DISTRICT SURVEY REPORT (DSR)

OF

GAJAPATI DISTRICT, ODISHA

FOR

SPRCIFIED MINOR MINERAL SOURCES OF DECORATIVE STONES

(DRAFT COPY)

(FOR PLANNING AND EXPLOITING OF MINOR MINERAL RESOURCES)

As per Notification No.- S.O. 3611(E), New Delhi,

25th July, 2018

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

(MoEF & CC)

Submitted By:

COLLECTORATE, GAJAPATI

PREAMBLE

Odisha is one of the Major Mineral rich State in India. Gajapati is a unique District in Odisha lies on the Southern most part of the State with rich and varied mineral resource. It is a paradise for Geo-scientists of India and aboard. It has preserved many important rock groups from the earliest of crust formation to the geologically recent times. The land mass constituting the Gajapati District, explorers to many Entrepreneurs on account of its diverse geological setting and rich and varied mineral resources.

In pursuance of MoEF& CC Notification S.O. 141(E) dated 15th Jan. 2016,District Environment Impact Assessment Authority (DEIAA) & District level Expert Appraisal Committee (DEAC) has been formed for Category–B_2 Minor Minerals having area less than or equal to 5ha. Prior to the formation of Odisha Minor Mineral Concession Rule 2004, (OMMCR-2004) the mining operation form in or mineral were carried out in un-scientific manner. Identifying this fact in exercise of power, Conferred by Section 15 by Mines and Minerals (Development and Regulation) Act 1957 as amended in 2015 and all other powers enabling it in that behalf, the industry Mines & Geology Department, Govt. of Odisha framed the aforementioned rule, which has been amended with period of times in the year 2014, 2015 and 2016.

Keeping in view of experience gained in period of decade, the MoEF & CC came out with Environmental Impact Assessment NotificationS.O.-1533(E) dated14th Sept. 2006. It has been made mandatory to obtain environmental clearance for different kinds of development projects as listed in Scheduled-I of notification. Further, pursuance of the order of Hon'ble Supreme Court Petition (C) No. 19628-19629 of 2009, dated 27th Feb, 2012. In the matter of Deepak Kumar etc., Vs State of Haryana and others etc., Prior

Environmental Clearance has now become mandatory for mining of Minor Minerals irrespective of the area of Mining Lease. And also in view of the Hon'ble National Green Tribunal, order dated the 13th Jan, 2015 the matter regarding Sand, Brick Earth, & Burrowed Earth cutting for Road Construction has to take prior E.C. for Mining Lease irrespective of the fact that whether the area involved is more or less than 5 hectares. They also suggested for making a policy on E.C for minor minerals lease in cluster.

MoEF & CC in consultation with State Government has prepared Guidelines on Sustainable Sand Mining & Minorminerals other than sand mining in 2016, detailing the provisions on Environmental Clearance for cluster creation of District Environmental Impact Assessment Authority (DEIAA) & proper monitoring of Minor Minerals mining, using Information Technology to track the mineral out material from source to destination.

DEAC will scrutinize and recommend the prior environmental clearance of mining of minor mineral to DEIAA on basis of District Survey Report. This will model and guiding document which is a compendium of available mineral resources, geographical set up, Environmental and Ecological set up of the District and replenishment of minerals and is based on data of various departments, publishedreports, Journal and websites. Subsequently, Hon'ble Supreme Court vide their orderdt. 18.01.2022 in connection with Civil Appeal Nos. 3661-3662 of 2020, the State of Bihar and others Vrs- Pawan Kumar and others at Paragraph 14". We therefore find it appropriate to substitute the directions issued by Tribunal vide judgment and order dated 14th October, 2020 with the following directions,

i. The exercise of preparation of DSR for the purpose of mining of the State of Bihar in all the Districts shall be under taken afresh. The Draft DSRs shall be prepared by the Sub-

Divisional Committees consisting of the Sub-Divisional Magistrate, Officers from Irrigation Department, State Pollution Control Board or Committee, Forest Department, Geological or Mining Officer. The same shall be prepared by undertaking site visits and also using by modern technology. After the Draft DSRs are prepared the District Magistrate of the concerned Districts hall forward the same for examination and evaluation by the SEAC. The same shall be examined by the SEAC and its report shall be forwarded to SEIAA. The SEIAA will thereafter consider the grant of approval such DSRs.

ii. Needless to state that while preparing DSRs and appraisal thereof by SEAC and SEIAA. It should be ensured that a strict adherence to the procedure and parameters laid down in the policy of January-2020 should be followed.

The District Survey Report will form the basis for application for Environmental Clearance, preparation of reports and appraisal of projects. District Survey Reports are to be reviewed once in every five years as per statue.

In lieu of above guideline and orders of Hon'ble Supreme Court and incompliance to the orders of Hon'ble NGT, EZ, Kolkata, in connection with O.A No. 63/2020, the Member Secretary of SEIAA, Odisha, Bhubaneswar issued a Letter on 27th December, 2022 to Collector & District Magistrate, Gajapati with a direction "the DSR is to be signed a fresh by the Collector and District Magistrate, along with members of the designated sub-committee consisting of Sub-Divisional Magistrate, and District Level Officers from Irrigation Department, State Pollution Control Board, Forest Department, Geology and / or Mining Department. Keeping in view of the orders of Hon'ble Supreme Court, Hon'ble NGT and directions of SEIAA, Odisha. Bhubaneswar a fresh DSR has been prepared observing all formalities in the year, 2023

The Main objective of the preparation of District Survey Report is to ensure the following:-

1. Identification of Mineral Resources in the District.
2. Identification of areas of minor minerals having the potentiality where mining can be allowed.
3. Identification of area and proximity to infrastructure and installations where mining should be prohibited.

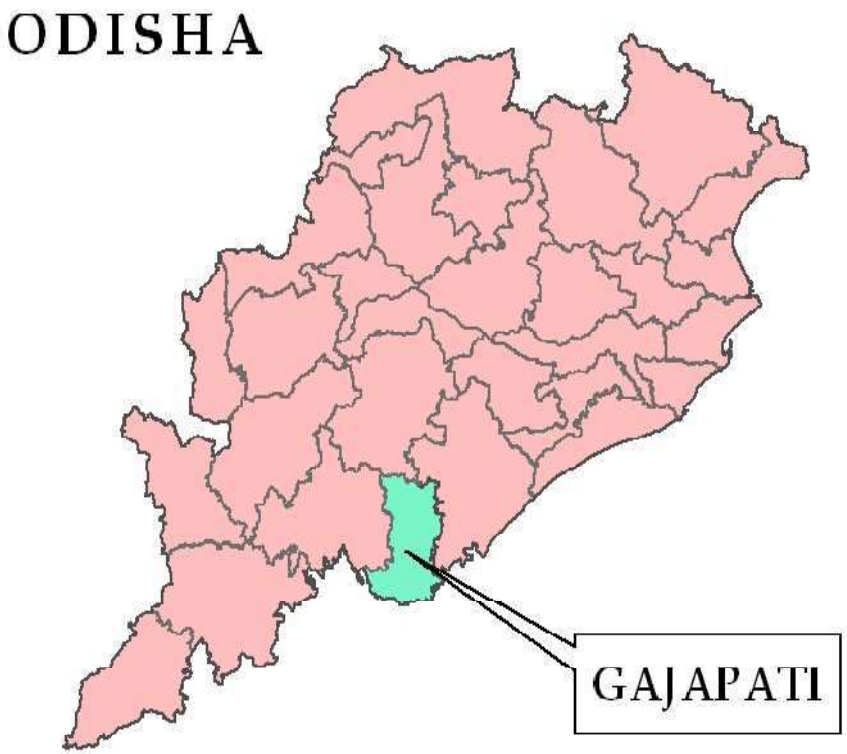
INTRODUCTION

1.0. Gajapati District at a Glance:

1.1. Location and Geographical Area:

Gajapati district has been named after Shri Krushna Chandra Gajapati Narayan Deo, the Ex- Raja Saheb of Paralakhemundi Estate (The first prime minister of Odisha State), who is remembered for his contribution in formation of a separate Odisha Province and inclusion of Paralakhemundi Estate in Odisha. It got a district status on 2nd October 1992 after bifurcation of Ganjam district. It was sub-divisio in Ganjam and yet it is only sub-division in Gajapati district. Paralakhemundi is the District Head Quarter of Gajapati district, spreading over an area of 4325 sq.km lies between 18° 46′ North and 19° 39′ North latitudes and 83° 48′ and 84° 27′ East longitudes. The District is surroundedby Andhra Pradesh state in its South, Ganjam District in its East, Rayagada District in its West and Kandhamal in its north side.This District consists of one Sub-Divisions namely Paralakhemundi.Thereare7Tahasilsfor7Blocks, 1534 Villages, 149 Gram Panchayat and 11 Police stations of the District. Paralakhemundi is the main town of the District and is also its centre of economic growth. The primary occupation of people in the District is cultivation. This District is mainly known for cultivation of Maize. Agriculture and Tourism are the major revenue sources of Gajapati District. Gajapati District gains a large amount of its revenue through the agricultural sector. Also agro–processing and horticulture industries add to the economic wealth of this region. Economy of Gajapati District is agrarian in character. Except a few agro–processing units, there is no major industry in the District. However, some activities of cottage industries like Horn work, Jaikhadi bag, Cane and bamboo work, Ganjappa card and Pattachitra mukha, Broom work and Siali leaf plate making and Tibetan Woolen Carpet

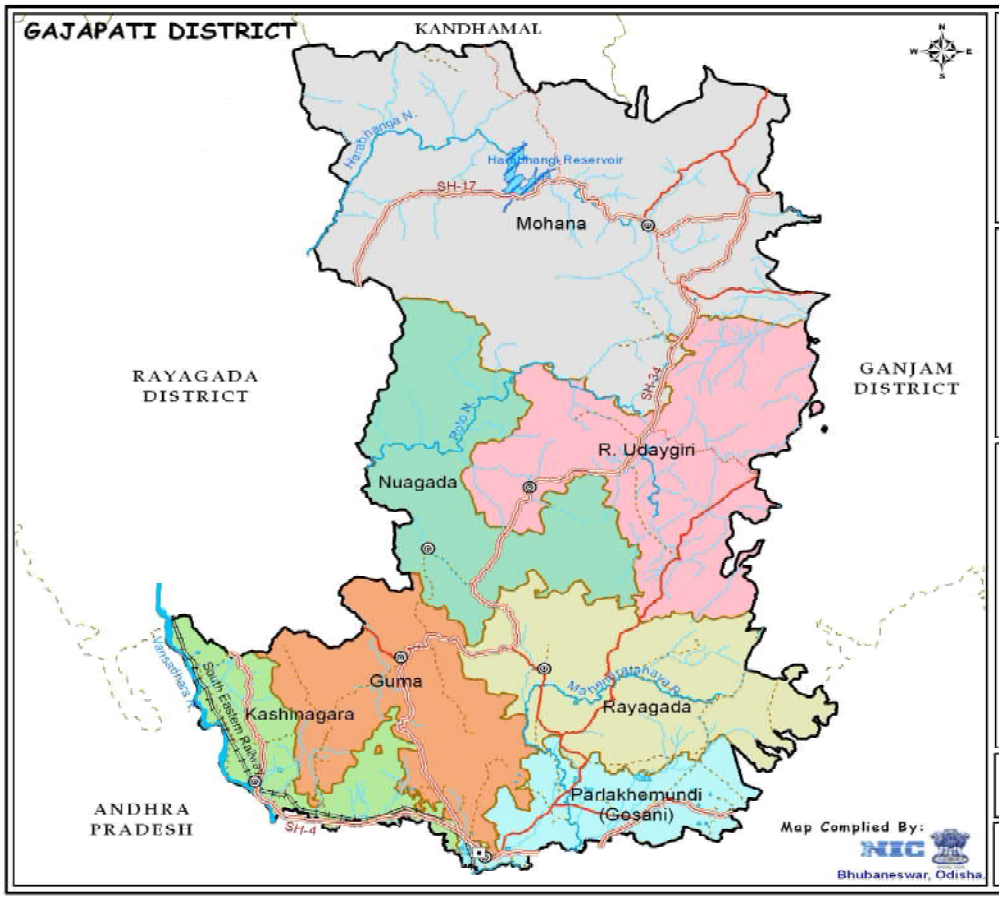
contribute to the economy of the District. Being an agrarian economy, agriculture is the main stay of the people of Gajapati District. It is in the coastal section of Odisha blessed with hot and humid cliamte, with alluvium soil and intersected by the perennial rivers, which collectivelyprovides conducive infrastructure for the growth of agriculture in the region. Rice, Pulses, oil seeds like groundnut, mustard, castor and linseed are grown in the District of Gajapati. The District has a rich mineral base of soft stones, lime stone, stone chips are available in the District, which are mainly used in industrial units in the District. The huge deposits of granite stones at different regions provides tremendous scope for development of few more industries based on this resources. Except these, no minerals in large quantity which can be explored for commercial purpose found in the District.



1.2. Administrative Units:-

Paralakhemundi is the administrative headquarter of Gajapati District. It is located at a distance of 194 Km from Bhubaneswar, State capital of Odisha.It has1534 villages covering 7 Blocks, 7 Tahasil and 1 sub- Division, namely Paralakhemundi . The 7 Blocks and Tahasils are namely,

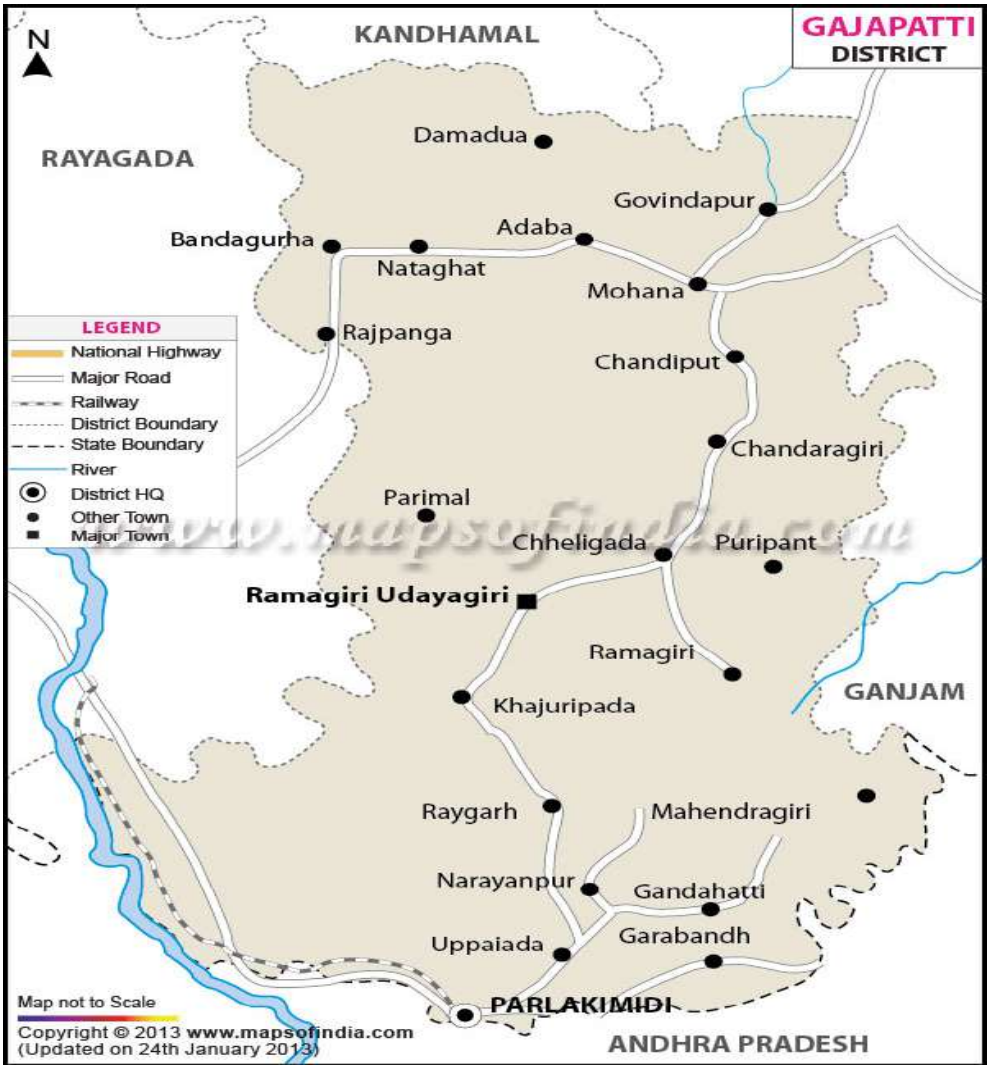
i) Paralakhemundi, ii) Kashinagar, iii) R Udayagiri, iv) Mohana, v) Rayagada, vi) Nuagada, vii) Gumma. Total population of the Gajapati District (2011 census) was 5,77,817 comprising total 2,82,882 male population and 2,94,935 female population. Total SC population of the District is 39,175 and total ST population of the District is 3,13,714.



1.3 Connectivity Facilities:-

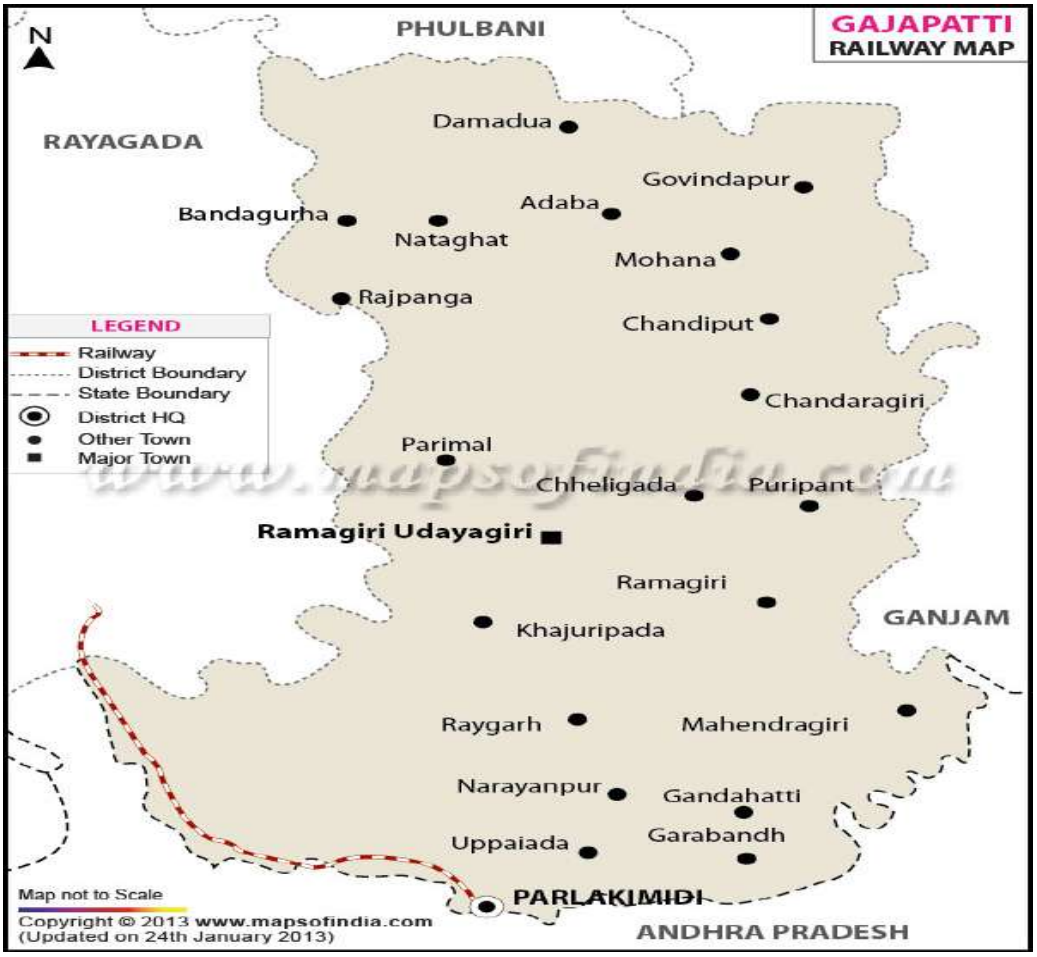
1.3.1 Road Network:

The District is well served by a network of good roads and has been called the motorists paradise. The chief roads emanating from Gajapati town are NH-326A and SH-4 passes the District. Gajapati is 120 Kms from Brahmapur, 206 Kms from Bhubaneswarr, 136 Kms from Visakhapatnam. It is also connected with other cities such as Rayagada, Nawarangpur, Malkangiri, Puri, Palasa, Brahmapur and Visakhapatnam via Odisha State Road Transport Corporation and some private transport services.



1.3.2 Rail Network:

Gajapati District is partially connected by Rail link to different places, Paralakhemundi Railway Station is an important station of this district. The distance to Visakhapatnam is approximately 232 km, while the distance to Bhubaneswar is about 206 km; from the city of Gajapati is well connected to many places in the state.



1.3.3 AirNetwork

At present, Gajapati has no connection by Airway. Nearest air port is Biju Patnaik Airport, Bhubaneswar, 200 Kms from Gajapati and Visakhapatnam International Airport (A.P) is 144 Kms from Gajapti district.

2.0 OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT:

2.1 MINERALS:

The district hists a variety of mineral occurrences which include Calc-tuffa, China clay, Mica, Lime Kankar, Quartz and feldspars, Red ochre, Pegmatite and Dimension/ decorative stones. Brief description of the mineral occurrences is given below.

2.1.1. China clay:

An occurrence of China clay has been reported near Jhinjhira over an area of 200m X 100m with thickness verifying from 2m to 6m. The chemical analysis indicates the Al_2O_3verifying from 6.47% to 14.73%, Fe_2O_3 from 1.97% to 3.59% and CaO from 0.58% to 1.15%.

2.1.2 Calc-tufa:

At a distance of about 1.5 km SE Nuagada an occurrence of Calc-tufa has been reported. Another occurrence of Calc-tufa is also found around North of Hatimunda.

2.1.3. Mica:

Muscovite micas associated with pegmatite have been located near Tumbagaon Ranikhoma, Ladrimi near Mohana, Samarasingi, Badaraisingi, Jamugada and Adaba etc. having maximum book size of 200m X 50m X 3 cm. Mostly these are stained and cracked and are not large enough to be workable.

2.1.4. Lime Kankar:

About 1 km south of Rakeshpanka village near Durbankula nallah, a small patch of lime kankar has been marked. On analysis, the percentage of CaO is 44% and Silica is 9%. Total recovery may be of 10,000 Cu.m

2.1.5. Quartz & Feldspar:

There are some zoned pegmatite occurrences around Koinpur, Mohana etc. where quartz core and feldspars have been encountered. The quartz analysis to be 98.2% of Sio_2. The important localities are Tumbagaon, Koinpur, Baligonda Mohana, Uparsahi Ranikhoma etc.

2.1.6. Red Ochre:

At a distance of about 1 km East of Hajipanga, an occurrence of red ochre is reported. The chemical analysis indicates the Fe_2O_3 content of 17.61 to 18.63% and $A_{l2}O_3$ 14.90 to 31.11%.

2.1.7 Dimension Stone:

Keeping in view the features like colour, consistency, homogeneity in grain size, joint spacing, outcrop dimension and easy accessibility about 20 potential occurrence of dimension/decorative stones are located in the district around Antarba, Jamurhiha, Poibandha, Khariguma, Bariabandha, Dengama, Kandha, Adaba-I, Kandha, Adaba-II, Narayanpur, Khariguda-I, Khariguda-II, Mandimera and Burhandi, around Laxmipur, Venkatpuram, D.jeypur, Jhinjiriguda, Kharia, Budhanala, Gududum etc. They usually consist of the rock types comprising granite gneiss. The reserve of Dimension stone of Gajapati district is about 70.85 lakh cubic meters. Besides above deposits, the dimension/ decorative stones in the district are also reported around hills to the north of Mohana and the hills near Adava. Other than the above mentioned minerals, minor minerals such as river sand, laterite slabs, building stone/black stone/road metals, morrum, bricks earth etc. are also available in the district.

3.0 GENERAL PROFILE:

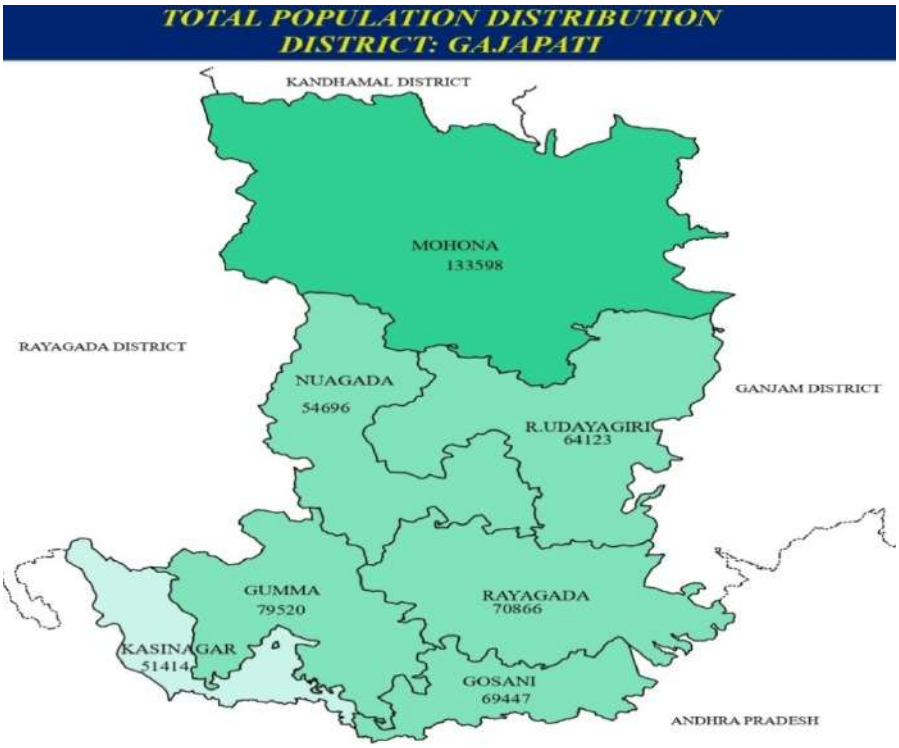
a. Administrative set up:

Sl No	Item	Unit	Magnitude
1	**Location**		
	Longitude	Degree	$83^0$48′ to $84^0$27′ East
	Latitude	Degree	$18^0$46′ to $19^0$39′ North
2	**Geogrphical area**	Sq.km.	4325
3	**Sub-division**	Numbers	1
4	**Tahasils**	Numbers	7
5	**C D Blocks**	Numbers	7
6	**Municipalities**	Numbers	1
7	**NACs**	Numbers	1
8	**Police Stations**	Numbers	11
9	**Gram Panchayats**	Numbers	149
10	**Villages**	Numbers	1612
	Inhabited	Numbers	1499
	Uninhabited	Numbers	113
11	**Assembly constituencies**	Numbers	2

b) Area and Population:

The district has an area of 4325 sq.km. and 5.78 lakh of population as per 2011 census. The district accounts for 2.78 percent of the states territory and shares 1.38 percent of the state population. The density population of the district is 134 sq.km as against 270

person per sq.km. of the state. As per 2011 census the schedule caste population is 39175 (6.80%) and schedule tribe population 31374 (54.3%). The literacy percentage of the district covers 53.5 against 72.90 of the state.



c) Climate:

The climate condition of the district is generally hot and high humidity during April to May and cold during December to January. The monsoon generally breaks during the month of june. Actual average annual rainfall of the district was 1473.93 mm during 2019-20 to 23-24, which higher than the normal rainfall 1403.3mm.

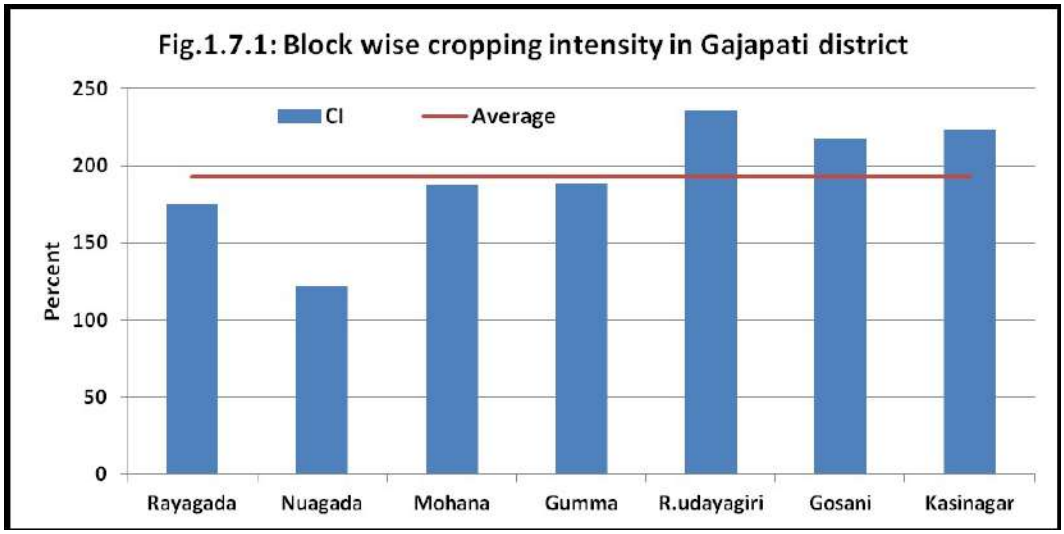
d) Agriculture:

During the year **2023-24** the net area sown was 76 thousand hectares against 5356 thousand hectares of the state. The production of was as below;

Name	Paddy	Wheat	Maize	Mung	Biri	Kulthi	Till	Groundnut	Mustard	Potatoes	Jute	Sugarcane
Production in MT	78230	0.00	30450	2370	4720	250	0.00	2480	450	700	0.00	3870

During 2023-24, the total fertilizers used in the district was about

Type of fertiliser	Nitrogenous	Phosphatic	Pottasic	Total	Consumption per ha
Quantity in MT	5373	4565	1492	11430	22.72



e) Power:

Consumption of electricity in the district during the year 2023-24 covers 12.50 million units and villages so far electrified as on Sept 2023, 1514 revenue villages which constitutes 94% to the total revenue villages of the district.

f) Transport & Communication:

Railway route (14-15) km	47.00
No of Rly stations and PH (14-15)	6

Forest road (17-18) km	104.60
National Highway km (2019)	171.9
State Highway km (2019)	147.912
Major district road km (2019)	67.7
Other dist road km (2019)	205.845
Rural road km (2019)	1237.998
Inter village road km (2019)	3015.99
Intra village road km (2019) (2019)	7229.54
Municipality Paralakhemundi Road km	54.343
NAC, Kashinagar Road km	13.800

g) Health:

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

Govt. Allopathic medical institutions 31 Nos.(Details as in below table)

Block name	DHH	UPHC	CHC	PHC(N)	OH
Gosani Block	1	1	1	3	0
Gumma (T) Block	0	0	1	3	0
Kashinagr Block	0	0	1	2	0
Mohana (T) Block	0	0	2	5	0
Nuagada (T) Block	0	0	1	1	1
R. Udayagiri (T) Block	0	0	1	3	0
R. Udayagiri (T) Block	1	1	1	3	0
Total(31)	**2**	**2**	**8**	**20**	**1**

Beds facilities 10 Nos (Details as in below table)

Sl. No.	Name of the Block	Name of the facility	Facility Type	No.of sanction Bed
1	Mohana	CHC Mohana	CHC	30
2	Mohana	CHC Chandragiri	CHC	50
3	R.Udayagiri	CHC R. Udayagiri	CHC	16

4	Nuagada	CHC B.K. Pada	CHC	16
5	Nuagada	CHC Nuagada	CHC	6
6	rayagada	CHC Nuagada	CHC	16
7	Gosani	CHC Gurandi	CHC	6
8	Kashinagar	CHC Kashinagar	CHC	16
9	Gumma	CHC Gumma	CHC	6
10	Paralakhemundi	Paralakhmeundi	DHH	111+50(MCH Building)

Homoeopathic Dispensaries - 6 Nos.

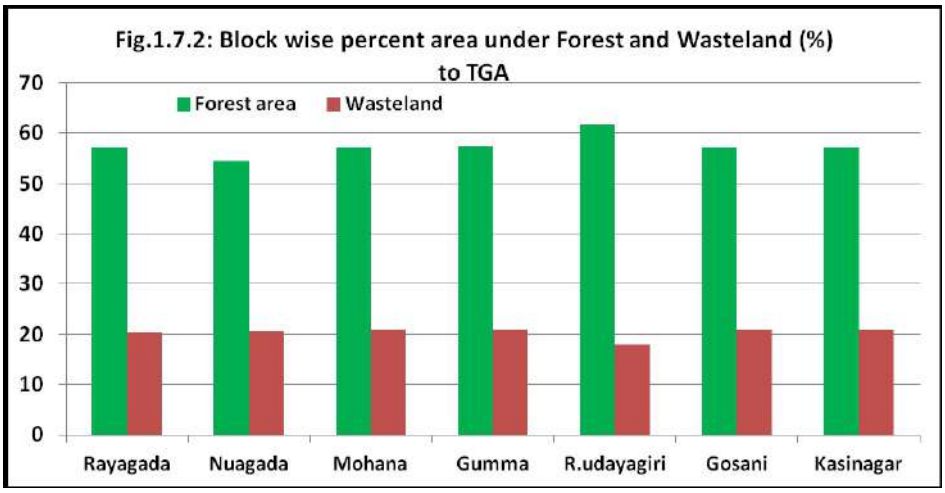
Ayurvedic Dispensaries - 7 Nos.

h) Tourist Places:

There are four nos. of tourist spots in Gajapati district namely Paralakhemundi, Mahendragiri, Gandahati waterfall and Harabhangi projects as identified by department of Tourism, Governemnt of Odisha. During 2011, 24133 nos. of domestic tourist were visited to the tourist centers of Gajapati district.

i) Forest Areas:

Category of forest	Area in sq km
Reserve Forest	447.17
Unclassified Forest	0.13
Demarcated Protect Forest (DFR)	57.67
Un-demarcated Protect Forest	1116.67
Other forest under Revenue Dept	794.39
Total	2469.01



j) Education:

Primary School (2017-18	No.of Schools	539
	Enrollment No.	49547
	Pupil Teacher Ratio	19.78:1
Upper Primary School	No.of Schools	265
	Enrollment No.	33891
	Pupil Teacher Ratio	17.29:1
General College (2017-18)	Junior	43
	Degree	
Secondary School	No.of Schools	161
	Enrollment No.	18221
	Pupil Teacher Ratio	14.71:1
Literacy Rate, 2011	Male	64.38
	Female	43.18
	Total	53.39

k) Culture & Heritage:

Tribals form majority of the population of Gajapati district. The Saura Community constitutes the largest group among them and Lanjia Saura is considered most primitive in this district. The Saouras are one of the oldest known tribes of India. They are called

by various terms such as Savaras, Sabaras, Saura, Sora etc. But here the term Saura is used uniformly as it closely approximates their languages. They are widely distributed from Bundelkhand in the west to Odisha in the east. But they are found in great compactness on the edges of the Eastern ghats in Ganjam, Gajapati and Koraput district of Odisha and Srikakulam district of Andhra Pradesh. The Saouras show their racial affinity to the Proto Australoid physical characters which are dominant among the aborigines of Central and Southern India. Their language is akin to the Kolarian stock which has close resemblance to the forms of speech of the wild tribes of Malayan Peninsula and Nicobar Islands. Their linguistic affinity with the tribes of South-East suggest their migration from the Islands of India Archipelago and Malayan peninsula, unless contrary is proved that India was the cradle-land of the kolan speaking tribes and the South-Eastern countries were colonized by them. The term Saura appears to have two connotations- one derived from Sagoriss, the Scythian word for axe and the other from Saba roye;, the Sanskrit term for carrying a dead boy. Both of them fit well with their habit of carrying an axe always on their shoulders with their primitive occupation of hunting. The epics and purans refer to their devotion to the Hindu religious heroes like Rama and the Jagannath cult. The legend of Viswabasu, a Saura king who worshipped the image of Vishnu in the term of Lord Jagannath indicates the impact of Vaishnvism on the Saors. It is well known that, like other tribal communities, the Sauras are the indigenous, autochthons of India in the sense that they had been long settled in different parts of the country particularly on the plains and river valleys and other fertile areas. Many of the Sauras were in a food gathering economy and a few were perhaps on the threshold of a real food producing economy. On the whole, they were in all respects primitive, wild and under developed.

4.0. Geology:

Geologically the district is a part of the Eastern Ghat Mobile Belt and rocks of charnockite Group, Khondalite Group and Migmatite Group are the main lithounits of this area. These Archean- Proterozoic Eastern ghat Super Group of rocks mark the oldest rock unit and area represented by acid charnoickite, garnet-sillimanite bearing gneiss (Khondalite) and granite gneiss (Migmatite Group). Younger Quartz vein and pegmatite cut across the Eastern Ghat Super Group of rocks in some places. Unclassified Quaternary sediments are found along Vanshadhara river. The Geological succession in

the district is as follows:

4.1. STRATIGRAPHY:

AGE	SUPER GROUP	GROUP	LITHOLOGY
Quaternary (Unclassified)			Clay, silt
Proterozoic (Unclassified)			Quartz vein, pegmatite
		Migmatite Group	Granite gneiss/ Migmatite
Archean to Proterozoic		Charnockite Group	Acid/ Intermediate charnockite
			Basic Charnockite/ Pyroxene granulite
		Khondalite Group	Quartz-garnet-sillimanite schist calc sillicate

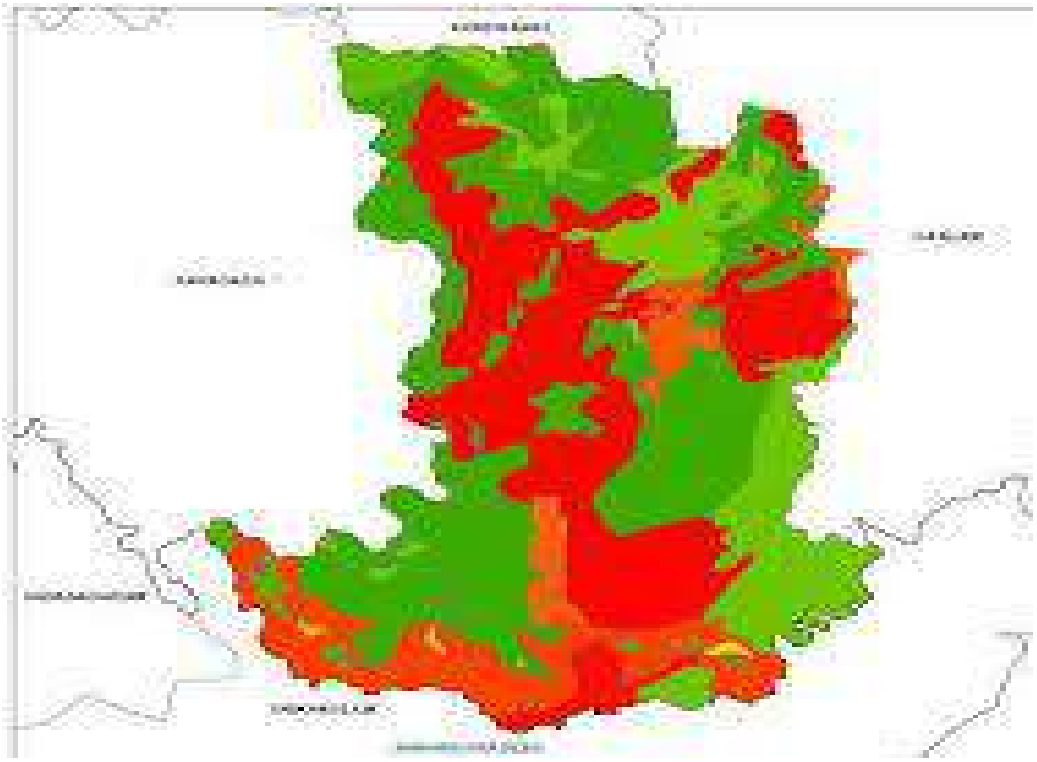
5.0. DRAINAGE AND IRRIGATION PATTERN.

Gajapati district comes under north Eastern Ghats agro climate and type of terrain is mostly undulating. The river Vansadhara along with its tributaries controls the overall drainage of the district. The important tributaries of river Vansadhara are Harabhangi, Badanadi, Mahendratanaya etc. are mostly seasonal in nature. The district has limite irrigation facility. There is no major or medium irrigation project has command area till date. Only minor irrigation and lift irrigation are main source of irrigation. The total cropped area is about 1.33 lakh Ha out of which (28% TCA) is irrigated and (72% TCA) in under rainfed. The block like Gosani and Kashinagar haven higher percentage of irrigation as completed others blocks.

6.0. LANDUSE PATTERN

Table 1.7.1 Land use pattern of Gajapati district

S no	Block	Total Geographical Area	Area under Agriculture					Area under Waste Land	Area under other uses
			Gross Cropped Area	Net Sown Area	Area sown more than once	Cropping Intensity (%)	Area under Forest		
		ha.	ha.				ha.		
1	Rayagada	64950	20023	11414	11115	175	37050	13302	3184
2	Nuagada	74086	12180	10004	12661	122	40261	15232	8589
3	Mohana	59321	19523	10404	10131	188	33814	12321	2782
4	Gumma	59278	19674	10427	10227	189	33938	12366	2547
5	Rudayagiri	42434	17509	7448	7252	236	26206	7620	1160
6	Gosani	59797	27165	12496	10219	217	34111	12424	766
7	Kasinagar	73177	28650	12844	12581	223	41743	15210	3380
Total		433043	144804	75037	74186	193%	247123	88475	22408



7.0 SURFACE WATER & GROUND WATER SCENARIO

The district comes under Eastern ghats climate and type of terrain is mostly undulating. As the terrain is undulated most of the rainfall flows as surface run off to the river or nallas. The ayacut area of this district is only 28% and rets 72% is rainfed. Hence it is highly essential to promote extension activities relating to water harvesting and water management. Similarly, steps have to be taken for creation of major and medium irrigation projects to make optimum utilization of surface water.

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

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

Depth of water level (mbgl)/ Period	April	August	November	January
Minimum	2.1	0.27	0.7	0.85
Maximum	10.2	7.13	7.29	10.5

8.0. RAINFALL & CLIMATIC CONDITION:

The district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July and continues till end of October. The temperature goes as high as up to 45^0 C in the summer and up to 7^0-8^0 C during peak winter. The rainfall statistics of the district for last four years is given bellow:

Year/ Month	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
20-21	92.22	54.04	228.77	222.22	195.97	162.00	20.61	14.38	0.0	31.57	0.0	0.28	**1022.06**
21-22	75.16	93.76	97.71	224.28	211.13	389.43	174.3	121.98	48.08	57.9	0.00	12.32	**1506.05**
22-23	25.63	108.09	138.21	313.17	360.9	302.23	208.09	5.55	5.99	0.13	0.00	97.83	**1565.82**
23-24	84.95	106.8	118.2	310.13	166.97	269.45	21.26	16.17	28.49	6.89	3.93	43.86	**1177.1**
Avg.	**69.49**	**90.67**	**145.72**	**267.45**	**233.74**	**280.77**	**106.06**	**41.00**	**39.52**	**24.12**	**0.98**	**38.57**	**1338.09**

9.0. DETAILS OF MINING LEASES OF SPECIFIED MINERALS DECORATIVE STONE IN GAJAPATI DISTRICT:

Attached as Annexure- I (A), I (B), I (C)

9.1. DETAILS OF ROUTE MAPS OF INDIVIDUAL MINING LEASES OF SPECIFIED MINERALS DECORATIVE STONE IN GAJAPATI DISTRICT.

Attached as Annexure-III (A)

9.2. DETAILS OF ROUTE MAPS OF CLUSTER MINING LEASES OF SPECIFIED MINERALS DECORATIVE STONE IN GAJAPATI DISTRICT.

Attached as Annexure-III (B)

10.0. DETAILS OF ROUTE MAPS OF INDIVIDUAL MINING LEASES OF ROAD METAL STONE SAIRATS IN GAJAPATI DISTRICT DETAILS OF ROYALITY COLLECTED

Year-wise calculation of Royality (Rs) of Road metal

Sl. No.	Name of Tahasil	2020-21	2021-22	2022-23	2023-24
1	Kashinagar	6585988	15441462	12895680	9565098
2	Paralakhemundi	14380492	12133407	15230771	16059249
3	Gumma	7506033	8685277	8609031	5916900
4	Mohana	25662750	12842538	15463643	23703455
5	Nuagada	7582264	6524006	10133820	9754604
6	R. Udayagiri	18486019	23719571	19345789	16274828
7	Rayagada	15228238	22183488	10818870	3513300
	TOTAL	95431784	101529749	92497604	84787434

11.0. DETAILS OF PRODUCTION OF MINOR MINERAL

Year wise Production of Road Metal In Cum

Sl. No.	Name of Tahasil	2021-22	2022-23	2023-24
1	Kashinagar	0	0	0
2	Paralakhemundi	0	0	0
3	Gumma	0	0	0

4	**Mohan**	**0**	**0**	**0**
5	**Nuagada**	**0**	**0**	**0**
6	**R. Udayagiri**	**0**	**0**	**0**
7	**Rayagada**	**0**	**0**	**0**
TOTAL		**0**	**0**	**0**

12. MINERAL MAP OF THE DISTRICT

Attached as plate No. - 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

Attached as Annexure II

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral reserve of road metal/ building stone/ black stone/white stone is 3,55,073 cum which may increase after details investigation. Details of the potential areas submitted as **Annexure III**.

15. QUALITY/GRADE OF MINERAL

Road metal/building metal of the district is very much suitable for various construction purpose after its crushing and screening. The insitu rocks are fractured making these unsuitable for decorative purpose.

16. USE OF MINERALS

Road metal/ building metal of the district is used mainly for various construction purpose like road making, concrete making, dams etc.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand is to the tune of 50,000 cum of road metal and is mainly supplied from different Tahasils of the district and adjoining districts of Ganjam and Rayagada and the nearest area of neighbor state Andhra Paradesh.

18. MINING LEASES MARKED ON THE MAP OF THE DISTRICT

Attached as plate No.-5

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

Not applicable

20. DETAILS OF ECO-SENSITIVE AREA

TABLE A: GEO- COORDINATES OF PROMINENT LOCATIONS OF LAKHARY VALLEY WILDLIFE SANCTUARY

Direction	Latitude	Longitude
North-	$N19^0$ 23'37.2"	E 84^0 22'11.8"
South-	$N19^0$ 10'30.0"	E 84^0 23'22.7"
East-	$N19^0$ 21'51.6"	E 84^0 28'5.0"
West-	$N19^0$ 16'31.7"	E $84^0$15'5.0"

TABLE A: GEO- COORDINATES OF PROMINENT LOCATIONS OF ECO-SENSITIVE ZONE

Direction	Latitude	Longitude
North-	$N19^0$ 29'8.0"	E 84^0 22'25.0
South-	$N19^0$ 21'11.8"	E 84^0 25'37.5"
East-	$N19^0$ 7'7.0"	E 84^0 22'48.0"
West-	$N19^0$ 19'58.0"	E 84^0 11'50.0"

List of Villages coming within the Lakhary Valley Wildlife Sanctuary is as below;

Name of the Division	Name of the villages	Name of the Protected Area	Remarks
	Gandapadar		
	Lokapadar		
	Mohana		
	Betrasingi		
	Anlaguda		

Divisional Forest Office, Paralakhemundi Division	Benipadar	Lakhary Valley Wildlife Sanctuary	Villages within uniform 10 km distance of the Boundary of Lakhary Wildlife Sanctuary
	Bandhapada		
	Bandhaguda		
	Kamiliguda		
	Guburiguda		
	Bedepur		
	Liliguda		
	Andima		
	Ludru		
	Tunguda		
	Gochhaguda		

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

Activities attributed to Mining:

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

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

Impact on Ambient Air

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

The major air pollutants due to mining activities include:-

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

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

Water Impact

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

Noise Impact

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

Impact on Land environment

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

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of it's diverse and dynamic characteristics. Mining activities generally result in the deforestation, land degradation, water air and noise pollution which directly or indirectly affect the fauna and flora status of the project area. However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved.

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

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

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

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

WATER

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

NOISE

- Periodic maintenance of machineries, equipments shall be ensured to keep the noise generated within acceptable limit.
- Development of thick green belt around mining/cluster area, haul roads to reduce the noise.

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

BIOLOGICAL ENVIRONMENT

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

23.0. RECLAMATION OF MINED OUT AREA

Necessity of Reclamation & Rehabilitation:

- Exponential growth in mineral production since 1980.
- Mining activities causes physical, chemical, biological and socio- economic changes in the area.
- Surface mining activities disturb the original land profile.
- In India, mineral production comes mostly from open cast mines & hence Land de-gradation problems are of serious concern.
- An intricate, in-depth and site-specified techniques involving integrated approach is necessary.

Reclamation has three vital roles:

i. **Reclamation**–Reclamation means return the mined – out land with useful life. It

implies restoring the land to a form and productivity that is useful and in conform it with a prior land use. Reclamation always may not be a single-phase operation.

ii. **Rehabilitation** – Rehabilitation is to bring back the degraded land to a normalstage by a special treatment. It is a process of taking some mitigation measures for disturbed environmental condition created through mining activities.

i. **Restoration**– Restoration is the process of returning the mined out land being fit to an acceptable environmental condition. However, the general acceptable meaning of the term is bringing the disturbed land to its original form. Restoration is often used to indicate that biological properties of soil are put back to what they were. This is a rate phenomenon.

ii. When active mining ceases, mine facilities and the site are reclaimed and closed. The goal of mine site reclamation and closure should always be to return the site to a condition that most resembles the pre-mining condition. Mines that are notorious for their immense impact on the environment often made impacts only during theclosure phase, when active mining operations ceased. These impacts can persist for decades and even centuries.

Mine reclamation and closure plans must describe in sufficient detail how the mining company will restore the site to a condition that most resembles pre-mining environmental quality; how it will prevent–in perpetuity– the release of toxic contaminants from various mine facilities (such as abandoned open pits and tailings impoundments); and how funds will be set aside to insure that the costs of reclamation and closure will be paid for.

Proposed future land use after reclamation:

a. Forestry,
b. Recreation,
c. Water Reservoir,
d. Crop Land,

e. Residential / Commercial,

f. Fish & wild life Habitat,

g. Undeveloped Land,

h. Grazing / Pasture Land

Statutory Requirement:

As per the Mineral Conservation Development Rule, 2017, the following rules mustbe bear in mind by the mine owner/agent/manager, which is a part of reclamation activities – Rule 22 Mine Closure Plan Rule - 23, Submission of Progressive Mine Closure Plan Rule - 24, Submission of Final Mine Closure Plan Rule - 26, Responsibility of holder of mining lease Rule - 27, Financial assurance Rule - 35, Sustainable Mining.

24.0. RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN:

Mining activity because of the very nature of the operation, complexity of the systems, procedures and methods always involves some amount of hazards. Hazard identification and risk analysis is carried for identification of undesirable events that can leads to a hazard, the analysis of hazard mechanism by which this undesirable event could occur and usually the estimation of extent, magnitude and likelihood of harmful effects. The activities which can cause high risk related toface stabilityandthe person blasting the shots. It was observed that on a working face of the mine, there were large cracks and unsupported rocks were present, which can lead to a serious hazard and injure workers engaged in loading operation and machineries because of rock falls or slides. This type of condition turns out because improper dressing of the bench and improper supervision. To avoid the hazards due to fall of rocks the face must be examined, made suitable for working and the remedial measures must be taken to make it safe if there is any doubt that a collapse could take place. Working of the face should be in the direction considering the geology of the area such that face and quarry side remain stable. Another major risk identified in mines is due to the firing of explosive by an unqualified person. In the mines there is problem of fly rocks and the village is located close to the

mine and so it is rated high as it can affect may people. Explosives by nature have the potential for the most serious and catastrophic accident. Planning of round of shots, holes correctly drilled, direction logged, weight of explosive suitable for good fragmentation are the few of the steps necessary to ensure its safe use and if the shots are not properly designed can result in misfires, early ignition and flying rocks. No person is allowed to use explosives without being properly trained in its handling. In the mine a large numbers of heavy vehicles were in operation and the roads were not proper for haulage purpose. The haulage roads were not even and were not wide enough for the crossing purpose and hence the chances of hazards are very high. The main hazards arising from the use large earth moving vehicles are incompetent drivers, brake failure, lack of all-around visibility from the driver position, vehicle movements particularly reversing, roll over, and maintenance. Those most at risk are the driver and pedestrians likely to be struck by the vehicle, and drivers of smaller vehicles, which cannot be seen from the cabs of large vehicles. Edge protection is always necessary to prevent inadvertent movement over the edge of roadway or a bench. Seat belt will protect driver in case of roll. Good maintenance and regular testing are necessary to reduce the possibility of brake failure. Access to the vehicles should always be restricted to those people necessary for the work in hand. The use of personal protective equipment and proper arrangements is essential to check if the person is wearing protective equipment or not. The personal protective equipment includes helmet, non-skid safety boots, safety glasses, earmuffs etc. The required personal protective equipment should be provided and used in a manner that protects the individual from injury. Few minor injuries which can be prevented are slip, trip, or fall hazards; hazards due to rock falls and collapse of unstable rocks, atmosphere containing toxic or combustible gases; protects from chemical or hazardous material etc. 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 road ways which affects the operators and can lead to accidents causing injury. They are in acceptable range because of pre-cautions measures taken but no step is taken. It can cause hazard hence steps should be taken to reduce the hazards such as

for dust suppression system should be installed. Other problems like occurrence of lots of mosquitoes in the area due to un-hygienic conditions which affect the human health causing malaria, dengue etc. and causing a person to be hospitalized.

Disaster in the mines like fires, explosions, entrapments, and inundations can occur anytime, 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 rescue and survivors. According to MMR act 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 onduty. Duties of attendance Clerk (Emergency Siren) the attendance clerk or other designated person should on getting information of major accident, sound a hooter 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

Attendance roaster and duty charge register should be properly maintained so the record of missing people can be obtained.

25.0. DETAILS OF THE OCCUPATIONAL HELTH ISSUE IN THE DISTRICT:

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 air borne dust at work place.

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. Tuberculosis

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

25 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

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 audiometry.

(c) Classification of chest radiographs of workers as per ILO Classification.

(d) Medical examination within one year of superannuation. Evaluation of all cases of suspected pneumoconiosis by Pneumoconiosis Medical Board.

(e) 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 mis-diagnosed due to lack of training of medical professionals.

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

During mining operation green belt development through plantation is most important for environment safeguard, which should be supervision by mining department. Different type of species should be planted near lease periphery to keep environment clean at post mining period through reclamation. Where specific usefulness of land could be decided, afforestation is normally planned through the site could have been considered for better possibilities of land use.

27. CONCLUSION:

To meet the requirement of minerals in the present scenario, it is proposed to identify such potential areas at certain interval and get the data bank of DSR to be updated regularly. The insitu mining activity in any area is on one hand bring revenue and employment (Direct and indirect) and on other hand if not done properly potential pollution and ecological imbalance increases, the ability of the ecosystem can also be reduced. Particulate matter transported by the wind as a result of excavations, blasting, transportation of materials, heavy equipment used raise these particulate levels; and Gas emissions from the combustion of fuels in stationary and mobile sources, explosions, and mineral processing. All these activities indirectly affected the biodiversity of area. Larger potential and smaller areas have been identified in Gajapati District on the basis of geological study carried out during field observation, which can be considered for mining concession after all the parameters for statutory clearances are verified by consulting with concerned authorities.

Existing Operational Specified Minor Minerals (Decorative Stone) Sairat Sources of Gajapati District

Annexure-I (A)

SL.NO		1	2	3		4
Name of Tahasil		Paralakhemundi	Paralakhemundi	paralakhemundi		paralakhemundi
Name of Minor Minerals		New Laxmi Granite	Barlanda Decrotive Stone	Barlanda Decrotive Stone		Parsurampur Decrotive Stone
Name of Village		Parsurampur	Barlanda	Barlanda		Parsurampur
Name of Lessee		New Laxmi Granite	Y.Rajani	M.Murali Krishna		Sri K Saptagiri
Address & Contact no. of Lesee		Plot No.11, Mancheswar Industrial Estate, Bhubaneswar,	MPV Colony, Visakhapatnam, Andhra Pradesh	Puniapu Street, Srikakulam, Andhra Pradesh		Palace Street, Parlakhemundi, Gajapati
Mining lease grant order no. date		557/SM,dtd15.01.200	9157/SM dated 08.11.2021	10754/SM, Dtd-06.11.2015		9389/SM, Dt.16.11.2016
AREA OF LEASE IN HECTARE		49.922	5.018	2.436		5.276
Location of Resources	Khata No	78	36	36		78
	Plot No.	250, 252, 254, 255	9	8, 7		253
Period of QL	From	30.03.2005	20.12.2017	06.08.2004		
	TO	29.03.2025	19.12.2047	07.08.2034		
Date of comencement of Mining Operation		30.03.2005	20.12.2017	NA		
Period of Mining lease (1st/2nd Renewal)		NA	NA	NA		NA
Status (Working/Non-working Temp. Working)		working	working	working		Working
Captive/Non-captive		Non-captive	Non-captive	Non-captive		Non-captive
Letter no & Grant of EC		NA	3488/SEIAA Dtd. 30.08.2017	5044/SEIAA Dtd. 06.06.2018		
Longitude		NA	84°9'28.8"	84°9'14.4"		
Lattitude		NA	18°52'44.4"	18°52'40.8"		
Method of Mining		Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized		Open Cast/Semi-Mechanized
LOI Issued (Yes/No)		Yes	Yes	Yes		Yes
Existing/ Proposed		Existing	Existing	Existing		Existing
Reserve in cum		5355700	29400	39152.5		58596

6	5	
Nuagargh	Gumma	
Tabraput decotive stonr	Logu decrotive stone	
Tabaraput	Logu No-102	
Smt. N. Saroja	G.Anil Kumar	
Flat No.166, Bankers Colony, Srikakulam District, Andhra	New Kapu Street – 4, Parlakhemundi, Gajapati, Odisha.	
1646 / Dtd 18.10.2016	7910/SM, 21.09.2017	
7.551	16.228	
36	35	
237	155	153
16.12.2016	20.12.2017	
15.12.2036	19.12.2047	
27.04.2017	20.12.2017	
NA	NA	
working	working	
Non-captive	Non-captive	
SEIAA/2140 dtd.28.10.2016	3133/SEIAA, Dtd.12/06/2017	
84°2'6.0"	84°4'26.4"	
19°9'25.2"	18°51'0.0"	
Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	
Yes	Yes	
Existing	Existing	
524172	2421933	

Annexure- I (B)

NON-OPERATIVE SPECIFIED MINOR MINERAL (DECORATIVE STONE)SAIRAT SOURCES OF GAJAPATI DISTRICT

SL.NO		1	2	3	4	5	6
Name of Tahasil		Kashinagar	Kashinagar	Rayagada	Rayagada	Rayagada	Paralakhemundi
Name of Village		Tadabha	Khandva	Jakara	Kainpur	Magada	Rajsitapur
Name of Minor Minerals		Tadabha Decrotive Stone	Khandva decorative stone	Jakara Decrotive Stone	Kainpur decorative stone	Magada decorative stone	Rajsitapur Decorative Stone
Name of Lessee		Sri K Sashibhusana Rao	M/s Chamundi Natural Stone	M/s Tejeswani Granites	Abhiram Sahu	Sumati Kumari panigrahi	Smt Rashmi Jain
Address & Contact no. of Lesee		AT-Chodangipur,	NA	AT/PO – Akusingi,	Kainpur, Rayagada	Magada, Rayagada	T-7 Green Park Extn. New Delhi,
Mining lease grant order no. date		6530/SM, Dt.05.09.2019	NA	7610/SM, Dt.04.10.2019	NA	NA	NA
AREA OF LEASE IN HECTARE		9.368	62.81	22.675	44.72	1.307	8.089
Location of Resources	Khata No	271	526	29	73	22	NA
	Plot No.	1141 1143	828	180 181	153 155	12	56 57 59
Period of QL	FROM	2016		2010	30.12.2003	05.07.2004	28.10.2000
	TO	2046		2040	29.12.2013	04.07.2014	27.10.2010
Period of Mining lease (1st/2nd Renewal)		NA	NA	NA	NA	NA	NA
Date of comencement of Mining		NA	NA	LoI Issued	NA	NA	LoI Issued
Status (Working/Non-working Temp.		Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Captive/Non-captive		Non-captive	Non-Captive	Non-captive	Non-Captive	Non-Captive	Non-Captive
Letter no & Grant of EC		NA	NA	NA	NA	NA	NA
Longitude		83°57'25.2"	NA	84 20' 00.0" - 84 22'25.5"	84° 19' 48"	NA	84° 7' 51.6"
Lattitude		18°50'16.8"	NA	18 51 49.05 - 18 52 09.4	18° 56' 16.8"	NA	18° 48' 3.6"
Method of Mining		Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized
LOI Issued		Yes	NO	Yes	Yes	Yes	Yes
Existing/ Proposed		Existing	Existing	Existing	Existing	Existing	Existing
Reserve in cum		NA	NA	NA	NA	NA	NA

13	12	11	10	9	8	7
Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi
Maringi	Baralanda	Parsurampur	jagannathpur	Magada	Buguda	Lingipur
Marini decorative stone	Baralanda decorative stone	Parsurampur Decorative Stone	Jagannathpur Decorative Stone	Magada decorative stone	Buguda decorative stone	Lingipur decorative stone
Bhagirathi Panigrahi	Sankar Panigrahi	Sankar Panigrahi	Sri.M.Murli Rao	Sri. K.saptagiri	Smt Rashmi jain	Sri T Vishnumurty
Maringi, Paralakhemundi	Baralanda, Paralakhemundi	Parsurampur	C/o Baba GranitesMatia Street, Parlakhemundi, Gajapati	Place Street, Parlakhemundi, Gajapati	T-7 Green Park Extn. New Delhi,	AT-Bhusukudi, Via – Parlakhemundi, Dist - Gajapati
NA	NA	NA	NA	NA	NA	NA
7.66	17.25	7.559	8.801	9.71	1.473	2.327
119	115	78	288	22	143	159
241 242	349	247/P	1732	12	278	711
31.03.2005	30.03.2005	23.12.2004	30.07.1996	23.04.2007	04.12.2002	27.05.2005
30.03.2015	29.03.2015	22.12.2014	29.07.2006	22.04.2017	03.12.2012	26.05.2025
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	84° 9' 57.6"	84° 11' 16.8"
NA	NA	NA	NA	NA	18° 52' 40.8"	18° 49' 30"
Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Existing	Existing	Existing	Existing	Existing	Existing	Existing
NA	NA	NA	NA	NA	NA	NA

21	20	19	18	17	16	15	14
Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi
Duragam Hill	Venketpur	Uruda	Taramba	Baralanda	Jagannathpur	jagannathpur	Andharijhola
Duragam Hill decorative stone	Venketpur decorative stone	Uruda decorative stone	Taramba decorative stone	Baralanda decorative stone	Jagannathpur decorative stone	Jagannathpur decorative stone	Andharijhola decorative stone
Sparkle Minerals Pvt.Ltd	M/s Stone Field	D.Vani	D.Srikantha	M.Murali krishna	Baba Granite	M.Murali krishna	K.P Granite Industries
NA	NA	NA	NA	NA	NA	Punapu Street, Srikakulam, Andhra Pradesh	Andharijhola, Paralakhemundi
NA	NA	NA	NA	NA	NA	NA	NA
102.06	7.989	49.5	54.89	11.48	8.801	8.881	6.972
1	96	99	146	36	288	288	19
109 110 111 116 117	13	439	1051 1052 857 858	7 8	1732	1732	149/P
NA	NA	NA	NA	NA	21.03.2006	07.03.2006	13.02.2006
NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
NA	NA	84° 18' 46.8"	NA	NA	NA	NA	NA
NA	NA	18° 50' 9.6"	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized
NO	NO	NO	NO	NO	NO	NO	Yes
Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
NA	NA	NA	NA	NA	NA	NA	NA

29	28	27	26	25	24	23	22
R.Udayagiri	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi	Paralakhemundi
Godara	Parsurampur	Parsurampur	Rajasitapur	Jolla	Baralanda	Sambalasa	Andharijhola
Godara decorative stone	Parsurampur Decorative Stone	Parsurampur Decorative Stone	Rajasitapur decorative stone	Jolla decorative stone	Baralanda decorative stone	Sambalasa decorative stone	Andharijhola decorative stone
Suchitra Sahu	M.Mukunda Rao	G.Anil kumar	M/s S.P Granitex	Neelachala Granite	Y.Rajani	K.Sanghamitra	Y.Rajani
Godara, Paralakhemundi	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
9.24	22.79	23.68	8.47	1.4	5.018	12.201	4.945
96 88 86 73	78	78	154	301	36	82	19
295 351 352 175 178	246	247	56 57 59	131	9	130/P	1389 140
10.11.2003	NA	NA	NA	NA	NA	NA	NA
09.11.2013	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA
Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized
Yes	NO	NO	NO	NO	NO	NO	NO
Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
NA	NA	NA	NA	NA	NA	NA	NA

35	34	33	32	31	30
Gumma	Gumma	Gumma	Gumma	Mohana	R.Udayagiri
Logu	Logu & Namanagada	Namangada Jungal	Namangada Jungal	Manikyapur	Tabaraputa
Logu decorative stone	Namangada decorative stone	Namangada Jungal decorative stone	Namangada Jungal decorative stone	Manikyapur Decorative Stone	Tabaraput decorative stone
D.Srinivas	Sri Aditya Kumar Mohanty	D.Vani	M/s Siridi sai Granite	Sita ram sahu	Smt.Nooty Saroja
Loggu, Gumma	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
27.599	57.793	15.27	24.375	5.196	19.72
35	35	1	1	67	36
150 152	19/P 152/P 20 19 21	19 20 21	19 20 21	829 830 831 834 836	237
08.09.2000	NA	02.02.2010	29.01.2010	02.10.2010	NA
07.09.2010	NA	01.02.2020	28.01.2020	01.10.2020	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
NA	NA	84° 4' 51.6"	84° 5' 2.4"	NA	NA
NA	NA	18° 51' 32.4"	18° 51' 18"	NA	NA
NA	NA	NA	NA	NA	NA
Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized	Open Cast/Semi-Mechanized
Yes	NO	NO	NO	NO	NO
Existing	Existing	Existing	Existing	Existing	Existing
NA	NA	NA	NA	NA	NA

Annexure - I (C)

Proposed Specified Minor Minerals (Decorative Stone) Sairat Sources of Gajapati District

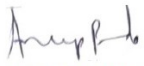
SL.NO		1	2	3	4	5	6	7
Name of Tahasil		Paramkonda Northem DDS Block	Paramkonda southem DDS Block	Derab East DDS Block	Derab west DDS Block	Tentulikhunti DDS Block	Baharapada-Jamurhia East Dimension Stone Block	Baharapada-Jamurhia West Dimension Stone Block
Name of Minor Minerals		Kashinagar	Kashinagar	Mohana	Mohana	Mohana	Mohana	Mohana
Name of Village		Paramkonda	Paramkonda	Derba	Derba	Tentulikhunti	Baharapada-Jamurhia	Baharapada-Jamurhia
Name of Lessee		New	New	New	New	New	New	New
Address & Contact no. of Lesee		NA	NA	NA	NA	NA	NA	NA
Mining lease grant order no. date		NA	NA	NA	NA	NA	NA	NA
Area of Lease in Hectare		50.18	47.053	87.245	84.552		53.307	63.817
Location of Resources	Khata No	NA	NA	NA	NA	NA	NA	NA
	Plot No.	NA	NA	NA	NA	NA	NA	NA
Date of comencement of Mining Operation		NA	NA	NA	NA	NA	NA	NA
Status (Working/Non-working Temp. Working)		Non-working	Non-working	Non-working	Non-working	Non-working	Non-working	Non-working
Captive/Non-captive		Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
Letter no & Grant of EC		NA	NA	NA	NA	NA	NA	NA
Longitude		84°17’26.33"-84°17’29.73"	84°13’29”-84°13’53.7"	84°14’30.00"-84° 14' 13.49"	84°13’22.00"-84° 13' 44.60"	84°14’21.0”-84°14’49.5”	84°13’29”-84°13’53.7"	84°13’09”-84°13’46.6"
Lattitude		19°13’19.30-19°13’10.92	19°18’05”-19°17’42.3”	19° 17' 06"-19°16’46.99"	19°16’44.00"-19°17’13.99"	19°17’2.0”-19°17’14.0”	19°18’05”-19°17’42.3”	19°18’01"-19°17’38.3”
Method of Mining		Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes

14	13	12	11	10	9	8
Nuagan Decorative Stone Block	Lausahi Decorative Stone Block	Jhadapada Dimension Stone Block	Betarsing (Block – B) Dimension Stone Block	Betarsing (Block – A) Dimension Stone Block	Nuagaon (Nuagad) Dimension Stone Block	Damba Dimension Stone Block
R.Udayagiri	R.Udayagiri	R.Udayagiri	R.Udayagiri	R.Udayagiri	R.Udayagiri	R.Udayagiri
Nuagaon	Ranidiba	Jhadapada	Betarsing	Betarsing	Nuagaon	Damba
New	New	New	New	New	New	New
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
11.017	9.144	8.211	15	23	17.04	9.98
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
Non-working	Non-working	non-working	Non-working	Non-working	Non-working	Non-working
Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive	Non-Captive
NA	NA	NA	NA	NA	NA	NA
84°12’39.17”-84°12’23.94”	84°15’33.35"-84°15’26.88"	84°17’36.15"-84°17’34.83"	84°014'1.51"-84°013'50.57"	84°013'38.24"-84°013'37.96	84°17’26.33"-84°17’29.73"	84°14'32.21"-84°14'29.95"
19°14’48.14”-19°14’59.89”	19°07’42.13"-19°07’57.69"	19°07’10.52"-19°07’ 09.88"	19° 06'05.15"-19°05'49.53"	190 06'05.15"-19005'44.31"	19°13’19.30-19°13’10.92	19°06'56.27"-19°06'58.51"
Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes	Open Cast/ Semi-Mechanizes

ANNEXURE-II(A)

CLUSTER & CONTIGUOUS CLUSTER DETAILS OF DECORATIVE STONE SAIRATS IN GAJAPATI DISTRICT

Cluster No.	Quarry No.	Name of Tahasil	Name of Minor Minerals	Khata No.	Plot No.	Areaof Lease in Hectare	Total Cluster Area in Hectare	Total Mineral Excavation In Ton.	LOI Issued(Yes/NO)	Existing / Proposed
1	1	PARALAKHEMUNDI	New Laxmi Granites	78	250 252 254 255	49.922	109.443	9104690	Yes	Existing
	2	PARALAKHEMUNDI	Parsurampur Decorative Stone	78	253	5.276		996132	Yes	Existing
	3	PARALAKHEMUNDI	Parsurampur Decorative Stone	78	247/P	7.775		NA	NO	Proposed
	4	PARALAKHEMUNDI	Parsurampur Decorative Stone	78	247	23.68		NA	NO	Proposed
	5	PARALAKHEMUNDI	Parsurampur Decorative Stone	78	246	22.79		NA	NO	Proposed
2	1	PARALAKHEMUNDI	Jagannathpur Decorative Stone	288	1732	8.801	26.483	NA	NO	Proposed
	2	PARALAKHEMUNDI	Jagannathpur Decorative Stone	288	1732	8.881		NA	NO	Proposed
	3	PARALAKHEMUNDI	Jagannathpur Decorative Stone	288	1732	8.801		NA	NO	Proposed
3	1	PARALAKHEMUNDI	Magada Decorative Stone	22	12	1.307	11.017	NA	NO	Proposed
	2	PARALAKHEMUNDI	Magada Decorative Stone	22	12	9.71		NA	NO	Proposed
4	1	PARALAKHEMUNDI	Barlanda Decorative Stone	36	7 8	11.48	16.498	NA	NO	Proposed
	2	PARALAKHEMUNDI	Barlanda Decorative Stone	36	9	5.018		NA	NO	Proposed
5	1	GUMMA	Logu Decorative Stone	35	150 152	27.559	124.997	NA	NO	Proposed
	2	GUMMA	Logu Decorative Stone	35	19/P 152/P 20 19 21	57.793		NA	NO	Proposed
	3	GUMMA	Namangada Jungle Decorative Stone	1	19 20 21	24.375		NA	NO	Proposed
	4	GUMMA	Namangada Jungle Decorative Stone	1	19 20 21	15.27		NA	NO	Proposed

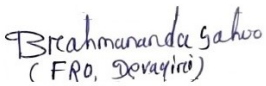


Sub- collector, Gajapati

RO, SPCB, RAYAGADA

Executive Engineer,
Irregation/WR, Gajapati

Deputy Director of Mines,
Berhampur



Divisional Forest Officer/ ACF

Geologist, Office of the Joint Director,
Geology(SZ), Berhampur

Mining Officer,
Gajapati

DISTRICT RESOURCE MAP — GAJAPATI, ORISSA

I. GEOLOGY & MINERALS

Scale 1:2,50,000

Km 5 0 5 10 15 Km

Based on Bhawanipatna, Vizianagaram, Chatrapur and Parlakimidi Geological Quadrangle Maps of GSI. (SOI Degree Sheets Nos. 65M, 65N, 74A, and 74B)

84° 00' 84° 15' 84° 30'

19° 30' 19° 15' 19° 00' 18° 45'

PHULBANI DISTRICT (O R I S S A)

RAYAGARHA DISTRICT (O R I S S A)

GANJAM DISTRICT (O R I S S A)

ANDHRA PRADESH

G A J A P A T I

Govindapur

Mohana

Kamalapur

Mahendragiri

Nuagad

Uppalada

PARLAKIMIDI

Bansadhara R.

South Eastern Railway

KEY MAP

INDIA

ORISSA

1. The territorial waters of India extend into the sea to a distance of 12 nautical miles measured from the appropriate base line

KEY MAP

ORISSA

GAJAPATI

LEGEND

Quaternary (Unclassified)

- Qf_1 — Clay , silt

Proterozoic (Unclassified)

- Qz — Quartz vein, pegmatite

Eastern ghat Super Group — Archean to Proterozoic

Khondalite Group
- Ka — Quartz-garnet-sillimanite schist
- Cc — Calc silicate

Charnockite Group
- Ca — Acid / Intermediate charnockite
- Cb — Basic Charnockite / pyroxene granulite

Migmatite Group
- Gn — Granite gneiss/ Migmatite

STRUCTURAL FEATURES

- Foliation, inclined / vertical
- Fault
- Lineament

GEOGRAPHICAL FEATURES

- River
- Lithological Boundary
- State Boundary
- District Boundary
- Railway line
- Road
- Locality
- District Headquarter
- △881 Triangulation Point
- • 904 Spot height (in m. above msl)

MINERALS (OCCURRENCES / DEPOSITS)

- Clay
- Kankar
- Dimension Stone
- Mica

EXPLANATORY NOTE

Gajapati, bounded by latitude 18°45' – 19° 40' N and longitude 83°45' – 84°30' E is a part of earstwhile Ganjam district and falls within part of SOI degree sheet 65M , 65N, 74A & 74B, covering an area of 2,351.11 Sq. km. The district is bounded in the north by Phulbani district, in the east by Ganjam district, in the south by Srikakulam district, Andhra Pradesh and in the west by Rayagarha district. The district headquarters Parlakhemundi, is connected by bus to Bhubaneswar and Berhampur. The nearest railhead is Palasa in Andhra Pradesh, which comes in the main line of South Eastern Railway. The temperature of the area varies from 16°C in winter to 48°C in peak summer. Average annual rainfall of the area is 1323.55 mm. Its total population is 575,880 (2011 cencus).

Geomorphologically the district comprises four geomorphic units, i.e., i) Ridges and hills without valleys ii) Colluvial footsteps and iv) Low lying flats. Major part of the area is composed of ridges or hills with valleys in between. Other geomorphic units are occurring as small patches. Banshadhara river drains part of the western part of the district. The district is more or less covered with dense jungle and high hills. Many reserve forests cover the district. The main slope of the district is from north to south.

Geologically the district is a part of the Eastern Ghat Mobile Belt and rocks of Charnockite Group, Khondalite Group and Migmatite Group are the main lithounits of this area. These Archean – Proterozoic Easternghat Super Group of rocks mark the oldest rock unit and are represented by acid charnockite , garnet – sillimanite bearing gneiss (Khondalite) and granite gneiss (Migmatite Group). Younger Quartz vein and pegmatite cut across the Easternghat Super Group of rocks in some places. Unclassified Quaternary sediments are found along Banshadara river. Structurally the area is affected by numerous faults and lineaments in the northern part. The trend of this fauts is NW – SE.

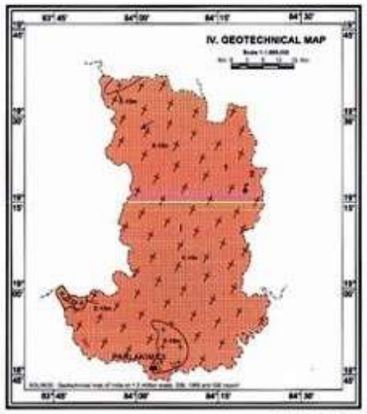
Groundwater occurs within fracture zones of the granitic terrain and within confined and unconfined aquifers in the western part near Bansadhara river. The area mainly comprises hard rocks (i.e. khondalite, charnockite and granite) where ground water is restricted to weathered residuum and fracture zones. Major part of the area is having very low yield except a small patch in the southwestern part where the yield is moderate to high.

Geotechnically the area comprises basement crystalliane having low permeability and medium to high bearing capacity. This type of rock has very good foundation characteristic. The district has got an existing major irrigation project at Ramhandi and an ongoing major irrigation project at Harbangi.

The district is seismologically stable as it falls within zone I of the earthquake zonation map of India. One hot spring is situated at the eastern part of the area. Sheet erosion, rill and gully erosion and bank erosion are the major natural hazards of the district. Southern part of the district is a drought prone area.

So far mineral resources of this district are concerned no important mineral deposit is found in this district. Few occurrences of mica are found within the granite suite. Few clay pockets are found near Kamalapur (19°15'-84°14') and kankar is found at Gobindpur (19°30' – 84°16') and Mohana (19°29'- 84°16'). Workable deposits of dimension stone occur around Uppalada (18°46' – 84°14') and also in the central part of the district.

IV. GEOTECHNICAL MAP



GEOTECHNICAL CHARACTERISTICS

MORPHOLOGIC / MORPHOTECTONIC UNIT	ENGINEERING GEOLOGIC PROVINCE	ROCK TYPES: Lithology	Permeability	Bearing capacity compressive strength (Kg/cm²)	Foundation characteristics
Peneplain , Plateau and residual hills	Basement crystalline	Granite, charnockite, rhyolite	Low	High (1000-2000)	Very good
		Gneiss , khondalite, high grade schist, intrusive	Low	Medium(within 500)	Good

NATURAL HAZARD

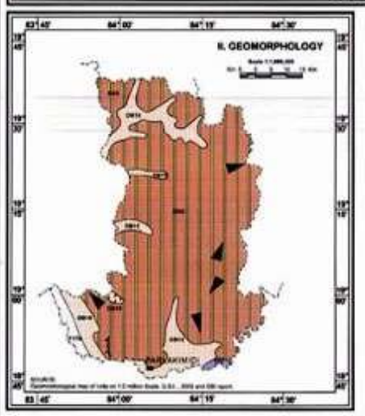
- Sheet erosion - Common in pediplain
- Rill and gully erossion - hilly areas with pediplain
- Bank erosion

GEOTECHNICAL PROJECT

1. Harbhangi - On going major irrigation project
2. Ramhandi stage I - Existing major irrigation project

- Hot spring
- Seismic Zone

II. GEOMORPHOLOGY



GEOMORPHOLOGY

UNITS OF DENUDATIONAL ORIGIN

DENUDATION STRONGLY CONTROLLED BY STRUCTURE

- DA6 — Ridges / Hills with or without valleys

DENUDATION WITH MINIMAL CONTROL OF STRUCTURE

- DB15 — Planation surfaces (Pediments / Pediplains and Peneplains)

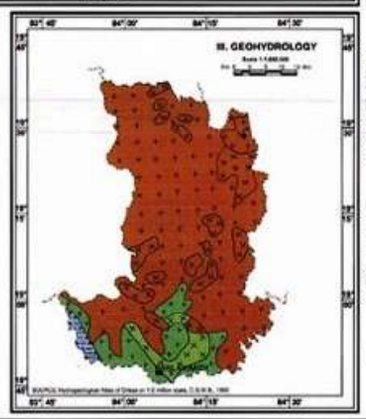
UNITS OF FULUVIAL AND LACUSTRINE ORIGIN

- F21 — Colluvial footslopes
- F17b — Lowlying flats / Plains present foodplains

FORMS OF DENUDATIONAL ORIGIN

- Escarpments
- Dissection

III. GEOHYDROLOGY



HYDROGEOLOGY

	AGE	LITHOLOGY	HYDROGEOLOGICAL CONDITION	GROUNDWATER POTENTIAL
UNCONSOLIDATED FORMATION	Quaternary	Recent alluvium, clay, silt, sand, gravel, pebble etc.	Fairly thick, regionally extensive unconfined / confined aquifer down to 300 metres.	Low yield prospect less than 15 Lps
			POROUS FORMATION	
CONSOLIDATED FORMATION	Archean	Khondalite , Charnockite	**FISSURED FORMATION**	Low yield 1- 5 Lps
				Hilly areas without productive aquifer except in pockets yield <1Lps
		Granite and Granite gneiss	Groundwater restricted to weathered residuum and fracture zones	Low to moderate yield 3-10 Lps
				Hilly areas without productive aquifer except in pockets yield <1Lps

HYDROGEOLOGICAL FEATURES

- Spring

Compiled by : A.K. Mishra, (Sr.) Geologist
Scrutiny & Editing by : Srinanda Mukharjee, (Sr.) Geologist
Under the supervision of : Tripti Roychoudhury, Director, M & C Divn., GSI, ER.
Under the overall guidance by : Dr. Srinivas Madabhushi, Dy. Director General, ER, GSI, Kolkata
2011

DISTRICT BOUNDARY

KANDHAMAL

GAJAPATI DISTRICT
ODISHA

RAYAGADA
DISTRICT

GANJAM
DISTRICT

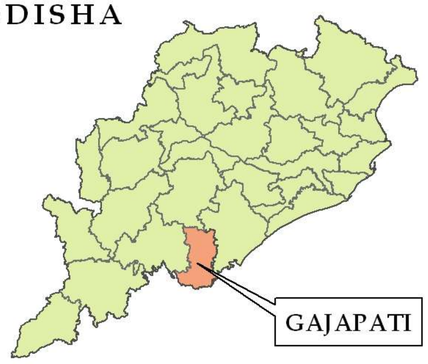
GAJAPATI

Parlakhemundi

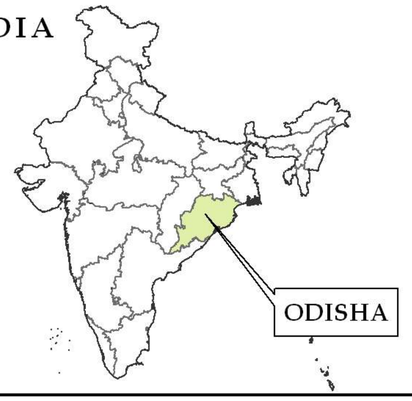
ANDHRA
PRADESH

Map Complied By:
NIC
Bhubaneswar, Odisha.

ODISHA



INDIA



LEGEND

District Head Quarter

District Boundary

Scale:

9 4.5 0 9 Kilometers

Data Source:
District Administration

BLOCK BOUNDARY

KANDHAMAL

GAJAPATI DISTRICT
ODISHA

RAYAGADA
DISTRICT

GANJAM
DISTRICT

ANDHRA
PRADESH

Mohana

R. Udaygiri

Nuagada

Guma

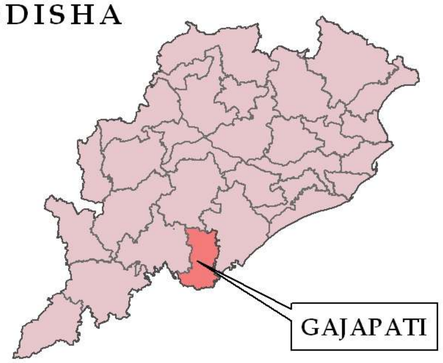
Rayagada

Kashinagara

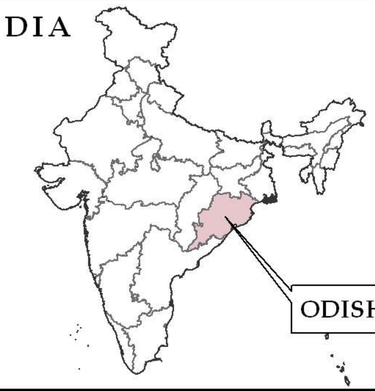
Parlakhemundi
(Gosani)

Map Complied By:
NIC
Bhubaneswar, Odisha.

ODISHA



INDIA



LEGEND

Block Head Quarter

District Boundary

Block Boundary

Scale:

10 5 0 10 Kilometers

Data Source:
District Administration

DRAINAGE MAP OF GAJAPATI DISTRICT

PARALAKHEMUNDI (GOSANI) BLOCK
GAJAPATI DISTRICT

RIVER, STREAMS & WATERBODY

Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream Nala River/Waterbody

Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.

KASINAGAR BLOCK
GAJAPATI DISTRICT

RIVER, STREAMS & WATERBPDY

NUAGADA BLOCK

RAYAGADA DISTRICT

GUMMA BLOCK

Vansadhara R.

ANDRA PRADESH

PARALAKHEMUNDI (GOSANI) BLOCK

Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream River/Waterbody

Scale:

2.5 1.25 0 2.5 Kilometers

Map Complied By:

NIC

Bhubaneswar, Odisha.

MOHANA BLOCK
GAJAPATI DISTRICT

RIVER SYSTEM

KANDHAMAL DISTRICT

GANJAM DISTRICT

Harabhanga N.

Harabhangi Reservoir

RAYAGADA DISTRICT

NUAGADA BLOCK

R.UDAYAGIRI BLOCK

Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream River/Waterbody Reservoir

Scale:

2.5 1.25 0 2.5 Kilometers

Map Complied By:

NIC

Bhubaneswar, Odisha.

RAYAGADA BLOCK
GAJAPATI DISTRICT

RIVER, STREAMS & WATERBODY

N
W E
S

R.UDAYGIRI BLOCK

NUAGADA BLOCK

GANJAM DISTRICT

Jalanga R.

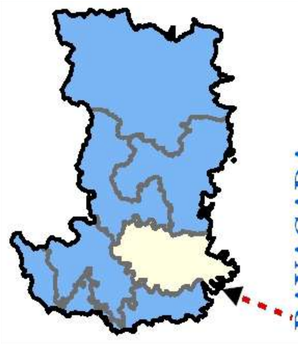
Mahendratanaya R.

GUMA BLOCK

PARLAKHEMUNDI (GOSANI) BLOCK

ANDRA PRADESH

Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream River

Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.

RIVER & STREAMS

NUAGADA BLOCK
GAJAPATI DISTRICT

MOHANA BLOCK

R.UDAYGIRI BLOCK

RAYAGADA DISTRICT

Roto N.

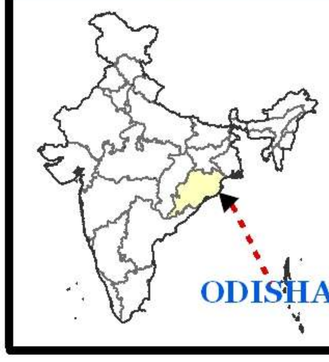
Gurhas Nala

Bangurajhula Nala

GUMA BLOCK

RAYAGADA BLOCK

Data Source:
Survey of India & LISS-III Image

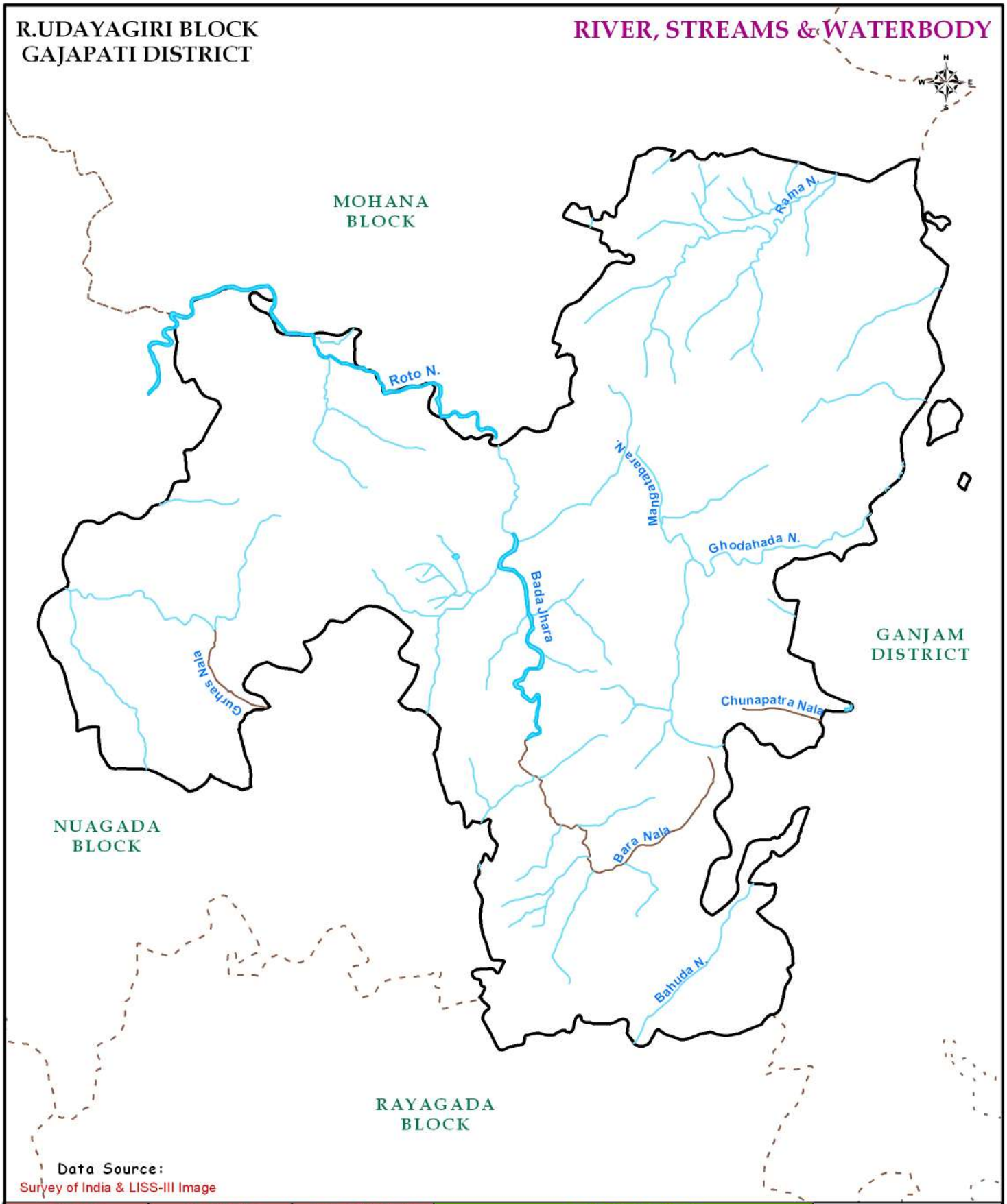
INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream Nala River

Scale:
2.5 1.25 0 2.5 Kilometers

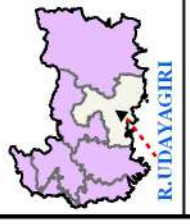
Map Complied By:
NIC
Bhubaneswar, Odisha.

R.UDAYAGIRI BLOCK
GAJAPATI DISTRICT

RIVER, STREAMS & WATERBODY



Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary Stream Nala River/Waterbody

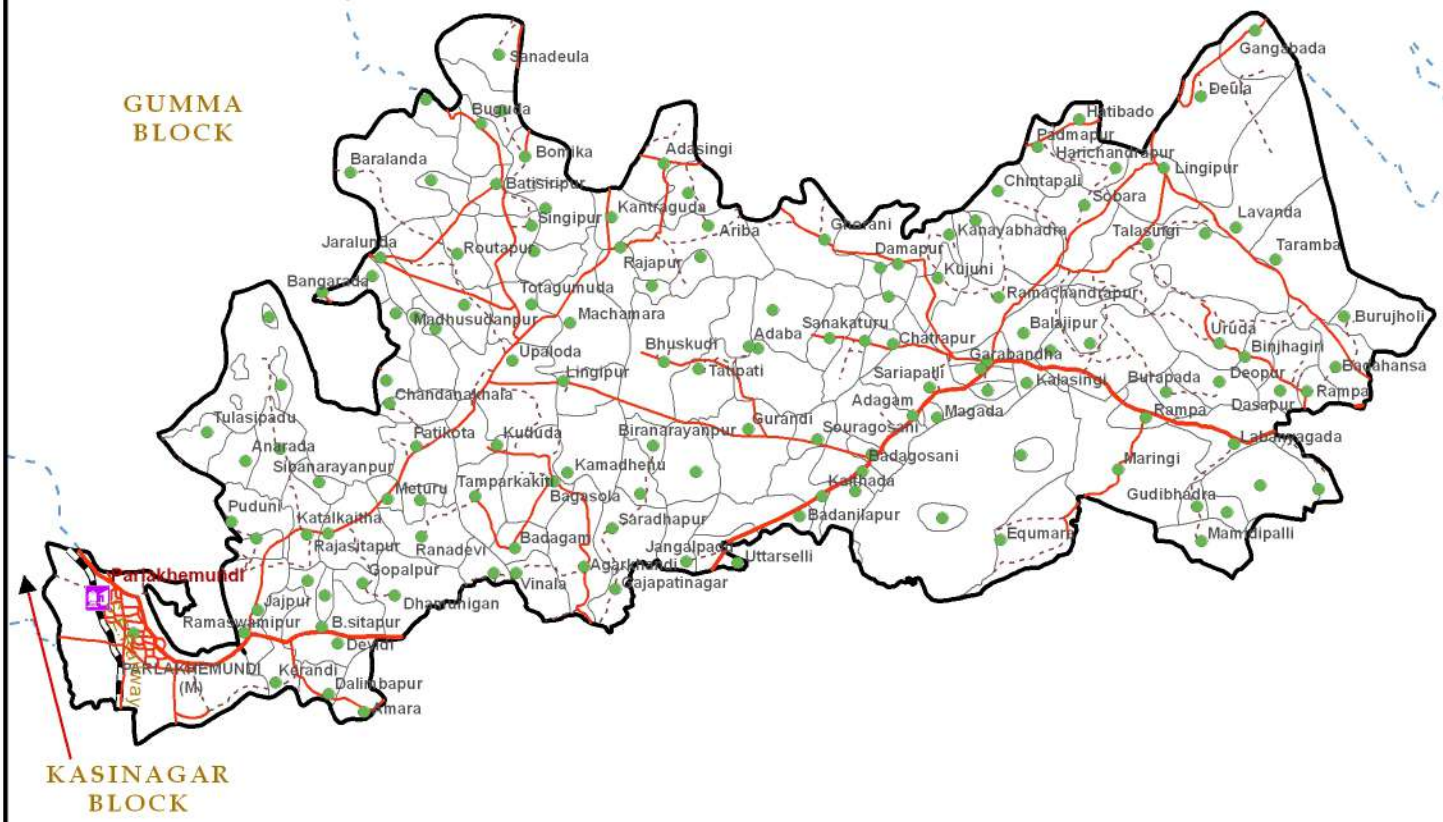
Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.

TRANSPORTATION ROUT MAP OF GAJAPATI DISTRICT

PARALAKHEMUNDI (GOSANI) BLOCK
GAJAPATI DISTRICT

ROAD & RAILWAY NETWORK



Data Source:
Survey of India & District Administration

INDIA	ODISHA	GAJAPATI	LEGENDS
			Habitation Railway Station Block Boundary Village Boundary State Highway Road Railway Line GP Road

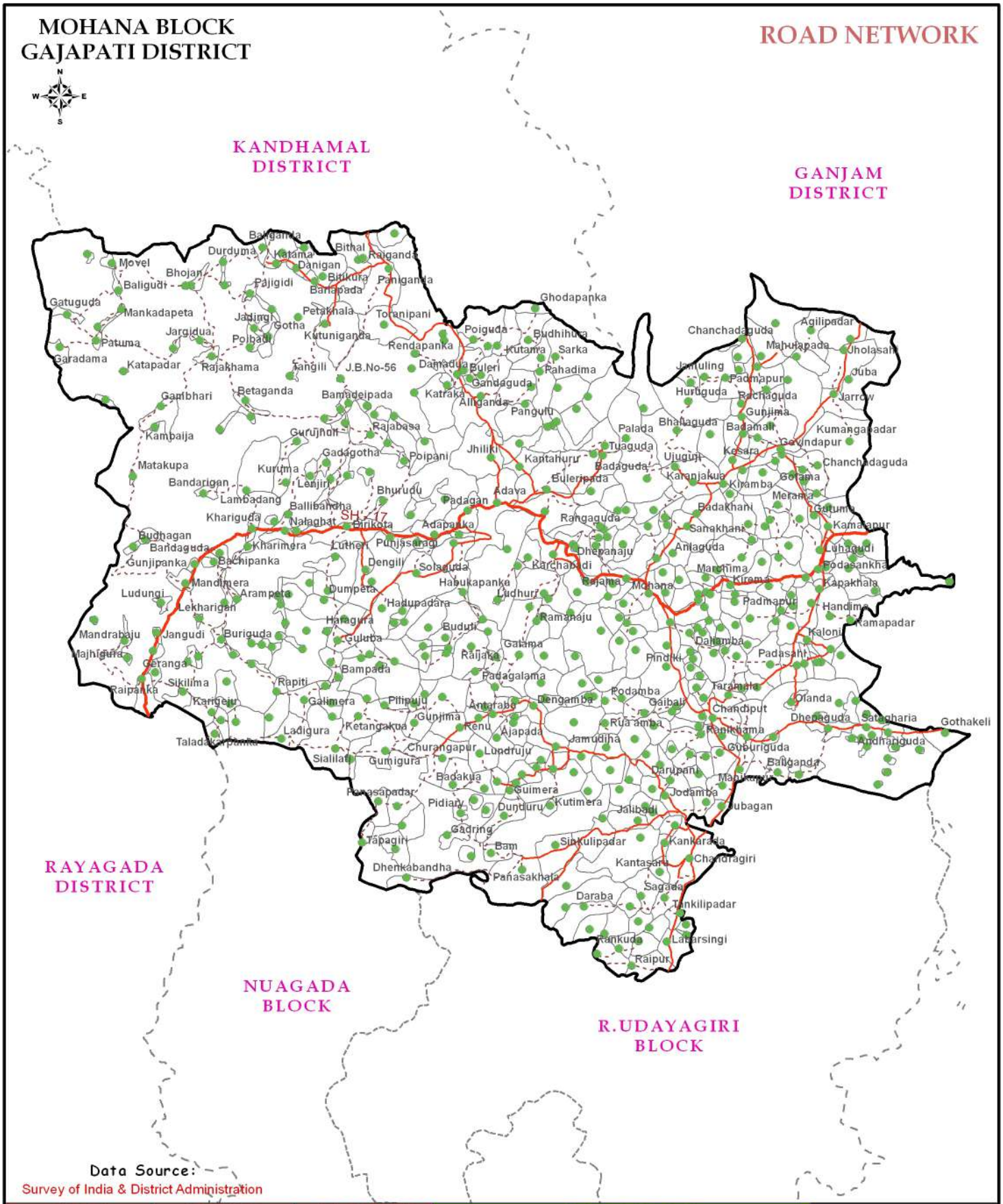
Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.


KASINAGAR BLOCK
GAJAPATI DISTRICT
ROAD & RAILWAY NETWORK
N
W
E
S
NUAGADA BLOCK
RAYAGADA DISTRICT
GUMMA BLOCK
Palasingi
Palasingi
Badigam
Badigan
Sara
Sara
Ullabhadra
Srimaharajapeta
Bansadhara
Armada
Allada
Khandava
Purushiguda
Ankarada
Gouri
Lalgutipeta
Gariaguda
Gatraguda
Vanda
Gyali
Chandrayapetta
Lihuri
Kamibhadra
Tamayapeta
Pedamadi
SH 4
Pedamadiliaripur
Gonbandha
Kolla
Bhupatilaxmipur
Ramchandrapur
Madhusudanpur
Budura
Sirida
Khurigan
Idudi
KASINAGAR (NAC)
Kasinagara
Papasapeta
Rajpur
Karatam
Sanyasipeta
Gokula
Jayapur
Champahgiguda
Kantrajoti
Kidigan
Katuru
Navada
Devadala
Nilapur
Khanduru
Hadubhangi
Jambada
Kharada
Sitapuram
Hadubhangi
Visala
Minigan
Gumbhadra
Rampeta
Venkatapur
Rangapudi
Sourajoduru
Goraba
Janigan
Partada
Endri
Tadava
Arimba
Rayimba
Tarala
Hurati Jaganathpur
Purusurampur
Nilakanthapur
Poluru
ANDRA PRADESH
PARALAKHEMUNDI (GOSANI) BLOCK
Data Source:
Survey of India & District Administration
INDIA
ODISHA
GAJAPATI
ODISHA
GAJAPATI
KASI NAGAR
LEGENDS
Habitation
Railway Station
Block Boundary
Village Boundary
SH Road
Major Road
Railway Line
GP Road
Scale:
2.5 1.25 0 2.5 Kilometers
Map Complied By:
NIC
Bhubaneswar, Odisha.

MOHANA BLOCK
GAJAPATI DISTRICT

ROAD NETWORK

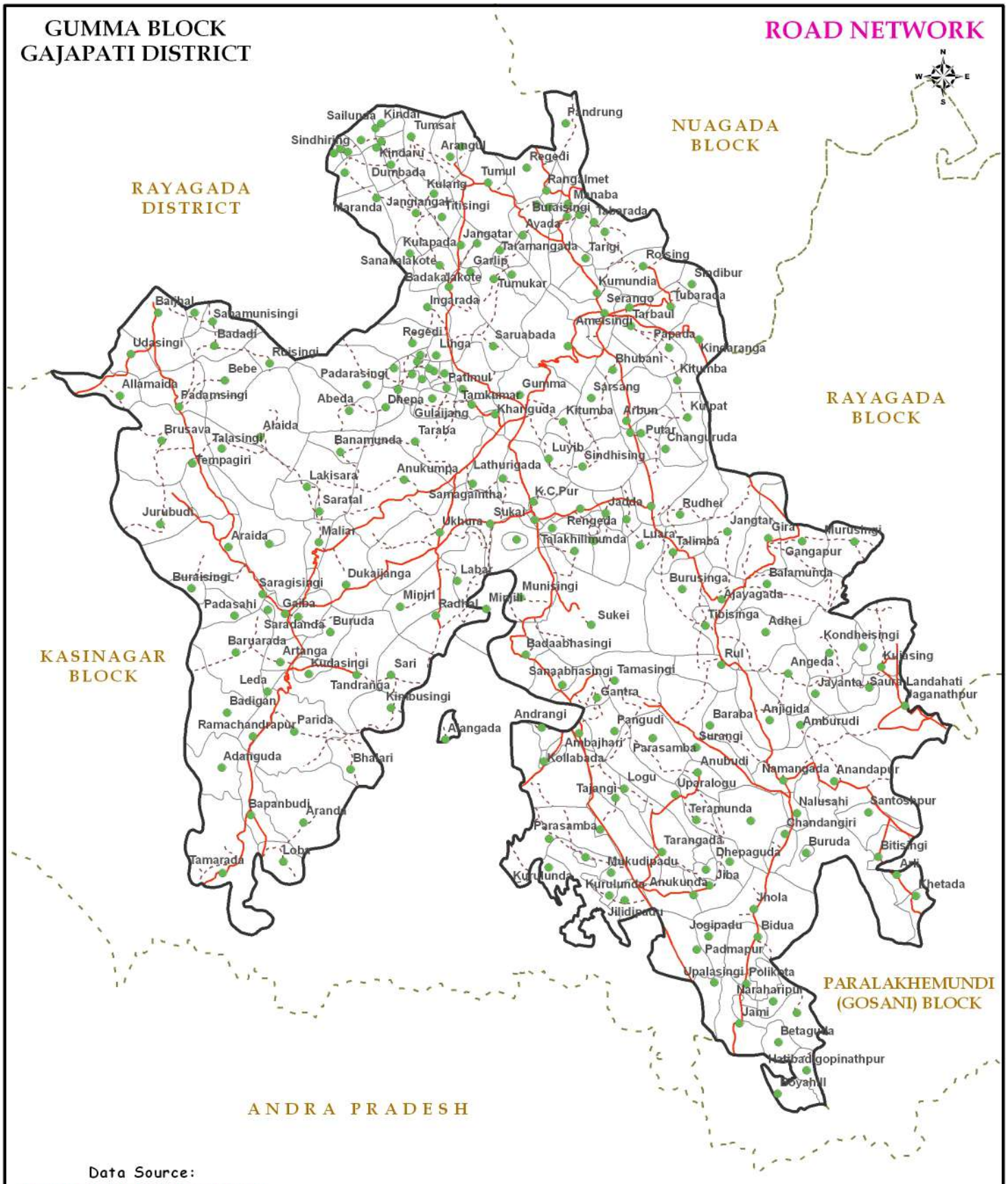


Data Source:
Survey of India & District Administration

INDIA	ODISHA	GAJAPATI	LEGENDS
			Habitation Block Boundary Village Boundary State Highway Road GP Road

Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.


GUMMA BLOCK
GAJAPATI DISTRICT
ROAD NETWORK
N
W
E
S
NUAGADA BLOCK
RAYAGADA DISTRICT
RAYAGADA BLOCK
KASINAGAR BLOCK
PARALAKHEMUNDI (GOSANI) BLOCK
ANDRA PRADESH
Sailunda
Kindari
Tumsar
Sindhiring
Arangul
Kindaru
Regedi
Dumbada
Tumul
Kulang
Rangalmet
Munaba
Maranda
Jangiangal
Titisingi
Buraisingi
Tubarada
Ayada
Jangatar
Kulapada
Tarangada
Tarigi
Sanakalakote
Garlip
Rolsing
Badakalakote
Tumukar
Kumundia
Sindibur
Ingarada
Serango
Tubarada
Baijhal
Sanamunisingi
Tarbaul
Ameisingi
Badadi
Regedi
Saruabada
Papada
Udasingi
Linga
Kinnaranga
Roisingi
Bhubani
Bebe
Kitumba
Padarasingi
Patimul
Allamaida
Gumma
Sarsang
Padamsingi
Abeda
Dhepa
Tamkumai
Kurpat
Gulaijang
Khanguda
Kitumba
Arbun
Alaida
Brusava
Taraba
Putar
Talasingi
Banamunda
Changuruda
Luyib
Sindhising
Tempagiri
Anukumpa
Lathurigada
Lakisara
Samagamtha
K.C.Pur
Saratal
Jadda
Rudhei
Jurubudi
Sukai
Ukbura
Rengeda
Jangtar
Gira
Murusingi
Araida
Malian
Talakhillimunda
Luara
Talimba
Gangapur
Buraisingi
Dukajanga
Laba
Balamunda
Saragisingi
Munisingi
Burusinga
Padasahi
Mipiri
Radhal
Mipili
Ajayagada
Gaiba
Sukei
Tibisinga
Adhei
Saradanda
Buruda
Kondheisingi
Badaabhasingi
Baruarada
Rul
Artanga
Angeda
Kudasingi
Sari
Sanaabhasingi
Tamasingi
Jayanta
Saura
Landahati
Leda
Tandranga
Gantra
Jaganathpur
Kinibusingi
Badigan
Andrangi
Anjigida
Baraba
Ramachandrapur
Parida
Pangudi
Amburudi
Alangada
Surangi
Ambajhari
Parasamba
Adanguda
Bhatari
Kollabada
Anubudi
Namangada
Anandapur
Logu
Uparalogu
Tajangi
Nalusahi
Santoshpur
Bapanbudi
Aranda
Teramunda
Chandangiri
Parasamba
Tarangada
Buruda
Bitisingi
Dhepaguda
Tamarada
Loba
Mukudipadu
Jiba
Kurulunda
Anukunda
Khetada
Jhola
Jilidipadu
Jogipadu
Bidua
Padmapur
Upalasingi
Polikata
Naraharipur
Jami
Betaguda
Hatibadgopinathpur
Boyahill
Data Source:
Survey of India & District Administration
INDIA
ODISHA
GAJAPATI
ODISHA
GAJAPATI
GUMMA
LEGENDS
Habitation
Block Boundary
Village Boundary
Major Road
GP Road
Scale:
2.5 1.25 0 2.5
Kilometers
Map Complied By:
NIC
Bhubaneswar, Odisha.

ROAD NETWORK

NUAGADA BLOCK
GAJAPATI DISTRICT

MOHANA
BLOCK

RAYAGADA
DISTRICT

R.UDAYGIRI
BLOCK

SH-34

GUMA
BLOCK

RAYAGADA
BLOCK

Data Source:
Survey of India & LISS-III Image

INDIA	ODISHA	GAJAPATI	LEGENDS
			Block Boundary State Highway Road Other Road

Scale:
2.5 1.25 0 2.5 Kilometers

Map Complied By:
NIC
Bhubaneswar, Odisha.