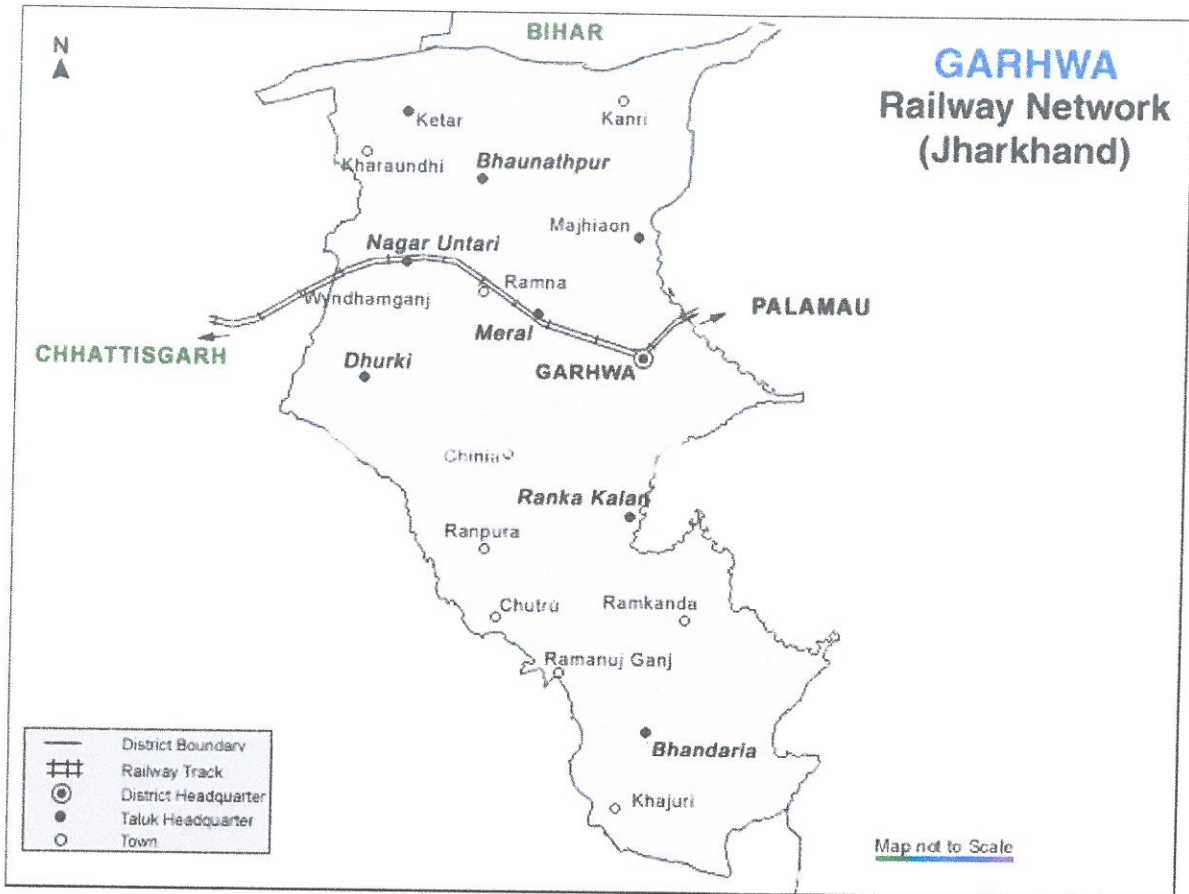


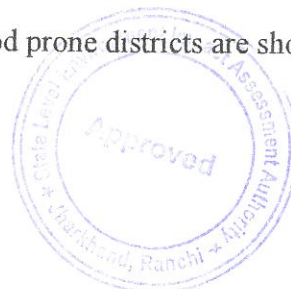
Figure 4-5:- Railway Network Map Garhwa District

(Source: <https://www.mapsofindia.com/maps/jharkhand/railways/garhwa.html>)

4.6 Floods in district Garhwa

The general line of drainage is from south to north towards the river Koyal and Sone. Koyal forms the eastern boundary and Sone forms northern boundary of the district. There are also a host of smaller streams, most of which are from mountain currents with rock stream beds. Other important rivers of the district are Danro, Sarsatiya, Tahale, Annaraj, Urea, Bai Banki, Bellaiti, Pando, Biraha, and Sapahi. Another notable river is Kanhar which forms south eastern boundary of the district for about 80 K.M.

Distribution of the vulnerable and less vulnerable flood prone districts are shown in the below figure no. 4.6.





Map 1.1: Multi hazard prone Area in Jharkhand

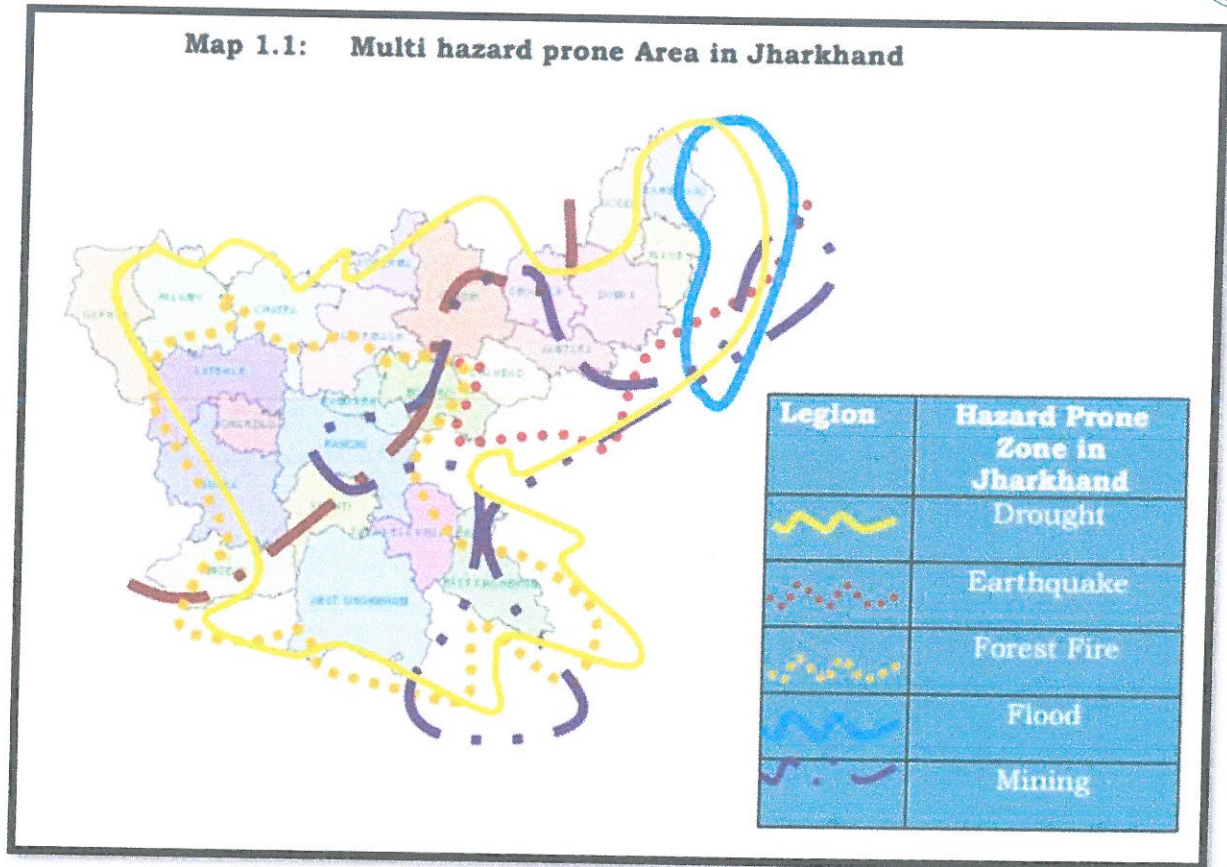


Figure 4-6:- Multi hazard prone area in Jharkhand.

From the above information, it is being observed that, Garhwa is non-flood prone district of Jharkhand.

4.7 Seismicity

As per Seismicity Zonation map, 3 types of Zones have been observed in Jharkhand. Garhwa comes under India's seismic zone-III.



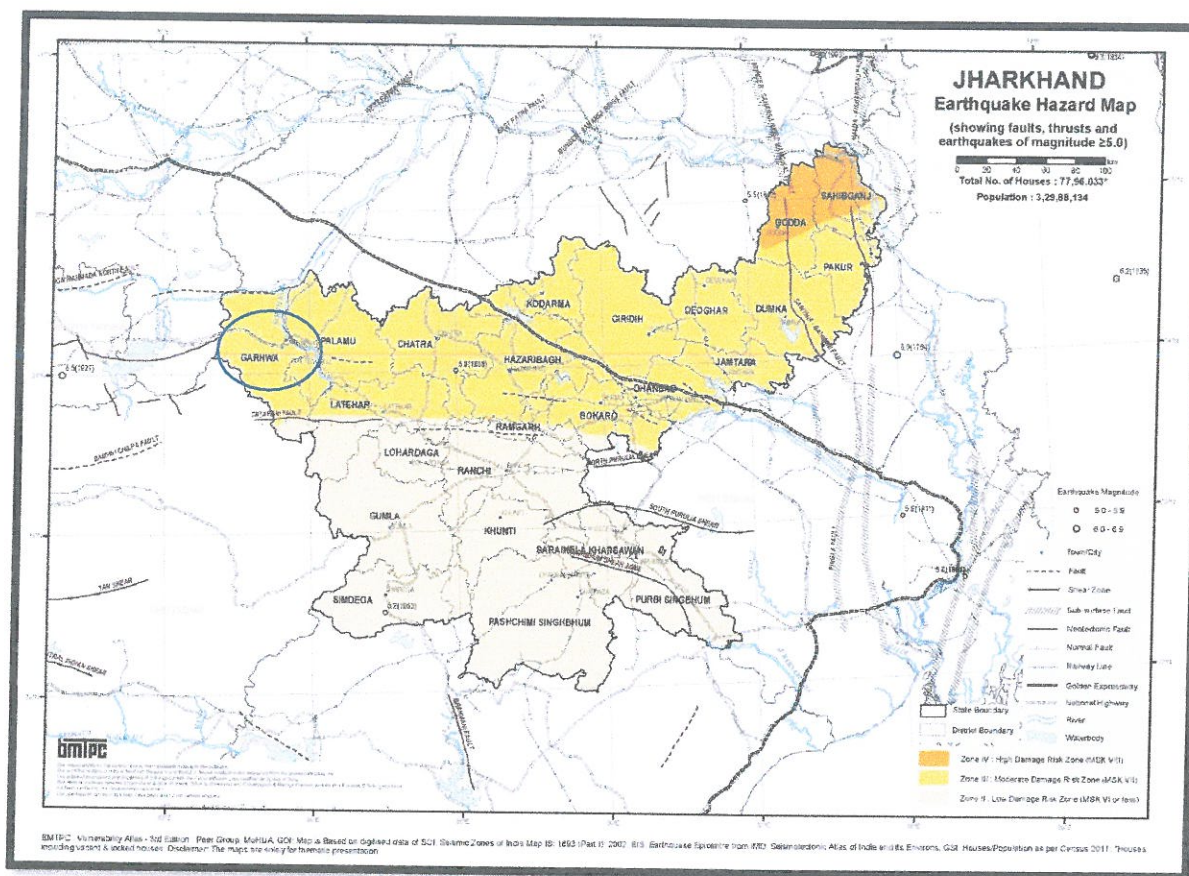


Figure 4-7:- Jharkhand Earthquake Map

4.8 Flora

The forest cover constitutes over 45% of the total area. The Common trees in the district are Khair, Kadamb, Bel, Kathal, Neem, Semal, Kachnar, Shisham, Jamun, Bargad, Sal, Peepal, Mango, Arjun etc.

4.9 Fauna

A map showing Wildlife Protected areas in Jharkhand state are furnished which depicts there is no Wildlife Protected area in Garhwa District.



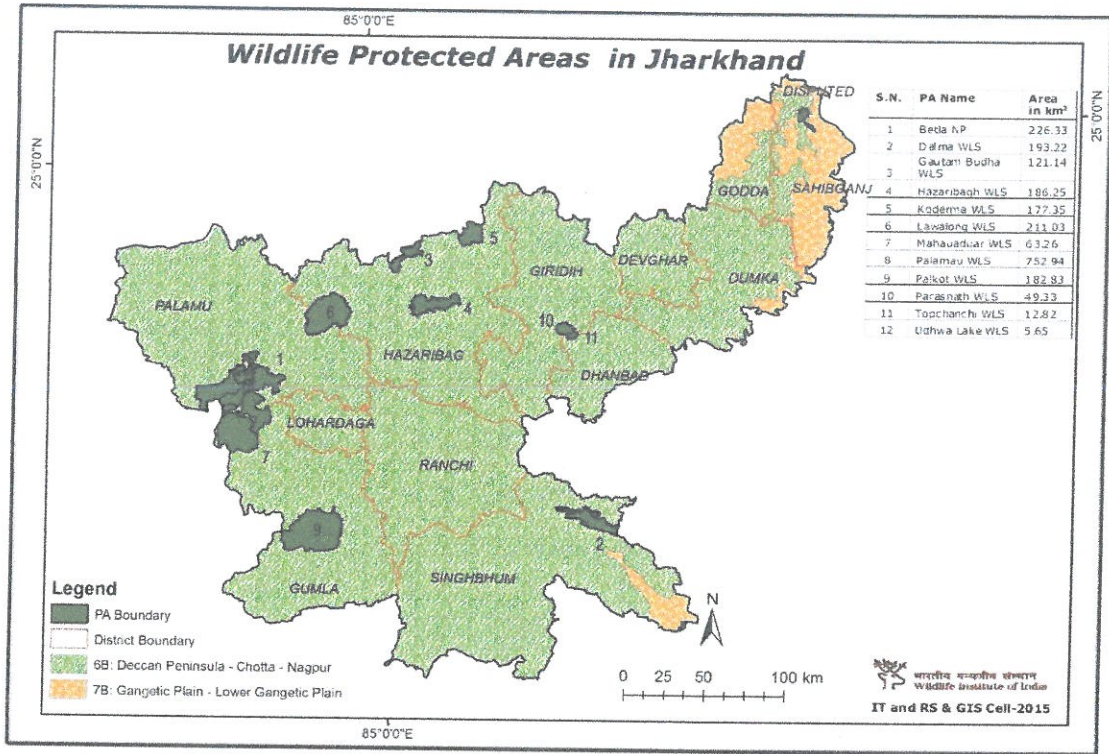


Figure 4-8:- Wildlife Protected area in Jharkhand District

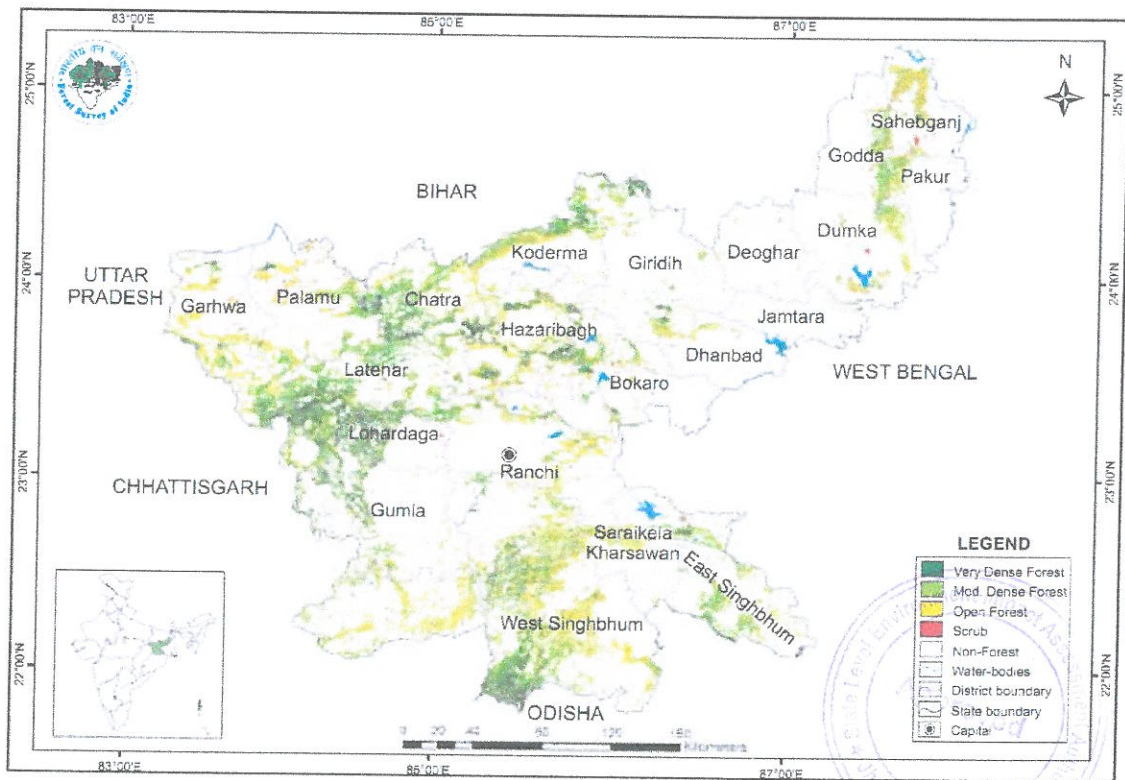


Figure 4-9:- Forest Cover Map of Jharkhand

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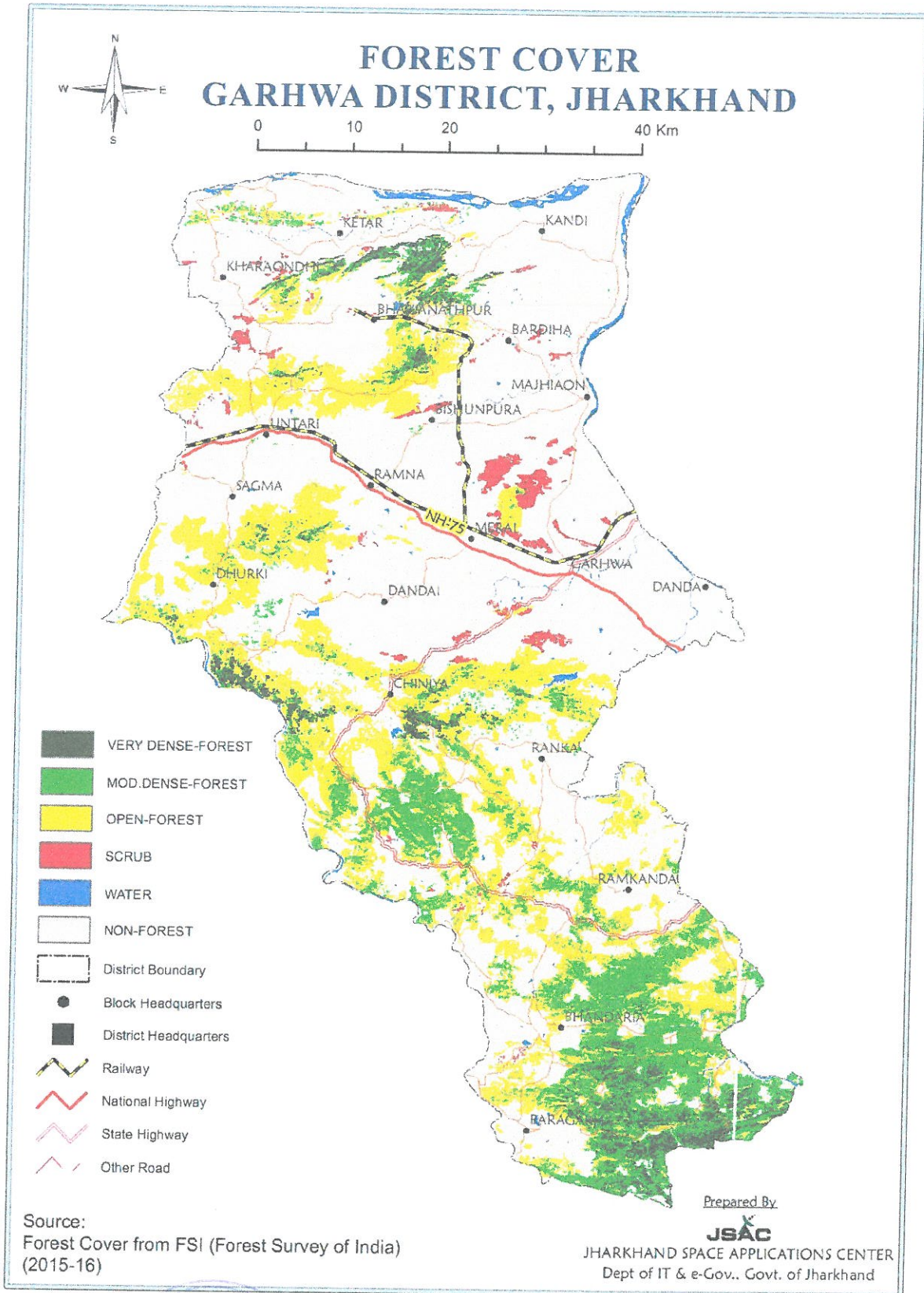
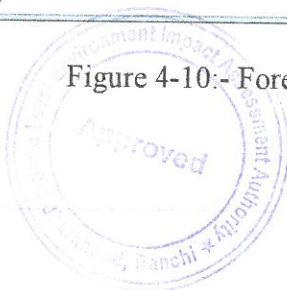


Figure 4-10:- Forest Cover Map of District Garhwa Jharkhand





5 PHYSIOGRAPHY OF THE DISTRICT

5.1 General Landforms

The district provides diverse physiographic features because northern part has relatively homogenous land formed by river Son and the southern portion is hilly and undulating. In the southern portion the land is more dissected and narrow valleys are found. Because of that smaller plain associated with rivulets are found. The northern portion has comparatively larger plains subdivided into Tanrs and Dons which provide contrasting landscape than that of the southern region. The general slope is from south to north.

5.2 Soil and rock pattern

There is a soil variation in the district. The soils of the district can broadly be grouped into three classes:

- a) **Heavy Clays:** This soil is locally known as Kewal Soil. This soil becomes hard when dry and sticky when wet. This soil can hold moisture for a longer period and as a result considered to be favourable for Rabi crops.
- b) **Sandy Soil:** This soil is locally known as Balsundar and consists of coarse sand to a large extent and facilitates production of Paddy, Fruits and vegetables.
- c) **Loamy Soil:** This soil is locally name as Dorasa and consists of sand and clay. This soil is suitable for growing sugarcane.



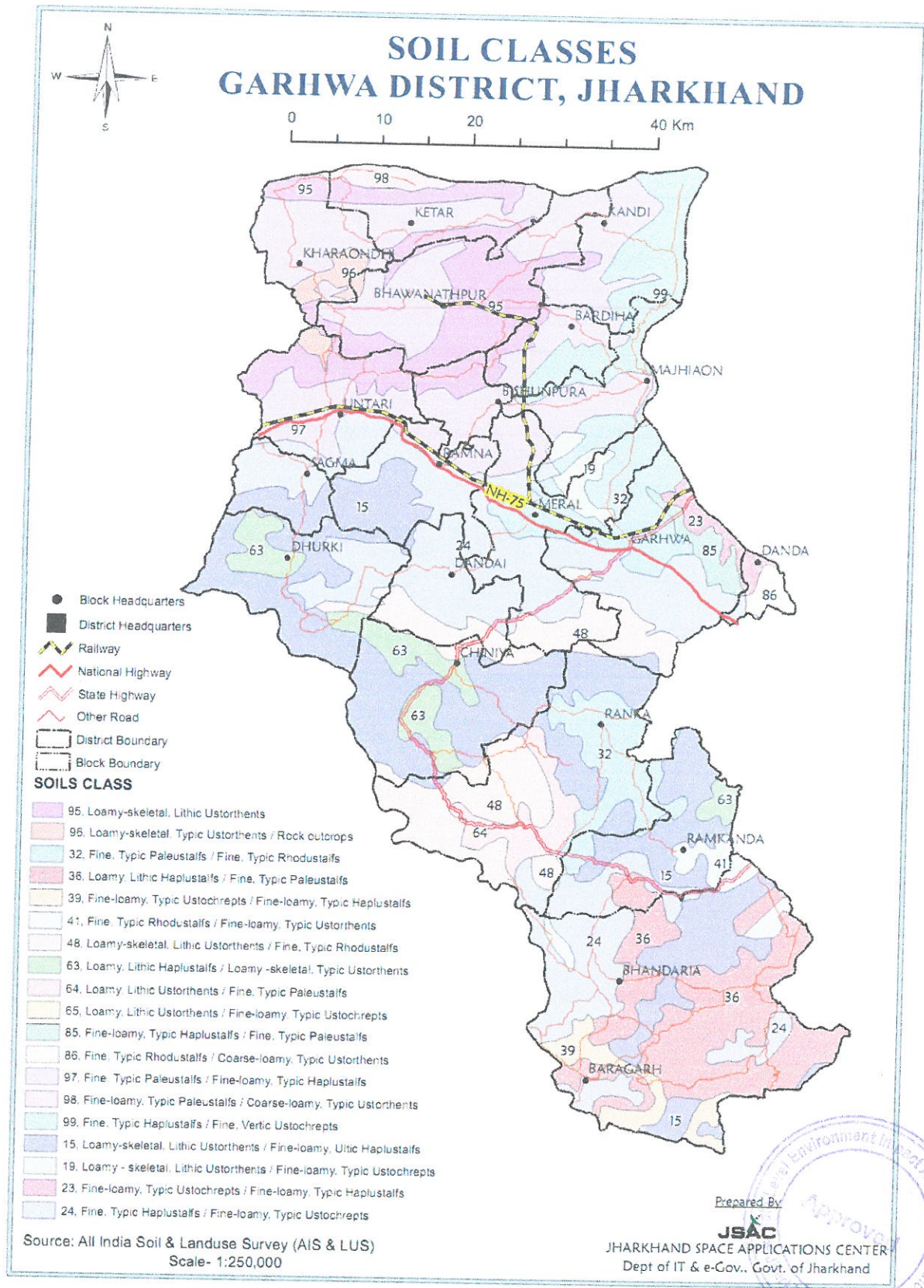


Figure 5-1:- Soil Classes Garhwa district



5.3 Geomorphology

Garhwa district is highly rugged topography with thick green forest all over the area. The hills are widely scattered and rise up to 1164 m above MSL in the Southern of the district. Average height of the hills varies from 700 – 900mts. The hill which is called Gulgulpath - 3819 ft. is said to be second highest peak in Jharkhand situated in Bhandriya Block of the district. There is also low land in Northern and Western part of the district which is suitable for agricultural purposes. The elevation of plain varies from 250 – 500 mtr. The slope of the district is towards north.



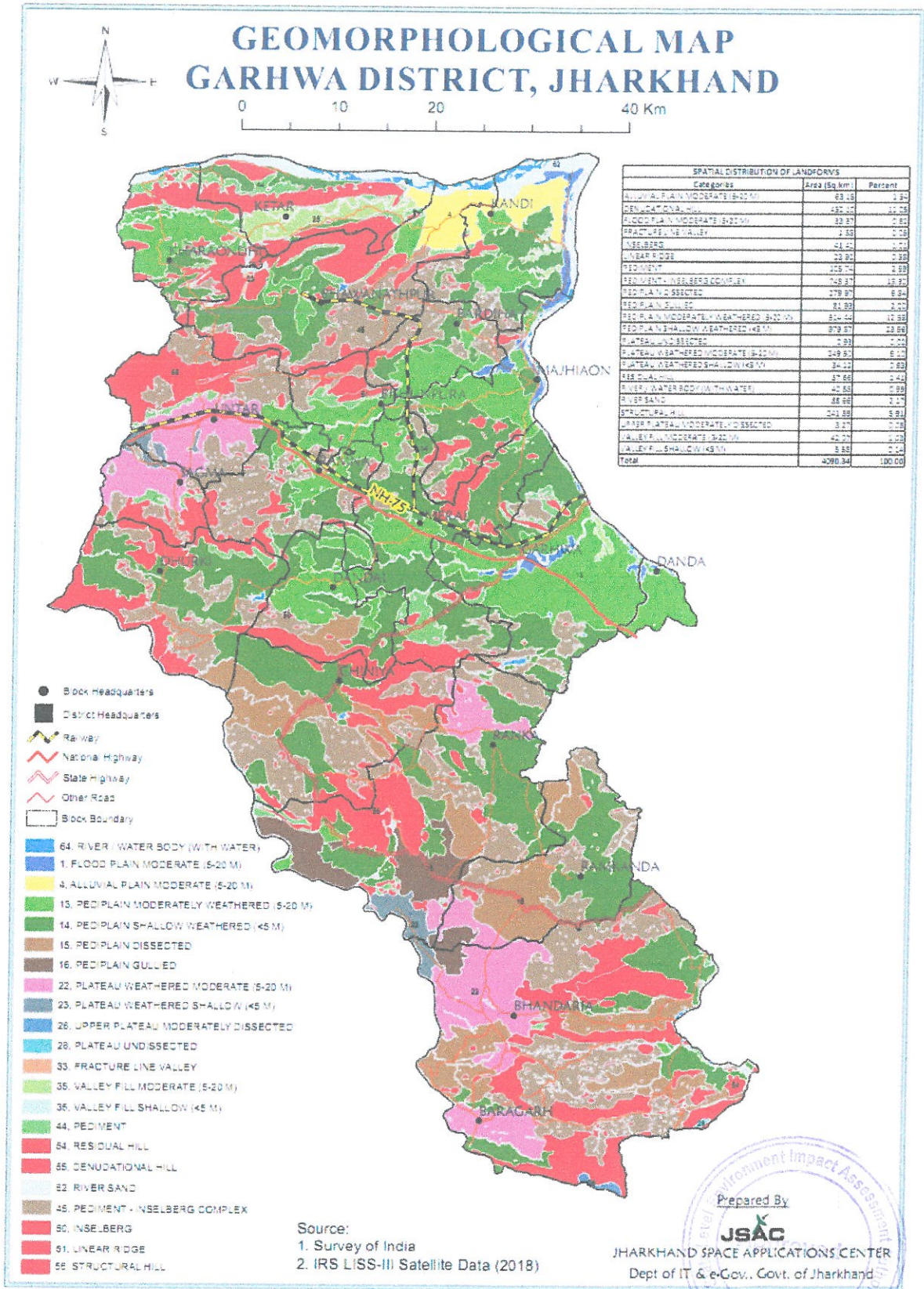


Figure 5-2:- Geomorphological Map Garhwa District



Table 5-1:- Geographical Profile of Garhwa District

Particulars	Details
Latitude	24.1756413
Longitude	83.8136494
DMS Latitude	24° 9' 17.6328" N
DMS Longitude	83° 47' 58.4196" E
Area in (Sq Km)	4044 Sq Km
Height from sea level	1180 ft
Temperature	Winter(Min 13.0 Max 28.5) and Summer(Min 35.0 Max 47.2)
Rainfall	1.335 mm/52.55 inches
Climate	Summer(May-jun), Winter(Dec-Feb), Rainy(Jul-Aug) Seasons
Main tribes	Oraon, Chero, Korwa and parahiya
Main minerals	Dolomite Lime Stone, Coal, Graphite, China Clay and Granite
Main crop	Paddy, Maize, Wheat and Pulses
Languages Spoken	Hindi and Oraon
Important rivers	Koyal, Kanhar, Danro, Sarsatiya, Tahale, Annaraj, Urea
Area in hectares	4,22,540.76 hect
Irrigated Land	1,35,730 hect
Forest Land	1,07,016 hect
Sinchith Area	38,340 hect
Nearest Railway St.	Garhwa
Nearest Airport	Chiyanki
Population density	256





6 GEOLOGY & MINERAL WEALTH OF THE DISTRICT

6.1 Geology

Garhwa district is a part of Chhotanagpur granite gneissic complex (CGGC). The geological formation of the Garhwa district comprises mainly of rocks of Archaean, Vindhyan and Gondwana ages, these formations are cut by dykes of Deccan trap age. The Archaean rocks include both schists of Dharwar age and gneisses and granites.

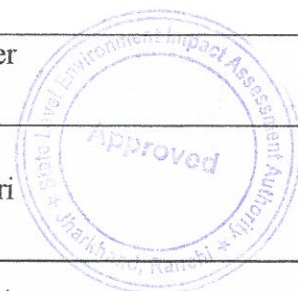
Archeans and metamorphics are the oldest formations of this region which are represented by Granites and Granite Gneiss and Quartzites. The Sedimentary rocks of Porcellanite and Basal Stages of the lower Semri Series overlie the Archeans. The Boundary between the sedimentary rocks and the Archeans is unconformable which runs almost East-West. The Basal stage comprises of Conglomerate, Shale, Porcellanite, Laterite and Limestone while the overlying Porcellanite comprises mainly of Porcellanites with some bands of Phosphatic Limestone and Shale at the contact and is yellowish in colour. The Proterozoic period also represented by the Vindhyan Supergroup of rocks exposed in the Western part, which draws attention for its bio-organic sedimentary structure and limestone deposits.

Granite gneiss, graphite schist, amphibolite, quartzite, meta-dolerite and pegmatites are the major rock formation of Archaean age. The Vindhyan Super group consists of good quality of limestone, dolomite and workable phosphates. The Gondwana super group of the area consists of coal, sandstone and shale.

Dolomite, limestone, graphite, phosphorite and coal are the chief economic minerals of Garhwa district. Other secondary resource of the district consists of Brick-earth, ordinary earth, morrum (lateritic soil), river sand.

Table 6-1:- Generalized stratigraphic succession of the district

Recent		Soil Cover
Gondwana Super Group	Lower Gondwana	Barakar Karharbari Talchir
Vindhyan Super Group	Lower Vindhyan	Semri Series



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	Unconformity	
Archaean	Post Dharwar	Pegmatite & Quartz vein Dolerite Granite gneiss
	Dharwar (Older Metamorphics)	Amphibolite, Magnetite Dolomite Quartzite Graphite schist Schistose rock

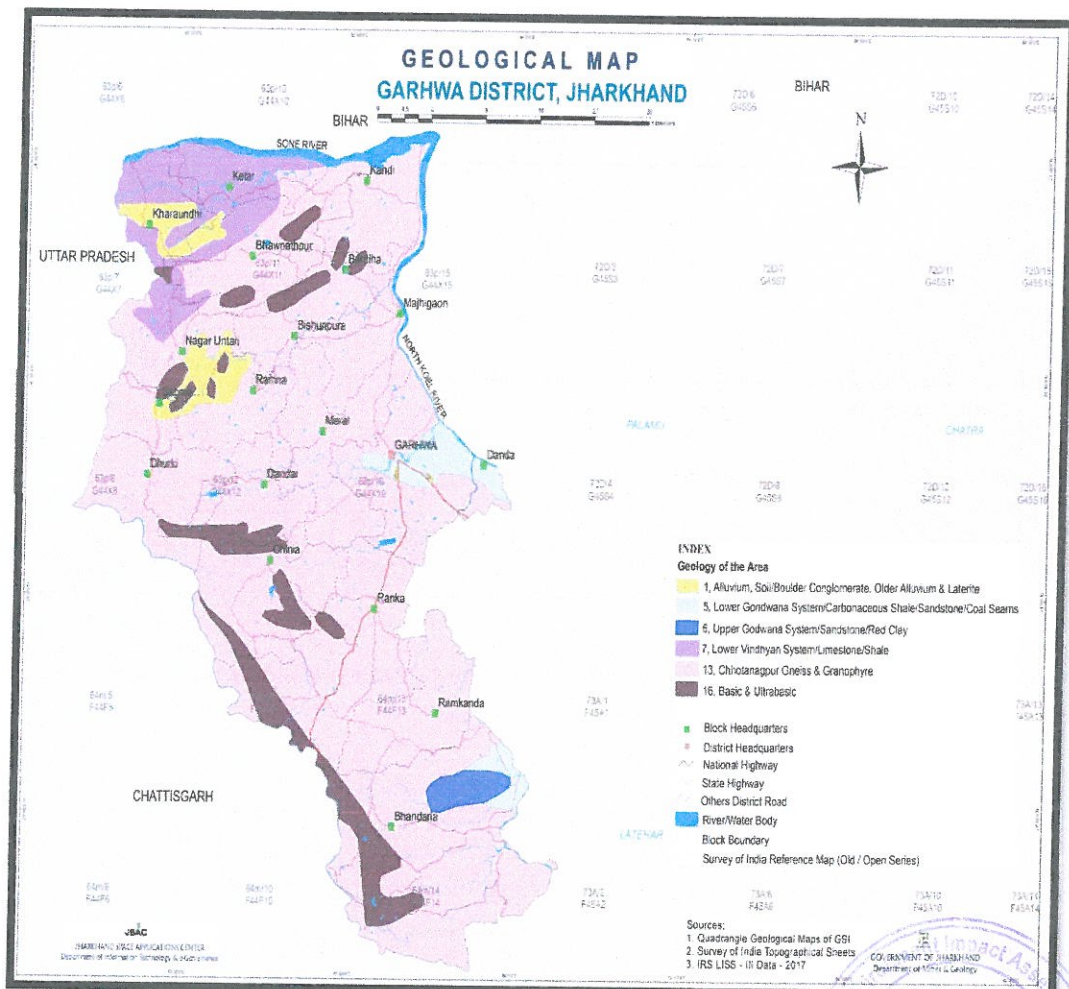


Figure 6-1:- Geological Map Garhwa District Jharkhand



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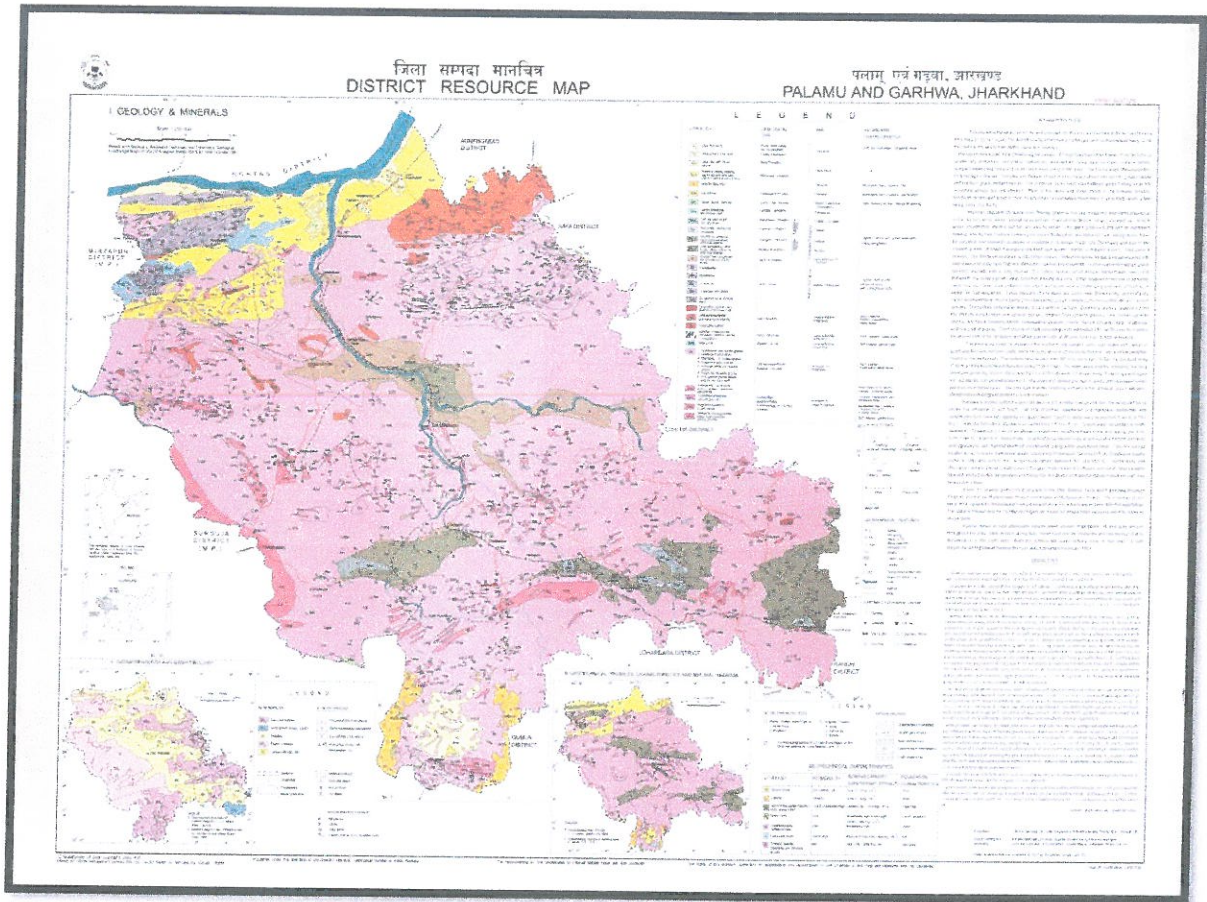


Figure 6-2:- District Resource Map, Palamu & Garhwa, Jharkhand

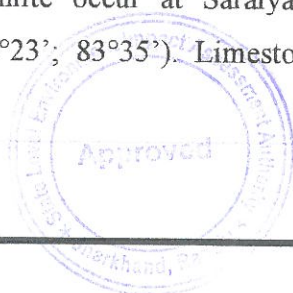
6.2 Mineral Resources

Garhwa district has major and minor Minerals abundances.

The Economic minerals reported from the district are Limestone, Dolomite, Graphite, Coal, Granite etc. Stone like Amphibolite and Dolerites are also found here.

Limestone and Dolomite: -

South of the Son there are several scattered and narrow outcrops of Vindhyan rocks belonging mainly to the Basal, Porcellanite and Kheinjua stages. The rocks of the Porcellanite group are indurated and silicified volcanic ashes. Towards the north-western part of the district there is a large outcrop of the Lower Vindhyan strata, south of the Son, which appears to be a part of the main Lower Vindhyan formation of the Rohtas plateau north of the son. Bhaunathpur is situated in the eastern part of the main outcrop. Good deposit of Limestone and Dolomite occur at Saraiya, Gorgaon, Tulsidamar and Ghagra area of Bhawnathpur etc ($24^{\circ}23'$; $83^{\circ}35'$). Limestone occurring in the lower Vindhyans of the





Bhawanathpur area may be suitable for the manufacture of Portland cement. The dolomites are usually white in colour, but in some places due to the presence of serpentine they are greenish. They usually occur associated with calciphyre or other calc-silicate rocks but at some places they are in pure and massive form and may be utilized as a flux or refractory.

Graphite: -

Deposits of Graphite area are known at Sewadih ($24^{\circ}58'28.6''$; $84^{\circ}44'44.6''$), Donhti ($23^{\circ}57'36.2''$; $83^{\circ}40'53.4''$) area of Ranka Block. Apart from this it also occurs near Uchari ($24^{\circ}14'$; $83^{\circ}48'$). Graphite is either amorphous or flaky and occurs in thin veins traversing the graphite schists. The quality is generally moderate to poor due to contamination with the country rock. It may, however, be improved to some extent by washing.

Coal: -

Coal is basically found in Bhandaria block. The area around Bijka, Tiharo and Binda. Bhandaria block of Garhwa district covers the south central and southern most part of Hutar Coal field at Gohrasul and Macharkanda sector and Kurum sector; four persistent regional coal seams (I, IIA, IIB and III) having thickness varying between 0.3 meter and 2.36 meters were encountered within coal bearing Karharbari formation (very shallow depth at places). The upper part of Karharbari contains coarse to pebbly sandstone, shale, carb-shale and one interbanded seam of coal and shaly coal.

The Gondwana coal field of Hutar coalfield contains Talchir, Karharbari, Barkar, Raniganj (Barren Measures as per report of CMPDI) and Panchet formation of lower Gondwana overlain by lithounits of Supra-panchet/ Mahadev formation of Upper Gondwana.

The Barakar series of strata overlap the Talchirs. The Mahadeva series is developed west of the Koel river.

There are intrusions of dolerite, probably of Deccan Trap age, in the Talchir formation between Chamardiha and Barawadih. The Hutar field is traversed by a strong east to west fault through TattaBalbal ($23^{\circ}45'30''$; $84^{\circ}1'$), where a hot spring occurs. There are smaller faults along the western and north- western ends of the field.



**Granite: -**

For administrative purpose the hard crystalline rocks which do not have any economic minerals are classified as granite dimension stones and granite (building stones). The definition given in the Jharkhand Minor Mineral Concession Rules 2015 is as follows:-

'Granite dimension stones include all types of granites, dolerite gneisses, migmatites, gabbro, anorthosites, rhyolites, syenites, charnockite, leptynites and other crystalline rocks of acid, intermediate, basic and ultra-basic groups of igneous and metamorphic origin which are suitable for cutting to pre-determined sizes, polishing, carving and amenable for making value added products in decorative monumental and ornamental fields of industry as a high-value item. Granite (building stone) include all those group of rocks specified above which are not suitable for using as dimension stone as specified therein, but can be used as ordinary building stones, road metal, rubble and ballasts after breaking into irregular pieces by blasting or otherwise as low value item. The rules insists that the rocks having the quality of granite dimension stone shall not be quarried for granite building stone as these two types of rocks have different values/royalties.

All Archaean rocks of Jharkhand (refer section on geology of Jharkhand) which are not listed above as granite dimension stone falls under the category of granite (building stone) and are found below ordinary earth/ laterites/and other sedimentary rocks. In some cases such rocks are exposed as hillocks without any overburden.

Occurrences of granite rock has been seen in Latdag, Dhurki, Autola area of Garhwa district. Among the granites the following three varieties can be distinguished which grade into each other; normal pink-coloured alkali granite characterized by pink potash feldspar, in some places gneissose; white-coloured oligoclase granite; and porphyritic granite and augen gneiss with large lenticular porphyroblasts of potash feldspar. The granites are younger than the gneisses and show intrusive relation to the latter.

Amphibolites: -

The amphibolites are dark grey and black- colored rocks and are found in many parts of the district including the area near Daltonganj. They are inclusions of older rocks in the gneiss as would appear from the abundance of small stringers of amphibolites in the granite and the lit-part-lit injection of granite in the amphibolites near their margins which has produced composite-gneiss, and show beautiful ptymatic folding.



Dolerites: -

The dolerites occur as dykes and bands and show various degrees of metamorphism. The slightly metamorphosed dolerites are known as meta-dolerites but in some areas the rocks are converted to epidiorites and amphibolites in which hornblende has more or less replaced the pyroxene while in the meta-dolerites, the original ophitic texture characteristic of igneous origin is present through the pyroxene is altered to amphibole. Some varieties contain hypersthene and approach basic charnockite in appearance.

Brick clay: -

Clays and clay minerals occur under a fairly limited range of geological conditions and are produced by weathering of silicate minerals containing calcium, magnesium, sodium, or potassium reacting with carbonic acid, carbonates, and bicarbonates. These soluble products are removed by ground water, while the remaining elements, aluminium, silicon and oxygen combine with water to produce stable clay minerals. The environment of formation includes soil horizons, continental and marine sediments, geothermal fields, and weathering rock formations. Extensive alteration of rocks to clay minerals can produce relatively pure clay deposits that are of economic interest. Clay formed at the site of the parent rocks is known as primary or residual clay; the one carried away or transported and deposited elsewhere is known as secondary clay. For obvious reasons, the former is purer with less impurity (5%-15%), while the latter may contain mica, quartz, and iron oxide as impurities. More than 110 bricks factories are currently running in the Garhwa district.

Occurrences of clay for bricks manufacturing is reported from Meral, Ramna, Kharaundhi, Dhurki, Bishanpura, Kandi, Majhiyaon, Bhawnathpur, etc.





7 DRAINAGE SYSTEM & IRRIGATION PATTERN

7.1 Drainage System

The general line of drainage is from south to north towards the river Koyal and Sone. Koyal forms the eastern boundary and Sone forms northern boundary of the district. The main river is Koel and its tributaries. There are a lot of small streams, most of which are making mountain terrains with rock stream beds. The upper reaches of Koel River is characterized by high banks. The bed of the Koel is rocky for small length from the North of its confluence with Auranga River after which it is sandy. The Koel flows from a total distance of about 255 Km from its source to the confluence of the Sone. It is generally dry in the summer. Other important rivers of the district are Danro, Sarsatiya, Tahale, Annaraj, Urea, Bai Banki, Bellaiti, Pando, Biraha, and Sapahi. Other notable river is Kanhar which forms south eastern boundary of the district for about 80 K.M. Due to its Geographical formation Garhwa district is rich in water resources.

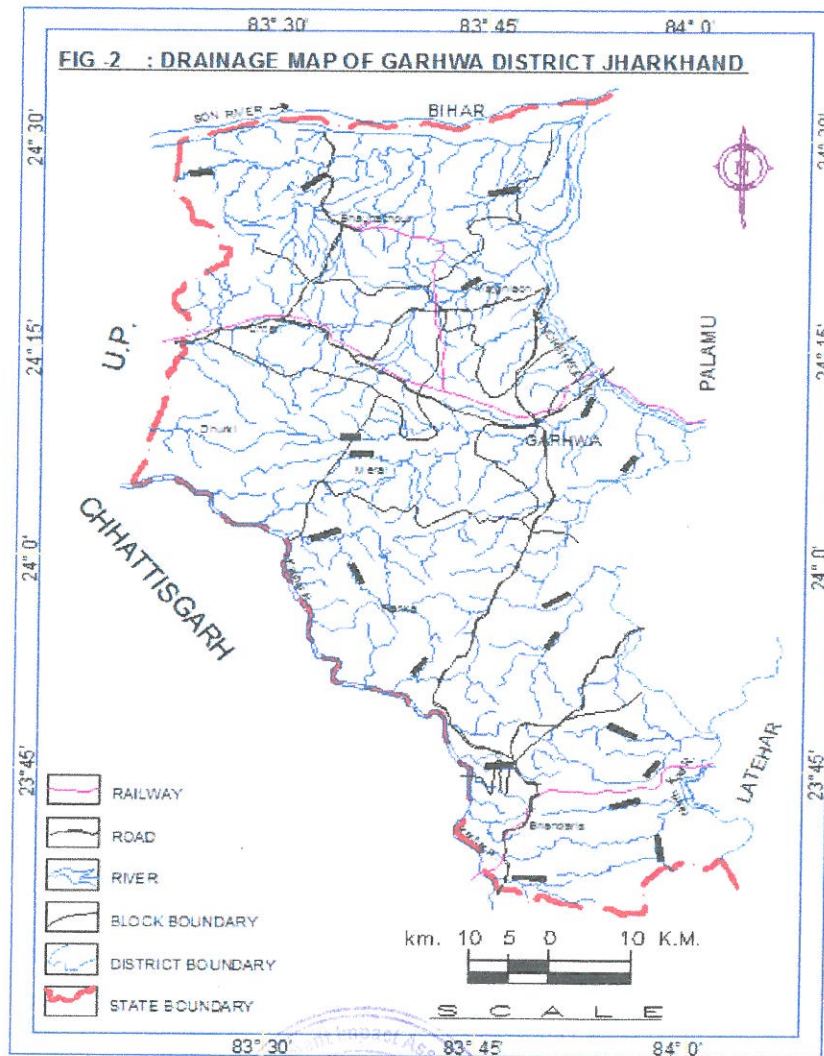


Figure 7-1:- Drainage map of Garhwa district

(Source: CGWB, Garhwa)



Table 7-1:- Details of major rivers of Garhwa District

River	Area drained (Sq. km)	% Area drained in the district
Kulwanti Nala	0.64	0.016
Kansi Sot	109	0.027
Barki Nadi	2.97	0.072
Gunga Nadi	1.12	0.027
Danro River	5.65	0.138
Dhengura Nadi	0.42	0.010
Annraj Nadi	1.16	0.028
Dhorara Nadi	0.79	0.019
Uriva Nadi	1.34	0.033
Daldaliya Nadi	0.24	0.006
North Koel River	48.54	1.187
Table Nadi	1.99	0.049

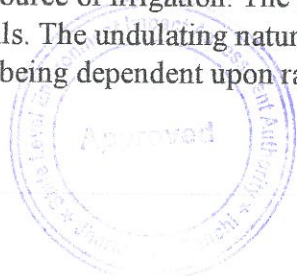
Table 7-2:- Salient features of important River & Streams

S. No.	Name of the River or Stream	Total Length in the District (in km)	Place of Origin	Altitude at Origin
1	North Koel River	52	Palamau hills in Jharkhand	377m
2	Sone River	49	Amarkantak Madhya Pradesh	1048m
3	Kanhar River	94	Gidha Dhodha on Khundia Plateau	600m

7.2 Irrigation Pattern

Agriculture is the major occupation of the rural population of the district. Since the density of population is high, there is acute pressure on land for agriculture use. But the land available for cultivation is limited because of rugged and hilly geomorphological set-up.

Surface flow and lift irrigation schemes are main surface water sources in this district and irrigated some hectare of land. The most common ground water source is the dug well, but this is not a very dependable source of irrigation. The major part of the district being rocky in nature, it is difficult to dig wells. The undulating nature of land makes it possible to store rain water by bunding. Apart from being dependent upon rains, these are by no means adequate.





The result is that failure of rains invariably involves failure of crops. However, as per 5th Minor Irrigation census for the year 2013-14, about 91% irrigation of the district is depend on ground water sources. Block wise number of irrigation structure and source wise irrigation data of the district.

Table 7-3:- Irrigation details

Irrigation	Area ('000 ha)		
Net irrigation	35.18		
Gross irrigated area	35.18		
Rainfed area	65.77		
Sources of irrigation	Number	Area ('000 ha)	Percentage of total irrigated area
Canals, Ponds, check dams, lifts		19.74	19.554
Tanks			7.53
Open wells		7.6	0.86
Bore wells, Pump sets		0.87	
Lift irrigation schemes			
Micro-irrigation			
Other sources (please specify)			
Total Irrigated Area		28.21	27.95
Pump sets			
No. of Tractors			
Groundwater availability and use* (Data source: State/Central Ground water Department /Board)	No. of blocks/ Tehsils	(%) area	Quality of water (specify the problem such as high levels of arsenic, fluoride, saline etc)
Over exploited			
Critical			
Semi- critical			
Safe			
Wastewater availability and use			
Ground water quality			

*over-exploited: groundwater utilization > 100%; critical: 90-100%; semi-critical: 70-90%; safe: <70%

Table 7-4:- Block wise number of irrigation structure of Garhwa district (2013-14)

Block	No. of surface water irrigation structures			No. of ground water irrigation structures			
	Surface flow scheme	Lift flow scheme	Total	Dug well	Shallow tube/bore well	Deep tube/bore well	Total
Bardiha	59	3	62	209	0	0	209



Bhandaria	303	5	308	678	1	0	679
Bhawnathpur	217	54	271	678	147	264	1089
Bishunpura	32	97	129	162	1	106	269
Chinia	48	2	50	132	0	0	132
Danda	120	1	121	65	3	0	68
Dandai	187	22	209	476	3	0	479
Dhurki	168	49	217	427	5	2	434
Garhwa	85	13	98	312	35	1	348
Kandi	80	50	130	400	18	0	418
Ketar	100	9	109	381	1	15	397
Kharaondhi	85	151	236	534	16	346	896
Majhiaon	31	5	36	178	16	6	200
Meral	100	27	127	440	1	2	443
Ramkanda	182	15	197	324	0	0	324
Ramna	390	34	424	1082	62	26	1170
Ranka	29	9	38	310	5	0	315
Sagma	197	111	308	674	14	0	688
Utari	435	60	495	1544	34	2	1580
Total	2848	717	3565	9006	362	770	10138

(Source:- <https://agricoop.gov.in/sites/default/files/JKD1-Garhwa-28.08.12.pdf>)



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8 LAND UTILIZATION PATTERN OF THE DISTRICT

8.1 Land Use

There is a heterogeneity in the soils of the area. The soils of the district is light grey and fine textures in nature. The Cultivated area is about 15% of the geographical area and about 12% of the area is irrigated by different sources. The forest cover constitutes over 45% of the total area. The surface water irrigation system has been developed to a very small scale and only 2325 Ha of land had been put under Canal Irrigation System. Irrigation from ground Water resources is very low and about 20.68 % of the land of farmers have access to irrigation in the district. 65.56% farmers use wells, 26.67% use lift irrigation, 4.44% use ponds and 3.33% use other sources of irrigation. There are two dams namely Annaraj dam and Panghutua dam situated in Garhwa and Dhurki blocks of Garhwa district. In the district, the percentage of area under irrigation is 28.3. The cropping intensity in the district is 128%.

Table 8-1:- Land use pattern of the Garhwa District

Land use pattern of the Garhwa District									
Geographical Area	Cultivable Area	Forest Area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
428.826	113.95	191.161	24.957	2.965	9.78	3.05	26.867	70.017	56.096

(Source: <https://www.bauranchi.org/files/dacp/dacps-for-Palamau-Division-1.pdf>)



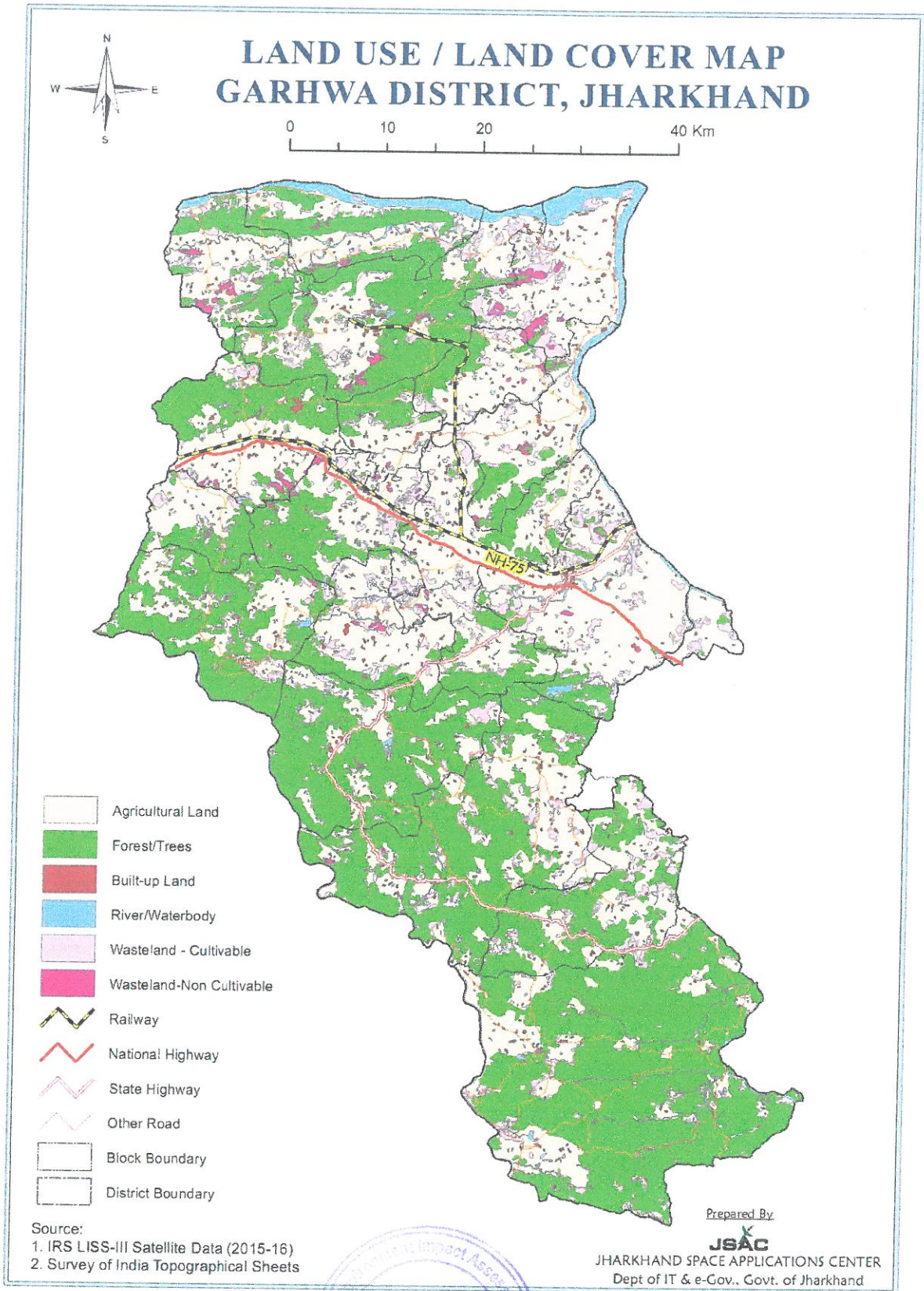


Figure 8-1:- Land use Land Cover Map Garhwa District



8.2 Forest

In Garhwa district more than 40% area of the total land area is under forest. Forest is big sources of revenue of the district. Many of the village of this district lies in thick forest area. Garhwa district lies partially under the rain shadow area.

Table 8-2:- District wise Forest Cover Area in Jharkhand (Area in Km²)

District wise Forest Cover in Jharkhand (in km ²)								
District	Geo-graphical Area (GA)	2021 Assessment				%of GA	Change wrt 2019 assessment	Scrub
		Very Dense Forest	Mod. Dense Forest	Open Forest	Total			
Bokaro	28,83	60.99	231.94	283.07	576	19.98	2.45	37.95
Chatra	3,718	244.28	871.73	666.08	1,782.09	47.93	4.74	23.57
Deoghar	2,477	0	14.3	191.5	205.8	8.31	2.09	14.04
Dhanbad	2,040	0	44	174.18	218.18	10.7	4.67	16.05
Dumka	3,761	0	259.4	318.23	577.63	15.36	0.32	44.55
East Singhbhum	3,562	54.81	591.69	434.19	1,080.69	30.34	1.31	20.91
Garhwa	4,093	125.14	415.6	890.98	1,431.72	34.98	40.13	44.32
Giridih	4,962	77.16	338.56	490.19	905.91	18.26	4.67	28.92
Godda	2,266	12.81	271.88	138.66	423.35	18.68	0	14.27
Gumla	5,360	304.69	585.81	552.65	1,443.15	26.92	0.89	8.25
Hazaribagh	3,555	230.11	348.54	784.54	1,363.19	38.35	10.42	15.99
Jamtara	1,811	0	20.84	85.18	106.02	5.85	5.38	5.32
Khunti	2,535	72.97	344.59	496.18	913.74	36.04	8.25	3.11
Koderma	2,540	80.8	494.43	447.82	1,023.05	40.28	-0.42	6.37
Latehar	4,291	480.36	1,308.93	613.75	2,403.04	56	-3.3	9.3
Lohardaga	1,502	174.03	218.4	111.99	504.42	33.58	-0.2	7.66
Pakur	1,811	2.96	172.4	111.64	287	15.85	-0.13	20.06
Palamu	4,393	62.82	512.73	640.18	1,215.73	27.67	14.95	84.23
Ramgarh	1,341	30.96	109.32	190.98	331.26	24.7	2.26	14.49
Ranchi	5,097	62.89	363.91	741.98	1,168.78	22.93	4.29	27.98
Sahibganj	2,063	17.74	258.73	297.48	573.95	27.82	1.6	47.53
Saraikela-Kharsawan	2,657	22.03	213.84	338.73	574.6	21.63	0.56	21.87
Simdega	3,774	21.97	343.54	877.89	1,243.40	32.95	2.48	20.28
West Singhbhum	7,224	461.53	1,353.80	1,553.11	3,368.44	46.63	2.32	47.18
Grand Total	79,716	2,601.05	9,688.91	11,431.18	23,721.14	29.76	109.73	584.2

(Source: India State of Forest Report 2021 - Jharkhand)



8.3 Cropping pattern

The main economic activity in the district is agriculture. Paddy and Maize are the two main crops in the district. However, in the absence of assured irrigation facility, agriculture in the district is primarily rain fed and as a result, mainly mono-cropping and subsistence farming is practiced in the district. As per the agro-climatic zones delineated by Planning Commission, Garhwa district falls under Zone (VII) i.e., eastern plateau and hill region. It requires strategic planning so as to maximize the use of rainwater, increased ground water utilization level to achieve balanced crop production. Water resources also need to be developed through dug wells and lift irrigation. Watershed development also holds promise in the district. The cropping pattern followed in the region is by and large under rain fed conditions. 85% of kharif is under paddy. The other main kharif crops are maize, arhar and urad. Rabi crops are grown only in areas where there is irrigation facility. Main rabi crop of the district is vegetables like potato, tomato, cauliflower etc. Productivity of agriculture is poor in the district. The erratic nature of the rainfall and its long inter spell gaps lead to frequent crop failure over a large part of the district.



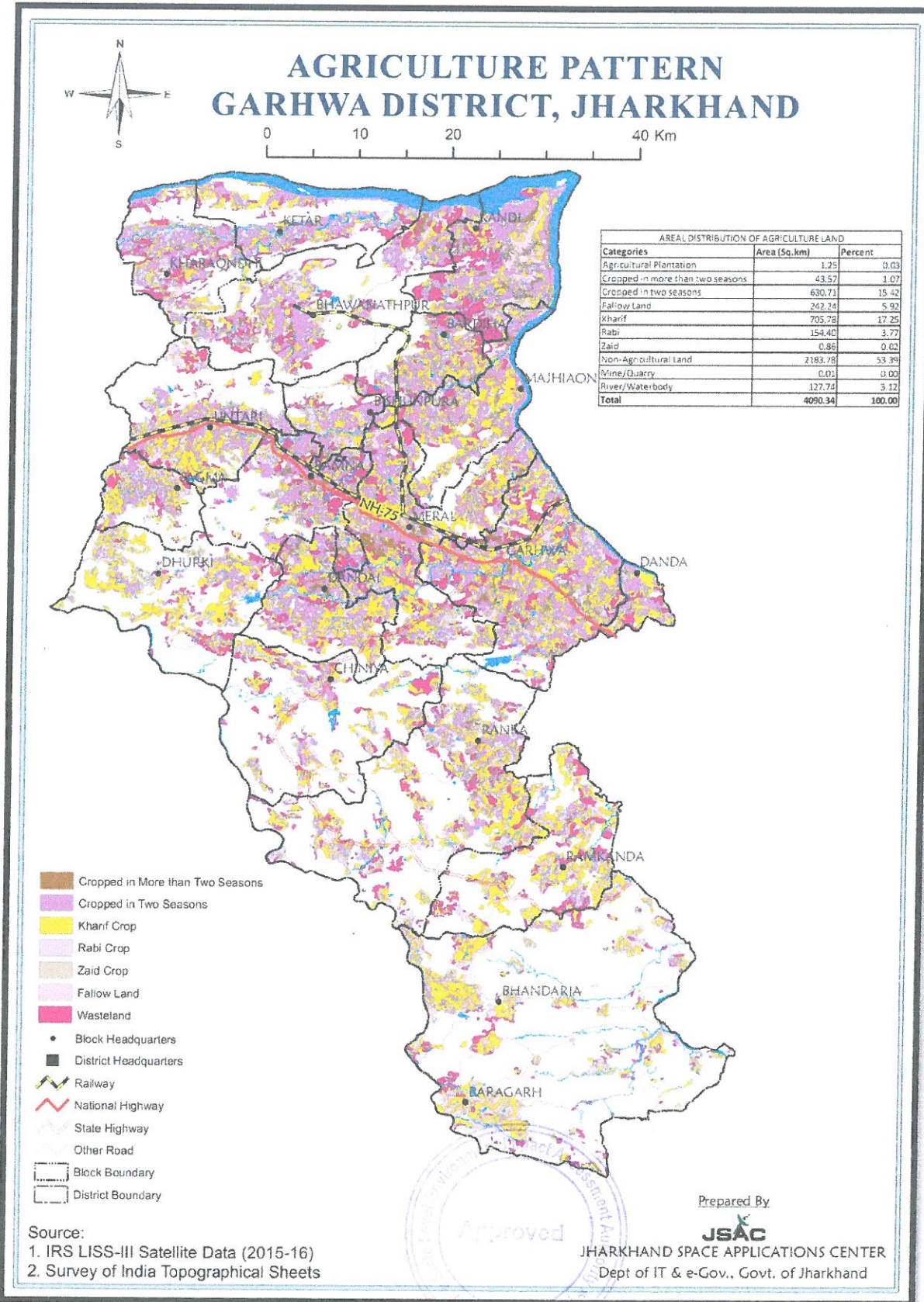


Figure 8-2:- Agriculture Pattern Map Garhwa District



9 GROUND WATER SCENARIO OF THE DISTRICT

9.1 Hydrogeology

The district is underlain by hard rock foundations if belonging to the precambrian period and recent alluvium along river banks. The geology and structure of underlying basement controls the occurrence and movement of ground water. The ground water occurs in secondary porosity like joints, fractures and the extent of inter connection with them.

Ground water occurs in the district within weathered mantle. Limited volume in alluvial deposits occurring along the Sone and North Koel rivers. The thickness of weathered mantle varies from 5 to 16 mbgl in general. The source of Ground Water recharge is entirely by rainfall. The rivers of the district are effluent which do not contain appreciable amount of water during lean period to recharge Ground water at lower reaches. Major part of the rain water goes as run off. The Hydrogeology of the district is shown in Fig – 9.1.



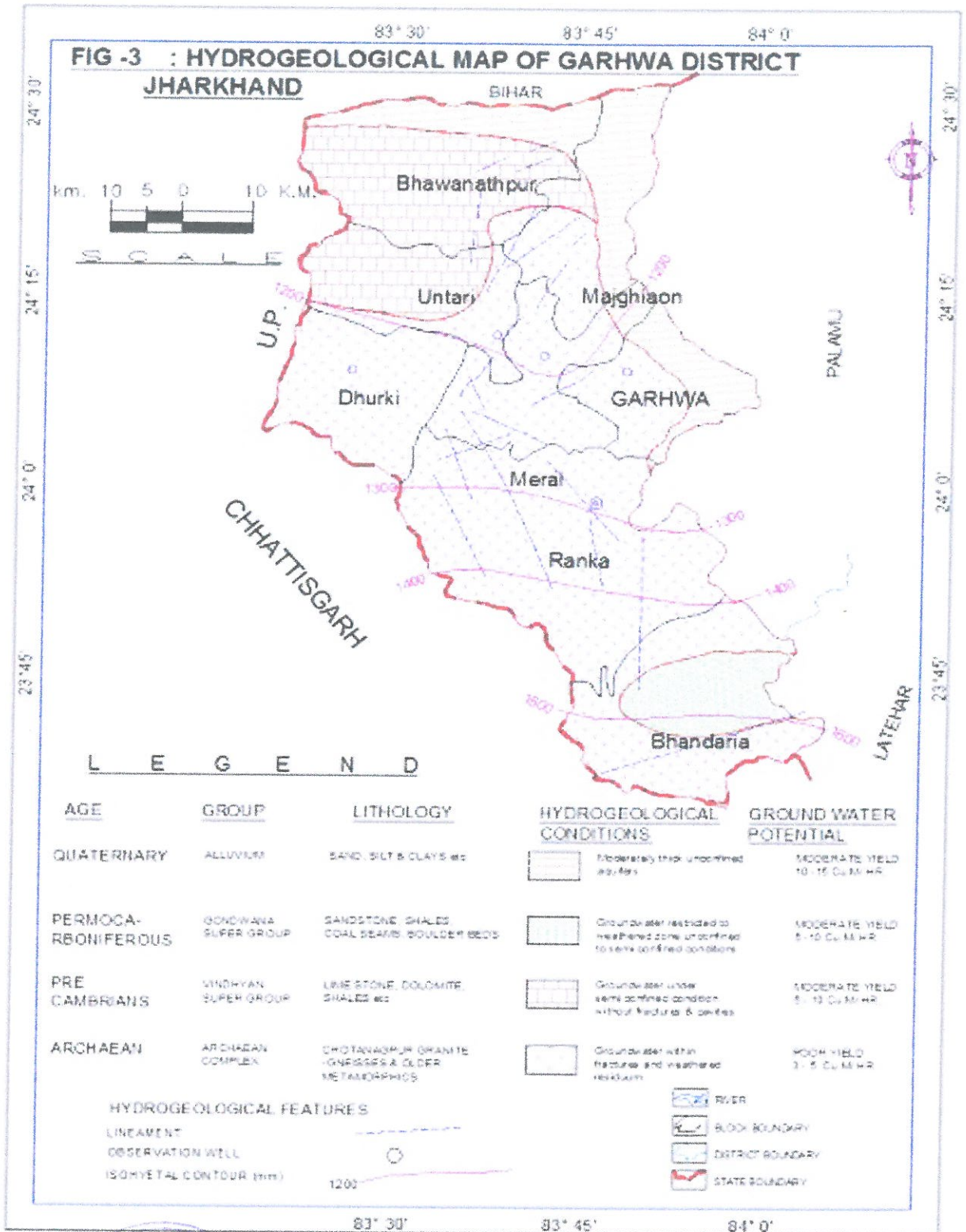


Figure 9-1:- Hydrogeology map

(Source: Central Ground Water Board, Garhwa)





9.2 Depth of Water Level

Central Ground Water Board has established network of observation wells for monitoring of ground water level to know the behaviour of ground ground regime in the district. During Pre-monsoon season in general the water level varies between 5 and 10 mbgl throughout the district. Higher water level >10 mbgl are recorded in northern and southern part of the state. (Fig - 9.2).

The water level in general the water level varies between 2 and 5 mbgl as throughout the district. Higher water level > 5.00 mbgl are recorded in northern and southern part of the state. (Fig - 9.3).



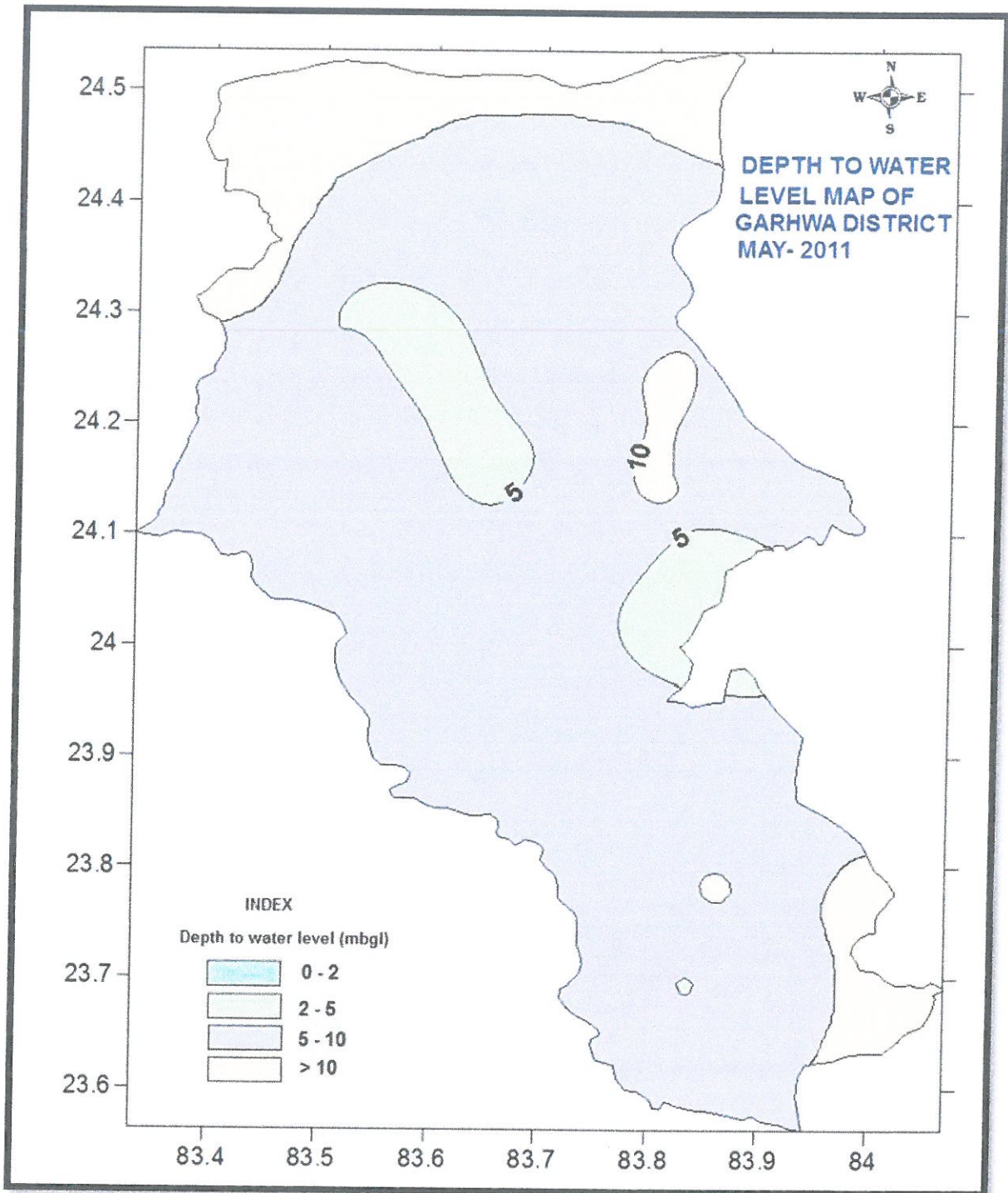


Figure 9-2:- Pre-monsoon season map
(Source: Central Ground Water Board, Garhwa)



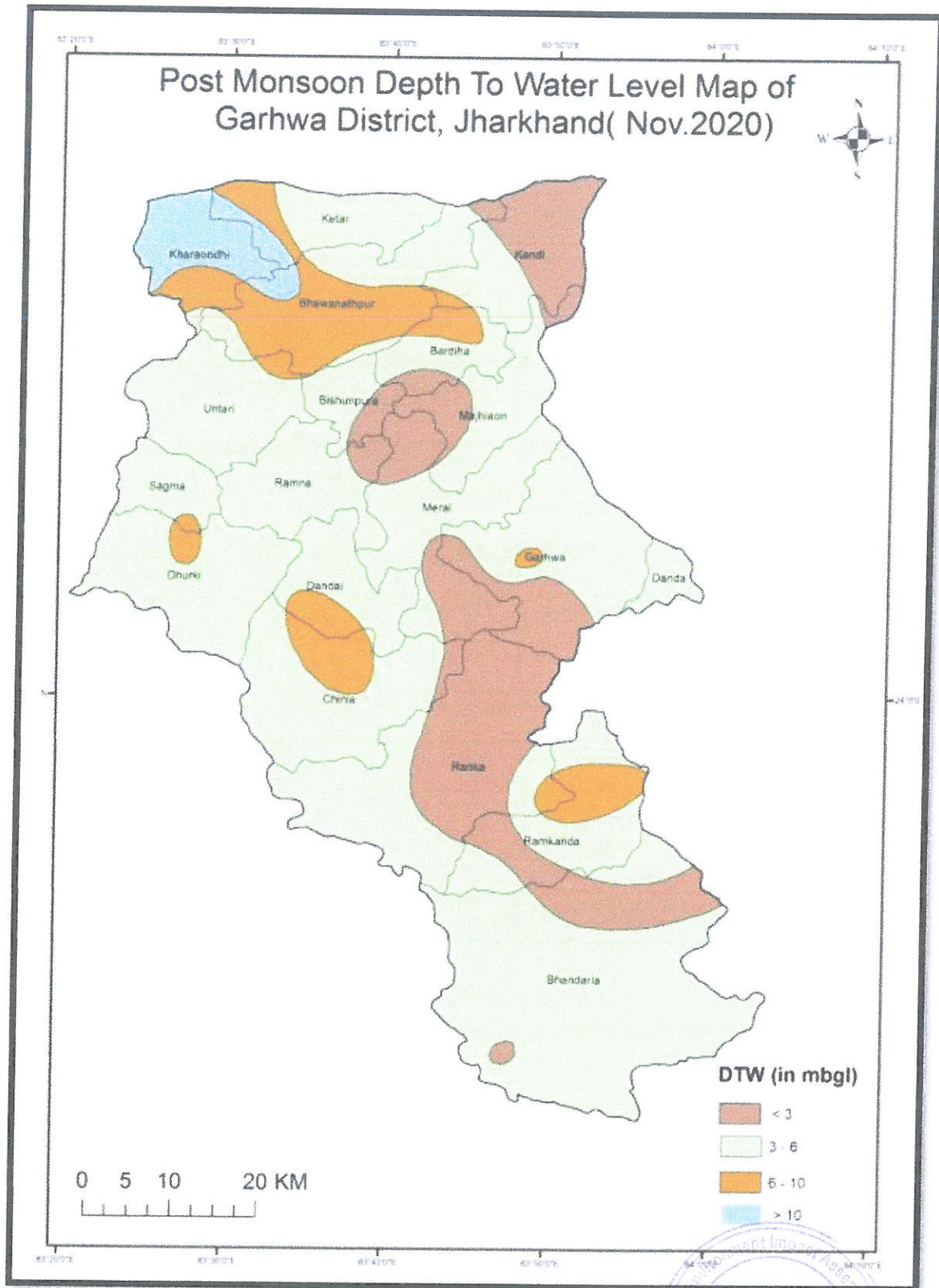


Figure 9-3:- Post-monsoon season Map

(Source: http://cgwb.gov.in/AQM/NAQUIM_REPORT/Jharkhand/GARHWA%20JH.pdf)



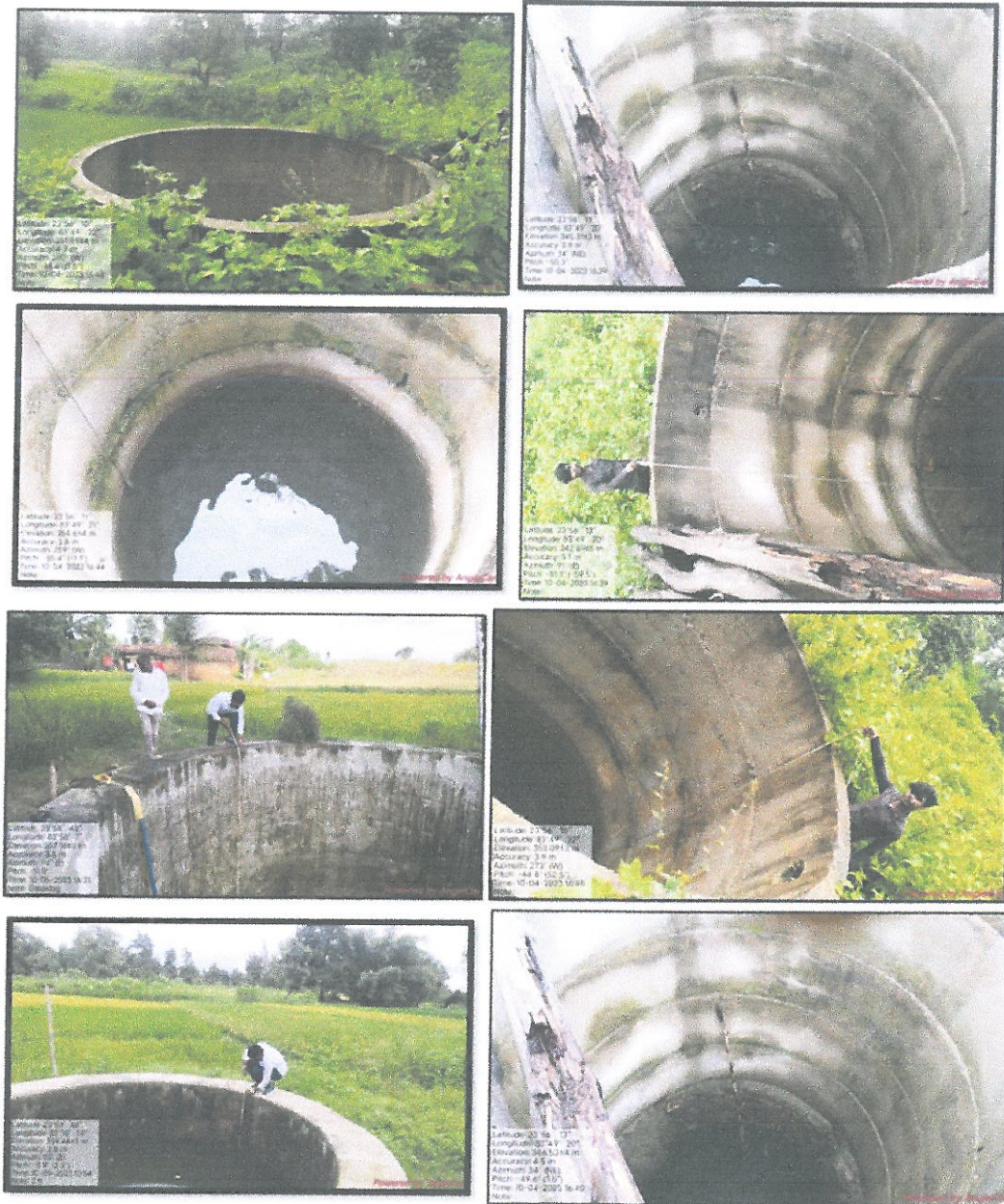


Figure 9-4:- Survey ground Water level

9.3 Water Level Trend

The water level of the maximum wells shows the falling trend in the district which are localized patches of the area. The observation well in Majhiaon and Ranka are showing rising trend. The maximum and minimum fall of water level trend of the observation wells are 0.205 M/Yr. (Garhwa) and 0.125 M/Yr. (Nagaruntari) respectively.

Source: CGWB Booklet, Garhwa 2013





9.4 Ground Water Resources

Ground Water Resources assessment has been carried out based on the recommendations of Central Water Estimation Committee Report 1997 (GEF, 1997). The net ground water availability has been assessed to be 31073.03 ha-m. The existing ground water draft for all uses has been assessed as 109586 ha-m. The net ground water availability for future irrigation has been assessed as 19305.88 ha-m. The stage of ground water development in Garhwa district is 35.29.

Source: CGWB Booklet, Garhwa 2013

9.5 Ground Water Quality

Chemical Quality of water is very important from the agriculture and public health point of view. The chemical constituents of water should be within the prescribed limits to avoid any harmful effect of crops and general health of local population.

The available chemical analyzed data reveals that ground water of the district is mainly alkaline in character (PH – 8.3). The chemical constituents are within the tolerance limit as per the drinking water norms.

9.6 Status of Ground Water Development

There is sufficient scope for shallow as well as deep borewells. State Government agency has been drilled a no. of borewells to minimize the drinking water problems in the district. Central Ground Water Board has also drilled 7 no. of borewells in the district. The depth of borewell ranges between 114.07 to 206 mbgl. The discharge of borewells ranges from 1.4 m³/hr. to 20.4m³/hr. The maximum draws down of the borewell is 30 m below ground level. The transmissivity and storativity of the borewell at Meral is 16m²/day and 1.7 x 10⁻⁴ respectively.

Source: CGWB Booklet, Garhwa 2013





Table 9-1:- Stage of ground water development of Garhwa District as on 31st March 2009
(Ha-m)

Sl. No	Assessment Unit/ District	Command/Non-Command area Total	Total Ground Water Recharge	Natural Discharge during Non Monsoon Season	Net Ground Water Availability	Existing Gross Ground Water Draft For all Uses	Stage of Ground Water Development
1	Bhandaria	6633.42	737.296	86.81	824.10	127.58	5768.55
2	Bhawnathpur+ Kandi	5882.81	1301.70	285.81	1587.51	419.50	4161.60
3	Chinia	1308.98	309.95	51.91	361.86	76.29	922.73
4	Dandai	982.32	382.80	83.97	466.77	123.41	476.11
5	Dhurki	1996.89	957.70	111.79	1069.49	164.30	874.11
6	Garhwa	3863.38	1431.62	253.25	1684.88	368.80	2062.96
7	Kharaundi	919.59	277.94	68.84	346.78	101.18	540.47
8	Majhiaon	1468.15	593.46	143.94	737.40	211.56	663.13
9	Meral	1821.11	656.56	169.09	825.65	248.51	916.03
10	Nagaruntari	1288.74	570.72	136.22	706.94	200.21	517.81
11	Ramkanda	1286.09	197.66	57.01	254.68	83.80	1004.63
12	Ramna	1482.63	1071.48	138.94	1210.42	204.20	206.94
13	Ranka	2138.91	768.6	122.68	891.28	180.30	1190.01
	Total	31073.03	9257.492	1710.26	10968	2509.65	19305.88

(Source: Central Ground Water Board, Garhwa)





10 RAINFALL AND CLIMATE OF THE DISTRICT

10.1 Climate & Rainfall

Climate: The climate of the district is humid and sub-tropical. The year can be divided in to three main seasons, the winter season from November to March, the summer season is from March to May and Monsoon season from June to September; October is a transitional month between Monsoon and winter seasons. December and January are the coolest months. In winter the temperature goes down to 30C. By March temperature begin to rise steadily. In May and early part of June the maximum temperature can be as high as 47°C on individual days. Humidity is generally normal in this district, except in Monsoon months.

Rainfall: From the onset of the Monsoon by the middle of June, rainfall rapidly increases reaching the peak level in August and continued to till the September.

The annual variation of rainfall is not much. The maximum precipitation occurs during July month. The average normal rainfall of the district as a whole is 1193 mm. During winter season it hardly records 10 cm rainfall but most of the rain occurs during rainy season.

The rainfall of the district is given below in Table No 10-1



Table 10-1:- Rainfall data

YEAR	JAN		FEB		MAR		APR		MAY		JUN	
	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
2016	55	244	0	-100	95	796	0	-100	93	786	83.5	-31
2017	7.3	-54	0.2	-98	3	-72	0	-100	0	-100	12.4	-90
2018	0	-100	7.4	-23	0	-100			6.2	-41	46.2	-62
2019	2.4	-82	6.4	-60	12.4	14	6	20	0	-100	42.8	-70
2020	11	-19	9.4	-41	60	450	3.2	-36	16.6	28	273.8	94
YEAR	JUL		AUG		SEPT		OCT		NOV		DEC	
	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
2016	304	6	474.5	62	123.6	-45	71.1	35	0	-100	0	-100
2017	171	-41	165.6	-43	70.4	-69	19.2	-63	3.4	31	0	-100
2018	149.8	-48	166.4	-43	70.2	-69	14	-73	0	-100	6.8	28
2019	161.6	-46	159.4	-46	86.2	-59	29	-33	0	-100	17	247
2020	222	-26	130.9	-55	86.4	-59	11.2	-74	0.8	-89	0	-100

(Source: <https://hydro.imd.gov.in>)



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Table 10-2:- Month wise data

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	OCT	Nov	Oct	Dec
Record high °C (°F)	33.0(91.4)	38.0(100.4)	41.0(105.8)	45.0(113.0)	47.0(116.6)	47.0(116.6)	40.0(104.0)	36.0(96.8)	35.0(95.0)	35.0(95.0)	32.0(89.6)	28.0(82.4)	47.0(116.6)
Average high °C (°F)	24.65(76.37)	28.99(84.18)	34.31(93.76)	39.98(103.96)	43.09(109.56)	39.53(103.15)	34.37(93.87)	32.24(90.03)	31.71(89.08)	30.39(86.7)	28.61(83.5)	24.65(76.37)	32.71(90.88)
Daily mean °C (°F)	20.16(68.29)	24.53(76.15)	30.34(86.61)	36.28(97.3)	39.67(103.41)	36.49(97.68)	31.83(89.29)	29.98(85.96)	29.07(84.33)	27.13(80.83)	24.56(76.21)	20.37(68.67)	29.2(84.56)
Average low °C (°F)	12.7(54.86)	16.22(61.2)	21.48(70.66)	26.48(79.66)	29.2(84.56)	29.67(85.41)	26.76(80.17)	25.23(77.41)	24.19(75.54)	21.06(69.91)	17.48(63.46)	13.4(56.12)	21.99(71.58)
Record low °C (°F)	9.0(48.2)	11.0(51.8)	14.0(57.2)	20.0(68.0)	21.0(69.8)	22.0(71.6)	22.0(71.6)	23.0(73.4)	21.0(69.8)	16.0(60.8)	14.0(57.2)	8.0(46.4)	8.0(46.4)
Average precipitation mm (inches)	6.37(0.25)	10.77(0.42)	7.04(0.28)	2.08(0.08)	1.81(0.07)	38.54(1.52)	102.73(4.04)	138.74(5.46)	110.34(4.34)	32.51(1.28)	0.15(0.01)	6.05(0.24)	38.09(1.5)
Average precipitation days (≥ 1.0 mm)	0.64	1.36	0.91	0.64	0.36	3.82	6.45	7.82	5.91	2.73	0.09	0.73	2.62
Average relative humidity (%)	47.27	41.96	29.8	23.13	22.82	44.03	68.17	79.91	79.23	68.68	54.91	50.72	50.89
Mean monthly sunshine hours	8.35	8.47	11.3	12.8	13.15	12.73	11.87	11.51	10.85	10.52	8.62	8.45	10.72

(Source: <https://tcktick.org/india/jharkhand/garhwa>)





11 DETAILS OF EXISTING/WORKING MINING LEASES IN THE DISTRICT

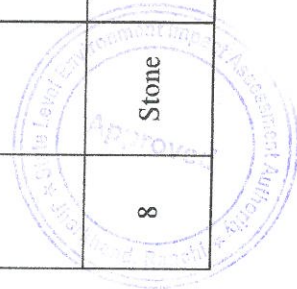
Table 11-1:- Details of Existing/Working Mining Leases in the District

Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & Date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1 st /2 nd .. renewal)	
						Form	To	From	To
1	2	3	4	5	6	7	8	9	10
1	Stone	Sri Sunil Kumar Sharma S/o-Sri Jai Kishan Sharma,	Vill- Sonpurwa, PO+PS -Garhwa	20.07.1994	1.23Acre/0.50 Ha	21.11.2004	21.11.2014	22.11.2014	21.11.2024
2	Stone	Ms Keshri Industries Partner Satya Prakash Keshri, S/o Basant Kumar Keshri,	Choudhrana Bazar, Garhwa	30 M, Dated 05-02-2004	8.00 Acre/3.24 Ha	07.02.2004	06.02.2014	07.02.2014	06.02.24
3	Stone	Maa Mundeshwari Interprises, Prop Lalit Kumar Singh, S/o Sri Ashok Kumar Singh,	Vill-Kariwadih, PO+PS- Kharoundi, Garhw a	Letter No. 688, M, Date 25-06-2016	2.4 acre /0.97 Ha	15.09.2017	14.09.2027	N.A	N.A
4	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Letter No. 211, 08.03.2019	9.92Acre/4.01 Ha	06.08.2019	06.08.2024	N.A	N.A

District Survey Report for Minor Minerals other than Sand Mining or River- bed Mining for Garhwa District, Jharkhand.



Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & Date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1 st /2 nd .. renewal)	
						Form	To	From	To
1	2	3	4	5	6	7	8	9	10
5	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Letter No. 210, 08.03.2019	9.5 Acre/3.84 Ha	06.08.2019	05.08.2024	N.A	N.A
6	Stone	Sri Raj Kumar Vishwakarma, S/o- Sri Shyam Kishore Vishwakarma,	Vil- Ambakhoria, PS- Dhurki, Garhwa	Letter no. 374, 10.07.2020	1.13 acre	15.07.2020	14.07.2030	N.A	N.A
7	Stone	Ms M.A Project, Prop-Md Nizam Ansari, S/o- Makbul Ansari, Terminated	Vill-Makri, PS- Bhawanathpur, Garhwa	15.07.2020	0.43 acre	15.07.2020	14.07.2030	N.A	N.A
8	Stone	Jai Sokha Baba Stone Works	Ranka Puregada	Letter no. 1040/M, dated 19.07.2022	6.0 acre/2.428 ha	22.02.2023	21.02.2033	N.A	N.A



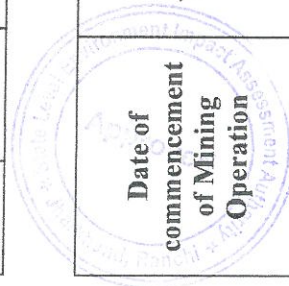
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Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & Date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1 st /2 nd .. renewal)	
						Form	To	From	To
1	2	3	4	5	6	7	8	9	10
9	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	Letter 487/M, 18.04.2023	7.0 Acre/2.833 ha	14.07.2023	13.07.2033	N.A	N.A
10	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	Letter 584/M, 08.05.2023	6.97 acre / 2.821 ha	14.07.2023	13.06.2028	N.A	N.A
11	Stone	M/S Jai Baba Bajnath Stone Works	At- Near Chandra Residency, Village & PO- Sudna, PS- Medininagar District Palamu, Jharkhand.	Letter No. 491/M, Dated 18.04.2023	5.42acre/ 2.19 Ha	26.07.23	25.07.33	N.A	N.A
12	Stone	Trideo Stone Mines Gasedag, S.P kofhi Road Palamau.	Village & Post Mahugawan, Thana- Chainpur, District Palamu, Jharkhand-822110	Letter No. 505/M, Dated 20.04.2023	6.91acre/ 2.80 ha	11.08.2023	10.08.2023	N.A	N.A



Sl. No.	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & Date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1 st /2 nd .. renewal)	
						Form	To	From	To
1	2	3	4	5	6	7	8	9	10
13	Stone	Maa Vindhewashini Stone mines	Address:- Devi Mandap Road, Ranchi Road Redma, Ward No. 17, Daltonganaj (Palamu) 822101	Letter no. 582/M, Dated 06.05.2023	6.4 acre/ 2.59 Ha	31.07.2023	30.06.2028	N.A	N.A
14	Stone	Smt. Bidhya Sharma, W/o Shree Ashok Kumar Terminated	At+P O Dindar, P.S -Hashpura, District Aurangabad, Bihar	Letter No. 209/M, Dated 08.03.2019	8.47 Acre/ 3.43 ha	14.06.2019	13.06.2029	NA	NA



Date of commencement of Mining Operation	Status (Working/Non-Working/ Temp. working for dispatch etc.)	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No. with date date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
N.A	Working	Non-Captive	Yes, Letter no. EC/SEIAA/2014-15/381/2014/709 RANCHI, DATED 31-12-2014	24°12'92.0" to 23°54'36.8064" N & 83°49'40.9240" to 83°46'79" E	Opencast

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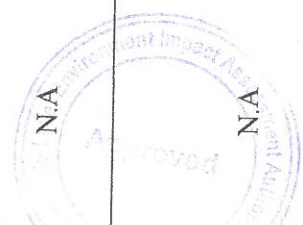


District Survey Report for Minor Minerals other than Sand Mining or River-bed Mining for Garhwa District, Jharkhand.

Date of commencement of Mining Operation	Status (Working/Non-Working/ Temp. working for dispatch etc.)	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No. with date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
11	12	13	14	15	16
N.A	Working	Non-Captive	Yes, Letter no. 233, Ranchi dated 09.01.2014	24°16'24.06" to 24°16'36.8064" N & 83°49'40.9240" to 83°46'79" E	Opencast
N.A	Working	Non-Captive	Yes, LETTER NO. EC/DEIAA/2016-17/10, GARHWA DATED 07-02-2017	24°23'15.9" N to 24°23'14.8" N & 83°43'30.4" E to 83°43'28.5" E	Opencast
24.09.2019	Working	Non-Captive	Yes, Letter No.- EC/DEIAA/2018-19/48, GARHWA, DATED 03.08.2018	23°54'32.3" to 23°54'44.0" N & 83°56'01.3" E to 83°56'04.9" E	Opencast
24.09.2019	Working	Non-Captive	Yes, Letter No.- EC/DEIAA/2018-19/49, GARHWA, DATED 03.08.2018	23°54'15.1" N to 23°54'21.5" N & 83°56'00.5" E to 83°56'12.7" E	Opencast
26.06.2021	Working	Non-Captive	Yes, letter no. EC/DEIAA/2018-19/52, GARHWA, Dated 03-08-2018.	24°5'10.878" N to 24°5'14.736" N & 83°28'25.08" E to 83°28'30.186" E	Opencast
N.A	Non-Working	Non-Captive	Yes	24°22'38.3" to 24°22'39.6" N & 83°34'00.5" to 83°34'03.6" E	Opencast



Date of commencement of Mining Operation	Status (Working/Non-Working/ Temp. working for dispatch etc.)	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No. with date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
11	12	13	14	15	16
N.A	Working	Non-Captive	Yes, letter no. EC/SEIAA/2022-23/2678/2022/339, Ranchi, Dated 29/12/2022	23°56'14.83" to 23°56'20.34" N & 88°49'26.51" to 83°49'35.00"E	Opencast
N.A	Non-Working	Non-Captive	Yes, letter No. EC/SEIAA/2023-24/2825/2023/113, Ranchi Dated 07-06-2023.	23°54'29.78" to 23°54'36.8064" N & 83°49'40.9240" to 83°49'51.6085" E	Opencast
N.A	Non-Working	Non-Captive	Yes, EC/SEIAA/2023-24/2825/2023/112, Ranchi Dated 07-06-2023.	23°54'09.2070" to 23°54'16.3588" N & 83°48'46.2290" to 83°48'54.0401" E	Opencast
N.A	Non-Working	Non-Captive	Yes, EC/SEIAA/2023-24/2840/2023/105, Ranchi Dated 07-06-2023.	23°54'41.93" to 23°45'49.92" N & 83°49'10.05" to 83°49'16.00"E	Opencast
N.A	Non-Working	Non-Captive	Yes, EC/SEIAA/2023-24/2850/2023/157, Ranchi Dated 05-07-2023.	1. 23°54'16.27"N 83°50'44.57" E 2. 23°54'18.40"N 83°50'46.54"E 3. 23°54'19.97"N 83°50'43.81"E 4. 23°54'17.97"N 83°50'42.29"E	Opencast





Date of commencement of Mining Operation	Status (Working/Non-Working/ Temp. working for dispatch etc.)	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No. with date date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
11	12	13	14	15	16
N.A	Non-Working	Non-Captive	Yes, EC/SEIAA/2023-24/2845/2023/121, Ranchi Dated 08-06-2023.	23°53'43.85"N to 23°53'50.27"N & 83°51'24.66" E to 83°51'33.77"E	Opencast
20.01.2020	Non-Working	Non-Captive	Yes, Letter No. EC/DEIAA/2018-19/46, GARHWA DATED-03.08.2018	24°02'25.7" N to 24°02'34.1" N & 83°44'08.4" E to 83°44'17.4" E	Opencast



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12 DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS

Table 12-1:- Royalty or Revenue Received

SUMMARY REPORT FROM THE FINANCIAL YEAR 2019-20 TO 2022-23 (FIGURE IN LAKH)					
SL. NO	NAME OF MINERAL	2019-20	2020-2021	2021-22	2022-23
1	LIMESTONE	0	0	0	23.57
2	DOLOMITE	122	0	117.34	111.26
3	STONE/MORAM	45.8	163.91	402.3	660.24
4	BRICK CLAY SAND	17.7	45.1	72.42	70.96
5	SAND	37.6	89.36	89.41	0
6	APPLICATION FEE AND OTHER	7.85	8.89	14.02	4.02
7	WORK DEPARTMENT	1367.85	2330.71	1365.46	2101.49
8	PENALTY	0	0	40.24	56.98
9	ENVIRONMENTAL FEE	0	0	5.14	6.55
10	MANAGEMENT AMOUNT	0	0	6.92	4
11	AUCTION ACCOUNT	0	0	0	4.21
12	TENDER AMOUNT	0	0	5	2.97
	TOTAL	1598.8	2637.97	2118.25	3046.25





13 DETAILS OF PRODUCTION OF MINOR MINERALS IN LAST THREE YEARS

Table 13-1:- PRODUCTION & DISPATCH

PRODUCTION & DISPATCH FY 2017-18 TO 2022-23						
SL.NO	LESSEE NAME/ ADDRESS	MAUZA	MINERAL NMAE	FY	PRODUCTION	DISPATCH
1	Sri Sunil Kuma Sharma S/o-Sri Jai Kishan Sharma, Vill- Sonpurwa,Po+Ps- Garhwa	OKHARGARA	STONE	2017-18	81000	7303
				2018-19	176500	135604
				2019-20	38500	2000
				2020-21	0	15500
				2021-22	0	0
				2022-23	0	0
				TOTAL	296000	160407
2	Ms Keshri Industries Partner Satya Prakash Keshri,S/o Basant Kumar Keshri, Choudhrana Bazar,Garhwa	JOGIRAL KHURD	STONE	2017-18	116556	0
				2018-19	536864	173472
				2019-20	105960	193420
				2020-21	0	0
				2021-22	100000	72372
				2022-23	50000	325459
				TOTAL	909380	764723
3	Maa Mundeshwari Interprises,Prop Lalit Kumar Singh,S/o Sri Ashok Kumar Singh, Vill- Kariwadih,Po+Ps- Khroundi,Garhwa	BARDIHA	STONE	2017-18	0	0
				2018-19	615000	51110
				2019-20	0	53253.3
				2020-21	100000	119300.05
				2021-22	269000	347500
				2022-23	412500	486300
				TOTAL	1396500	1057463.35
4	Sri Rajat Kapoor,S/o R.d Kapoor, Belwatika,Daltonga nj, Palamau	MURKHUR	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	250000	52834
				2020-21	2475000	737123
				2021-22	3400000	3157765
				2022-23	3200000	4557693.5
				TOTAL	9325000	8505415.5
5	Sri Rajat Kapoor,S/o R.d Kapoor, Belwatika,Daltonga nj, Palamau	KURUMDARI	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	250000	35300
				2020-21	2255000	1114899.5
				2021-22	3350000	2442485
				2022-23	2850000	4374614
				TOTAL	8705000	7967298.5
6	SMT BIDYA SHARMA, WO	SIGSIGAKALA	STONE	2017-18	0	0
				2018-19	0	0



PRODUCTION & DISPATCH FY 2017-18 TO 2022-23

SL.NO	LESSEE NAME/ ADDRESS	MAUZA	MINERAL NMAE	FY	PRODUCTION	DISPATCH
	ASHOK KUMAR, VILL+PO- DINDER, AURANGABAD, BIHAR			2019-20	0	0
				2020-21	273500	2175
				2021-22	1095000	179716
				2022-23	1330000	577601
				TOTAL	2698500	759492
7	Ms M.A Project, Prop-Md Nizam Ansari, S/o- Makbool Ansari, Vill-Makri, Ps- Bhawanathpur, Gar hwa	BUKA	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	19250	0
				2021-22	0	2652
				2022-23	0	0
				TOTAL	19250	2652
8	Sri Raj Kumar Vishwakarma, S/o- Sri Shyam Kishore Vishwakarma, Vil- Ambakhorya, Ps- Dhurki, Garhwa	AMBAKHORY A	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	0	0
				2021-22	38800	16950
				2022-23	185500	33750
				TOTAL	224300	50700
9	M.G Constuction Pvt. Ltd AUTHORISED ASIM KUMAR	PINDRA	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	0	0
				2021-22	0	0
				2022-23	0	0
				TOTAL	0	0
10	M.G Constuction Pvt. Ltd AUTHORISED ASIM KUMAR	GASEDAG	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	0	0
				2021-22	0	0
				2022-23	0	0
				TOTAL	0	0
11	M/S Jai Baba Bajinath Stone Works PARTNER RANA KUNDAN SINGH	CHATAKMAN	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	0	0
				2021-22	0	0
				2022-23	0	0
				TOTAL	0	0
12	MAA BINDHWASINI	GASEDAG	STONE	2017-18	0	0
				2018-19	0	0



PRODUCTION & DISPATCH FY 2017-18 TO 2022-23

SL.NO	LESSEE NAME/ ADDRESS	MAUZA	MINERAL NMAE	FY	PRODUCTION	DISPATCH
	STONE MINES PARTNER NISHANT AGARWAL			2019-20	0	0
				2020-21	0	0
				2021-22	0	0
				2022-23	0	0
				TOTAL	0	0
13	JAI SOKHA BABA STONE WORKS PARTNER VIVEK KUMAR SINGH	PUREGARA	STONE	2017-18	0	0
				2018-19	0	0
				2019-20	0	0
				2020-21	0	0
				2021-22	0	0
				2022-23	0	0
	TOTAL	0	0			



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14 MINERAL MAP OF THE DISTRICT

14.1 Mineral Wealth

The mineral resources of Garhwa district plays a pivotal role in industrial, social and economic development of the district. The district holds good resources of Graphite, Limestone, Dolomite, Granite, General Stone etc.

Available minor mineral resources in the district are:

- Sand
- Stone

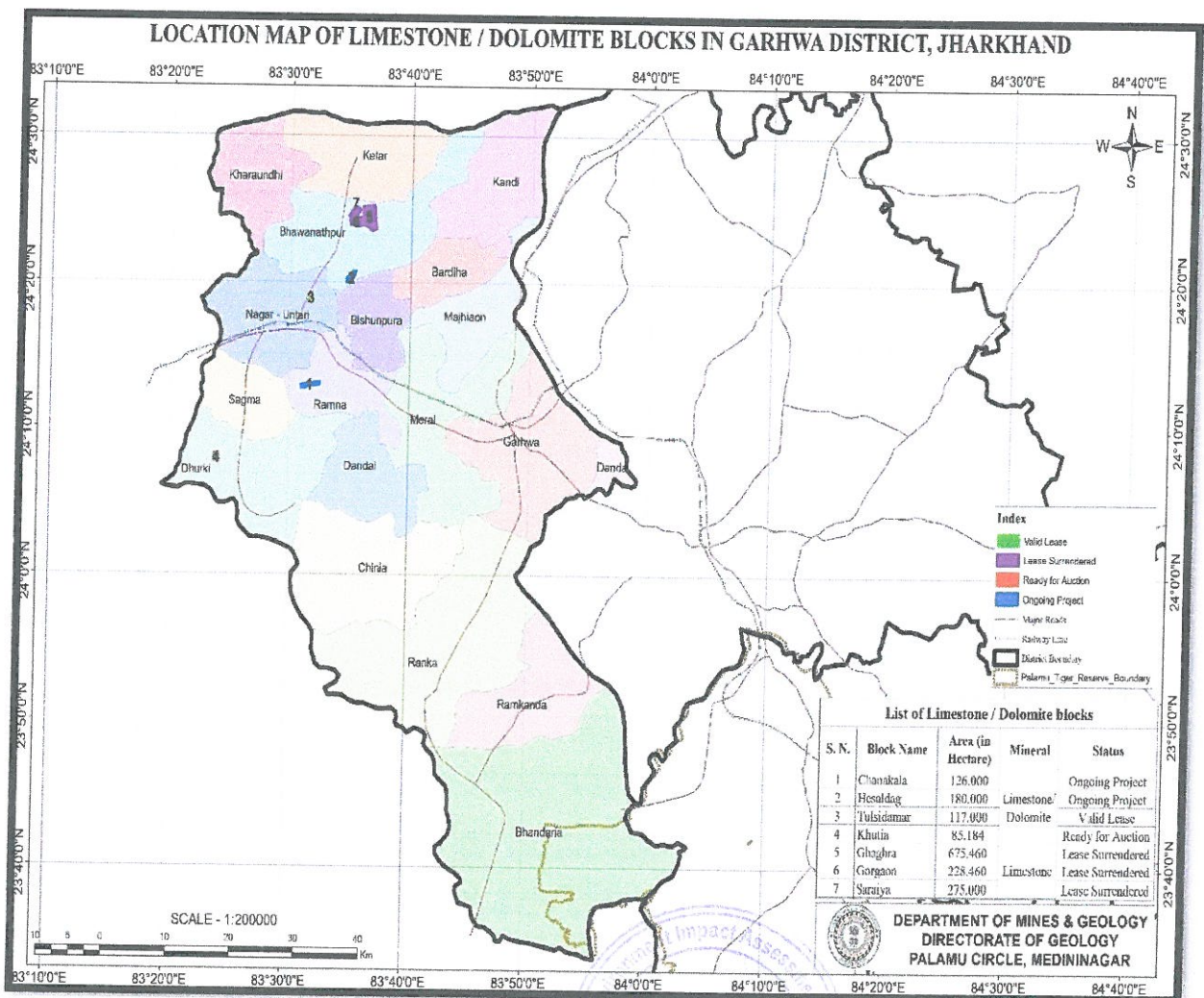


Figure 14-1:- Location Map Limestone / Dolomite

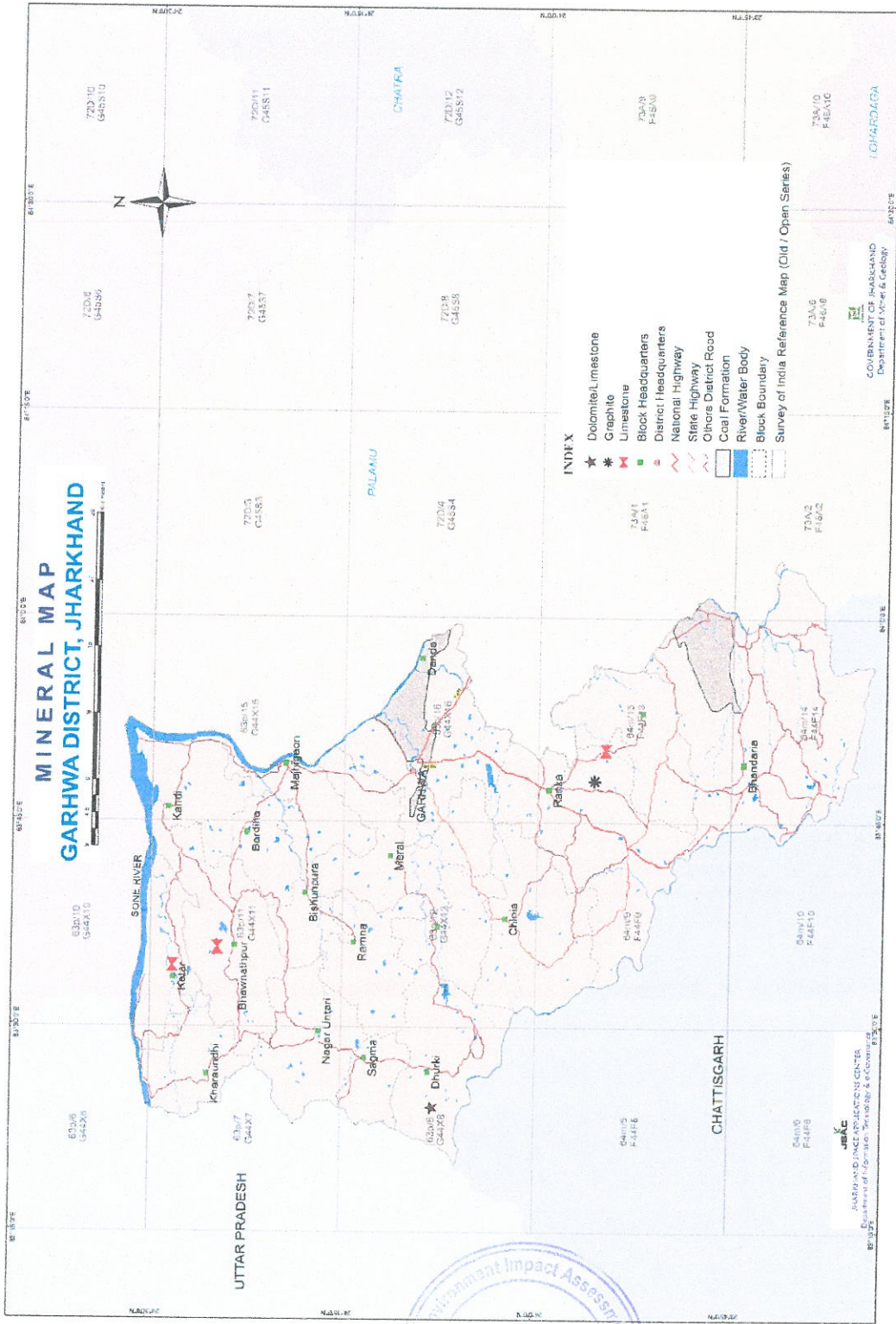


Figure 14-2:- Mineral Map Garhwa district



15 LIST OF LETTERS OF INTENT HOLDERS IN THE DISTRICT

Table 15-1:- LIST OF LETTERS OF INTENT

Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Letter of Intent Grant Order No. & Date	Area (acre)	Validity of LoI (in yrs)	Use (Captive/ Non-Captive)	Location of the Mining lease (Latitude & Longitude)
1	Stone	Sri Sunil Kumar Sharma S/o-Sri Jai Kishan Sharma,	Vill-Sonpurwa, PO+PS-Garhwa	20.07.1994	1.23 Acre/0.50 Ha	10	Non-Captive	24°12'92.0" to 23°54'36.8064" N & 83°49'40.9240" to 83°46'79" E
2	Stone	Ms Keshri Industries Partner Satya Prakash Keshri, S/o Basant Kumar Keshri, Maa Mundeshwari Interprises, Prop Lalit Kumar Singh, S/o Sri Ashok Kumar Singh,	Choudhrana Bazar, Garhwa	30 M, Dated 05-02-2004	8.00 Acre/3.24 Ha	10	Non-Captive	24°16'24.06 to 24°16'36.8064" N & 83°49'40.9240" to 83°46'79" E
3	Stone	Mundeshwari Interprises, Prop Lalit Kumar Singh, S/o Sri Ashok Kumar Singh,	Vill-Kariwadiah, PO+PS-Khroundi, Garhwa	Letter No. 688, M, Date 25-06-2016	2.4 acre /0.97 Ha	10	Non-Captive	24°23'15.9" N to 24°23'14.8"N & 83°43'30.4"E to 83°43'28.5"E
4	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Letter No. 211, 08.03.2019	9.92 Acre/4.01 Ha	5	Non-Captive	23°54'32.3" to 23°54'44.0"N & 83°56'01.3"E to 83°56'04.9"E



Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Letter of Intent Grant Order No. & Date	Area (acre)	Validity of LoI (in yrs)	Use (Captive/ Non-Captive)	Location of the Mining lease (Latitude & Longitude)
5	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Letter No. 210, 08.03.2019	9.5 Acre/3.84 Ha	5	Non-Captive	23°54'15.1"N to 23°54'21.5"N & 83°56'00.5"E to 83°56'12.7"E
6	Stone	Sri Raj Kumar Vishwakarma, S/o-Sri Shyam Kishore Vishwakarma,	Vil-Ambakhorya, PS-Dhurki, Garhwa	Letter no. 374, 10.07.2020	1.13 acre	10	Non-Captive	24°5'10.878"N to 24°5'14.736"N & 83°28'25.08"E to 83°28'30.186"E
7	Stone	Ms M.A Project, Prop-Md Nizam Ansari, S/o-Makbul Ansari, Terminated	Vill-Makri, PS-Bhawanathpur, Garhwa	15.07.2020	0.43 acre	10	Non-Captive	24°22'38.3" to 24°22'39.6" N & 83°34'00.5" to 83°34'03.6" E
8	Stone	Jai Sokha Baba Stone Works	Ranka Puregada	Letter no. 1040/M, dated 19.07.2022	6.0 acre/2.428 ha	10	Non-Captive	23°56'14.83" to 23°56'20.34" N & 88°49'26.51" to 83°49'35.00"E
9	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	Letter 487/M, 18.04.2023	7.0 Acre/2.833 ha	10	Non-Captive	23°54'29.78" to 23°54'36.8064" N & 83°49'40.9240" to 83°49'51.6085" E
10	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	Letter 584/M, 08.05.2023	6.97 acre / 2.821 ha	4Y 11M	Non-Captive	23°54'09.2070" to 23°54'16.3588" N & 83°48'46.2290" to 83°48'54.0401" E



Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Letter of Intent Grant Order No. & Date	Area (acre)	Validity of Lol (in yrs)	Use (Captive/ Non-Captive)	Location of the Mining lease (Latitude & Longitude)
11	Stone	M/S Jai Baba Bajinath Stone Works	At- Near Chandra Residency, Village & PO- Sudna, PS- Medininagar District Palamu, Jharkhand.	Letter No. 491/M, Dated 18.04.2023	5.42acre/ 2.19 Ha	10	Non-Captive	23°54'41.93" to 23°45'49.92" N & 83°49'10.05" to 83°49'16.00"E
12	Stone	Trideo Stone Mines Gasedag, S.P kothi Road Palamau.	Village & Post Mahugawan, Thana- Chainpur, District Palamu, Jharkhand- 822110	Letter No. 505/M, Dated 20.04.2023	6.91acre/ 2.80 ha	10	Non-Captive	1. 23°54'16.27"N 83°50'44.57" E 2. 23°54'18.40"N 83°50'46.54"E 3. 23°54'19.97"N 83°50'43.81"E 4. 23°54'17.97"N 83°50'42.29"E
13	Stone	Maa Vindhewashini Stone mines	Address:- Devi Mandap Road, Ranchi Road Redma, Ward No. 17, Daltonganj (Palamu) 822101	Letter no. 582/M, Dated 06.05.2023	6.4 acre/ 2.59 Ha	4Y 11M	Non-Captive	23°53'43.85"N to 23°53'50.27"N & 83°51'24.66" E to 83°51'33.77"E
14	Stone	Smt. Bidhya Sharma, W/o Shree Ashok Kumar Terminated	At+P.O Dindar, P.S - Hashpura, District Aurangabad, Bihar	letter No. 209/M, Dated 08.03.2019	8.47 Acre/ 3.43 ha	10	Non-Captive	24°02'25.7" N to 24°02'34.1" N & 83°44'08.4" E to 83°44'17.4" E
15	Stone	M/s Gannayak coal and construction Pvt. Ltd.	At flat no. 102 uma Bhavan 3591/A, Road No. 04, Ashok Nagar, Ranchi	Letter no. 707/M, dated 30-05-2023	5.25 acre/ 2.12 Ha	4Y 11M	Non-captive	23°56'36.29"N to 23°56'37.05"N & 83°50'01.75"E to 83°49'00.07"E



Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Letter of Intent Grant Order No. & Date	Area (acre)	Validity of LOI (in yrs)	Use (Captive/ Non-Captive)	Location of the Mining lease (Latitude & Longitude)
16	Stone	Sumit Jaiswal	Jatrabigh Collage Road, P.O+ Thana+ District- Chatra, Jharkhand	Letter no. 695/M, dated 30-05-2023	3.75 acre /1.517 ha	9Y 11M	Non-captive	23°54'9.65"N to 23°54'15.20"N & 83°51'05.46"E to 83°51'10.04"E
17	Stone	Prabhat Kumar Azad	Dhangar Toli, P.S+ District - Chatra, Jharkhand	Letter no. 750/M, dated 06-06-2023	4.9 acre/ 1.983 ha	9Y11M	Non-captive	23°54'7.47"N to 23°54'13.17"N & 83°51'08.23"E to 83°51'16.31"E
18	Stone	Mahadev Stone Mines. Partner Shri Nishant Kumar Agarwal	R/o Devi Mandap Road Ranchi, Redma, ward no. 17, Daltonganj, post & Thana Daltonganj, Palamu, Jharkhand 822101	Letter no. 1234/M, dated 15-09-2023	4.21 acre/1.70 ha	9Y11M	Non-captive	23°56'1.642"N to 23°56'12.954"N & 83°49'46.924"E to 83°49'52.266"E
19	Stone	Amit Kumar Sinha S/o Shri Arun kumar Sinha	R/o Near Police Line Shantipuri, Ward No. 20, Daltonganj, P.O+ P.S- Daltonganj, District Palamu, 822101	Letter no. 1049/M, dated 27-07-2023	5.0 acre/ 2.03 ha	4Y 11M	Non-captive	23°54'14.21"N to 23°54' 21.30" N & 83°48'47.83"E to 83°48'54.23"E

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लघु खनिज
गढ़वा जिलान्तर्गत पत्थर खनन हेतु आवेदन पत्रों की सूची:-

क्रमांक	खनन पट्टाधारी का नाम एवं पता	अंचल का नाम	खाता एवं प्लॉट नं०	रकबा	Coordinate	Reserve	
						Geological Reserve	Mineable Reserve
1	मेसर्स कल्पतरू स्टोन वर्क्स पार्टनर 1. संजय कुमार पाठक, पिता- आदित्य नारायण पाठक, वार्ड नं०- 6 एफ.सी. आई गोडाउन के पास आबादगंज पलामू 2. गौतम नारायण पाण्डेय, पिता- जय प्रकाश नारायण पाण्डेय, ग्राम- एस०पी० कोठी रोड आबादगंज, वार्ड नं०- 22 पलामू 3. प्रेम चौधरी, पिता-दुधनाथ चौधरी, रंका कला पो०- रंका राज, थाना- रंका, जिला- गढ़वा	3	4 खाता सं० पुराना 1/55, नया 26, प्लॉट सं० पुराना 434, नया 976, 978, 979 अंश,	5 5.94 एकड़	6 कागजातों की मांग की गई है	7 कागजातों की मांग की गई है	8 कागजातों की मांग की गई है
2	शमीम अली, पिता- स्व० अमीन गद्दी, ग्राम- पटेल चौक नहर के पास वार्ड नं०- 03, पो० + थाना- भभुआ, जिला- गढ़वा, राज्य- बिहार	रंका, मौजा- चटकमान	खाता सं० पुराना 50, नया 120, प्लॉट सं० पुराना 209, नया 810, 811, 812 एवं, 820.	4.92 एकड़	कागजातों की मांग की गई है	कागजातों की मांग की गई है	कागजातों की मांग की गई है
3	साहिद अली, पिता- शमीम अली, ग्राम- पटेल चौक नहर के पास वार्ड नं०- 03, पो० + थाना-	रंका, मौजा- पुरेगाड़ा	खाता सं० पुराना 01, नया 47, प्लॉट सं०	3.97 एकड़	कागजातों की मांग की गई है	कागजातों की मांग की गई है	कागजातों की मांग की गई है



क्रमांक	खनन पट्टाधारी का नाम एवं पता	अंचल का नाम	खाता एवं प्लॉट नं०	रकबा	Coordinate	Reserve	
						Geological Reserve	Mineable Reserve
1	2 भभुआ, जिला- गढ़वा, राज्य- बिहार	3	4 पुराना 269, नया 915.	5 5	6 6	7 7	8 8
4	माँ भगवती ट्रेडर्स पार्टनर श्री निखिल कुमार सिंह, पिता- श्री भानु प्रताप सिंह, ग्राम- दौनादाग, पोस्ट+ थाना- रंका, जिला- गढ़वा	रंका, मौजा- पुरेगाड़ा	खाता सं०- 125, प्लॉट सं०- 874 अंश, एवं 907 अंश	5.0 एकड़	23°56'35.33"N to 23°56'41.68" N & 83°49'31.99" E to 83°49'37.12" E	कागजातों की मांग की गई है	कागजातों की मांग की गई है

(Source: - DMO, Garhwa)



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16 TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Based on the data collected from the existing mining leases and their approved mining plans a Total 1,934,090.36 cum or 6,507,532.81 Tonnes of mineable reserve of Stone is recorded in the Garhwa district.

Letter of Intent to 19 nos. of potential stone deposits is issued in Garhwa District. Based on reconnaissance survey, it has been also assessed that about 942957.2 tonnes of mineable reserve of Stone deposit can be mined to meet the demand-supply gap of district.

Table 16-1:- Existing/ Working Mining Lease Details

Sl. No	Existing/ Working Mining Lease Details	MINEABLE RESERVE		Lease period	Status
		IN CUM	IN TONNES	In yrs	
1	Sri Sunil Kumar Sharma, Mauza: - Okhargada P.S:- Meral, Circle :- Meral, Khata No:- 506, Plot No:- 3618P, Area :- 1.23 acre/ 0.50 ha	14,760	39,853	10	Working
2	Ms Keshri Industries, Mauza:- Jogirai Khurd, P.S:- Bishunpura, Circle :- Bishunpura, Khata No:- 59, Plot No:- 481, Area :- 8.00acre/ 3.23 ha	3,79,012	9,47,530	10	Working
3	Maa Mundeshwari Interprises Mauza:-Bardiha P.S:- Bardiha. Circle :- Bardiha Khata No:-91 Old, 307 new Plot No:-29P, Old, 260P New, Area :- 2.40 acre/ 0.97 ha	82,093	2,21,653	10	Working
4	Sri Rajat Kapoor, Mauza:-Murkhur, P.S:- Ramkanda, Circle :- Ramkanda, Khata No:-31old, 70 new, Plot No:-317, 320old, 1345, 1346, 1366,1375,& 1377, Area :- 9.92acre	9,78,412	26,41,713	5	Working
5	Sri Rajat Kapoor, Mauza:- Kurumdari, P.S:- Ramkanda, Circle :- Ramkanda, Circle :- Ramkanda, Khata No:-29old, & 55 new, Plot No:-116 & 126 (old) & 496 & 573 (New), Area :- 9.50 acre	8,06,656	21,77,972	5	Working



Sl. No	Existing/ Working Mining Lease Details	MINEABLE RESERVE		Lease period	Status
		IN CUM	IN TONNES	In yrs	
6	Sri Raj Kumar Vishwakarma Mauza:- Ambakhorya P.S:- Durki Circle :- Durki Khata No:-38 Plot No:- 796 Area :- 1.13 acre	44,135	1,19,167	10	Working
7	Ms M.A Project Mauza:- Buka P.S:- Bhawnathpur Circle :- Bhawnathpur Khata No:-82, Plot No:- 988 Area :- 0.43 acre Lease Terminated	41899	23150	10	Not Working
8	Jai Sokha Baba Stone Works Mauza:- Puregara P.S:- Ranka Circle :- Ranka Khata No:- 38 old & 115 new Plot No:-265 old, 263 & new 931 P Area :- 6.00 acre/ 2.428 ha	5,55,700	1500390	10	Working
9	M.G Constuction Pvt. Ltd Mauza:-Gasedag P.S:- Ranka Circle :- Ranka Khata No:-old 121, new 144 Plot No:- old 01, new 43 & 44 Area :- 7.00 acre/ 2.833 ha	8,90,063.44	24,03,171.3	10	EC granted, but Not Working
10	M.G Constuction Pvt. Ltd Mauza:- Pindra P.S:- Ranka Circle :- Ranka Khata No:- old 06, 25, 07, new 18,36,&29 Plot No:-old 24, 25, & 26 new 92, 93,P, 95, 96, 97, 150 & 101 Area :- 6.97 acre/ 2.821 ha	7,02,677.64	18,97,229.63	4 Y 11 M	EC granted, but Not Working
11	M/S Jai Baba Baijnath Stone Works Mauza:- Chatakman P.S:- Ranka Circle :- Ranka Khata No:-old 50, new 141 Plot No:- old 244, new 928p, 929 & 930P Area :- 5.42 acre/ 2.19 ha	6,61,200	17,85,240	10	EC granted, but Not Working



Sl. No	Existing/ Working Mining Lease Details	MINEABLE RESERVE		Lease period	Status
		IN CUM	IN TONNES	In yrs	
12	Trideo Stone Mines Mauza:-Gasedag P.S:- Ranka, Circle :- Ranka Khata No:-234 Plot No:- 413, 416p, Area :- 6.91 acre/ 2.80 ha	6,40,715	17,94,002	10	EC granted, but Not working
13	M/S Maa Vindhewashini Stone Mines. Mauza:-Gasedag P.S:- Ranka Circle :- Ranka Khata No:- old 70, 84, new 19, 20, 174 & 175 Plot No:- 203P, 204P, 205P, 206P& 292 new 1980P, 1981P, 2019, 2022, 2024 & 2036 Area :- 6.40 acre/ 2.59 ha	5,14,087	14,39,443	4 Yrs 11 Months	EC granted, but Not Working
14	Smt. Bidhya Sharma, "Mauza:-Sigsighakala P.S:- Chiniya Circle :- Chiniya Khata No:- 7 & 36, Plot No:- 856,859,863 & 1252 Area :- 8.47acre/3.43 ha Lease Terminated	576260	1555902	10	Not Working
	Total	759,147	3,119,295		
	Terminated	618,159	1,579,052		
	Balance	140,988	1,540,243		





Table 16-2:- LoI Issued' Mining Lease Details

Sl. No	LoI Issued' Mining Lease Details	MINEABLE RESERVE		Lease period	Status
		IN CUM	IN TONNES	In yrs	
1	Amit Kumar Sinha Mauza:-Pindra P.S:- Ranka, Circle :- Ranka Khata No:-6,45,33 Plot No:- 138, 149,110P,139,136P, Area :- 5.0 acre/ 2.03 ha	5,59,083.92	15,65,435	4Y 11M	Mine Plan Approved EC Not Granted
2	Mahadev Stone Mines Mauza:-Gaugada P.S:- Ranka, Circle :- Ranka Khata No:-56 Plot No:- 419,420,421,422,423, & 424 Area :- 4.21 acre/ 1.70 ha	4,29,697.14	12,03,152	9Y11M	Mine Plan Approved EC Not Granted
3	M/s Gannayak coal and construction Pvt. Ltd. Mauza:- Puregara P.S:- Ranka Circle :- Ranka Khata No:- 01(old), & new 25, Plot No:- old 434P, new 957, 958, 962P, 961P Area :- 5.25 acre/ 2.12 ha	2,70,351	7,56,983	4Y 11M	Mine Plan Approved EC Not Granted
4	Sumit Jaiswal Mauza:-Gasedag P.S:- Ranka Circle :- Ranka Khata No:- old 76, new 183 Plot No:- old 63, new 518/ 2546 P & 518 Area :- 3.75 acre/ 1.517 ha	2,33,112.9	6,29,404.83	9Y 11M	Mine Plan Approved EC Not Granted
5	Prabhat Kumar Azad Mauza:-Gaugada P.S:- Ranka, Circle :- Ranka Khata No:-new 234,95 & old 06,21 Plot No:- old 65,64 & new 525,517,516 (P) Area :- 4.9 acre/ 1.983 ha	3,00,857.4	8,12,314.98	9Y 11M	Mine Plan Approved EC Not Granted
Total		1,793,102.36	4,967,289.81		

**The above mineral reserve/ resource is as per approved mining plan of the respective mining leases.*



Table 16-3:- List of areas explored for minor minerals by Department of Mines and Geology.

S.N.	District/Block/Village	OSM NO. (T. S. No.)	Limiting Co-Ordinates	Area (In Hectare)	Resource (M.T.)
1	Garhwa/Meral/Banua	G44X11 (63P/11)	Latitude- 24° 14' 58.19"N to 24° 15' 05.42"N and Longitude: - 84° 41' 34.37"E to 84° 41' 47.68."E	5.1 Ha.	General Stone-1.87 MT
2	Garhwa/ Ramna/ Bhangonda	G44X12 (63P/12)	Latitude 24°14'5.74"N to 24°14'5.46"N and Longitude-83°35'6.03"E to 83°35'23.69"E	9.32 Ha.	General Stone-1.19 MT
3	Garhwa/Nagar Untari/ Pipardih	G44X7 (63P/7)	Latitude- 24°15'0.00"N to 24°17'30.00"N and Longitude- 83°25'0.00"E to 83°27'30.0"E	6.73 Ha.	General Stone-0.83 MT
4	Garhwa/Meral And Ramna /Latdag	G44X12 (63P/12)	Latitude-24°11'58.29" N to 24°12'53.00" N and Longitude- 83°37'23.30" E to 83°39'07.27" E.	280.4 Ha.	Decorative Granite Slab- 58.018 MT Granite Stone/Chips- 232.0734 MT
5	Garhwa/ Ranka/ Gasedag	F44F13 (64M/13)	Latitude:- 23°53'13.93"N to 23°53'21.04"N and Longitude: - 83°50'33.79"E to 83°50'43.64"E	3.15 Ha.	General Stone-1.45 MT
6	Garhwa/ Ranka/ Bahahara	F44F13 (64M/13)	Latitude: 23° 53' 25.7" N to 23° 53' 35.5" N and Longitude: 83° 48' 39.8" E to 83° 48' 50.0" E	5.047 Ha	General Stone-2.28 MT
7	Garhwa/ Meral/ Tenar	G44X12 (63P/12)	Latitude:-24° 12' 51.66" N to 24° 13' 00.74" N and Longitude:- 83° 40' 35.76" E to 83° 40' 46.43" E	6.14 Ha.	General Stone-1.68 MT





17 QUALITY/GRADE OF MINERAL AVAILABLE IN THE DISTRICT

17.1 MAJOR ROCK FORMATION

Granite gneiss, graphite schist, amphibolite, quartzite, dolerite and pegmatite are the major rock formation of Archaean age. The Vindyan Super group consists of good quality of limestone, dolomite and workable phosphates. The Gondwana super group of the area consists of coal, sandstone and shale. Dolomite, limestone, graphite, phosphorite and coal are the chief economic minerals of Garhwa district.

17.2 MINERAL RESOURCES

Table 17-1:- GRADE OF MINERAL

Sl. No.	Name of Mineral	Probable Reserves (in Million Tons)	Grade (in %)
1.	Dolomite	39.94	CaO -30.90 MgO - 18.22 B/F grade SiO ₂ - 6.04
2.	Limestone	122.95	SiO ₂ - 7.09 - 8.25 B/F MgO - 6.35 - 8.94 Grade CaO - 35.93 -41.82
3.	Phosphorite (K-bearing Shale)	10.00	P ₂ O ₅ - 3 Low SiO ₂ - 27-29.18 Grade CaO - 1.12 - 34.76
4.	Graphite	N.A.	Low grade fixed carbon ranges between 8-15%
5.	Coal	N.A.	Low grade

(Source: Mineral Inventory of Garhwa District-2007)



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18 USE OF MINERAL

Stones form one of the most important building materials in civil engineering. Stones are derived from rocks, which form the earth's crust and have no definite shape or chemical combination but are mixtures of two or more minerals. The mineral is a substance which is formed by the natural inorganic process and possesses a definite chemical combination and molecular structure. They are strong, durable and descent in appearance. Stone is an essential and more permanent building material in construction than other natural building materials. Based on the type, stones can be used in buildings for flooring, roofing, masonry paving roads and also as aggregates foe concrete. Most of the prehistoric monuments are built with natural stones as they remain stable with time.

Before the advent of concrete stones were highly preferred for heavy engineering works like bridge piers, harbour walls, sea side walls and for facing works. Stones for construction purposes are obtained by quarrying from solid massive rocks. The stone used for masonry construction should be hard, durable, tough and should be free from weathered soft patches of material, cracks and other defects that are responsible for the reduction of strength and durability.

Based on Geology, stones or rocks are classified into three types:

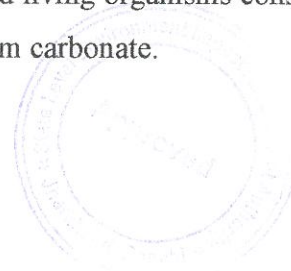
- Igneous Rocks – Basalt, Trap, Andesite, Rhyolite, Diorite, Granite.
- Sedimentary Rocks – Limestone, Dolomite and Sandstone.
- Metamorphic Rocks – Gneiss, Quartzite, Marble, Slate.

18.1 Types of Building Stones

Some of the common building stones which are used for different purposes in India are as follows: -

18.1.1 Limestone

It is a sedimentary rock formed by remanants of seaweeds and living organisms consolidated and cemented together. It contains a high percentage of calcium carbonate.



Limestone is used for flooring, roofing, pavements and as a base material for cement.



18.1.2 Phosphorite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$)

It is a sedimentary rock containing a high proportion of calcium Phosphate. Approximately 90% of rock phosphate production is used for fertilizer and animal feed supplements and the balance for industrial chemicals. In addition to phosphate fertilisers for agriculture, phosphorus from rock phosphate is also used in animal-feed supplements, food preservatives, baking flour, pharmaceuticals, anticorrosion agents, cosmetics, fungicides, insecticides, detergents, ceramics, water treatment and metallurgy.



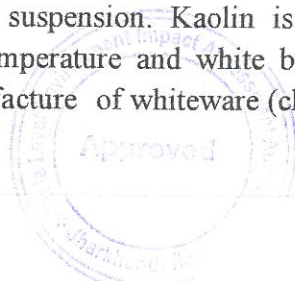
18.1.3 K-Rich Shale

Potassium-bearing shale is a type of layered sedimentary rock that forms exploitable deposits of water-insoluble potassium-bearing rock. Potassium-bearing shale is being developed as a potential alternative to potash for use in fertilisers. potassium-bearing shale is a potential source of potash fertiliser until large quantities of soluble potash are found. Potassium-bearing shale has been used to prepare potash fertilisers by physical methods with experimental research showing that the smaller the particle size of the shale, the greater its efficacy.



18.1.4 China Clay (Kaolinite)

Kaolinite, also called China clay, soft white clay that is an essential ingredient in the manufacture of porcelain and refractories and is widely used in the making of paper, rubber, paint, and many other products. Kaolin as found in nature usually contains varying amounts of other minerals such as muscovite, quartz, feldspar, and anatase. When kaolin is mixed with water in the range of 20 to 35 percent, it becomes plastic (i.e., it can be moulded under pressure), and the shape is retained after the pressure is removed. With larger percentages of water, the kaolin forms a slurry, or watery suspension. Kaolin is used extensively in the ceramic industry. where its high fusion temperature and white burning characteristics makes it particularly suitable for the manufacture of whiteware (china), porcelain, and refractories.





18.1.5 Graphite

Graphite is a naturally occurring form of crystalline carbon. It is a native element mineral found in metamorphic and igneous rocks. Graphite is a mineral of extremes. Graphite is used in pencils, lubricants, crucibles, foundry facings, polishes, arc lamps, batteries, brushes for electric motors, and cores of nuclear reactors.



18.1.6 Dolomite (CaMg (CO₃)₂)

Dolomite is used as a source of magnesium metal and of magnesia (MgO), which is a constituent of refractory bricks. Dolostone is often used instead of limestone as an aggregate for both cement and bitumen mixes and also as a flux in blast furnaces.

Dolomite is also used as feed additive for livestock, a sintering agent and flux in metal processing, and as an ingredient in the production of glass, bricks, and ceramics.



18.1.7 Decorative Stone

A term sometimes used alternately with ornamental stone. Natural material used as architectural trimmings in columns, fireplaces, and store fronts; may be set in silver- or gold-filled jewellery, as curio stones; e.g., malachite and marble. It is commonly used for all types of interior design projects.





18.2 Uses of Building Stones

The stones used for various types of works are as follows:

- Fine-grained granite and gneiss stones are used for heavy engineering works such as building bridge piers, breakwaters, monuments etc.
- Granite Quartzite and compact Sandstones are used for masonry works in industrial areas exposed to smoke and fumes.
- Marble, Granite and Sandstones are used for facing work of buildings.
- Limestone and Sandstone are used for general building works.
- Fine-grained Granite, Marble and soft Sandstones are used for carving and ornamental works.
- Compact Limestone and Sandstones are used for fire-resitant masonry.
- Granite, Quartzite stones are used in foundations of building in place with high groundwater level.
- Marble, Slate, Sandstone and Granite stones are used for floor pavings.





19 DEMAND AND SUPPLY OF THE MINOR MINERAL IN LAST THREE YEARS

In the present scenario, the stone boulders & chips have good market in all regions of the country for construction of buildings, roads, bridges, railway line and other constructional purposes. As such there are huge infrastructural activities such as road, building, railways are coming up by Govt. of India & PSUs under “Make in India” programme. The production of stone boulders & chips are the main raw minerals for the above activities and considering the last three years’ actual production of garhwa with respect to the requirement of the State has a huge gap. It is proposed to start the stone production from larger areas to at least double the production of the district which will enhance the revenue of the district and also support the livelihood of the local people.

The mining project will also bring economic benefits to the State by the ways of royalty of stone as well as benefit to the lessee. It will help in general of employment in rural areas in Jharkhand State where tribal people are starving due to unemployment. A single mining project shall be providing employment to approximately 10 to 20 people of the poorest section of the society and benefitting more than 50 to 60 people indirectly. Further, infrastructure development will help in development of nation. Socio-economic condition of the area will be improved as mining activity will create additional employment for the local habitants for raising their socio-economic status. Significant contribution will be made by lessee towards societal development of the surrounding area in the form of CSR fund.

There is a huge demand of stone chips for domestic and infrastructure sector. Only a few stone mines have environmental clearance for extraction of stone. There is limited supply of stone and there is huge gap. Due to construction of roads and public buildings for development works in the district a large number of stone chips & boulders are required. This will meet only by granting new leases in the district. The major part of the stone mineral will be supplied to the private and Government projects of RCD, PWD work, canal work & government building, Pradhan Mantri Awas Yojana (PMAY), Mukhyamantri Gramya Setu Yojana (MGSY) etc.

The production dispatch of the District Garhwa in the Financial Year 2017-18 TO 2022-23 is tabulated below:





PRODUCTION & DISPATCH FY 2017-18 TO 2022-23		
Year	Production in cft	Dispatch in cft
2017-18	197556	7303
2018-19	1328364	360186
2019-20	644460	336807.3
2020-21	5122750	1988998
2021-22	8252800	6219440
2022-23	8028000	10355418
Total	23573930	19268152.3

(Source DMO Garhwa)

Based on the data collected from the existing mining leases and their approved mining plans a Total **1,934,090.36 cum or 6,507,532.81 Tonnes** of mineable reserve of Stone is recorded in the Garhwa district.

Letter of Intent to 19 nos. of potential stone deposits is issued in Garhwa District. Based on reconnaissance survey, it has been also assessed that about 942957.2 tonnes of mineable reserve of Stone deposit can be mined to meet the demand-supply gap of district





20 MINING LEASES MARKED ON THE MAP OF THE DISTRICT

As per record of Garhwa District Mining Office, 19 Stone mining leases are registered out of which only 7 mining leases are in operational in current. The location of mining leases is given in Table 20.1 & Figure: 20.1: Location of Mining Lease in the Map of Garhwa district.

Table 20-1:- Location of Mining Lease in the Garhwa district.

Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Status (Working/Non-Working/Temp. working for dispatch etc.)	Location of the Mining lease (Latitude & Longitude)
1	Stone	Sri Sunil Kumar Sharma S/o-Sri Jai Kishan Sharma,	Vill- Sonpurwa,PO+PS- Garhwa	Working	24°12'92.0" to 23° 54'36.8064" N & 83°49'40.9240" to 83°46'79" E
2	Stone	Ms Keshri Industries Partner Satya Prakash Keshri, S/o Basant Kumar Keshri,	Choudhrana Bazar, Garhwa	Working	24°16'24.06 to 24°16' 36.8064" N & 83°49'40.9240" to 83°46'79" E
3	Stone	Maa Mundeshwari Interprises, Prop Lalit Kumar Singh, S/o Sri Ashok Kumar Singh,	Vill-Kariwadih, PO+PS- Khroundi, Garhwa	Working	24°23'15.9" N to 24°23'14.8"N & 83°43'30.4"E to 83°43'28.5"E
4	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Working	23°54'32.3" to 23°54'44.0"N & 83°56'01.3"E to 83°56'04.9"E
5	Stone	Sri Rajat Kapoor, S/o R.D Kapoor,	Belwatika, Daltonganj, Palamau	Working	23°54'15.1"N to 23°54'21.5"N & 83°56'00.5"E to 83°56'12.7"E
6	Stone	Sri Raj Kumar Vishwakarma, S/o-Sri Shyam Kishore Vishwakarma,	Vil- Ambakhorya, PS- Dhurki, Garhwa	Working	24°5'10.878"N to 24°5'14.736"N & 83°28'25.08"E to 83°28'30.186"E
7	Stone	Ms M.A Project, Prop-Md Nizam Ansari, S/o-Makbul Ansari, Terminated	Vill-Makri, PS- Bhawanathpur, Garh wa	Not Working	24°22'38.3" to 24°22'39.6" N & 83°34'00.5" to 83°34'03.6" E
8	Stone	Jai Sokha Baba Stone Works	Ranka Puregada	Working	23°56'14.83" to 23° 56'20.34" N & 88°49'26.51" to 83°49'35.00"E



Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Status (Working/Non-Working/Temp. working for dispatch etc.)	Location of the Mining lease (Latitude & Longitude)
9	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	EC granted, but Not Working	23°54'29.78" to 23° 54'36.8064" N & 83°49'40.9240" to 83°49'51.6085" E
10	Stone	M.G Constuction Pvt. Ltd	Plot No-376, Industrial Area, Phase-1, Panchkula, Haryana-134113	EC granted, but Not Working	23°54'09.2070" to 23° 54'16.3588" N & 83°48'46.2290" to 83°48'54.0401" E
11	Stone	M/S Jai Baba Bajinath Stone Works	At- Near Chandra Residency, Village & PO- Sudna, PS- Medininagar District Palamu, Jharkhand.	EC granted, but Not Working	23°54'41.93" to 23° 45'49.92" N & 83°49'10.05" to 83°49'16.00"E
12	Stone	Trideo Stone Mines Gasedag, S.P kothi Road Palamau.	Village & Post Mahugawan, Thana-Chainpur, District Palamu, Jharkhand-822110	EC granted, but Not working	1. 23°54'16.27"N 83° 50'44.57" E 2. 23°54'18.40"N 83°50'46.54"E 3. 23°54'19.97"N 83°50'43.81"E 4. 23°54'17.97"N 83°50'42.29"E
13	Stone	Maa Vindhewashini Stone mines	Address:- Devi Mandap Road, Ranchi Road Redma, Ward No. 17, Daltonganj (Palamu) 822101	EC granted, but Not Working	23°53'43.85"N to 23°53'50.27"N & 83° 51' 24.66" E to 83°51' 33.77"E
14	Stone	Smt. Bidhya Sharma, W/o Shree Ashok Kumar Terminated	At+P.O Dindar, P.S -Hashpura, District Aurangabad, Bihar	Not Working	24°02'25.7" N to 24° 02' 34.1" N & 83°44' 08.4" E to 83° 44' 17.4" E
15	Stone	M/s Gannayak coal and construction Pvt. Ltd.	At flat no. 102 uma Bhavan 3591/A, Road No. 04, Ashok Nagar, Ranchi	Mine Plan Approved EC Not Granted	23°56'36.29"N to 23°56'37.05"N & 83°50'01.75"E to 83°49'00.07"E
16	Stone	Sumit Jaiswal	Jatrahibagh Collage Road, P.O+ Thana+ District- Chatra, Jharkhand	Mine Plan Approved EC Not Granted	23°54'9.65"N to 23°54'15.20"N & 83°51'05.46"E to 83°51'10.04"E
17	Stone	Prabhat Kumar Azad	Dhangar Toli, P.S+ District - Chatra, Jharkhand	Mine Plan Approved EC Not Granted	23°54'7.47"N to 23°54'13.17"N & 83°51'08.23"E to 83°51'16.31"E



Sl. No	Name of the Mineral	Name of the lessee	Address & Contact No. of Letter of intent Holder	Status (Working/Non-Working/Temp. working for dispatch etc.)	Location of the Mining lease (Latitude & Longitude)
18	Stone	Mahadev Stone Mines. Partner Shri Nishant Kumar Agarwal	R/o Devi Mandap Road Ranchi, Redma, ward no. 17, Daltonganj, post & Thana Daltonganj, Palamu, Jharkhand 822101	Mine Plan Approved EC Not Granted	23°56'1.642"N to 23°56'12.954"N & 83°49'46.924"E to 83°49'52.266"E
19	Stone	Amit Kumar Sinha S/o Shri Arun kumar Sinha	R/o Near Police Line Shantipuri, Ward No. 20, Daltonganj, P.O+ P.S- Daltonganj, District Palamu, 822101	Mine Plan Approved EC Not Granted	23°54'14.21"N to 23°54' 21.30" N & 83°48'47.83"E to 83°48'54.23"E

LOCATION DETAILS OF ALL MINERALS

Table 20-2:- LOCATION DETAILS OF ALL MINERALS

S. No	Name of Minerals	Location	Block	Latitude	Longitude	T.S. No.
1	Graphite	Sewadih-Uchari	Ranka	23°58'30"N	83°46'0"E	64M/13
2	Graphite	Sikat	Ranka	23°56'39"N	83°47'43"E	64M/13
2	Coal	Binda - Harta	Bhandaria	23°44'33"N	83°53'26"E	64M/14
3	Phosphorite (K-Bearing Shale)	Makri - Muskania - Chandriya	Bhawanathpur	24°23' N to 24°27' N	83°22' E to 83°37' E	63P/14
4	Dolomite	Tulsidamar - Gangipur	Nagar & Bhawanathpur	24°05' N to 24°20' N	83°30' E to 83°35' E	63P/11
5	Limestone	Ghaghrah Gurgawan Saraiya	Bhawanathpur	24°20' N to 24°25' N	83°30' E to 83°40' E	63P/11
6	Limestone	Khutia	Dhurki	24°07' N to 24°08' N	83°23' E to 83°24' E	63P/8
7	General Stone	Banua	Meral	24° 14' to 24° 15' N	84° 41' to 84° 41' E	63P/11



S. No	Name of Minerals	Location	Block	Latitude	Longitude	T.S. No.
8	General Stone	Bhangonda	Bishnupura	24°14'05"N to 24°14'5.46"N	83°35'06"E to 83°35'23"E	63P/12
9	Granite/ Decorative Stone	Latdag	Meral/ Ramna	24°11'58'' N to 24°12'53'' N	83°37'23'' E to 83°39'07'' E.	63P/12
10	General Stone	Pipardih	Nagar Untari	24°15'0.00"N to 24°17'30.00"N	83°25'0.00"E to 83°27'30.0"E	63P/7
11	Dolomite	Hesaldag	Bhawnathpur	24°19'52.90"N to 24°20'51.30"N	84°34'34.65" to 84°35'31.10"	63P/11
12	Dolomite/ Limestone	Chanakala	Ramna	24°13'19.78"N to 24°12'47.35"N	83°31'26.78" to 83°32'4439.50"	63P/12

(Source: geology.jharkhand.gov.in)



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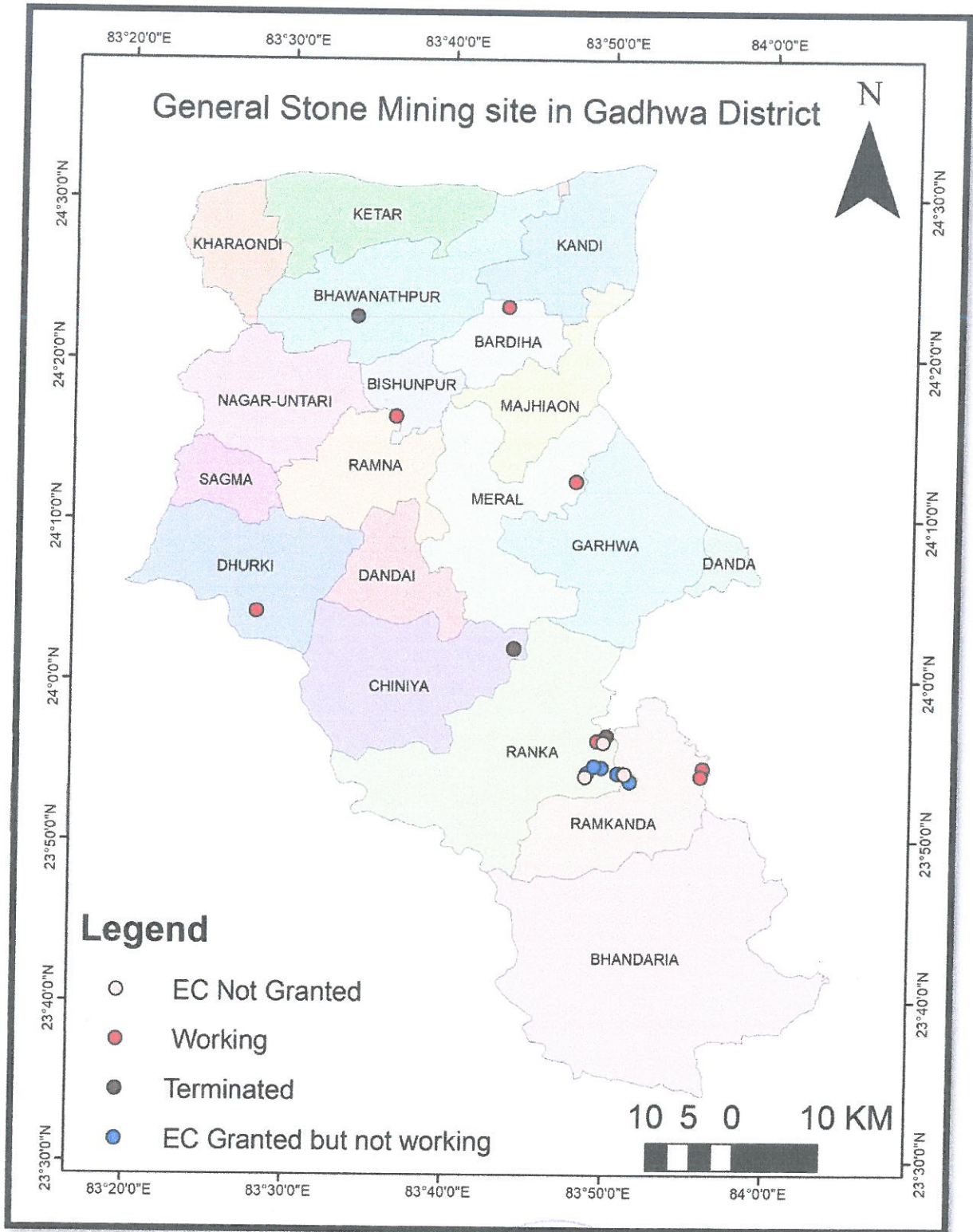
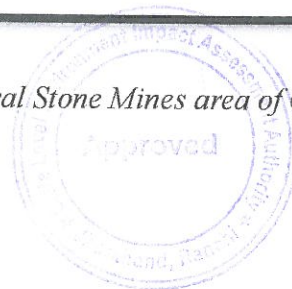


Figure 20-1:- Location of General Stone Mines area of Garhwa district



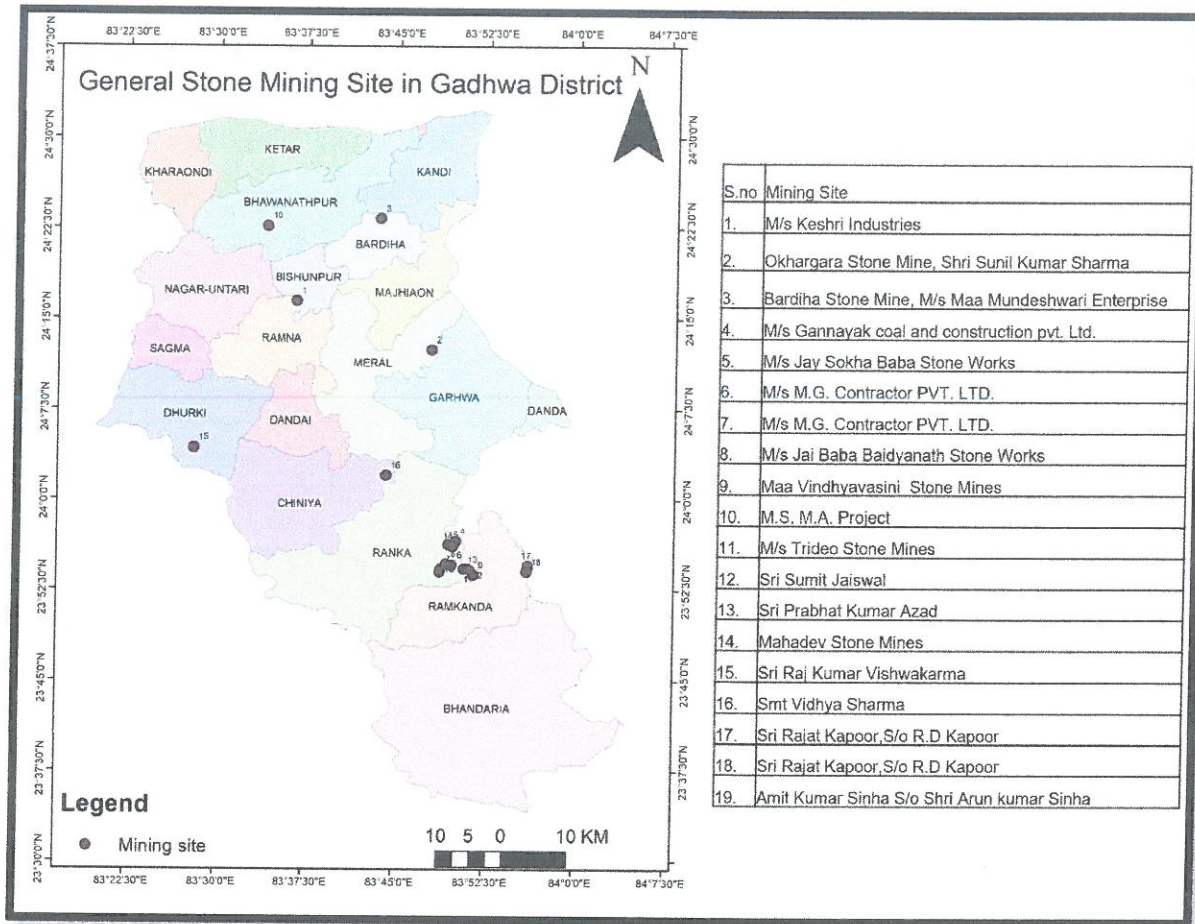


Figure 20-2:- Location Map Minor mineral General Stone LOI issued Mines Garhwa district.



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21 DETAILS OF THE AREA OF WHERE THERE IS A CLUSTER OF MINING LEASES

21.1 Details of the area of where there is a cluster of mining leases viz. number of mining leases, location (latitude and longitude);

There is no such cluster of mining lease found in Garhwa district. However, it is proposed to consider the cluster of mining lease while planning for new lease area in coming years.





22 DETAILS OF ECO-SENSITIVE AREA

There is Eco-Sensitive area falls in Garhwa district.

Table 22-1:- Eco-Sensitive area details

Name of Sanctuary	Notification of Sanctuary	Area (Sanctuary)	ESZ Notification & Date	Area (ESZ)
1	2	3	4	5
Betla National Park	S.O.No 1224 Dated 17.07.1976	1042.52 sq.km	S.O. No. 2898 (E) Dated 09.08.2019	1253.49 sq.km
Palamau Wildlife Sanctuary				
Mahuadanr Wolf Sanctuary (Latehar & Garhwa distt)				

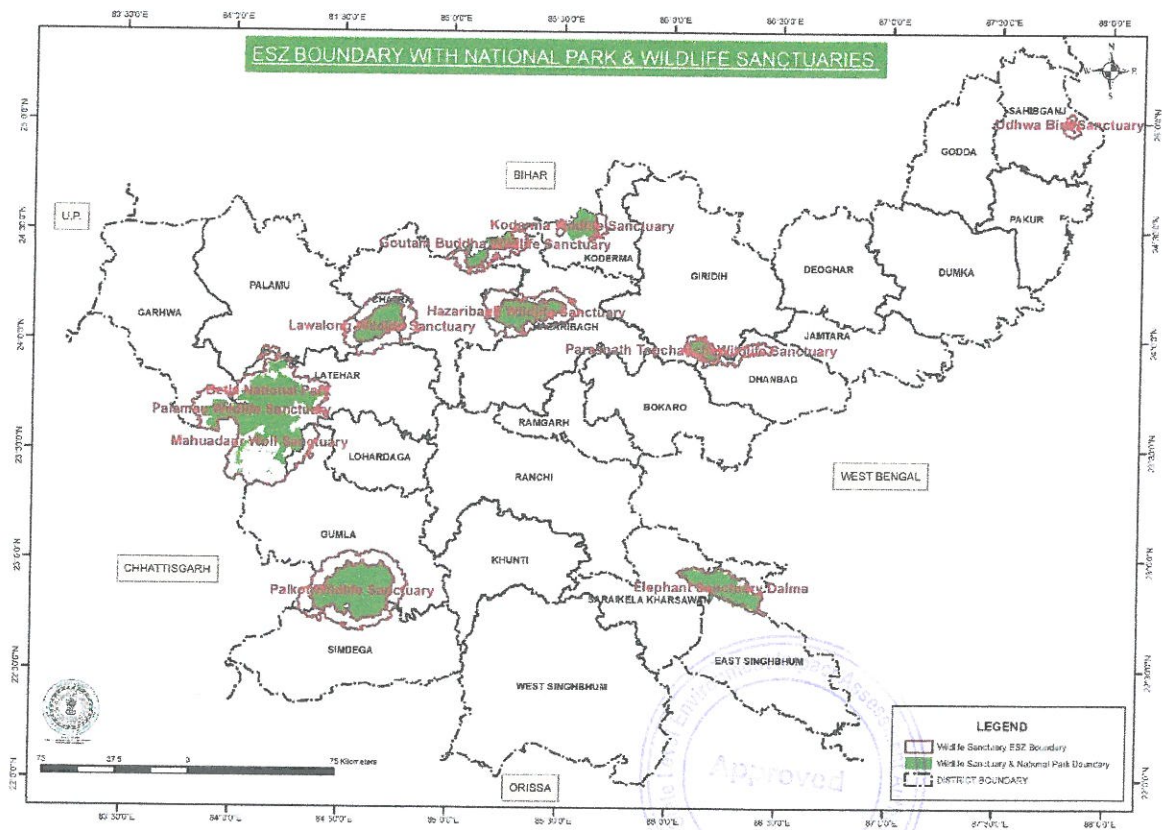


Figure 22-1:- Eco-Sensitive area Map



23 IMPACT ON THE ENVIRONMENT DUE TO MINING

23.1 Impact on the Environment (Air, Water, Noise, Soil, Flora & Fauna, land use, agriculture, forest etc.) due to mining activity;

23.1.1 Impact on Air Environment

The mine sites of garhwa district are located in barren small hilly area and located in remote village where limited agriculture is practiced during rainy season only. In some lease surroundings only, a few households are living in the area and population density of village is very less. The area does not have any industrial activity in the core/buffer zone and hence, the ambient air quality of the area is good. Mining will be carried out in a limited area with OTFM mining method. Hence, impact on air quality due to mining will not be significant.

23.1.2 Impact on Water Environment

23.1.2.1 Surface Water

There is no any surface water body in and around the lease area of garhwa district. Hence, effect on surface water quality will be negligible. In order to arrest rain water flowing from the lease boundary to surrounding area, a garland drain will be recommended & constructed in the lower side of the all the leasehold area and runoff water will be accumulated in the settling pond/water harvesting pit. Rainwater accumulated in the mine pit will be pumped to the settling pond before discharging into the agricultural field during heavy rainfall. Many rivers are flowing in and around the mine site, but all are far away from the mine leases and effect on water quality of the river is not expected as no water is allowed to flow directly from the mine site.

23.1.2.2 Ground Water

Mining operation will be carried out in limited scale on a small hilly area above groundwater level in Garhwa district. The mineral formation does not contain any harmful elements; hence no contamination will take place into ground water. Moreover, settling pond/pit sump will be constructed for rain water harvesting and ground water recharge. Finally, all the mine pits will be converted into pond after mine closure, which will further help in ground water recharge and utilization of pond water for irrigation and other domestic uses.



23.2 Impact on Noise Level

Noise will be created by the movement of the tractors/dumpers/heavy machines etc. However, noise generated by these will be occurring at the very low level and ambient noise level in the buffer zone shall be within permissible limit of CPCB. Noise level in the core zone shall be maintained as per DGMS standard for continuous noise exposure level. Controlled blasting is proposed, hence effect of ground vibration and blasting generated noise shall be within in the DGMS standard.

23.3 Impact on Land Environment

Mining operation in garhwa district will be carried out in limited scale on a small barren hilly area only. Very little amount of soil is present in small patches. Soil within the leasehold area will be used for plantation purpose. In order to arrest siltation during rainy season, runoff water will be accumulated in the settling pond/water harvesting pit. Further, plantation/green belt shall be developed along transport road. The open pit will be converted into pond after mine closure, which will further help in use of water for agriculture for local people. Hence, no negative impact on land environment is expected.

23.4 Impact on Biological Environment

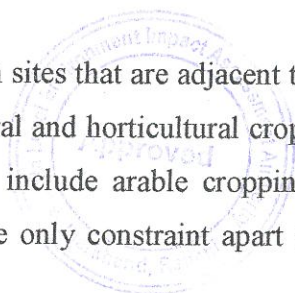
All the leasehold area in garhwa district is barren. Hence, impact on biological environment in not expected. As mentioned earlier, it is proposed to develop a green belt around along both sides of transport road. This will help in improving biological environment of the area.

23.5 Impact on Socio-economic Environment

There is no habitat in the lease hold area as well as within 500 m from lease boundary. There will be no adverse impact of mining but up to some extent socio-economic environment of the area will improve as, the mining activity and green belt development will create new job opportunities for the local people. The pit pond after mine closure shall be used for agricultural purpose, growing of fish, drinking water for animal and other domestic uses. Further, applicant will provide the occupational health and safety by providing regular medical check-up and medicine distribution. Mining operation will improve the financial status of the local people.

23.6 Impact on Agriculture

Some form of agricultural use may be possible in sites that are adjacent to farmland provided the soil and topography are favorable. Agricultural and horticultural crops can be grown in a variety of materials. The range of possibilities include arable cropping, grazing in either productive low land or over upland pasture. The only constraint apart from the site is that





there must be some integration into the local rural agricultural pattern. But it would be inappropriate to establish pasture in an area of arable cropping, even though the grazed pasture would recreate the soil structure more rapidly.



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24 REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT

24.1 Remedial Measures for other than Sand Mining

Remedial Measures for Air Pollution:

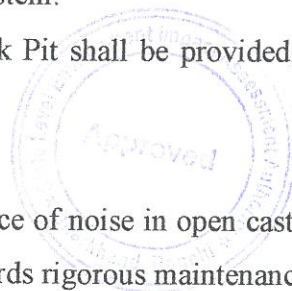
- All machineries and transport vehicles will be properly maintained and pollution check will be done once in a year to keep the emissions from machineries and vehicle under control.
- Water sprinkling will be done on haul road to control emission of dust while transporting minerals and waste. Provision for water spray by tankers on 'kuccha' road shall be done.
- Water sprinkling at loading area.
- Tree plantation along the haul roads & approach road will be done. Plantation along the mine boundary shall be done with tree density of 2000 trees per Hectare as per the norms of MoEF & CC, to control dust & noise.
- Use of personal protective equipment like dust mask.
- Ambient air pollution monitoring will be carried out.

24.2 Remedial Measures for Water Pollution

- Mining is proposed to plan above the ground water table. Therefore, pumping of ground water from mine pit does not arise in this mine. The rain water during rainy season is proposed to settle in a pit and shall be use for dust suppression and plantation. Excess water, if any shall be discharged in natural stream after settling of suspended particles in the pit. Pump having required capacity will be installed to lift accumulated rain water from working pit and pumped to the settling tank.
- Garland drain shall be made around the Waste dump and the rain water shall be collected in garland drain and allowed to settle in a small pit for settling suspended particles before allowing discharge to natural drainage system.
- For domestic waste water Septic Tank with Soak Pit shall be provided, discharge from Soak Pit, if any shall be used for plantation.

24.3 Remedial Measures for Noise Pollution

- Diesel powered machineries, which is major source of noise in open cast mining shall be properly maintained. Attention shall be paid towards rigorous maintenance of the silencer of the diesel engines.





- Protective devices shall be provided for use of persons employed in the vicinity of high noise areas.
- With the adoption of controlled blasting techniques, the ground vibrations will be minimized.
- Plantation around the lease boundary will cut the noise levels.

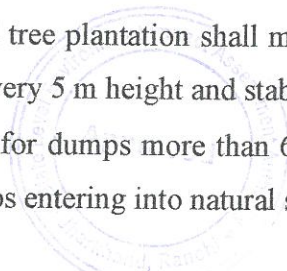
24.4 Remedial Measures for Land Environment

Some of the measures followed to minimize the impacts are as follows:

- The mining activities will be restricted within the lease area only.
- The waste material will be utilized for the construction of road and also will be used by the local people for construction work.
- The surface run off from the lease area will be retained within the lease and used for plantation, dust suppression and block cutting. So, there will be no soil erosion from the lease area and its surrounding due to mining activity.
- The dump will have inward slope with catch drains at inward side of the terrace and the catch drain of the individual terrace will be connected to the garland drain outside the periphery of the dump. Retaining wall and garland drain will be constructed around the dumps and the surface runoff water pass through the garland drain and finally settled in a settling pit before released outside.
- Retaining wall and garland drains for the proposed waste dump will be constructed to arrest wash offs from the dump.
- Maintenance/repair of vehicles and machineries will not be inside the mining area. However, steel trays will be used for any emergency repair and sudden leakage of oil.

24.5 Remedial Measures for Waste Management

- The solid waste shall be dumped systematically with proper repose angle and stabilization as follows:
- Gradation of dump shall be done automatically as coarser materials go to the bottom and finer at the top and therefore drain of rain water flow freely to the bottom without endangering the stability of dump.
- Stabilization of dump with top soil and tree plantation shall make the dump more stable on long. Dump should be terraced for every 5 m height and stabilized.
- 1m height parapet shall be constructed for dumps more than 6m height along the toe to prevent and control wash out from dumps entering into natural system through rain water.





- Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse.

24.6 Remedial Measures for Flora and Fauna

Extensive plantation comprising of pollutant resistant trees will be undertaken, which will serve not only as pollution sink but also as a noise barrier. It is proposed to include azadirachta Indica, and ficus Religiosa in the plantation program as they serve as sinks for gaseous emissions.

The impact on the fauna due to the mining activity will be insignificant. The progressive plantation over a period of time will reduce the impact, if any, on the fauna.





25 RECLAMATION OF MINED-OUT AREA

25.1 Reclamation of Mined out area (best practice already implemented in the district, requirement as per rules and regulation, proposed reclamation plan);

25.1.1 Reclamation of mined-out area

25.1.1.1 Importance

It is necessary to reclaim the land affected by mining due to following reasons:

- To put the land into productive use like agriculture, forestry or recreational purposes.
- To check soil erosion from dump leading to destruction of watersheds and siltation of river.
- Accumulation of huge quantity of water in worked out pits may pose threat to life and property.
- To combat adverse visual impact.

This requires two stages planning i.e. pre mining planning and post mining land use and monitoring. First stage considers all necessary measures to be taken for making second stage effective. This requires Environmental Impact Assessment (EIA) to be prepared. This should clearly bring out the likely impact of mining on environment, both biotic and a biotic and the likely extent of degradation, which may occur to the environment in the absence of any abatement measures. And to prepare this statement baseline information are required which includes geology/geomorphology, climate, hydrology/hydrogeology, hydro geochemistry and soil. Generation of information may also be required on quality of water, air and noise level, topography, land use pattern, demography of the area etc.

25.1.1.2 Components

For successful reclamation following points are to be considered

- Listing inventory of pre mining condition.
- Monitoring flexibility of mining programme in the light of efficient land reclamation.
- Evaluation of the post mining requirements of the region and to decide on the needs and desire of the affected ground.
- To make reclamation planning suitable to techno-economical and socio-political environment.
- To assess the physio-chemical characteristics of overburden.



- Extra cost of preservation, re-handling, spreading and levelling of subsoil and topsoil.
- Knowledge of hydrogeological/geomorphological conditions. Aesthetic and/or historic value of land.





26 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The area is hilly area. No possibility to flooding the area. Since, the pits are developed on the hard compact and medium grain rocks hence, there are no possibilities of slope failure. The Risk Assessment & Risk Management Plan will be prepared for safety of man & machinery deployed in the mining activities as per Mining Act, Rules, and Regulations & DGMS circulars.

RISK ASSESSMENT

The hazard identification and risk analysis are done using qualitative method:

Table 26-1:- Probability/Likelihood of Occurrence of Hazard

Likelihood Level	Probability	Description
L5	Very Unlikely	Has not occurred/reported within last 5 years.
L4	Remote / Moderate	May occur if conditions exist. Has occurred within last 3 years.
L3	Occasional	Likely to occur if conditions exist. Has occurred within last 2 years.
L2	Probable	Very likely to occur. Has occurred within last year.
L1	Frequent	Almost certain to occur. Has occurred more than one within last year.

Table 26-2:- Severity/Impact Intensity

Severity Level	Severity	Description
C1	Catastrophic	May commonly cause death or major system loss, thereby requiring immediate cessation of the unsafe activity or operation.
C2	Major	May commonly cause severe injury or illness or major system damage thereby requiring immediate corrective action.
C3	Moderate	Minor injury to personnel or environment
C4	Minor	Minor damage but does not cause injury to personnel



C5	Insignificant	May result in no, or less minor, illness, injury or system damage
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Table 26-3:- Risk Assessment Chart (Qualitative Method)

Risk Rank (Likelihood x Consequence)	L5 (Very Unlikely)	L4 (Remote)	L3 (Occasional)	L2 (Probable)	L1 (Frequent)
C1 (Catastrophic)	5	4	3	2	1
C2 (Major)	10	8	6	4	2
C3 (Moderate)	15	12	9	6	3
C4 (Minor)	20	16	12	8	4
C5 (Insignificant)	25	20	15	10	5

Table 26-4:- Risk Rating Scale

S.No.	Rating	Scale
1	High Risk	1-4
2	Medium Risk	5-12
3	Low Risk	13-25

Table 26-5:- Hazard identification & Risk Analysis in Stone Mining operation

S.No.	Activity	Hazard	Probability	Severity	Score
1	Temporary Storage of Explosives	Unintended Explosion	Very Unlikely	Catastrophic	5
2	Charging of Explosives	Unwanted Explosion	Very Unlikely	Catastrophic	5



3	Blasting	Hit by fly rock (Bodily Injury)	Occasional	Major	6
4	Drilling	Exposure to Dust	Frequent	Insignificant	5
5	Bench Formation	Fall/Slide/Tripping (Bodily Injury)	Probable	Moderate	6
6	Loading/Unloading	Bodily injury by hitting by loading material, Exposure to Dust	Very Unlikely	Minor	20
7	Transportation	Vehicle Accident, Exposure to Dust	Remote	Minor	16

The risk score lies between 5 to 20. Hence, the risk in stone quarry ranges from Medium to Low-Risk Rank and hence the risk is “**Acceptable**”

Preventive Measures:

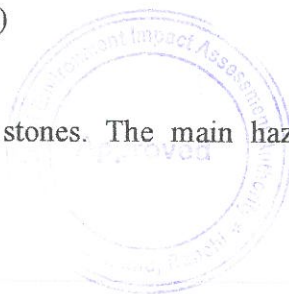
Face Stability

Face instability gives rise to rock falls or slides. Face instability can arise because of adverse geological faulting or poor work methods. Those at greatest risk will be workers engaged in loading material and driving vehicles. To manage the face stability, the following measures will be taken:

- Overall slope angles of benches will be maintained at 45°
- Unmanageable heights are not created
- Loose sides are properly dressed
- No tree, loose stone or debris will be permitted to remain within 3 meters of the edge or side of any excavation (Regulation 106(4) of MMR 1961)
- No undercutting of any face or sides will be permitted so as to cause any overhanging (Regulation 106(5) of MMR 1961)

Drilling Operations

Drilling is common to the mining of stones. The main hazards linked to the drilling operations are:





- I. Falls from the edge of a bench
- II. Dust generation during drilling
- III. Noise Generation due to drilling
- IV. Entrapment in by moving part of the drilling equipment

I. Falls from the edge of a bench

While the primary hazard is that of the driller falling over the edge of a working or abandoned bench, the risk of minerals or materials falling onto workers at the foot of the face should not be overlooked. A face and bench are a necessary part of a working quarry and therefore it is not possible to remove the hazards associated with them.

While others may need to work at or near the edge of a working bench the person most at risk during the drilling operation is the driller. Others such as the manager of the mine or maintenance personnel, may approach the bench edge during the drilling operation in the event of a breakdown of the drilling equipment.

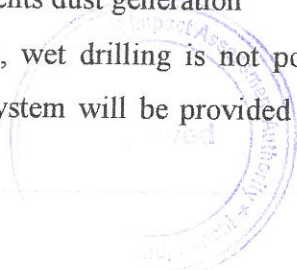
Control Measures

- It will be ensured that the drilling equipment is suitable for the job.
- The person in charge of the drilling machine is competent to carry out the drilling operation; part of the training includes instructions to always face towards the open edge of the bench so that any inadvertent backward step is away from the edge.
- Provision of portable rail fencing between the drilling operations and the edge of the bench
- Provision to attach a safety line to the drilling rig and provide a harness for the driller to wear.
- Restricted access to the area to all persons except those necessary for the drilling operation.

II. Dust generation during drilling

The hazard is the inhalation of dust which is created during the drilling operation. Properly applied control measures can substantially reduce the risk to the drill operator

- Wet drilling will be carried out by constantly injecting a jet of water at the drill bit inside the hole, which prevents dust generation
- In case due to any reason, wet drilling is not possible (due to non-availability of water), exhaust/ vacuum system will be provided which removes the dust from the





drill hole continuously and discharges the same in a dust collector specially provided for the purpose.

- Drilling machine shall be fitted with dust suppression, collection and disposal arrangement
- Deep wetting of drilling zones will be done by water sprinkling before starting drilling.

III. Noise Generation during drilling

Drilling operations give rise to harmful levels of noise. It is created by both drilling the hole and the operation of the drill rig itself.

The noise levels around drilling equipment will be continuously measured and the risk will be assessed. Unless control measures are in place no-one, except those necessary for the work in hand, will be allowed inside the designated noisy area. In most cases this will be the drill operator.

The risk is highest at older machines. Newer large drilling machines are provided with sound insulated operating cabins which control the noise level within the cabins to acceptable levels. Hence, it will be ensured that newly updated machines will be used for drilling.

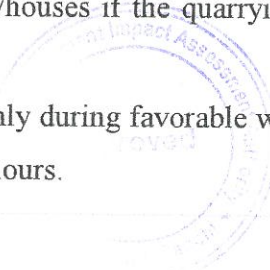
Other control measures will include training operators and providing them with ear protection, although the latter should only be seen as an interim precaution until a permanent solution can be found.

Blasting Operations

Most of the accidents from blasting occur due to the projectiles and mainly due to overcharging of the shot holes as a result of certain special features of the local ground.

Flying rocks are encountered during initial and final blasting operations. Noise and dust also generated during blasting. Following control measures should be taken:

- Blast hole geometry shall be properly designed.
- Blast site shall be wetted before and after blasting operations are completed.
- Only optimum quantity of permissible explosives shall be used so that the vibrations do not damage the structures/houses if the quarrying operations are close to human habitation.
- Blasting shall be conducted only during favorable weather conditions and only during the day time and permissible hours.





- While carrying out blasting operations near habitations, wide publicity will be given in the local area through announcement and other available media so that local people become aware of the blasting activities being undertaken in the area and take appropriate precautions.
- The vibrations should be monitored periodically in consultation with the local Mining authorities.

Handling of Explosives

Explosives by virtue of their nature have the potential for the most serious and catastrophic accidents in the mining operations yet the way they are used is an excellent example of how risk assessment is properly applied. For example, persons holding blasters certificate granted by DGMS with proper training in explosive handling and use will be allowed for blasting operations.

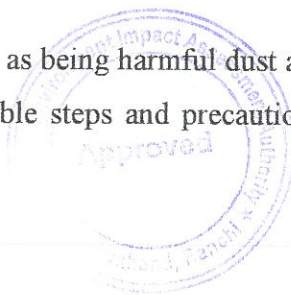
- Use of explosives is specialist work. Planning for a round of shots is necessary to ensure that the face is properly surveyed, holes correctly drilled, direction logged, the weight of explosive suitable for good fragmentation and the continuity of the initiator are but a few of the steps necessary to ensure its safe use.
- Poorly designed shots can result in misfires, early ignition and flying rock.

The storage of the explosives and its transfer to and from the quarry area shall be strictly in accordance with the conditions listed in the permission granted by Explosives Department. Few conditions are listed below:

- Proper and safe storage of explosives in approved and Licensed Magazine
- Proper security system to prevent theft/ pilferage, unauthorized entry into Magazine area and checking authorized persons to prevent carrying of match box, lights, mobile phones, cigarette or Bidi etc. will be put in place.
- Explosives shall be conveyed in special containers
- Explosives and detonators shall not be carried in the same container
- The holes which have been charged with explosives will not be left unattended till blasting is completed.

Health Hazards

Health hazards should be interpreted as being harmful dust and noise which is emitted during surface mining operations. All suitable steps and precautions will be undertaken to ensure





minimum health hazard. Provision of use of Personal Protective Equipment (PPE) will be kept.

The PPE shall be of good make and quality, wherever possible ISI certified, suitable for the hazard e.g. a dust respirator fitted with the correct filter to capture the particulate hazardous dust and maintained to recommended standards. As personal protective equipment only affords limited protection it will only be used as a last resort and as an interim arrangement until other steps are taken to reduce the risk of personal injury to an acceptable level.

Accident at Site

Identifying the hazards that come along with the presence of vehicles at the workplace (e.g. reversing operations, loading) can cause harm if not properly handled. Among some of the factors that may make vehicle accidents more likely are:

- Rough access roads
- Time pressure
- Inadequate brakes (Possibly from lack of maintenance)
- Carelessly parked vehicles (e.g., being parked on a slope without being adequately secured)
- Untrained drivers
- Overturning vehicles

To avoid such instances, it will be ensured that workers shall be trained and involved in the risk management process and tell them to share their experience regarding what to do, to reduce risk.

Transportation

The usual method of transporting minerals from the working face is by trucks / tippers/dumpers. Large earth moving equipments are used for loading /transporting large quantity of mineral from a mine. During transportation of minerals in the mining area, utmost care will be taken by the vehicle operator to avoid any accident with any incoming vehicle by keeping sufficient gap between the two vehicles, keep safe distance from the edge of the mine face, avoid any accident to a worker crossing the haul road and shall maintain low speed. The vehicle operator shall not try to overtake another vehicle.

- Mine road shall be made smooth regularly with a road roller.



- Mine road will be cleaned daily to remove fallen rock/stones for smooth transportation.
- Mine road will be made sufficiently wide to keep two-way traffic.
- Mine roads will be designed as per the specifications given under MMR 1961.
- Regular water sprinkling will be done on mine road and haul road to avoid suspension of dust.
- All transportation within the mine lease area should be carried out directly under the supervision and control of management.
- The vehicles will be maintained in good working condition and checked thoroughly at least once a month by the competent person authorized for the purpose by the management.
- Navigation signs will be provided at each and every turning point up to the main road (wherever required)
- To avoid danger while reversing the vehicles especially at working place/loading points, stopper should be posted to properly guide reversing/spotting operating.
- Only trained drivers will be hired.

A disaster management plan should be prepared for taking care of for any disaster. Other risk which are included in this category are noise, as it occurs and it can lead to permanent disability. There are problems related to road traffic in and out issuers; inappropriate exposure of moving machines; mechanical failure and because of large number of moving trucks and dumpers there is large quantity of dust present in roadways which affects the operators and can lead to accidents causing injury. They are in acceptable range because of precautions measures taken but no step is taken it can cause hazard. Hence, the steps should be taken to reduce the hazards such as for dust suppression system should be installed.

Disaster in the mines like fires, explosions, entrapments, and inundations can occur any time, so emergency preparedness is a must. The Disaster Management Plan and risk assessment in the mines will include all sorts of above-mentioned emergency and the extent that this plan will be implemented will depend on the nature and scope of the emergency. The basic purpose of Disaster management plan and risk assessment to ensure that mine rescue and recovery activities are conducted safely for rescuer and survivors. According to MMR 1961 a standard operating procedure should be drawn for involvement different category of staff and



officers. The SOP should be updated periodically to reduce the chaos and response to the emergency should be quick and smooth.

The responsible person should be familiar with his responsibility during the mock drills. One or two standby should be there to replace the person in Emergency situation. Rescue operations should not include the survivors for any assistance. First Information of Disaster/Emergency should go to the attendance clerk on duty. Duties of attendance Clerk (Emergency Siren) the attendance clerk or other designated person should on getting information of major accident, sound a hotter or a siren immediately declaring a state of emergency at the mine and then to contact the manager and on his advice to call key personnel using the information listed in the Emergency Organization Chart. It is important that all telephone calls are recorded in a telephone log book. Duties of Other Officials should be displayed and handed over to all concerned. Copy the same should be kept at Manager's Office for ready reference. Establishment of Control Room at Unit Level, Area Level and Company Level is essential. Control Room should keep the contact information about –

- Company Manager
- Company Owner/Administrative Officer
- District Administration
- Govt. Hospitals in nearby localities
- Private Nursing Homes of localities





27 DETAILS OF THE OCCUPATIONAL HEALTH ISSUES IN THE DISTRICT

27.1 Details of the Occupational Health issues in the district. (Last five-year data of number of patients of Silicosis & Tuberculosis is also needs to be submitted)

27.1.1 Occupational Health Hazard and Remedial Measures

The persons employed in the mines are exposed to a number of hazards at work which adversely affect their health. Some of the important ones are dust, noise, heat, humidity, vibration etc. In recent times, there has been increasing awareness among mining industry and the workers about occupational diseases such as Coal Worker's Pneumoconiosis, Silicosis, Manganese Poisoning, Hearing Impairment etc. caused by exposure to health hazards at work. Almost all occupational diseases are known to cause permanent disablement and there is no effective treatment. However, most of the occupational diseases can be prevented by adopting proper occupational health measures and engineering control on airborne dust at workplace. Following diseases have been notified as the diseases connected with mining operations for the purpose of sub-section (1) of Section 25 of the Mines Act, 1952:

S.R.O. 1306 dated the 21st July, 1952

1. Silicosis
2. Pneumoconiosis

S.R. O. 2521 dated the 26th June, 1986

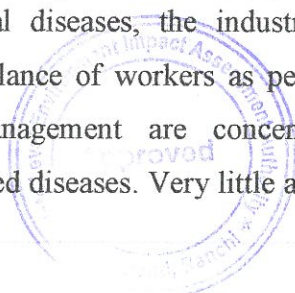
Cancer of lung or the stomach or the pleura and peritoneum (i.e., mesothelioma)

S.O. 399(E) dated 21st February, 2011

1. Noise Induced Hearing Loss.
2. Contact Dermatitis caused by direct contact with chemical.
3. Pathological manifestations due to radium or radioactive substances.

27.1.2 System of Detection of Occupational Diseases in Mines

In order to detect occupational diseases, the industry is required to conduct medical examinations and health surveillance of workers as per the provisions of Mines Act. The present efforts of mines management are concentrated on detection of silicosis, Pneumoconiosis and other notified diseases. Very little attention is paid to other occupational





diseases. The essential features of health surveillance programme required to be carried out in mines are:

- (a) Initial Medical Examination of persons to be employed in mines.
- (b) Periodic Medical Examination once every five years. General physical examination, chest radiographs, lung function tests and audiometric.
- (c) Classification of chest radiographs of workers as per ILO Classification.
- (d) Medical examination within one year of superannuation.
- (e) Evaluation of all cases of suspected pneumoconiosis by Pneumoconiosis Medical Board.
- (f) Maintenance of medical records till the person is in service and 10 years thereafter. The cases of silicosis detected during health surveillance programme are referred to Pneumoconiosis Medical Board of the mining companies for evaluation and certification. If certified, the case is notified to the enforcement authority and evaluated for disability and payment of compensation. Many cases of silicosis and other pneumoconiosis go undetected and a large number of cases of silicosis are misdiagnosed due to lack of training of medical professionals.

As discussion with Garhwa district Civil Surgeon Office, there are not any cases of Silicosis & Tuberculosis, due to stone mining activity in last five-years in garhwa district and further the data of number of patients of Silicosis & Tuberculosis, due to stone mining activity are not found.





28 PLANTATION AND GREEN BELT DEVELOPMENT

28.1 Plantation and Green Belt Development in respect of leases already granted in the district

Green belt along lease boundary and both sides of transportation road shall be developed in almost all the existing leases in the district. Maximum numbers of plants shall be planted in each year around the lease boundary and both sides of transportation road as mentioned in mining plan. Some mine owner also planted a large number of plants outside the lease area to develop green belt in the district. Neem, Sheesham, Aam, Sal, Arjun, Teak, Mahua, Ashoka, Jamun, Pipal, Banyan etc. are some important plants commonly planted in mine site of garhwa district. It is proposed to have a detailed record of plantation to be kept by the respective owner/agent/manager of the mine every year, which has been planted in the safety zone area and transport rout, which is statutorily required. As per the norms of the forest department, the plantation has to be carried out at the rate of 2500 local plants per hectare and along the road side, at an interval of 2 meters in the zig-zag manner in both sides.





29 ADDITIONAL INFORMATION

Air Emission during Mining Operations

During mining activity, the emission may arise due to various mining operations i.e. drilling, blasting, excavation and transportation. While calculating load coming out from various activities of these mines, several data related challenges has been observed i.e. activity area, maximum annual production etc. In mining operations, major contributor of pollution is the dust coming out from various activities at mine site. To streamline the calculation of PM emissions, following assumptions have been made:

1. Area of activity at a time is taken as 100 x 100 sqm.
2. To obtain maximum production in TPA, available mineable reserve was divided by total years of the mine lease.
3. Drilling and blasting are not considered in the modelling scenario as these activities are not continuous operation.
4. Emission from haul road is not taken into consideration as they are different in route and different in distance travelled for different mines.

While calculating the load following parameters are taken in to considerations:

1. Meteorological condition of district Garhwa prevailing in the month of March has been taken.
2. Average Wind Speed 2.5 m/s is taken.
3. Average Wind Direction is found to be blowing from North West to South East.
4. Working Hours per day is taken as 8 hours.
5. Total 300 numbers of working days in a year is taken.
6. Moisture content in the soil in the month of March is taken as 5%.

Based on the assumptions and input data, the calculated PM emission rate from different mines would be as follows:

Table 1: PM Emission Rate

S.No.	Mine	Location	Area, Ha	Production, Tonnes	Mine Lease, Years	Production, TPA	PM,g/s/m ² (Mine)
1	Sunil Kumar	Meral	0.5	39853	10	3985.3	8.45E-09
2	Keshri Industries	Bishunpura	3.23	947530	10	94753	2.01E-07
3	Maa Mundeshwari	Bardiha	0.97	221653	10	22165.3	4.70E-08
4	Rajat Kapoor	Ramkanda	4.01	2641713	5	528342.6	1.12E-06
5	Rajat Kapoor	Ramkanda	3.84	2177972	5	435594.4	9.24E-07



S.No.	Mine	Location	Area, Ha	Production, Tonnes	Mine Lease, Years	Production, TPA	PM,g/s/m ² (Mine)
6	Raj Kumar	Durki	0.46	119167	10	11916.7	2.52E-08
7	M A Project	Bhawnathpur	0.174	23150	10	2315	4.91E-09
8	Jai Sokha Baba	Ranka	2.428	1500390	10	150039	3.18E-07
9	M G Construction	Ranka	2.833	2403171.3	10	240317.13	5.099E-07
10	M G Construction	Ranka	2.821	1897229.63	5	379445.926	8.05E-07
11	Jai Baba Baijnath	Ranka	2.19	1785240	10	178524	3.788E-07
12	Trideo Stone Mines	Ranka	2.8	1794002	10	179400.2	3.81E-07
13	Maa Vindhewashini	Ranka	2.59	1439443	5	287888.6	6.11E-07
14	Shrimati Vidhya Sharma	Chiniya	3.43	1555902	10	155590.2	3.30E-07
15	Amit Kumar Sinha	Ranka	2.03	1565435	5	313087	6.64E-07
16	Mahadev Stone Mines	Ranka	1.7	1203152	10	120315.2	2.55E-07
17	Gannayak Coal	Ranka	2.12	756983	5	151396.6	3.21E-07
18	Sumit Jaiswal	Ranka	1.517	629404.83	10	62940.483	1.33E-07
19	Prabhat Kumar	Ranka	1.983	812314.98	10	81231.498	1.72E-07

An effort has been made to draw some isopleths of pollutants arising due to mine operations. But, since the mines are scattered across the district, it is not possible to model all the mines in one scenario. Hence, the mines located nearby and falling within 10 km of common radius are taken into consideration for generating isopleths. All the mines of Ranka block are falling in common 10 km radius hence an isopleth is generated for PM during mining operation.

There are total 10 mines available in Ranka block. Emission rates of PM from these mines are put into the Lake Environment Software with meteorological data of Garhwa for the month of March and a uniform rectangular receptor grid is generated to know the values of PM concentration across the grid. It can be seen while analysing the outputs that the maximum concentration will be only limited to 3.13 $\mu\text{g}/\text{m}^3$. The emission will be found maximum near the clusters of mines and in the rest of the area it is found scattered with decreasing concentration.



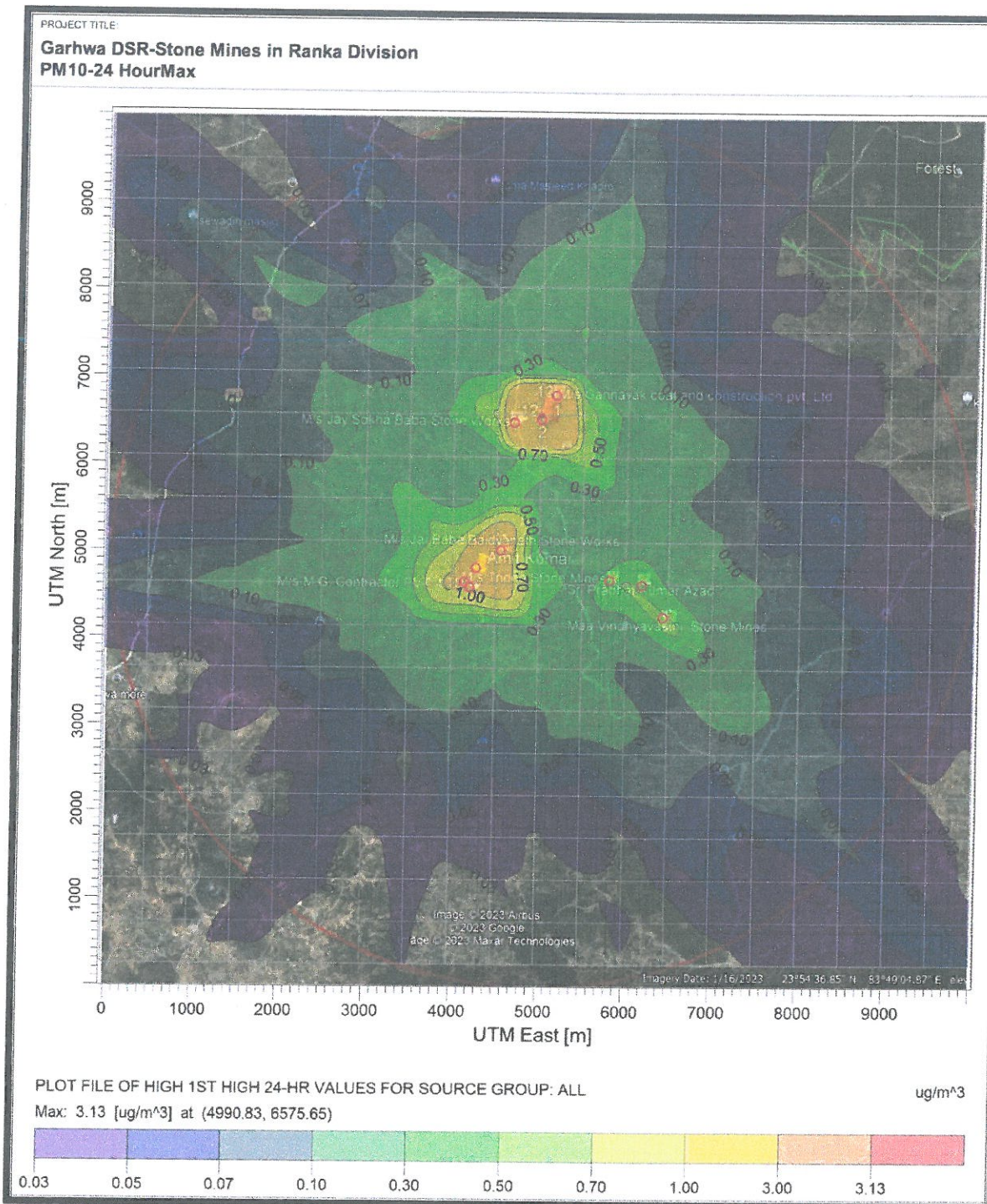


Figure 29-1:- PM 10 Stone Mines



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Figure 29-2:- Air Monitoring Photographs

References:

- www.garhwa.nic.in
- District Mining Office – Garhwa
- District Forest Office – Garhwa
- CGWB Report of Garhwa
- India State of Forest Report, 2021
- Geology of Bihar and Jharkhand by T. M. Mahadevan
- National Institute of Disaster Management Report
- Report of Central Ground Water Board, Ministry of Water Resources – State Unit Office, Ranchi, September 2013.
- D. S. R. of Stone (2018) – Garhwa
- JSAC, Deptt. of Mines & Geology, Govt. of Jharkhand
- <http://www.jharkhandminerals.gov.in>
- District Irrigation Plan – Garhwa, Govt. of Jharkhand
- https://sameti.org/Soil_Inventory/garhwaSoil_Analysis.pdf
- JSMDC site
- census2011.co.in
- National Informatics Centre



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झारखण्ड सरकार खान एवं भूतत्व विभाग
जिला खनन कार्यालय, गढ़वा।
ईट भट्टा की विवरणी सत्र 2022-2023

क्रमांक	ईट भट्टाधारी का नाम	ईट भट्टा का विवरण	प्रखण्ड	मो० नं०	स्वामिस्व की राशि	अभियुक्ति
गढ़वा						
1	राजबलि मेहता उर्फ संजय मेहता, पिता - स्व कृष्णा मेहता, ग्राम+पो० - कल्याणपुर थाना+जिला- गढ़वा।	मौजा - कल्याणपुर, थाना - गढ़वा, मार्क- SOS	गढ़वा,	9631817465		
2	सुनिल कुमार मेहता, पिता - स्व कृष्णा मेहता, ग्राम+पो० - कल्याणपुर, थाना+जिला - गढ़वा।	मौजा - कल्याणपुर, थाना - गढ़वा, मार्क - SKF	गढ़वा,	748005071		
3	श्री मिथलेश मेहता, उर्फ छोटु मेहता, पिता - स्व कृष्णा मेहता, ग्राम+पो० - कल्याणपुर, थाना+जिला - गढ़वा।	मौजा - कल्याणपुर, थाना - गढ़वा, मार्क - MRF	गढ़वा,	810054969		
4	रामजी कुमार मौर्या पिता - स्व कोदु मेहता, ग्राम - कल्याणपुर, थाना+जिला - गढ़वा।	मौजा - करमडीह, थाना - गढ़वा, मार्क - KMF	गढ़वा,	8863906143		
5	जितेन्द्र सिंह, पिता - स्व कर्मदेव सिंह ग्राम - पिपराकला, पो०+थाना+जिला - गढ़वा।	मौजा - जूटी, थाना - गढ़वा, मार्क - VIP	गढ़वा,	9431390813		



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6	1. गोपाल सिंह, पिता - बैजनाथ साव ग्राम - चिरौजिया, पो0 - नवादा, गढ़वा। 2. मनीष गुप्ता, ग्राम - चिरौजिया, पो0 - नवादा, गढ़वा।	मौजा - छतरपुर, थाना - गढ़वा, मार्क - MTS	गढ़वा,	6200694828	
7	1. वकिल अहमद, पिता - गुलवान अंसारी, 2. अनिल गुप्ता, ग्राम - छतरपुर, पो0 - कल्याणपुर, गढ़वा।	मौजा - छतरपुर, थाना - गढ़वा, मार्क - JBS	गढ़वा,	96311865519006086387	
8	मो0 मेंहेदी हसन अंसारी पिता - स्व0 सकुर अंसारी, ग्राम - कोरवाडीह, पो0 - लगमा, थाना - गढ़वा, जिला - गढ़वा।	मौजा - कोरवाडीह, थाना - गढ़वा, मार्क - T.S	गढ़वा,		RS 112660.00 GR NO- 2316320381 Date- 27.03.2023
9	श्री आनन्द दूबे उर्फ बबलू दूबे, ग्राम+पो0+थाना - गढ़वा, जिला - गढ़वा।	मौजा - अनराज नावाडीह, थाना - गढ़वा, मार्क - डिम्पल	गढ़वा,		
10	श्री नन्दू महतो, पिता - केशव महतो, ग्राम - महुलिया, पो0 - सोह, थाना+जिला - गढ़वा।	मौजा - महुलिया, थाना - गढ़वा, मार्क - NBF	गढ़वा,		RS 112660.00, GR NO- 2315182508, Date- 10.01.2023
11	श्री पप्पू पाण्डेय उर्फ उमाकान्त पाण्डेय पिता - गोविन्द पाण्डेय, ग्राम+पो0+थाना - डण्डा, जिला - गढ़वा।	मौजा - कितासोती कला, थाना - गढ़वा, मार्क - ARP	गढ़वा,		
12	श्री अरविन्द सिंह, पिता - स्व0 कन्हैया प्रसाद सिंह ग्राम - सहिजना, पो0+थाना+जिला - गढ़वा।	मौजा - कितासोती कला, थाना - गढ़वा, मार्क - KBS	गढ़वा,		RS 112660.00, GR NO- 2316232095 Date- 16.03.2023

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13	श्री पप्पू पाण्डेय उर्फ उमाकान्त पाण्डेय, पिता - गोविन्द पाण्डेय, ग्राम+पो0+थाना - डण्डा, जिला - गढ़वा।	मौजा - कितासोती कला, थाना - गढ़वा, मार्क - I.P.L	गढ़वा,		
14	मिनहाज खान, पिता - अब्दुल रहीम ग्राम - पचफेडी, पो0 - ओखरगाड़ा, थाना - मेराल, गढ़वा।	मौजा - संग्रहे, थाना - गढ़वा, मार्क - I.P.L	गढ़वा,		
15	गुप्त प्रसाद गुप्ता, पिता - श्री बालेश्वर साव, ग्राम+पो0 - ओखरगाड़ा, थाना - मेराल, गढ़वा।	मौजा - पतसी, थाना- गढ़वा, मार्क- T.L	गढ़वा,	RS 112660.00, GR NO- 2315958227 Date- 25.02.2023, RS 16200 DMFT RS 1080 I.T	
16	मो0 नुरुलहोदा, पिता - स्वं ऐनुल शेख, ग्राम - फरटिया, पो0 - हूर, थाना+जिला - गढ़वा।	मौजा - फरटिया, थाना - गढ़वा, मार्क - B*S	गढ़वा,	RS 112660.00, GR NO- 2315167179, Date- 09.01.2023, RS 16200 DMFT, RS 1080, I.T	
17	श्री राधे कृष्ण मेहता, पिता - स्वं जगपत मेहता, ग्राम - टंडवा (जनकपुर मोहला) पो0+थाना+जिला - गढ़वा।	मौजा - सोनपुरवा, थाना - गढ़वा, मार्क - M.R.F	गढ़वा,		
18	उपेन्द्र कुमार तिवारी, पिता - गोरखनाथ तिवारी, ग्राम - तिवारी मरहटिया, पो0 - तिलदाग, थाना+जिला - गढ़वा।	मौजा - तिवारी मरहटिया, थाना - गढ़वा, मार्क - TMT	गढ़वा,		
19	श्री अमरजीत दूबे उर्फ चुनमुन दूबे, पिता - मुरलीधर दूबे, ग्राम -	मौजा - चेशीपोखर, थाना - गढ़वा, मार्क - B.D	गढ़वा,		

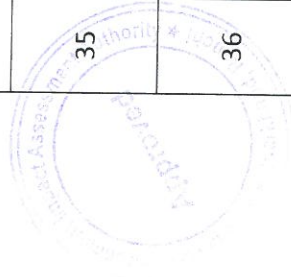
उण्डई						
क्र.सं.	विवरण	मौजा - तसरार, थाना - उण्डई, मार्क - G*G	उण्डई	उण्डई	उण्डई	उण्डई
26	कामिल अंसारी, पिता - हाजी क्यूम अंसारी, ग्राम - तसरार, पो0 - जरही, थाना - उण्डई, जिला - गढ़वा।				RS 112660.00, GR NO- 2315195939 Date- 10.01.2023, RS 16200 DMFT RS 1080, I.T	
27	1. नरेन्द्र मिश्रा, ग्राम - विशुनपुर (पुलिस लाईनसे उत्तर), थाना - गढ़वा। 2. राज कुमार मेहता, पिता - सरयुग मेहता, ग्राम+पो0 - टण्डवा, थाना+जिला - गढ़वा।	मौजा - नावाडीह, थाना - उण्डई, मार्क - S.F.F	उण्डई			
28	श्रीमती शिला देवी, पति - मिथिलेश कुमार गुप्ता, ग्राम+पो0+थाना+जिला - गढ़वा।	मौजा - उण्डई, थाना - उण्डई, मार्क - M.K	उण्डई			
29	1.श्री पंकज मेहता, पिता - अम्बिका मेहता, ग्राम - सहिजना, पो0+थाना+जिला - गढ़वा। 2. अयोध्या चौधरी, पिता - प्रयाग चौधरी, ग्राम - पिपरा (नाहर चौक) थाना+जिला - गढ़वा।	मौजा - सेमरा टॉड, थाना - उण्डई, मार्क - K.T.M	उण्डई			
30	श्री गुप्तेश्वर साव, पिता - श्री बंशी साव, ग्राम - लवाही, थाना - उण्डई, जिला - गढ़वा।	मौजा - लवाही, थाना - उण्डई, मार्क - G*S	उण्डई		RS 112660.00, GR NO- 2316430756 Date- 28.03.2023	
31	रामजी कुमार, मौर्या पिता - स्व कोदु मेहता, ग्राम - कल्याणपुर थाना+जिला - गढ़वा।	मौजा - पोखरिया, थाना - उण्डई, मार्क - MKF	उण्डई			

नगरउंटारी



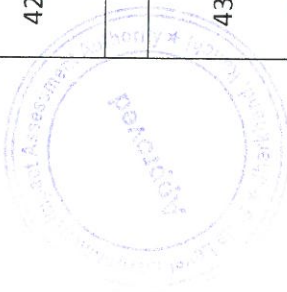
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32	मे० माँ अमिला इंटरप्राइज, प्रो० - विक्रांत सिंह, पिता - विजय सिंह, ग्राम - स्टेशन रोड़ नगरउंटारी, जिला - गढ़वा।	मौजा - नायाखाड़, थाना - नगरउंटारी, मार्क - 555	नगरउंटारी	RS 112660.00, GR NO- 2315579411 Date- 03.02.2023, RS 16200 DMFT RS 1080, I.T
33	श्री अमरेन्द्र कुमार, पिता - स्व इलार चन्द्र प्रसाद, ग्राम+पो०+थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - चितविश्राम, थाना - नगरउंटारी, मार्क - V.I.P	नगरउंटारी	
34	विनोद सिंह, पिता - हरिनंदन सिंह, ग्राम - हेन्होमोड़, पो०+थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - चितविश्राम, थाना - नगरउंटारी, मार्क - 552	नगरउंटारी	
35	श्री चन्द्र प्रकाश दुबे, पिता - स्व उदय शंकर दुबे, ग्राम - चिनिया रोड़, पिपरा कला, जिला - गढ़वा।	मौजा - विलासपुर, थाना - नगरउंटारी, मार्क - ACC	नगरउंटारी	
36	किरण देवी, पिता - स्व प्रमोद कुमार सिंह, ग्राम - हेन्होमोड़, पो०+थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - भजना, थाना - नगरउंटारी, मार्क - 558	नगरउंटारी	RS 112660.00, GR NO- 2316629132 Date-10.04.2023
37	दिपक प्रताप देव, पिता - ग्राम - भैंसबेड़वा पो०+थाना - नगरउंटारी।	मौजा - भैंसबेड़वा, थाना - नगरउंटारी, मार्क - 777	नगरउंटारी	RS 112660.00, GR NO- 2314966587 Date- 26.12.2022, RS 16200 DMFT RS 1080, I.T
38	मे० आशुतोष, महादेव ब्रिक्स, प्रो० - श्री शृंगार चौबे, पिता - स्व दया नाथ चौबे, ग्राम+पो० - पाल्हे, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - भैंसबेड़वा, थाना - नगरउंटारी	नगरउंटारी	RS 112660.00, GR NO- 2315352664 Date-10.04.2023



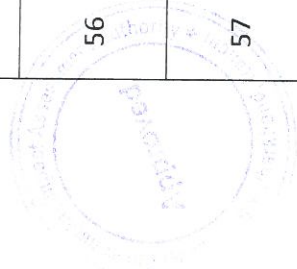
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39	आई वी ब्रिक्स, प्रो० - ईदल सिंह, पिता - शाम्भु नाथ सिंह, ग्राम - भैसबेड़ा, पो० - भोजपुर, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - भैसबेड़ा, थाना - नगरउंटारी	नगरउंटारी	RS 112660.00, GR NO- 231535303 Date-20.01.2023
40	राजेश शुक्ला, पिता - श्री रामकिशोर शुक्ला, ग्राम - जतपुरा, पो० - भोजपुर, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - अधौरा, थाना - नगरउंटारी, मार्क - 525	नगरउंटारी	
41	प्रकाश चन्द्र, पिता - स्व नन्दलाल प्रसाद, मेन रोड़ नगरउंटारी, पो०+थाना - नगरउंटारी जिला - गढ़वा।	मौजा - अलकर, थाना- नगरउंटारी, मार्क- भारत	नगरउंटारी	RS 112660.00, GR NO- 2316282117 Date-20.03.2023
42	रजनी कुमार सिंह, पिता - बलीराम सिंह, ग्राम - भैसबेड़ा पो० - भोजपुर, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - भोजपुर, थाना - नगरउंटारी		RS 112660.00, GR NO- 2316664483 Date-11.04.2023
विशुनपुरा				
43	मै० मॉ अमिला इंटरप्राईजेज, प्रो० - विक्रांत सिंह, पिता - विजय सिंह, ग्राम - स्टेशन रोड़ नगरउंटारी, जिला - गढ़वा।	मौजा - चितरी, थाना - विशुनपुरा, मार्क - 555	विशुनपुरा	RS 112660.00, GR NO- 2316249144 Date-17.03.2023
44	पासव कुमार, पिता - स्व अखैरी ज्वाला प्रसाद, ग्राम - चितरी, पो० - पिपरीकला, थाना - विशुनपुरा, जिला - गढ़वा।	मौजा - चितरी, थाना - विशुनपुरा, मार्क- 554	विशुनपुरा	
45	सुनिल कुमार मेहता, पिता - स्व कृष्णा मेहता, ग्राम+पो० - कल्याणपुर, थाना+जिला - गढ़वा।	मौजा - अमहर खास, थाना - विशुनपुरा, मार्क - 501	विशुनपुरा	RS 112660.00, GR NO- 2315193764 Date-10.01.2023



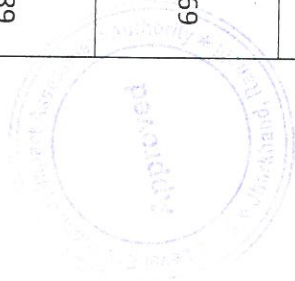
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53	जावेद आलम, पिता - मो0 नईम अंसारी, ग्राम - पचफेडी, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - खोलरा, थाना - मेराल, मार्क - TTL	मेराल	RS 112660.00, GR NO- 2316207490 Date-31.03.2023
54	श्री कृष्णा प्रसाद गुप्ता, उर्फ कैल साव, पिता - स्वं रामदास, ग्राम+पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - खोलरा, थाना - मेराल, मार्क - KB	मेराल	RS 112660.00, GR NO- 2316207490 Date-15.03.2023, RS 16200 DMFT RS 1080 I.T
55	श्री मनोज सिंह, पिता - स्वं विजय बहादुर सिंह, ग्राम - कमरमा, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - कमरमा, थाना - मेराल, मार्क - VS	मेराल	
56	विनय चन्द्रवंशी, पिता - सुखवीर चन्द्रवंशी, ग्राम - दुलदुलवा, पो0 - पेशका, थाना - मेराल, जिला - गढ़वा।	मौजा - अमवार, थाना - मेराल, मार्क - R.B	मेराल	
57	विनोद चन्द्रवंशी, पिता - शंकर चन्द्रवंशी, ग्राम - दुलदुलवा, पो0 - पेशका, थाना - मेराल, जिला - गढ़वा।	मौजा - अमवार, थाना - मेराल, मार्क - J.B.R	मेराल	
58	राजबलि मेहता उर्फ संजय मेहता, पिता - स्वं कृष्णा मेहता, ग्राम+पो0 - कल्याणपुर, थाना+जिला - गढ़वा।	मौजा - तिसरटेडूका, थाना - मेराल मार्क - SOA	मेराल	
59	आजाद अंसारी, पिता - आशिक अंसारी, ग्राम - दुलदुलवा, पो0 - पेशका, थाना - मेराल, जिला - गढ़वा।	मौजा - तिसरटेडूका, थाना - मेराल, मार्क - KING	मेराल	



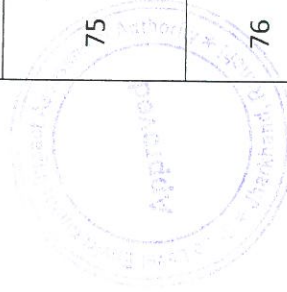
60	श्री संजय कुमार सिंह, पिता - राममुरत आजाद, ग्राम+पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - ओखरगाड़ा, थाना - मेराल, मार्क - SUN	मेराल		
61	कमसुदीन आलम, पिता - मरहुम नाजीर हुसैन, ग्राम - पचफेडी, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - परसही, थाना - मेराल, मार्क - LNT	मेराल		
62	रंजीत कुमार, पिता - श्री शम्भु प्रसाद, ग्राम - जोबरई, पो0+थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - परसही टोला जोगनी, थाना - मेराल, मार्क - सोना	मेराल		
63	मो0 खालीद अंसारी / मो0 नौसाद / मो0 शाहीद, पिता - अब्दुल गन्नी, ग्राम - पचफेडी, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - गढ़ौता, थाना - मेराल, मार्क - ATM	मेराल	9006781953	
64	श्री प्रतिक अग्रवाल, पिता - श्री मुरली प्रसाद, अग्रवाल, ग्राम - सिहो, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - सिहो, थाना - मेराल, मार्क - BPL	मेराल		
65	श्री अशोक कुमार, पिता - श्री यमुना प्रसाद अग्रवाल, ग्राम - सिहो, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - सिहो, थाना - मेराल, मार्क - APL	मेराल		
66	जोखु अंसारी, पिता - जान मोहन्द अंसारी ग्राम - पिपरा थाना - मेराल, जिला - गढ़वा। गुलजार खान, पिता - रहमान खान, ग्राम - धरनीयां, पो0 -	मौजा - सिहो, थाना - मेराल, मार्क - TATA	मेराल	9199869871	

	ओखरगाड़ा, थाना - मेराल।						
67	1. राजेन्द्र प्रसाद गुप्ता, 2. सुबोध कुमार गुप्ता, पिता - श्री जगदीश प्रसाद गुप्ता, ग्राम+पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - सिहों, थाना - मेराल, मार्क - L*G	मेराल	7352944915			
68	अशरुदीन खान, पिता - अलमुदीन खान, ग्राम - टिकुलडीहा कला, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - सिहों, थाना - मेराल, मार्क - T.T	मेराल			RS 112660.00, GR NO- 2316413756 Date- 27.03.2023, RS 16200 DMFT	
69	अशरुदीन खान, पिता - अलमुदीन खान, ग्राम - टिकुलडीहा कला, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - सिहों, थाना - मेराल, मार्क - T.M.T	मेराल				
70	श्री दिनेश ठाकुर , पिता - स्वं विश्वनाथ ठाकुर, ग्राम+पो0 - रावे, थाना - डण्डई, जिला - गढ़वा।	मौजा - पेशक, थाना - मेराल, मार्क - RDF	मेराल				
71	श्री रूपेश कुमार बिन्द, पिता - श्री सुरेश प्रसाद बिन्द, उर्फ घुरा बिन्द, ग्राम+पो0+थाना+जिला - गढ़वा।	मौजा - जोबरईया, थाना - मेराल, मार्क - RDF	गढ़वा,	9279484464			
भण्डरिया							



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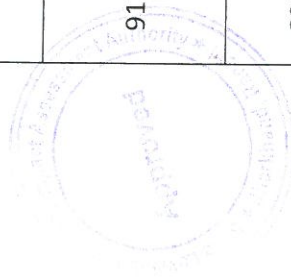
72	अमानत अंसारी, पिता - रोज मोहम्मद अंसारी, ग्राम - उगरा, पो0 - बड़गड, थाना - भण्डरिया, जिला - गढ़वा।	मौजा - उगरा, थाना - भण्डरिया, मार्क - TARA	भण्डरिया,	RS 112660.00, GR NO- 2316005135 Date-28.02.2023, RS 16200 DMFT RS 1080 I.T
73	विशाल कुमार मेहता, पिता - गोर्बधन मेहता, ग्राम - टंडवा, पो0 - गढ़वा, थाना+जिला - गढ़वा।	मौजा - जनेवा, थाना - भण्डरिया, मार्क - V.S.L	भण्डरिया,	
बरडीहा				
74	अनिल यादव, पिता - भरदूल यादव, ग्राम - सिहरा, पो0+थाना - उंटारी रोड, जिला - गढ़वा।	मौजा - सुखनदी, थाना - बरडीहा, मार्क - ANIL	बरडीहा	
75	विनोद यादव, पिता - तपेश्वर यादव, ग्राम+पो0 - खरसोता, थाना - मझिओंव, जिला - गढ़वा।	मौजा - बमनी, थाना - बरडीहा, मार्क - BR	बरडीहा	RS 112660.00, GR NO- 2316005135 Date-28.02.2023, RS 16200 DMFT RS 1080 I.T
76	ददन यादव, पिता - बद्रीनाथ यादव, ग्राम - सरसतिया, पो0 - हरिगांव, थाना - बरडीहा, जिला - गढ़वा।	मौजा - सरसतिया, थाना - बरडीहा, मार्क - 575	बरडीहा	
77	श्री संजय सिंह, पिता - स्व पृथ्वीनाथ सिंह, ग्राम - सिड्हा, पो0+थाना - उंटारी रोड, जिला - पलामू।	मौजा - बमनी, थाना - बरडीहा, मार्क - अमन	बरडीहा	
डण्डा				
78	पप्पू पाण्डे, पिता - गोविन्द पाण्डे, ग्राम - पिपरा कला कृषि विज्ञान केन्द्र गढ़वा के नजदीक।	मौजा - बोंगारसी, थाना- डण्डा, मार्क- A.R.P	डण्डा	



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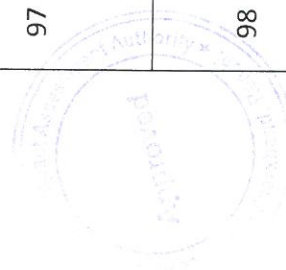
79	अजीत कुमार चौबे, पिता - बिरेन्द्र कुमार चौबे, ग्राम+पो0+थाना - रेहल।	मौजा - बोंगासी, थाना- डण्डा, मार्क- N.G.T	डण्डा		
80	श्री सुभाष दुबे, पिता - स्वं बिक्रमा दुबे, ग्राम - बनपुरवा, पो0 - तिलदाग, थाना+जिला - गढ़वा।	मौजा - बोंगासी, थाना - डण्डा, मार्क - BABA	डण्डा		
81	अरूण दुबे, पिता - शिवकुमार दुबे, ग्राम+पो0 - बेलहार, थाना+जिला - गढ़वा।	मौजा - बोंगासी, थाना - डण्डा, मार्क - LUCKY	डण्डा		
82	श्री युधिष्ठिर सिंह, पिता - स्वं नन्द किशोर सिंह, ग्राम - रामपुर, पो0 - कटुअल, थाना - चैनपुर, जिला - पलामू।	मौजा - भिखही (बहेरवादह), थाना - डण्डा, मार्क - ARYAN	डण्डा		
83	श्री अनिल कुमार चौधरी, पिता - राजेन्द्र चौधरी, ग्राम - थरीया, पो0+थाना - डण्डा, जिला - गढ़वा।	मौजा - थरीया, थाना - डण्डा, मार्क - अनुज	डण्डा		
84	लालमुनी चौधरी, ग्राम - थरीया, पो0+थाना - डण्डा, जिला - गढ़वा।	मौजा - थरीया, थाना - डण्डा, मार्क - अनुज	डण्डा		
कांडी					
85	श्री नरेश प्रसाद सिंह, पिता - स्वं डोमन सिंह, ग्राम + पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - लमारी खर्द, थाना - कांडी, मार्क - दुर्गा	कांडी		
86	नीरज सिंह, पिता - स्वं विश्वनाथ सिंह, ग्राम - चौरा, पो0 - परसोडीह, थाना - भवनाथपुर, जिला - गढ़वा।	मौजा - लमारी खर्द, थाना - काण्डी, मार्क - दुर्गा	कांडी		

87	श्री धन्जय सिंह, पिता - अवधेश प्रसाद सिंह, ग्राम - भण्डरीया, पो0 - कांडी, थाना - कांडी, जिला - गढ़वा।	मौजा - भण्डरीया, थाना - काण्डी, मार्क - DPS	कांडी		
88	श्री सुदेश सिंह, पिता - स्व जामन सिंह ग्राम + पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - राणाडीह, थाना - काण्डी, मार्क -	कांडी		
89	उपेन्द्र नाथ दुबे, पिता - श्री इन्द्रदेव नाथ दुबे, ग्राम - मिसरौलिया, पो0 - सेमौरा, जिला - गढ़वा।	मौजा - राणाडीह, थाना - काण्डी, मार्क - मौ	कांडी		
90	दिनेश मेहता, पिता - स्व रामदेव मेहता, ग्राम - गाड़ा, पो0 - सुण्डीपुर, थाना - कांडी, जिला - गढ़वा।	मौजा - गाड़ा, कला, थाना - काण्डी, मार्क - RBM	कांडी		
91	रौशन सिंह, पिता - श्री नरेश प्रसाद सिंह, ग्राम + पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - मोरवे, थाना - काण्डी, मार्क - पूजा	कांडी	RS 112660.00, GR NO- 2315559438 Date- 02.02.2023, RS 16200 DMIFT RS 1080 I.T	
92	1. रंजीत सिंह, 2. सोनु सिंह, पिता - श्री महेन्द्र सिंह, ग्राम - जपला, अनुमण्डल के पास, थाना - जपला, जिला - पलामू।	मौजा - बेलहत, थाना - काण्डी, मार्क - लक्ष्मी	कांडी		
93	अभिमन्यु कुमार सिंह उर्फ बल्लू कुमार सिंह, पिता - श्री गुप्तेश्वर प्रसाद सिंह, ग्राम+पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - राणाडीह दक्षिणी, थाना - भण्डरिया, मार्क - GPS	कांडी		



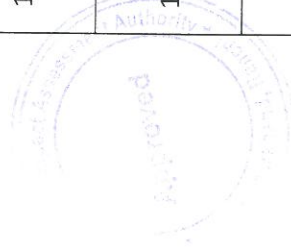
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94	अभिमन्यु कुमार सिंह उर्फ बब्लू कुमार सिंह, पिता - श्री गुणेश्वर प्रसाद सिंह, ग्राम+पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - राणाडीह उतरी, थाना - भण्डरिया, मार्क - GPS	कांडी		
95	श्री नरेश प्रसाद सिंह, पिता - स्वं डोमन सिंह, ग्राम + पो0 - मोरवे, थाना - मझिआंव, जिला - गढ़वा।	मौजा - डुमरसोता, थाना - कांडी, मार्क - - ओम	कांडी		
96	श्री पंकज सिंह, पिता - श्री लालबहादुर सिंह ग्राम + पो0 + थाना - भवनाथपुर, जिला - गढ़वा।	मौजा - रपुरा, थाना - कांडी, मार्क - उत्तम	कांडी		
97	श्री शोशिल सिंह, पिता - श्री बंसत सिंह ग्राम - रनुरा, पो0 - मझिगावों, थाना - भवनाथपुर, जिला - गढ़वा। श्री संजय गुप्ता, पिता....., ग्राम + पो0 + थाना - भवनाथपुर, जिला - गढ़वा।	मौजा - रपुरा, थाना - कांडी, मार्क - राजा	कांडी		
98	श्री संजय गुप्ता, पिता....., श्री अखिलेश सिंह, पिता स्वं सूरज देव सिंह ग्राम + पो0 + थाना - भवनाथपुर, जिला - गढ़वा।	मौजा - हरिहरपुर, थाना - कांडी, मार्क - 501	कांडी		
99	रामानुज कुमार सिंह, पिता - स्वं श्री कृष्णा प्रसाद सिंह, ग्राम - विकताम, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - रपुरा, थाना - हरिहरपुर,	कांडी		RS 112660.00, GR NO- 2315578940 Date- 12.02.2023, RS 16200 DMFT RS 1080 I.T
			रमना		



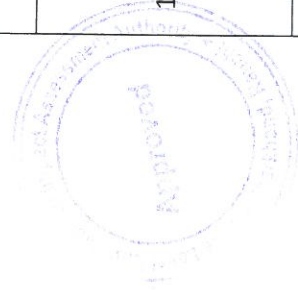
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100	डबल पाण्डये, पिता - बम पाण्डये, ग्राम - कबीसा, पो0 - मडवनिया, थाना - रमना, जिला - गढ़वा।	मौजा - कबीसा, थाना - रमना, मार्क - ANSH	रमना		
101	बब्लू चौबे उर्फ राकेश चौबे, पिता - गिरजा शंकर चौबे, ग्राम - उसकाकला, पो0 - भोजपुर, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - सिरियाटोंगर, थाना - रमना, मार्क- 553	रमना		
केतार					
102	श्री राजू सिंह उर्फ रामानन्द सिंह, पिता - श्री मोती सिंह, ग्राम - उसकाकला, पो0 - भोजपुर, थाना - नगरउंटारी, जिला - गढ़वा।	मौजा - गम्हरिया, थाना - केतार, मार्क-	केतार		
103	शैलेन्द्र सिंह उर्फ बब्लू सिंह, पिता - स्वं गुलाब सिंह, ग्राम - खरवा, पो0 - पाचाडुमर, थाना - केतार, जिला - गढ़वा।	मौजा - नावाडीह, थाना - केतार, मार्क- G.B.F	केतार		
104	शैलेन्द्र सिंह उर्फ बब्लू सिंह, पिता - स्वं गुलाब सिंह, ग्राम - खरवा, पो0 - पाचाडुमर, थाना - केतार, जिला - गढ़वा।	मौजा - मटगवा (बलिगढ़) थाना - केतार, मार्क - G.B.F	केतार		
105	श्री पंकज कुमार सिंह, पिता - स्वं विश्वनाथ सिंह, ग्राम - चौरा, पो0 - परसोडीह, थाना - केतार, जिला - गढ़वा।	मौजा - चौरा, थाना - केतार, मार्क -	केतार		RS 112660.00, GR NO- 2315578940 Date- 12.02.2023, RS 16200 DMFT RS 1080 I.T
106	श्री दिलीप गुप्ता, पिता - स्वं विश्वनाथ प्रसाद गुप्ता, ग्राम - परसोडीह, थाना - केतार, जिला - गढ़वा।	मौजा - परसोडीह, थाना - केतार, मार्क - R.D.F	केतार		



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107	रोहित कुमार सिंह, पिता - स्वं मणि सिंह, ग्राम - कधवन, थाना - केतार।	मौजा - डुरका, थाना - केतार, मार्क - समृद्धि	केतार		
108	विनय तिवारी, पिता - स्वं गिरजानन्द तिवारी, ग्राम - मेरौनी, पो0 + थाना - हरिहरपुर (भवनाथपुर), जिला - गढ़वा।	मौजा - मेरौनी, थाना - केतार, मार्क - शुभ, लाभ।	केतार		
मझिऑव					
109	ओम प्रकाश गुप्ता, पिता - श्री श्यामलाल गुप्ता, ग्राम + पो0 + थाना - विशुनपुरा, जिला - गढ़वा।	मौजा - देवनकारा, थाना - विशुनपुरा, मार्क - OMG	मझिऑव		
110	असुरेश सिंह, पिता - केदार नाथ सिंह, ग्राम - कम्रमा, पो0 - ओखरगाड़ा, थाना - मेराल, जिला - गढ़वा।	मौजा - बोदरा, थाना - मझिऑव, मार्क - 561	मझिऑव		RS 112660.00, GR NO- 2316224508 Date- 16.03.2023, RS 16200 DMFT RS 1080 I.T
111	1.जज सिंह, पिता - दरोगा सिंह, ग्राम - भाली, पो0 + थाना - मोहम्मदगंज, जिला - पलामू। 2. पप्पू सिंह, पिता - नामालुम, ग्राम - भाली, पो0 + थाना - मोहम्मदगंज, जिला - पलामू।	मौजा - खजूरी, थाना - मझिऑव, मार्क - 561	मझिऑव		
112	श्री जितेन्द्र सिंह, पिता - विजय सिंह, ग्राम - रामपुर, पो0 - हरिगावों, थाना - मझिऑव, जिला - गढ़वा।	मौजा - रामपुर, थाना - मझिऑव, मार्क - TOP	मझिऑव		
113	जितेन्द्र, पिता - स्वं कर्म देव सिंह, ग्राम - पिपरकला, पो0 + थाना + जिला - गढ़वा।	मौजा - जाहरसरई, थाना - मझिऑव, मार्क - MGF	मझिऑव	9431390813	



114	जितेन्द्र मेहता, पिता - विजय मेहता, ग्राम+ पो0 - कल्याणपुर, थाना + जिला - गढ़वा।	मौजा - जाहरसरई, थाना - मझिऑव, मार्क - MGF	मझिऑव		
115	1. कुन्दन सिंह, पिता - श्री विनोद सिंह, ग्राम - भाली, पो0 + थाना - मोहम्मदगंज, जिला - पलामू 2. पंचम खॉं, पिता - बाबर खॉं, ग्राम - गोरालीह, पो0 + थाना - मोहम्मदगंज, जिला - पलामू 3. केश खॉं, पिता - नामालूम, ग्राम - बटउआ, पो0 + थाना - मोहम्मदगंज, जिला - पलामू।	मौजा - बहेराघुरवा, थाना - मझिऑव, मार्क - GOLD	मझिऑव		
116	राकेश कुमार कुशवाहा, पिता - गोवर्धन मेहता, ग्राम - टंडवा, पो0 + थाना + जिला - गढ़वा।	मौजा - बंढीखाड़, थाना - मझिऑव, मार्क - MKF	मझिऑव		
खरौन्धी					
117	उमेश कुमार जयसवाल, पिता - स्वं राजेश्वर प्रसाद जयसवाल, ग्राम - गर्ल स्कूल के पास नगरउंटारी, जिला - गढ़वा।	मौजा - सिरीपलीया, थाना - खरौन्धी, मार्क - 999	खरौन्धी	6203344043	RS 112660.00, GR NO- 2316353688 Date- 23.03.2023, RS 16200 DMFT RS 1080 I.T





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DISTRICT SURVEY REPORT GARHWA - 2023

DISTRICT SURVEY REPORT GARHWA - 2023

Title	Description	Start Date	End Date	File
DISTRICT SURVEY REPORT GARHWA - 2023	DISTRICT SURVEY REPORT GARHWA - 2023.	30/08/2023	24/09/2023	View (6 MB)



जिल्हा खनन कार्यालय, गढ़वा

आवश्यक सूचना

आम नागरिकों को सूचित किया जाता है कि गढ़वा जिला का जिला सर्वेक्षण रिपोर्ट 2023 (बालू को छोड़कर) का Draft तैयार कर गढ़वा जिले के वेबसाइट N.I.C Portal पर Upload कर दिया गया है। जिस किसी का आपत्ति हो या सुझाव देना चाहते हों, तो अपनी आपत्ति या सुझाव दर्ज करा सकते हैं।

विशेष जानकारी के लिए अधोहस्तारी के कार्यालय में किसी कार्य दिवस में सम्पर्क किया जा सकता है।

PR305917 (Mines and Geology)/23-24'D

सहायक खनन पदाधिकारी,
गढ़वा

प्रभात खबर

Fri, 01 September 2023

<https://epaper.prabhatkhabar.com/c/73465033>



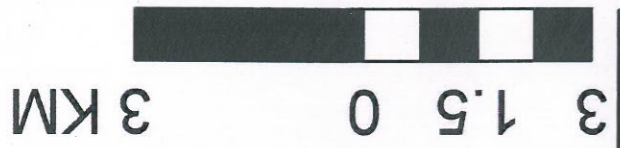
General stone Mine of Chiniya Block



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



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- Legend**
- Mines ●
 - Zone □
 - Village □
 - Block Boundary □



General stone Mine of Ranka Block

83°40'0"E

83°50'0"E

N



24°0'0"N

24°0'0"N



23°50'0"N

23°50'0"N

Legend

- Mines
- Zone
- Village
- Block Boundary

5 2.5 0 5 KM



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

83°40'0"E

83°50'0"E



Air Emission during Mining Operations

During mining activity, the emission may arise due to various mining operations i.e. drilling, blasting, excavation and transportation. While calculating load coming out from various activities of these mines, several data related challenges has been observed i.e. activity area, maximum annual production etc. In mining operations, major contributor of pollution is the dust coming out from various activities at mine site. To streamline the calculation of PM emissions, following assumptions have been made:

1. Area of activity at a time is taken as 100 x 100 sqm.
2. To obtain maximum production in TPA, available mineable reserve was divided by total years of the mine lease.
3. Drilling and blasting are not considered in the modelling scenario as these activities are not continuous operation.
4. Emission from 200 m haul road for each mine is taken into consideration however they are different in route and different in distance travelled for different mines.

While calculating the load following parameters are taken in to considerations:

1. Meteorological condition of district Garhwa prevailing in the month of March has been taken.
2. Average Wind Speed 2.5 m/s is taken.
3. Average Wind Direction is found to be blowing from North West to South East.
4. Working Hours per day is taken as 8 hours.
5. Total 300 numbers of working days in a year is taken.
6. Moisture content in the soil in the month of March is taken as 5%.
7. Silt content on the road is taken 20%.

Based on the assumptions and input data, the calculated PM emission rate from different mines would be as follows:



Table 1: PM Emission Rate

S.No.	Mine	Location	Area, Ha	Production, Tonnes	Mine Lease, Years	Production, TPA	PM, g/s/m ² (Mine)	PM, g/s (Transportation)
1	Sunil Kumar	Meral	0.5	39853	10	3985.3	8.45E-09	0.0063
2	Keshri Industries	Bishumpura	3.23	947530	10	94753	2.01E-07	0.1512
3	Maa Mundeshwari	Bardina	0.97	221653	10	22165.3	4.70E-08	0.0354
4	Rajat Kapoor	Ramkanda	4.01	2641713	5	528342.6	1.12E-06	0.8436
5	Rajat Kapoor	Ramkanda	3.84	2177972	5	435594.4	9.24E-07	0.6955
6	Raj Kumar	Durki	0.46	119167	10	11916.7	2.52E-08	0.0190
7	M A Project	Bhawnathpur	0.174	23150	10	2315	4.91E-09	0.0037
8	Jai Sokha Baba	Ranka	2.428	1500390	10	150039	3.18E-07	0.2396
9	M G Construction	Ranka	2.833	2403171.3	10	240317.13	5.099E-07	0.3837
10	M G Construction	Ranka	2.821	1897229.63	5	379445.926	8.05E-07	0.6059
11	Jai Baba Bajinath	Ranka	2.19	1785240	10	178524	3.788E-07	0.2851
12	Trideo Stone Mines	Ranka	2.8	1794002	10	179400.2	3.81E-07	0.2865
13	Maa Vindhewashini	Ranka	2.59	1439443	5	287888.6	6.11E-07	0.4597
14	Shrimati Vidhya Sharma	Chiniya	3.43	1555902	10	155590.2	3.30E-07	0.2484
15	Amit Kumar Sinha	Ranka	2.03	1565435	5	313087	6.64E-07	0.4999
16	Mahadev Stone Mines	Ranka	1.7	1203152	10	120315.2	2.55E-07	0.1921
17	Gannayak Coal	Ranka	2.12	756983	5	151396.6	3.21E-07	0.2417
18	Sumit Jaiswal	Ranka	1.517	629404.83	10	62940.483	1.33E-07	0.1005
19	Prabhat Kumar	Ranka	1.983	812314.98	10	81231.498	1.72E-07	0.1297



An effort has been made to draw some isopleths of pollutants arising due to mine operations. But, since the mines are scattered across the district, it is not possible to model all the mines in one scenario as the emissions from individual mines will be quite smaller as compared to the mines located in the cluster. Hence, the mines located nearby and falling within 10 km of common radius are taken into consideration for generating isopleths. All the mines of Ranka block are falling in common 10 km radius hence an isopleth is generated for PM during mining operation.

There is total 10 mines exist in a pocket in Ranka block. Emission rates of PM from these mines are put into the Lake Environment Software with meteorological data of Garhwa for the month of March and a uniform rectangular receptor grid is generated to know the values of PM concentration across the grid.

It can be seen while analysing the outputs that the maximum concentration will be $31.1 \mu\text{g}/\text{m}^3$ when there will be no air pollution control measures i.e. water sprinkling at site and water sprinkling on haul road is not done. However, the emission will be found maximum near the clusters of mines and in the rest of the area it is found scattered with decreasing concentration.

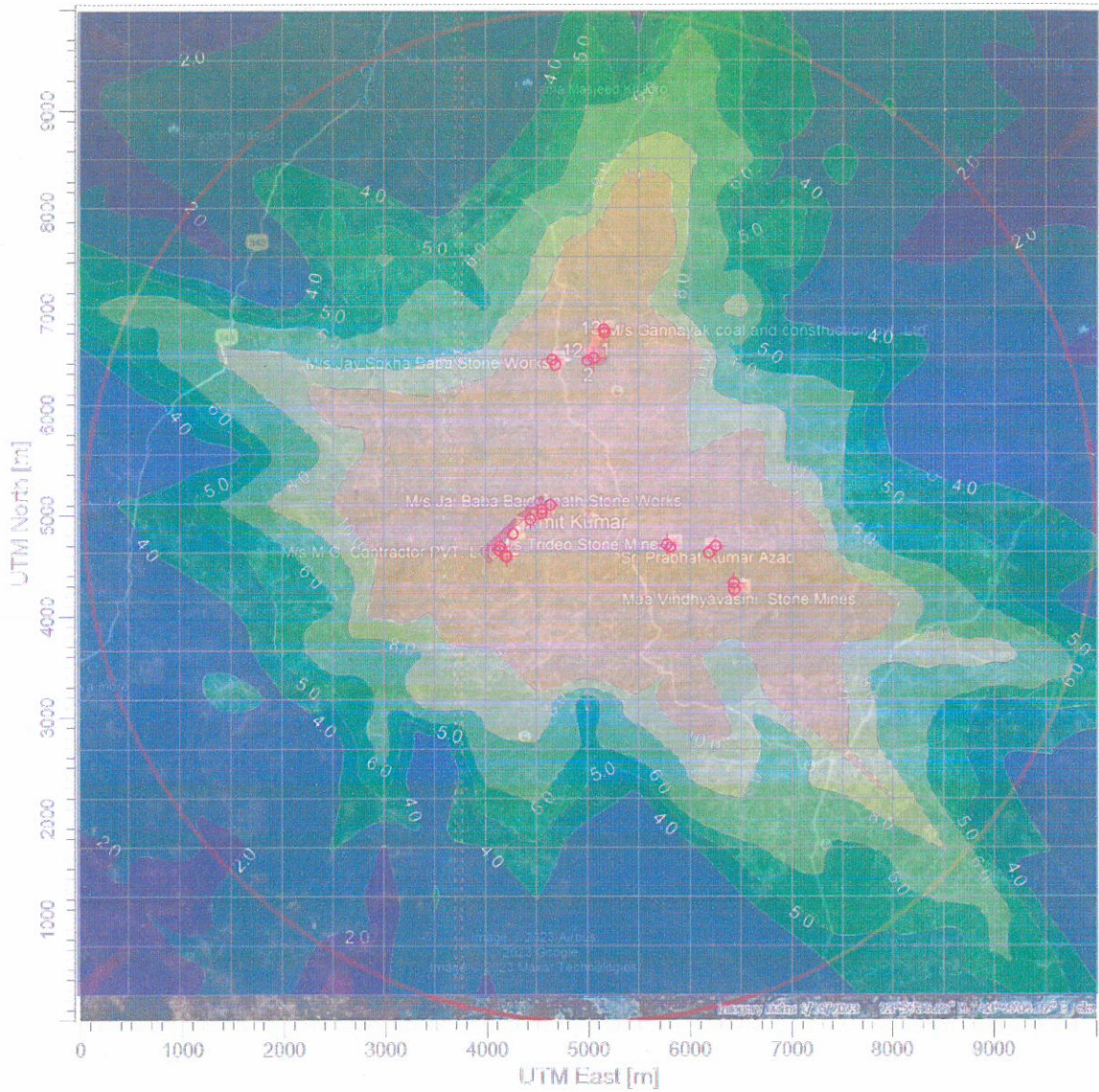
While when air pollution control measures are adopted i.e. water sprinkling which typically reduces emission of dust upto 90%, the emission comes down to $2.76 \mu\text{g}/\text{m}^3$.



PROJECT TITLE:

Garhwa DOR-Stone Mines in Raneigh Division

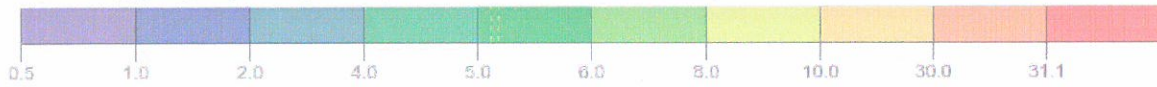
PM10-24 Hour Max (Mine+Transportation) Uncontrolled



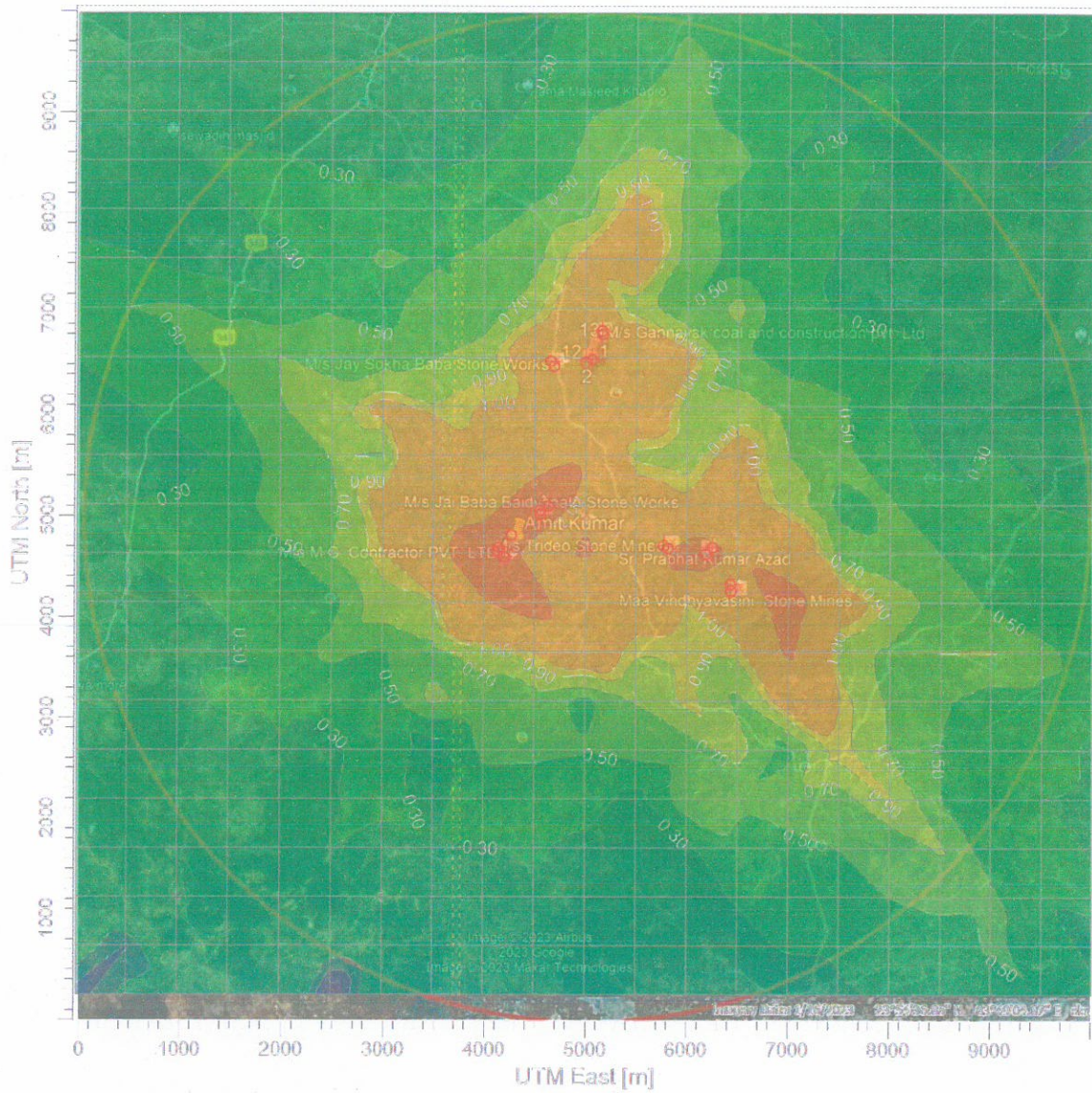
PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³

Max: 31.1 [ug/m³] at (3987/11,4628.33)



PROJECT TITLE:
 Garhwa CSR Stone Mines in Ranba Division
 PM10-24 HourMax (Mines+Transportation) Controlled



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³

Max: 2.76 [ug/m³] at (4488.97, 5115.16)

