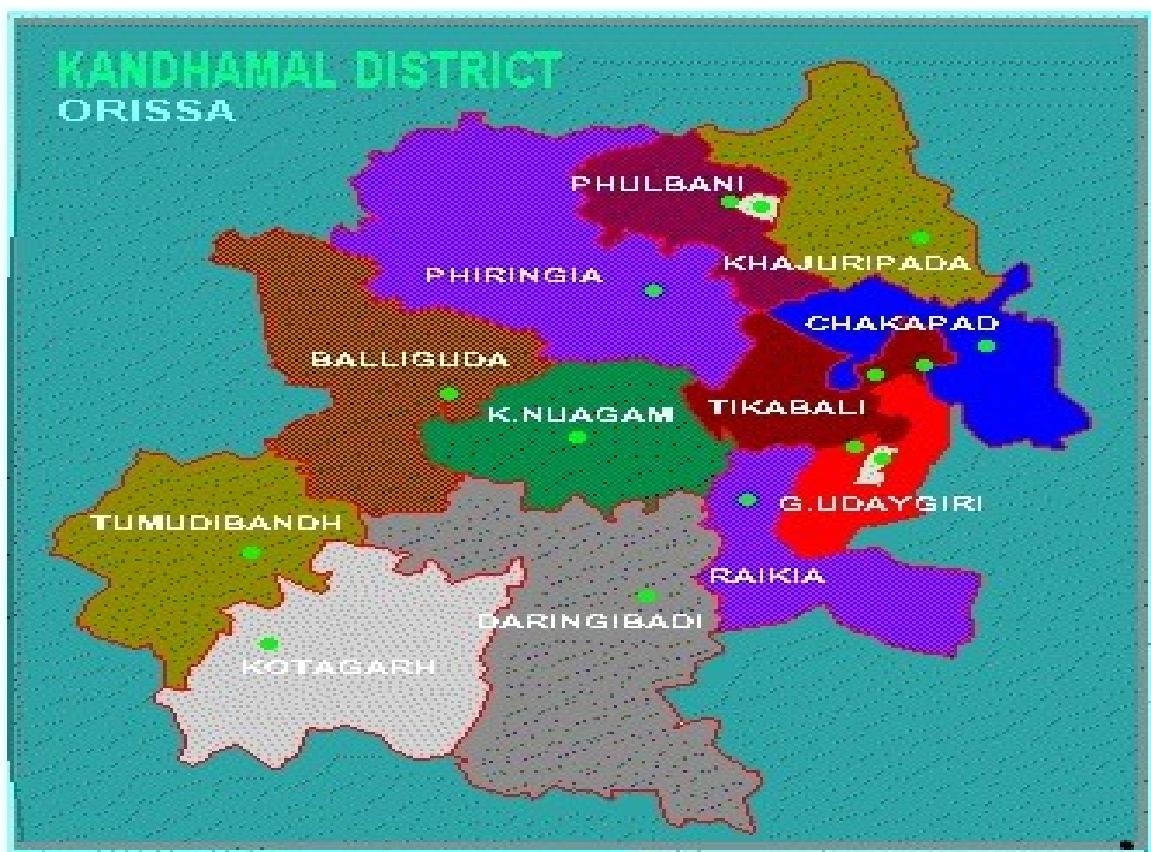




District Survey Report of Kandhamal District for Minor Mineral Excavation (Stone)



Prepared by

District Level Environment Impact Assessment Authority (DEIAA),

Kandhamal, Phulbani

Govt. of Odisha

Preface

In compliance to the Notification issued by the Ministry of Environment, Forest, Climate change dated 15.01.16, the preparation of District Survey Report of sustainable sand mining is in accordance with appendix 10 of the notification. It is also mentioned here that the procedure of preparation of District Survey report is as per notification/ guidelines. District Survey report (DSR) will be prepared in every district for each minor mineral. The District Survey Report will guide systematic and scientific utilization of natural resources, so that present and future generation shall be benefitted at large.

The purpose of District Survey report (DSR) is to identify areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining activities in that area.

Every effort has been made to identify stone mining locations, areas and overview of mining activity in the district with all its relevant features pertaining to geology and mineral sources. This report will be a model and guiding document which is a compendium of available mineral resources, geographical, environmental and ecological set up of the district and is based on various departments, published reports and websites.

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“APPENDIX-X”

[See paragraph 7(iii)(a)]

II. INFORMATION FOR PREPARATION OF DISTRICT SURVEY REPORT OF MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING IN RESPECT OF KANDHAMAL DISTRICT

01. INTRODUCTION

The Government of India, Ministry of Environment, Forests and Climate Change (MoEF&CC) has made certain amendments vide Notification No. S.O.141(E) dated 15.01.2016 and Notification No. S.O.190(E) dated 20.01.2016 in Environmental Impact Assessment (EIA) Notification No. S.O.1533(E) Dated 14.09.2006 issued by the erstwhile Ministry of Environment and Forests (MoEF). These amendments led to the constitution of the district Level Environment Impact Assessment Authority (DEIAA) at District Level for grant of Environmental Clearances for category B2 projects(B2 category projects pertaining to mining of minor minerals of lease area less than or equal to 5Hc) for mining of minerals, for all the districts in the country. In Kandhamal district, DEIAA comprises of following members:

Sl No	Designation	Designation in the Committee
01	District Magistrate-cum-Collector, Kandhamal	Chairperson
02	Divisional Forest Officer, Phulbani	Member
03	Executive Engineer,OLIC,Kandhamal	Expert Member
04	Sub-Collector, Phulbani	Member Secretary

The Central Government in addition to some other minor minerals has also declared the ordinary earth (used for filling or levelling purposes in construction of embankments, roads, railways and buildings) and brick earth as the minor minerals. The DEIAA shall base its decisions on the recommendations of District Level Expert Appraisal Committee (DEAC). It comprises of following members as per the guidelines of the MoEF&CC Gazette Notification Dated 20/01/2016.

Sl No	Designation	Designation in the Committee
01	Executive Engineer, Minor Irrigation, Phulbani	Chairperson

02	A.C.F., Phulbani	Member
03	Geologist, South Zone, Berhampur or his representative	Member
04	CDMO, Phulbani	Member
05	Executive Engineer, DRDA, Phulbani	Member
06	Regional Officer, Berhampur or his representative not below the Rank of Asst. Env. Engineer/ Asst. Env. Scientists of State	Member
07	ACF, Balliguda	Expert Member
08	Range Officer, Balliguda	Expert Member
09	Lecturer in Botany, Govt. Autonomous College, Phulbani	Expert Member
10	Senior most Assistant Executive Engineer, R&B, Phulbani	Member
11	Mining Officer, Phulbani	Member Secretary

In the light of above, The District Collector, Kandhamal in consultation with the Mining Officer, Kandhamal have constituted the DEAC which is in force till date.

District Survey report(DSR) is required to identify the areas of aggradations or depositions where mining can be allowed and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment after mining in that area. Every efforts have been made to cover sand mining locations, areas and overview of mining activity in the district with all its relevant features pertaining to geology and mineral wealth in replenishable and non-replenishable areas of rivers, stream and other sand sources.

2. Over view of Mining Activity in the District

Mainly two types of minor minerals constituents such as sand and stone are required for any type of construction apart from other material like cement and steel. In earlier times, the houses / buildings were constructed in form of small dwellings with walls made up of mud plaster, stone and interlocking provided with wooden frames and there were negligible commercial as well as developmental activities resulting in less demand of building material. However, with the passage of time, new vistas of developmental activities were started. The quantity of minor minerals consumption in a particular area is an indicator to assess the development of the area. Thus, with the pace of development activities, the consumption of minor minerals also increased. As such the demand for minor minerals in the district has

witnessed an increasing trend. In order to meet the requirement of raw material for construction, the extraction of sand is being carried out exclusively from the river beds.

Mining activity in Kandhamal district consists of river bed sand mining, mining of boulder, stones, morrums and ordinary earth. The demand for sand (river borne collection) in Kandhamal district, is mainly met by the supply from Salunki river bed flowing in the district. All mining activities are made for local consumptions only and are non-organized in nature. Manual excavation of sand from river bed is being done from notified sairat sources.

As per OMMC Rules, 2016 Sairat sources can be leased out for minimum of 05 years and can be extended up to 10 years. . In, Kandhamal district, out of 64 sairat sources, 14 sources have been leased out for 5 years from 2015-16 to 2020-21. Out of balance sources, 07 sources are below 5 hectare. As per Memo No. 41788/R&DM Dated 12.11.18 “DEIAA is the Competent authority for grant of E.C proposal of sand mining and other minor minerals mining on the basis of individual mining lease for Ha. 0.00 to Ha. 5.00 and also for sand mining and other minor minerals mining in cluster situation”. on this basis, necessary steps are being taken to lease out these 07 numbers of sources. Further, one source is pending for agreement, one source is subjudice before the Hon’ble High Court, Odisha and three other sources are pending in SEIAA Bhubaneswar for Environmental Clearance.

Total No. of sairat sources	Total no. of sources bidder finalized	Pending with RQP	Pending with SEIAA	Pending with Tahasildar	Settled	For Re-Adv	Receive extinction proposal	No. of sources below 5 Hc.	Pending with High Court
Sand 31	14	03	03	02	06	07	02	07	01
Stone 33	09	01	00	00	08	08	16	00	00
Total 64	23	04	03	02	14	15	18	07	01

3. General Profile of the District

Kandhamal District is one among 30 Districts of Odisha State. The administrative headquarters of Kandhamal District is Phulbani. It is Located 198 Km East towards State capital Bhubaneswar. The geographical area of the district is 8021 sq. kms. Area-wise the district rank is 6th among all the districts of Orissa.

Kandhamal literally "the land of Kondhs" is a district with a substantial tribal population. It was formed by bifurcating the former Boudh-Phulbani or Kandhamal District on 1st January, 1994. The agro-climatic condition of the district is otherwise very rich in organic contents.

Ever Since Boudh-Phulbani district was created in 1948 by merging feudatory state of Boudh with Phulbani sub-division with its Headquarters at Phulbani, the movement to separate Phulbani from Boudh began in early 1980's when two Tribal outfits named "KuiSamaj" and "Pahadi Sangram Manch" fight for the separation. When the movement became vociferous, the state Government had to concede the demand of the people ultimately and Kandhamal came into existence.

3.a. Location & Topography:

The district is situated within the longitudes $83^{\circ} 30'$ and $84^{\circ} 35'$ East and latitudes $19^{\circ} 34'$ to $20^{\circ} 34'$ North. The district is located in central Odisha and bound by Boudh district in North, Rayagada in South, Ganjam and Nayagarh districts in East and Kalahandi district in West. Phulbani and Baliguda are two sub-divisions of the district.

Phulbani sub-division forms a broken plateau about 518 meters above sea level. Continuous mountains surround this sub-division from all sides. On the north-east and west, these ranges rise abruptly from the plains of Boudh district, while on the south, they merge with the outlines of the Eastern Ghats of Baliguda sub-division. The high plateau lying within these ranges is broken up by numerous smaller ranges which form an endless series of valleys varying in size. Thick forests cover much of these tracts and villages lie in scattered clearings along hill sides. The whole of this sub-division is a network of hills and forests interspersed with small hamlets of the Kandhas. This hilly tract is intersected in all directions by streams and rivers, which run dry after the cessation of rains. Baliguda sub-division is on the plateau and lies at heights varying from 300 meter to 1100 meter above mean sea level. The eastern side of the sub-division consists of wide well cultivated valleys. The hills of this sub-division are a part of the Eastern Ghats. The uplands and slopes leading from the foot of the hills are utilized for growing dry crops periodically depending on the rain. The area of cultivated land is small.

3.b. Administrative set up:

The district has two subdivisions- Balliguda and Phulbani. To provide efficient administration, effective implementation and monitoring of development scheme the district is administratively divided into 12 tahsils & 12 Blocks namely Balliguda, Chakapada, Daringbadi,

G.Udayagiri, K.Nuagaon, Kandhamal, Kotagarh, Khajuripada, Raikia, Phiringia, Tikabali, Tumudibandh.

There are one municipality, two Notified Area Council, 171 Gram Panchayats and 2,506 villages with 2415 inhabited and 91 uninhabited villages. Baliguda, G. Udayagiri and Phulbani are three assembly constituencies.

Administrative Unit	Numbers
Subdivisions	2
Tahasil	12
Block	12
Municipality	1
NAC	2
Police Stations	18
Gram Panchayats	171
Total no. of Villages	2506
Inhabited Villages	2415
Uninhabited Villages	91
Assembly Constituencies	3

3.c. Demography

Demography is the statistical study of population of human beings. Kandhamal district has 7.33 lakhs of population as per 2011 census. Kandhamal district has 335251 male and 349186 female population. The district accounts for 5.15 % of the states territory and shares 1.75 % of the states population. The density of population of the district is 91 per sq.km. As against 270 persons per sq.km of the state. Literacy percentage of the district covers 64.1 against 72.9 of the state. Kandhamal has highest sex ratio of 1037 females for every 1000 males in rural areas in comparison to urban areas. The decennial growth rate of population in the district is 12.92% which is slightly less than the state average of 13.97%.The population of the district increased from 211,421 in 1901 to 731,952 in 2011.

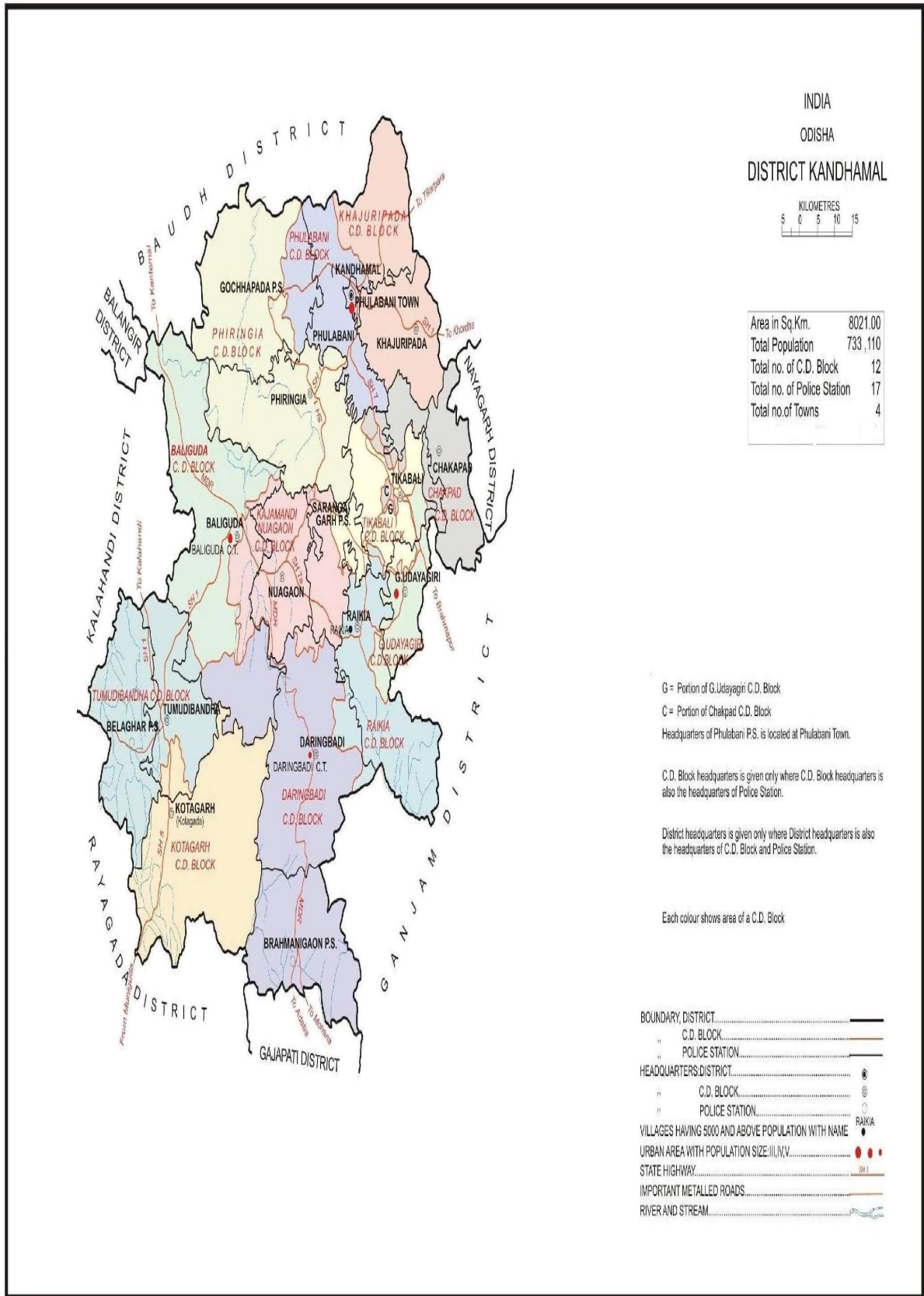


Fig 1. Administrative map of Kandhamal District

4. Geology of the District:

Geologically the area forms part of the Eastern Ghats Super Group and is divided into khondalite group, Charnockite group and migmatite group. The alluvium is of Pleistocene to recent age. Khondalite group of rocks are of metasedimentary origin and represented by quartz-garnet-silimanite schist and gneisses without graphite, sillimanite quartzite and quartz-silimanite sericite schist occurring as enclaves within granite. Occurrences of basic charnockite are very restricted as bands or lensoid patches within the granites. Intermediate or acid charnockite are common being distributed throughout the hilly area. Migmatite group comprising augengneiss, garnetiferous leucogranites are the most abundant rock types of the area. This constitutes high hill ranges at several places towards north and south and smooth rolling topography in the plains. Rocks of lower Gondwana group especially the Talchir formation is exposed in the northern part of the area. The contact between Talchir and older rocks is faulted at places. Pockets of laterites commonly found in khondalite bearing ridges mainly over the hill tops. The laterite exposed in the area is of Cainozoic age. The river beds of the area are covered by recent alluvium.

The general strike of the foliation is WNW-ESE to ENE-WSW through NE-SW and NS. The amount of dip ranges between 50° to sub-vertical. There is one major shear zone near Ranipathar area. Mylonite and silicification occur along this zone at several places. Both vertical as well as inclined joint planes are observed. Numbers of fault planes occur in the area with varieties of strike direction. A number of lineaments are deciphered in this area from LANDSAT imageries. Two major sets of these lineaments are deciphered running along NW-SE to NNW-SSE and NS directions.

A number of mineral occurrences are noticed in the area. Bauxite deposits have been located in the plateau of khondalite hills. Rucy, mica-bearing pegmatite vein is located East of Mundagaon. Several occurrences of dimension stones are found at the southern bank of kalipana river. Graphite occur in the garnet-quartz-silimanite schist of khondalite suite in the form of bands, enechelon veins and lenses or disseminated forms. They are usually disposed conformably along the foliation planes of the host rocks. A number of graphite deposits have been found in the western part of the area at NW of Tumudibandha. Only occurrence of bed ocher, found in the district is situated south of GhumusarUdayagiri.

5. Drainage of Irrigation pattern:

Kandhamal district mainly depends upon rain harvesting structure. Pila Salki irrigation project is only reservoir project of the district situated in Burupada village. The irrigation potential is 2033ha in Kharif and 1000Ha. in Rabi season. 26 villages of Khajuriapada block and 8 villages of Phulbani block are being benefited by the project. In existing irrigation type minor irrigation and lift irrigation plays major role. In Minor irrigation 5366 Ha. area is irrigated in Kharif and 598 Ha. in Rabi season (2014-15), like this in lift irrigation irrigated area is 4580Ha in Kharif and 2266 Ha.in Rabi season. Except this, other irrigation facilities like bore well, dug well, WHS, Medium Irrigation also provide water to agriculture. At present one medium irrigation project, 59 numbers of MI project and 532 numbers of LI points functioning to meet the water scarcity in the district and total an ayacut area of 20,550 hectare.

Sl. No.	Block	Medium Irrigation Project		Minor Irrigation Project		Lift Irrigation Points (Rivers)		LI Points (Deep bore wells)	
		Units	Ayacut area in hectare	Units	Ayacut area in hectare	No.	Ayacut area in hectare	No.	Ayacut area in hectare
1	12	01	2314	59	6392	532	10884	573	1143

Source of Command area Irrigation – District Profile

Source of Irrigation	Command Area(Ha.)
Surface Irrigation	8203
Ground Water	8327
Other Sources	19141
Total	35671

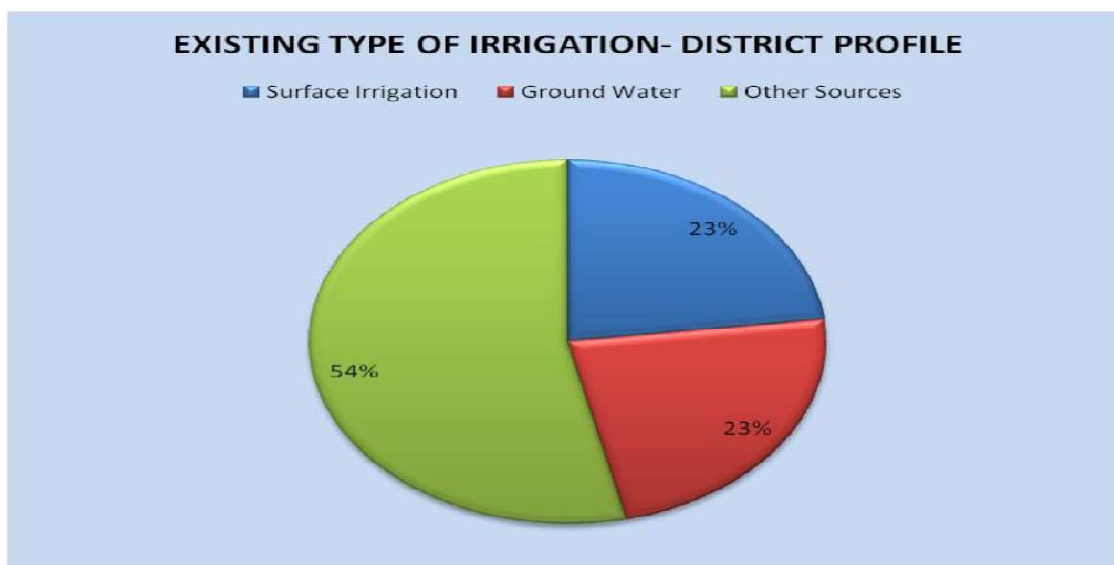


Fig 2. Existing type of Irrigation

6. Land Utilisation Pattern in the District: Forest, Agriculture, Horticulture, Mining etc.

The district is spread over a geographical area of 8021Sq.kms which is 7.14% of the total geographical area of the state. About 5709 Sq. kms area is under forest which is about 71% of the total geographical area of the district.

The land in the district is highly uneven and undulating comprising hill slopes, plateaus, valleys and plains with varying slopes. The agriculture land in the district has been classified in to 3 broad categories depending on the gradients of the land i.e. 1) High, 2) Medium 3) Low. The total cultivated land of the district is 1,27,790 hectares out of which 96298 hectares (75%) is high land, 20624 hectare (16%) Medium land and 10868 hectares (09%) low land. About 32223 hectares i.e. 25.22% of cultivated land is irrigated and rest 74.78% land is under rainfed condition which is exposed to vagaries of monsoon.

Land utilization pattern in Kandhamal District (Area in Ha.):

Geographical Area	Forest area	Cultivable waste land	Land put to Non-Agril. Use	Permanent Pasture s	Land under miscellaneous tree crops and grooves	Other fallow	Current fallow	Net Area sown	Gross cropped area	Cropping Intensity (%)
802100	570983	14245	9103	10079	33775	6182	950	126855	185170	146

As most of the area comes under forests, the people of the district basically depend upon the forest products. Most of the farmers are economically backward with higher percentage of SC & ST families. Majority of the farmers are small and marginal landless labours and depend on the forest and other minor forest products for their livelihoods. Some important crop grown in district are paddy, Maize, Turmeric, Ginger, Mustard and vegetable. As per agricultural census 2010-11 the no. of operational holdings of the district is 91512 with 92801 Ha. operational area. The average size of land holding for all social groups is 1.01 Ha.

Out of 8,02,100 hectares of geographical area of the district, 71% of land is under forest cover. Land under non-agricultural use constitutes 1.77%. Cultivable waste land, permanent pasture and land under miscellaneous tree crops and grooves constituting 7.24%, where the land comes under current fallows during 2012-13 & 2013-14 was 0.35%, which has decreased to 0.11% of the total land during 2014-15. Likewise, the net sown area during the year 2012-13 and 2013-14 was 15.57%, which has increased to 15.81% of total land during the year 2014-15.

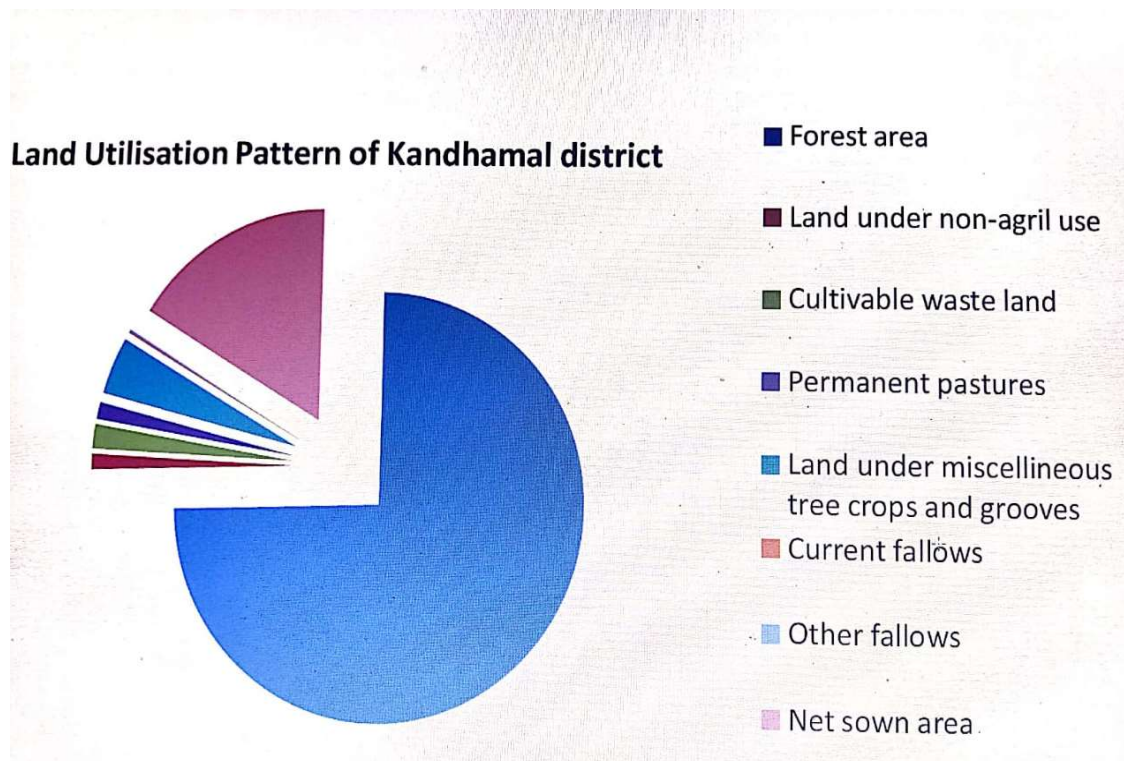


Fig 3. Land utilization pattern of Kandhamal District

7. Surface Water and Ground Water scenario of the district:

The Kandhamal district lie at an altitude of 300-1100 meter above mean sea level. it is mostly underlain by Archean crystalline of Eastern-ghat facies with limited patches of lower Gondwana sandstone and recent laterites and alluvium. Features like geological set up, rainfall distribution and the degree of primary and secondary porosity controls the hydrogeological framework of a place.

There is no major irrigation project in the district except one minor project "Pilasalunki". The normal annual rainfall is 1443.5 mm. the district is underlain by both porous & fissured formations. The important aquifer system in the district is constituted by unconsolidated and semi-consolidated formations with weathered, fissured & fractured crystalline rocks. The movement of ground water in these formations is mostly restricted to shallow levels. Ground water development is rather poor due to the rugged nature of the terrain and poor quality of the formation water. As the district is underlain by diverse rock type, it results in contrasting water bearing properties of these different geological formations.

The phreatic zone constitutes the most potential ground water reservoir in the district. This zone has been mapped in course of hydro geological surveys. The depth to water table values depend on several factors like rainfall, topography drainage characteristics, lithology, water bearing and water yielding properties of the rocks, as also land use. During pre-monsoon the depth of water level varies from 5.28 to 12.35 meter below the ground level. It is observed that no significant depletion in water table occurs in the district. The overall stage of Ground water development which includes both domestic & irrigation in the district as a whole is 12.45%. as per the norms of Indian standard institution for drinking water, mostly the ground water from deeper aquifer of Kandhamal district is suitable for drinking purpose except in few places where iron content of ground water is beyond permissible limit.

All the urban areas get piped water supply for domestic purposes. In rural areas, RWS&S, Govt. of Odisha have installed a good no. of piped water supply schemes, also installed hand pump, tube wells mainly as safe drinking water source.

Availability of surface water is poor in the district as most of nallahs become dry during summer season. Surface water can be utilised by constructing check dams/ weirs/barrages in the rivers at suitable locations which will also help in effecting additional recharge to the ground water reservoir.

8. Rainfall of the district and climatic condition:

Kandhamal district comes under North Eastern Ghatagro climatic zone covering 15% of area with Hot & moist, Sub-humid climate, characterized by hot and dry summer and dry cold winter. The geographical situation of the district is characterized by undulated topography with hilly terrain where the rain water is carried through hill streams and nallahs. The average annual rainfall of Kandhamal district is 1428.15 mm. and temperature ranges between a maximum of 40 degree to minimum 1 degree centigrade. The Humidity of the air is generally high especially in the south-west monsoon and post monsoon months. April is the driest month. Afternoon period is comparatively drier and more so from March to May. The peak period of rainy season is from 15th June to September.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2016	30.87	14.75	30.78	2.55	42.97	204.37	238.17	273.88	267.34	118.9	1.81	0	1226.39
2017	0.00	0.00	30.27	0.60	62.66	238.82	211.64	242.04	216.44	195.39	33.76	0.00	1231.62
2018	0	0	0.13	92.56	75.33	146.24	461.87	385.98	309.47	293.33	0	61.54	1826.45
Avg.	10.29	4.92	20.39	30.90	60.32	196.48	303.89	300.63	264.42	202.54	11.86	20.51	1428.15

9. Details of the mining leases in the District as per the following format:

Name of the Tahasil	Name of the Mineral (Stone)	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	
						From	To	From	To
1	2	3	4	5	6	7	8	9	10
Balliguda	Irpiguda	RKD Construction	Irpiguda 9439102465	145160018 41 Dated 4.11.2016	12.720	2016-17	2020-21	-	-
	Khamankhole (A)	RKD Construction			0.685	-	-	-	-
	Madinata	Subash Ch. Dash	Balliguda 943782223		2.100	-	-	-	-
	Kutikia	Simanchala	Balliguda 9437122941	145160005 4 dated	2.452	2015-16	2019-20	-	-

		Acharya		18.04.2016					
	Khamankhole (B)				2.575	-	-	-	-
T.bandh	Dadanga (A)	Anusha Project (p) Ltd	M.Sanjeev Reddy 009140235569 96	416/ 4.03.2016	1.9888	2015-16	2019-20	-	-
Daringbadi	Dalibandh	RKD Construction	Chandaka industrial Estate, Adars hVihar BBSR 9438228445	4259/25.08 ,2015	2.106	22.01 2016	21.1. 2021	-	-
	Kumbharamunda	Trishakti Construction	Daringbadi 9437980355	2360/21.11 .2016	1.620	29.11. 2016	28.1 1.20 21	-	-
Tikabali	Rudabidingia	Jagabandhu Samal RKD Cons.	At.Dadhimacha, Badakul, via Marshaghai, Ps Patkura Dist Kendrapada	534/ 25.03.2015	1.035	2015-16	2019-20	201 6- 17	201 7- 18
	Bengasahi	Santosh Kumarpanda	Tikabali 9438256308	900/11.06. 2015	1.000	2015-16	2019-20	201 6- 17	2- 17- 18
Raika	Dadingia	Backbone Enterprise	Dadingia, Raikia	403/ 3.3.2015	3.000	2015-16	2019-20	-	-
	Alamramu	Backbone Enterprise	Alamramu, Raikia	404/3.03.2 015	1.000	2015-16	2019-20		
Chakapad	Dadisahai	Santosh kumarpanda	Tikabali 3438256308	1067/19.08 .2016	0.770	2015-16	2019-20		

Date of commencement of Mining Operation	Status (working/ non working/temp Working for dispatch etc)	Captive / Non Captive	Obtained E.C (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
Irpiguda 5.11.2016	Working	Captive	Yes L.No.1818 dated 25.07.2016	Lat 20°05'39.8" N-20° 05' 50.2"N Long E83°47'36.7"- E83°47'52.9"	Open cast

Kutikia 19.04.2016	Working	Non Captive	Yes L.No.711 dated 30.01.2016	Lat 20°17'14.40"N - 20°17'19.20"N Long83°53'88.70"E - 83°54'10.00" E	Open Cast
Dadanga(A) 17.06.2016	Non working	Non Captive	Yes L No.599/SEIAA dated 30.01.2016	Lat 20,00595 Lon 83.70713	Open Cast
Dalibandh 22.01.2016	Working	Captive	Yes LNo.3684/SEIA A/dated 24.07,2015	Lat19°56'54.684"N to10°56'51.645"N Long84°06'35.856"E to 84°06'37.013E	Open cast
Kumbharmunda	Working	Captive	Yes L.No35/DEIAA /dated 23.08.2016	Lat.19°58'19.5"N to19°58'21.9" N Long84°01'13.1"E to84°01'22"E	Open cast
Rudabidingia 28.10.2016	Working	Captive	Yes 27/DEIAA /dated 6.05.2016	Lat20°16'31.00"N to 20°16'36.00"N Long84° 22'8.77" to 84°22'13.59"	Open cast
Bengasahi 28.10.2016	Working	Captive	29/DEIAA/dat ed 6.05.2016	Lat.20°16'31.00" N to 20°16'36.00N Long 84°15'52.00"E to 84°15'55.00E	Open cast
Dadingia 22.12.2015	Temp. working	Captive	Yes L.No.3228/SEI AA/dated20.05 .2015	Lat.20.0614 degree N Long84.2358 degree E	Open cast
Alamramu 22.12.2015	Temp. working	Captive	Yes L.No.3226/SEI AA/dated 20.05.2015	Lat.20.0614degree N Lon.84.2358degree E	Open cast
Landabali	-	-	-	Lat.20.0614degree N Lon.84.2358degreeE	
Dadisahai 6.08.2016	Working	Captive	Yes L.No.25/6.05.2 016	Lat.20°13'45.00N to 20°13'48.00N Lon 84°19'35.00"E to 84°19'38.00E	Open cast

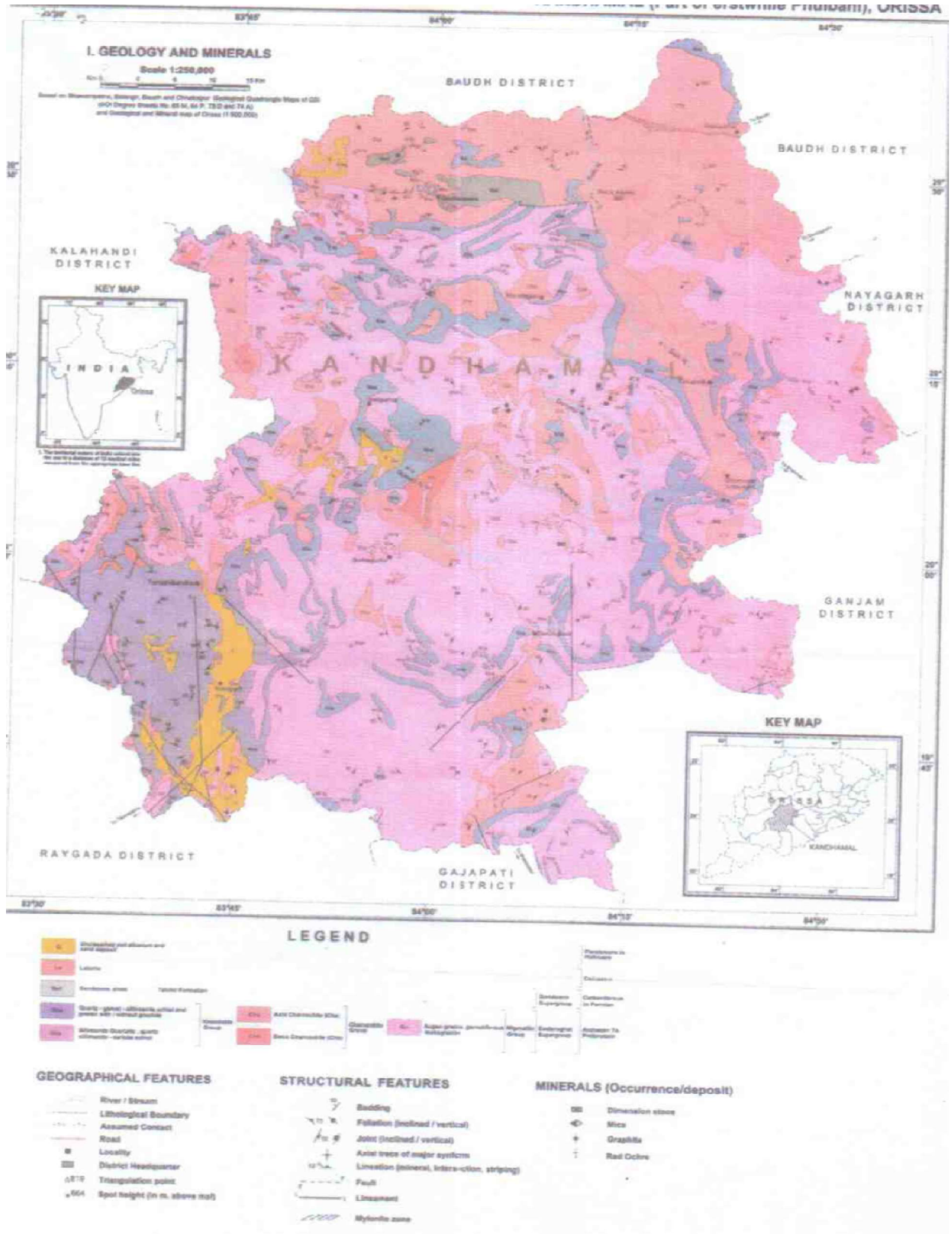
10. Details of Royalty or Revenue received in last three years from Stone sources

Name of Tahasils	Name of the Stone sairat sources	Production of stone in last 3 years (in Cubic Meter)		
		2016-17	2017-18	2018-19
Balliguda	Irpiguda	2174854.00	4349708.00	4349708.00
	Kutikia	20400.00	20400.00	20400.00
Tumudibandh	Dadanga (A)	1960000.00	1075000.00	nil
Daringbadi	Dalibandh	3597207.00	2511964.00	7832396.00
	Kumbharmunda	642600.00	1927800.00	1927800.00
Tikabali	Rudabidingia	4,77,450.00	5,69,622.00	6,35,668.00
	Bengasahi	1,00,075.00	1,35,200.00	-
Raikia	Dadingia	439560.00	-	-
Chakapad	Dadisahi	132538.00	141674.00	15994400

11. Details of Production of Stone in last three years

Name of Tahasils	Name of the Stone sairat sources	Production of stone in last 3 years (in Cubic Meter)		
		2016-17	2017-18	2018-19
Balliguda	Irpiguda	7764	29315	32100
	Kutikia	120	174	155
Tumudibandh	Dadanga (A)	8000	8000	0.00
Daringbadi	Dalibandh	46345	44825	49060
	Kumbharmunda	1024	985	1044
Tikabali	Rudabidingia	4289.75	4589.75	4889.75
	Bengasahi	960.00	1040.00	1120.00
Chakapad	Dadisahi	960.00	1040.00	1120.00

12. Mineral map of the District



14. Total Mineral Reserve available in the District:

The estimated deposit of graphite in the district is around 1.68 lakhs MT. Though occurrence of some minerals like Bauxite and Lime stone have been reported, the commercial production/exploitation is not viable.

PRODUCTION OF MINERAL 2010-11

Major Mineral		
Sl. No.	Name of Mineral	Production in tonnes 2010-11
1	Graphite	505.760 M. T

About 531 numbers of areas were applied for prospecting Licence, Reconnaissance Permit or Mining leases for minerals like Bauxite, Iron Ore & Manganese, Quartz, Feldspar, Mica, Precious and Semi-Precious Stones, Graphite, Limestone, Dolomite, Coal, Lime Kankar, China Clay, Red Ochre, Granite, Decorative Stone, Sand and Road Metals. The mining activity in the Kandhamal District is currently dependent on the decision of the government because of the restrictions imposed by the Ministry of Environment and Forest of the Government of India, and the leases for major minerals expired in the due course of time were listed for auction through International Bidding.

15. Quality/Grade of Mineral available in the District

The reserve of mineral available in district is much sufficient for many years. The grade of available minerals in the district is good quality grad.

16 Use of Mineral:

People of this district depends mostly on agriculture and mineral resources for their livelihood. The developments of mining provide direct and indirect employment opportunities, infrastructure development, communication and socio-economic infrastructure. Mainly two types of minor minerals constituents such as sand and stone are required for any type of construction apart from other material like cement and steel.

17. Demand & Supply of Mineral in the last three years

Name of the mineral	2016-17		2017-18		2018-19	
	Demand (in Cubic Meter)	Supply (in Cubic Meter)	Demand (in Cubic Meter)	Supply (in Cubic Meter)	Demand (in Cubic Meter)	Supply (in Cubic Meter)
Stone	69462.75	69462.75	89968.75	89968.75	89488.75	89488.75

18. Mining Leases Marked on the map of the District.



19 Details of area of where there is a cluster of Mining leases: NA

20 Details of Eco- Sensitive Areas in the District

The Kotagarh Wildlife Sanctuary has been notified by Govt. of Orissa u/s 18 of wildlife (Protection) Act 1972. Erstwhile Forest and Environment Deptt. Notification No. 8F 162/87 – 30253 Dt. 03.12.1981 for the purpose of protection, propagation, development and research on wildlife. The extent of area of the sanctuary is 399.5 sq. km. spread over the part jurisdiction of Kotagarh, Tumudibandha and Daringbadi CD Block of Balliguda civil Sub-Division. Out of the above the Forest area comes to 269.5096 sqkm, over 10 Forest Blocks and revenue area of 129.9904 sqkm. over 65 nos. of revenue villages.

The Sanctuary area is rich in floral diversity having 165 no. of tree species, 38 Shrub species, 48 Climber species and Herbs 132 species having high economic and ethno botanical importance which provide food security to the animals.

The Kotagarh sanctuary is a paradise for a no. of wildlife and have an encouraging faunal diversity. There are 43 species of Mammals, 144 species of Birds, 41 species of Reptiles, 19 species of Amphibians, 76 species of Butterflies and 23 species of Odonates.

The Northern and South western portion of Sanctuary constitute a part of Chandrapur Elephant corridor and it is migratory route for Elephants from Kalahandi Forest Division and from Lakhari Valley Sanctuary through Muniguda Range of Rayagada Forest Division. The other area are Forest land and habitation area, paddy fields, roads, river, nalah etc.

Extent of Eco sensitive Zone:

The Management of Sanctuary depends on the situation and condition of the area adjacent to the Sanctuary as it acts as a shock absorber for the protected area. These areas though outside the protected area act as of vital ecological corridor links and requires to be protected to prevent isolation of fragmentation of bio-diversity.

In South of Kotagarh Wildlife Sanctuary there are forest land of Bondru RF, Srirampur 'A'DPF, Lassery Extension RF, Durgapanga RF, Srirampur 'C'RF of Balliguda Division and Dhepaguda RF, Tamagudi RF of Rayagada Division with revenue villages of both the Districts. In North there are Bilamal RF, Belghar RF, Mundigarh RF, Jhiripani RF, Tumudibandha UDPF and some revenue villages of Kandhamal District. In East there are Adagan RF, Pakari RF and part of Srirampur 'B'PRF and revenue villages. In West there are Bilamal RF, Jhiripani RF of Kandhamal District and part of Raghubari RF of Rayagada District. There are no mining or industrial

activities in the area except habitation. However, the land is having good tree covers with a no. of perennial streams which forms an ideal condition for wildlife for their movement. Considering the above situation a strip of land having 2 Km. to 10 Km. width from Sanctuary boundary is proposed as Eco-sensitive Zone.

The Eco-sensitive Zone boundary starts from the meeting point of KotagarhMuniguda PWD road and common district boundary of Kandhamal District and Rayagada District 3 Km. from Durgapanga and moves north west in clock wise direction along common district boundary of Rayagada and Kandhamal about 1.5 Km. Then to west inside Rayagada through Tamagudi RF to Sana Mindra. Then to north through village boundary of Banaganagan, Maligan and touches RF boundary of Dhepaguda RF at Dingarpanga and moves in same direction along Dhepaguda RF boundary and touches common district boundary Rayagada and Kandhamal at Tangikiari. Then it proceed along common district boundary in same direction upto village Srabuli then re-enter in Rayagada District through Raghubari RF via Sanamandura, Kumurupi and touches common district boundary at Pudenpadar. Then it moves north in District boundary of Kalahandi and Kandhamal upto Sarachangudi village. From Sarachangudi it moves East along Jhiripani 'A' RF boundary via Saradhapur and touches Belghar RF at Surangbaru. From Surangbaru it moves East inside Belghar RF and crosses Uteinala near Gusupa village and proceed inside Mundigarh 'A'DPF and crosses NH – 59 at Matrugan and same NH at Jalespata. From Jalespata it moves East inside Tumudibandha UDPF touching village Badabandha, Dalabali, Jagadi. From Jagadi it moves South upto Sirla then towards East touching village Sinaguda. From Sinaguda it moves South inside then East amidst Adagan RF, then Pakari RF touching village Hadagan, Bathedi, Kukapanga, Adigamba, Parhatyabadi. From Parhatyabadi it moves South Srirampur 'B'PRF touching village Siripakal then village DaberhiSonepur and touches Srirampur 'C'RF near Budamaha and proceed upto village Sulumaha. Then it moves West crossing river Dimuru and moves inside Srirampur 'A'DPF touching village boundary Srirampur, Kuchimila, Tiamaha, Duriguda and enters to Bondru RF at Siranga. From Siranga it moves in South west direction in Bondru RF, Lassery Ext. RF then inside Durgapanga RF touching boundary of village Bondru, Dharakot, Sajeli and meet common district boundary near Kalishiguda and moves along common district boundary of Rayagada and Kandhamal in South west direction and meet the starting point.

21 Impact on Environment (Air, Water, Noise, Soil, Flora & Fauna, land use, Agriculture, Forest etc.) due to mining activity.

Environmental Impact arising out of mining operations may be defined as an alteration of environmental conditions or creation of a new set of environmental conditions caused or induced by the mining operations. The purpose of identifying and assessing the existing environmental

parameters is to know the basic conditions prevailing before getting the targeted production. Depending on the nature of activities and existing status, the impacts are assessed for their importance. On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts.

The environmental impact on land, air, water, noise, climate, flora & fauna and socioeconomic conditions arising out of mining operations need be assessed and thereafter mitigation measures are to be adopted. Impact due to mining on each of the environmental component are detailed below in accordance with the parameter of environment likely to be affected.

21.1 Air Environment

The mining and allied operations may cause deterioration of air quality due to pollution if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be the dust generation in the mine due to:

- Excavation of mineral, overburden.
- Movement of HEMM such as excavators, tippers etc.,
- Loading and unloading operation
- Overburden & mineral transportation

21.2 Water Environment

The major sources of water pollution normally associated due to mining and allied operations are:

- Generation of Industrial effluent water from workshop, service building.
- Disturbance to drainage course or water bodies in the project area, if any.
- Washouts from waste dumps/embankment, if any.
- Domestic effluent
- Mine discharge water pumped out from opencast mines, if any and effect on ground water table.

Direct impact on human beings due to poor water quality consequent to mining operation can lead to various water borne diseases like diarrhoea, jaundice, dysentery, typhoid etc. Besides, the polluted water may not be useful for animal or human consumption, vegetation and may affect aquatic life, if effluents are not properly treated to remove the harmful pollutants.

21.3 Noise & Vibration

The impact prediction and control measure for noise environment due to mining and allied activities are described below:

Noise is one of the inevitable causes of pollution in mining operations largely due to the extensive mechanization adopted. Hence, the major source of noise will be from the equipment's such as Excavation, loading & unloading & movement of vehicles etc., will produce noise of considerable

magnitude in mining operations. Cumulative impacts of shoveling, ripping, drilling, blasting, transport, crushing, grinding, and stock-piling can significantly affect wildlife and nearby residents. Prolonged exposure to a high noise level is harmful to the human auditory system and can create mental fatigue, rebellious attitude, annoyance and carelessness, which may lead to neglect of work and also results in accidents. Vibration has affected the stability of infrastructures, buildings, and homes of people living near large-scale open-pit mining operations. According to a study commissioned by the European Union in 2000: "Shocks and vibrations as a result of blasting in connection with mining can lead to noise, dust and collapse of structures in surrounding inhabited areas. The animal life, on which the local population may depend, might also be disturbed."

21.4 Impact on Land Environment:

Due to mining and its allied activities there will be some changes to the pre mining land status due to the following activities:

- Excavation of Overburden
- Temporary side casting / Backfilling of waste / overburden.
- Construction of Infrastructure facilities such as office, road, site services etc.,

21.5 Impact on Biological Environment

The major possible impact on biological environment due to mining is given below:

- Clearance of vegetation due to mining and allied activities
- Retardation of tree growth, tip burning etc., due to deposition of dust and the particulate matter generated from the mining operation.
- Presence of Schedule-I fauna in the mining area.
- Proposed impact on surface water quality that also provides water to wildlife
- Risk of fall/slip or cause death to wild animals due to project activities
- The project releases effluents into water bodies that also supplies water to wildlife
- Diversion of Agricultural and forest lands for mining

22. Remedial Measures to mitigate the impact of mining on the Environment.

The following remedial measures to be taken during mining.

22.1 Remedial Measures to mitigate Air Pollution

- Water sprinkling on mineral transport road from the mines to the main road
- Black topping of the main transportation roads to the possible extent.
- Avoiding crowding of trucks by properly spacing them to avoid the concentration of dust emission at any time

- Covering the trucks by tarpaulin sheets during ore transportation
- Proper maintenance of HEMM to minimize gaseous emission
- Imparting sufficient training to operators on safety and environmental parameters
- Development of green belt / plantation around mine, along the roads, backfilled area in various undisturbed areas within the mine lease areas etc.,

22.2 Remedial Measures to mitigate water Pollution

- Industrial effluent treatment systems wherever necessary to be introduced and maintained properly.
- Safety barriers to be provided for all water bodies and no mining activities should be carried out in the safety barrier area.
- Mitigative measures like construction of garland drains formation of earth bunds to be followed in the waste dumping areas to avoid wash off.
- Domestic effluents to be treated in scientific manner
- Required statutory clearances to be obtained and all precautionary measures to be adopted wherever pumping of ground water is involved.

22.3 Remedial Measures to reduce Noise & Vibration

- Planting rows of native trees around mine, along the roads, other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipment may lead to less noise generation.
- Proper and regular maintenance of equipment may lead to less noise generation
- Air silencers of suitable type that can modulate the noise of the engines of machinery to be utilized and will be maintained effectively.
- Providing in-built mechanism for reducing sound emissions.
- Providing ear muff's to workers exposed to higher noise level and to those persons operating or working close to any machine.
- Conducting regular health check-up of workers including Audiometric test for the workers engaged in noise prone area.

22.4. Remedial Measures to mitigate Land Pollution

The mining in the area is being done from long time, therefore, land has already been degraded. The land affected due to mining will not be backfilled, mined out area will be converted into water reservoir. The water of this reservoir will very useful for fauna and domestic Animals of the area. This also recharges the groundwater table. Entire dumps in the area will be reclaimed by plantation. Wire fencing around the excavated area is proposed to restrict the inadvertent entry of human beings as well as animals.

- (i) Measures for proper utilization of top soil will be ensured.

- (ii) The waste dump will be properly stacked and reclaimed by plantation.
- (iii) Minimum land shall be used for waste dumping and other infrastructures.

22.5. Mitigation Measures for Socio Economic Development

- (i) All the workers have been employed from nearby villages.
- (ii) The Association will take interest for the welfare amenities Scheme in the area with the help of local people. Provision of Scholarship for meritorious students will be given those who getting highest mark in district level/State level exams.
- (iii) All other facilities like Medical help for the children & women/ widow etc., arrange medical camps in nearby area.

23. Reclamation of Mined out area:

The Reclamation of the mined-out areas by simultaneous backfilling and development of compensatory afforestation taken in the neighbourhood/ backfilled areas of the mining areas by the mining companies and the proprietors of the mines and quarries in the forest areas are dealt by the Departments of Forests and Revenue.

24. Risk assessment & Disaster Management Plan

Any type of mining activities requires stringent safety measures to avoid unwanted incidences which may damage life & machineries. It may cause widespread harm to assets and serious disruption at site as well as outside. Such situation requires quick action and emergency response plans which can be executed without the loss of time. Time factor is the essence in dealing emergencies to minimize the loss of human life and disruption of work. Any accident may develop into a major emergency even with the best safety measures and programmes in mining. Disaster management plan is formulated with an aim of taking precautionary steps to avert disaster and also to take such action after the disaster which limits the damage to the minimum. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding and delays.

Objectives of disaster management plan

The objectives of DMP is to deal with various types of situation efficiently and to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to abnormality in the course of mining activity leading to a serious danger to workers or any machinery or the environment. Thus, the overall objectives of the emergency plan are summarized as: -

- To identify and assess emergencies, including risk impact assessment.
- Rapid control of hazardous situation

- Minimizing the risk and impact of event/ accident.
- Effective prevention of damage to property.
- Protect employees and people in vicinity by information about the risk and the role to be played in them in the event of emergency.
- Records, equipment, etc. should be preserved and organize investigation in cause of emergency and preventive measures to stop its recurrence.

In order to achieve objectives of emergency planning, the critical elements that form the spine of Disaster Management Plan (DMP) are: -

- Reliable and early detection of an emergency and immediate careful plan for action.
- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The accessibility of resources for managing emergency situation.
- Appropriate emergency response action.
- Effective announcement and communication facility to inform at site.
- Regular evaluation and revise DMP.
- Training of the concerned personnel.
- Steps taken for minimizing the effects may include rescue operations, first aid, evacuation, habilitation and communicating promptly to people living nearby.
- An internal communication system should be provided. Telephone nos. and addresses of adjoining mines, rescue station, police station, Fire service station, local hospital, electricity supply agency and standing consultative committee members should be properly updated and displayed.

Identification of Hazards and Mitigation Measures

The following types of hazards are identified and precautions to be taken against them are enumerated below. the following natural/industrial problems may be encountered during the mining operation:

- Slope failures at the mine faces.
- Inundation-Filling of the mine pit due to excessive rains/flooding.
- Accident due to fire.

Mitigation Measures for fall of Sides & Roof

- Flatter slope angles are adopted where occurrences of loose earth are encountered.
- Insurmountable heights are not created.

- Loose rocks are properly dressed.
- Nature and structure of the rocks are properly studied for their slips.
- Bench height will be kept with respect to the digging depth of excavating equipment.
- No overhang/ under cutting will be allowed to be created in benches by the excavating equipment's.

Inundation-Filling of the mine pit due to excessive rains/flooding

- Drainage will be maintained to reduce inundation of working pits during rain from surface run-off.
- Garland drains will be constructed to prevent the water entering inside the mine.
- Adequate capacity Sumps will be developed inside the mine.
- Adequate pumping capacity will be built up to deal of accumulated water.
- Dumping area will be benched and sloped at the top towards the low altitude side.

Fire

Fire generally occurs due to electrical short circuits, storage/handling of fuel oil, human carelessness, etc. Potential Impacts of fires are the burns, injuries and even loss of human life, property and loss of livelihood. Fire may interrupt services like power and communication. Environmental impacts include air pollution due to emission of harmful gases which may affect nearby settlements. Casualties during fire, some preventive measures will be taken to prevent the big damage to human life and property

- Proper care should be taken during the storage/handling of fuel oil without any negligence is the key to protect the fire hazard. First aid will be provided for burning case and immediate treatment will be provided.
- Adequate fire safety equipment's e.g. extinguishers, dry chemicals, carbon dioxide, foam spray, water spray should be kept.
- Good cables should be used for preventing short circuits.
- Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms.
- Rinse eyes thoroughly with water to remove all particles. Seek medical attention for abrasions and burns.

Accidents

- Accidents High vehicular speed results in greater stopping distances and turning radii which lead to possibilities of accidents.

- Transporting devices also contributes to serious accidents having potential to become fatal for the persons associated with such operations as well as those present in the vicinity at the time of accident.

Occupational Health and Safety

The steps will be taken to minimize the impacts of mining activities and to ensure occupational health and safety during commissioning, operations and maintenance of mining equipment/machinery. It can be minimized by adopting below mentioned measures: -

- Periodic examination and testing of equipment, machineries and equipment handling substances.
- Firefighting training to workers and Staff for first aid, safe handling of materials and integrating safety.
- Suitable notices / boards displayed at several locations indicating appropriate hazards warning as well as DOs and DON'T for ensuring operational and personal Safety for information of workers / staff and visitors.
- Personnel protective equipment is provided to prevent the noise hazards.

Health and Safety Monitoring Plan

- Each employee will undergo a proper medical examination.
- All other employees will be medically examined as per rules that are 20% strength every year.

25.Details of the Occupational Health issues in the District

Occupational health hazards refer to the potential risks to health and safety for those who work outside the home. Of course, the specific occupational health hazards faced by this large and growing number of people depend on the region and its economic standing. However, the following are some of the most common occupational health hazards faced by workers. Topping the list of occupational health hazards are structural failures and mechanical accidents. This includes structures vulnerable to adverse weather conditions, moving and/or unprotected parts of machinery, or general equipment failure. These occupational health hazards exist fairly equally in developed and undeveloped countries, regardless of industry. One of the most common work-related injuries to occur globally is the development of musculoskeletal disorders caused by heavy lifting and performing tasks that require repetitive motions. These occupational health hazards are also responsible for the most incidents of disability claims, whether temporary, long-term, or permanent. Muscle injuries due to physical stress most often

occur in occupations such as construction and farming, while repetitive motion injuries are most often sustained in environments related to services that typically involve heavy typing and data entry. Also grouped into this category of occupational health hazards are ergonomically poor working conditions and equipment. Hearing loss is another hazard encountered by those who work in industries such as construction and manufacturing. In fact, hearing loss ranks with mechanical hazards in terms of being one of the most common occupational health hazards in both developed and developing countries. Typically, hearing loss occurs over time from chronic exposure to noisy machinery without the use of earmuffs designed to protecting hearing. Even long-term exposure to vibrations can contribute to hearing loss. Exposure to chemicals and other biological agents account for one of the most common and most harmful of occupational health hazards that effect several industries. The health risks from these hazards include liver damage, cancer, and reproductive disorders from chronic exposure to pesticides, heavy metals, and corrosive substances. Health care workers are at particular risk for contacting diseases such as HIV/AIDS, tuberculosis, and hepatitis B and hepatitis C. Others, such as those who work in agriculture, are at increased risk of infections caused by fungi and parasites. Other groups are impacted by a high incidence of skin and respiratory disorders due to exposure to allergens, such as mold, bacteria, and organic dusts.

The details of number of patients treated for silicosis and Tuberculosis for the last five years in the district is given below:

Sl.No	Year	Number of patients treated for silicosis	Number of patients treated for Tuberculosis
1	2018	Nil	947
2	2017	Nil	1034
3	2016	Nil	880
4	2015	Nil	858
5	2014	Nil	898

26. PLANTAION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEAESES ALREADY GRANTED IN THE DISTRICT

The greenbelt development plan aims to overall improvement in the environmental conditions of the region. The plan with a five-fold objective addresses issues such as prevention of land degradation due to activities during Mining operation, enhancing the forest cover for increasing

the biodiversity of the region, providing aesthetic value to the project area for enhancing the ecological equilibrium of the area and to a large proportion in combating soil erosion.

Need for greenbelt development plan with scheme for greenbelt development

The implementation for development of green belt will be paramount importance as it will not only add up as an aesthetic feature, but also act as a pollution sink.

The scheme of plantation in-side the cluster area is given as follows:

- i. The species to be grown in the area should be dust tolerant and fast-growing species so that permanent green belt is created.
- ii. The Green belt development will be done along the haul roads.
- iii. The Green Belt Development will be done nearby the mining leases to minimize the pollution level.
- iv. The green belt will be put under a protective regulatory framework to ensure that it is not degraded or disturbed. No ecologically disruptive activity will be allowed in this zone.
- v. The Green Belt Development should be Approx. 33% of the area of the mining lease.

**Collector & District Magistrate
Kandhamal-cum-Chairperson, DEIAA**