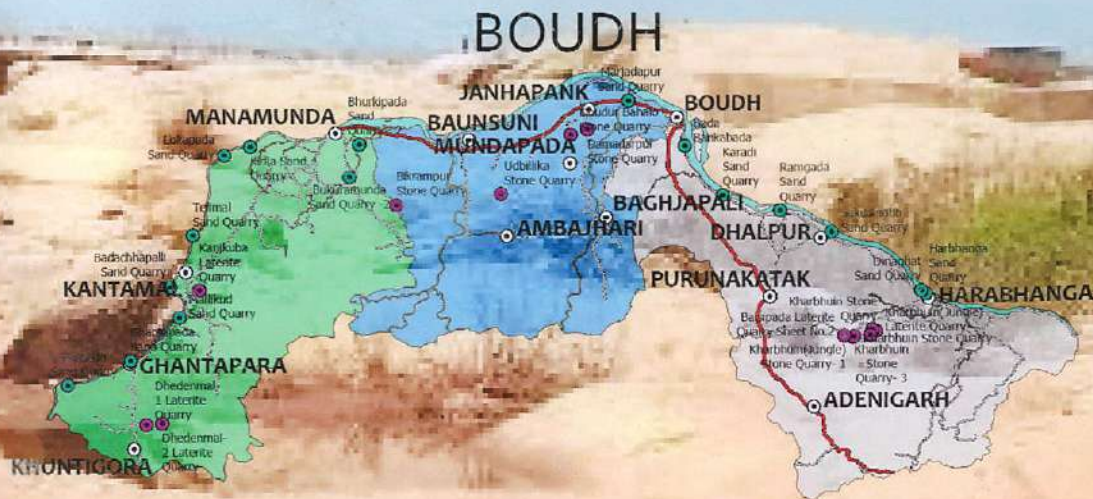




DISTRICT SURVEY REPORT (DSR)
OF
BOUDH DISTRICT, ODISHA
RIVER SAND
(FOR PLANNING & EXPLOITING OF
MINOR MINERAL RESOURCES)



As per Notification No. S.O. 3611(E) New Delhi,
25th July, 2018

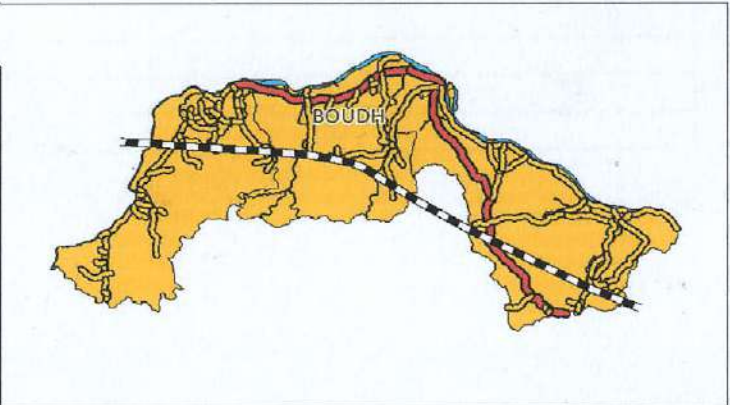
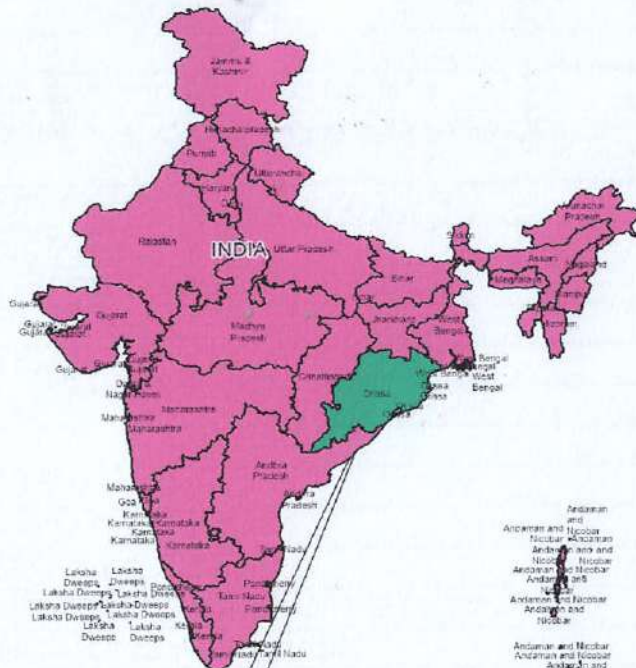
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE
CHANGE(MoEF & CC)

COLLECTORATE, BOUDH



ଓଡ଼ିଶା
ODISHA

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PREFACE

In compliance to the notification issued by the ministry of environment and forest and Climate Change Notification no. S.O.3611 (E) New Delhi dated 25.07.2018, the preparation of district survey report of road metal/ building stone mining has been prepared in accordance with Clause II of Appendix X of notification. Every effort has been made to cover road metal/ building stone mining locations, future potential areas and overview of road metal mining activities in the district with all its relevant features pertaining to geology and mineral wealth. This report will act as a compendium of available mineral resources, geological set up, environmental and ecological set up of the district and is based on data of various departments like Revenue, water Resources, Forest, Geology and Mining in the district as well as statistical data uploaded by various state Government departments. The main purpose of preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

1. INTRODUCTION

Boudh is a district in central position of Odisha, a state in India. The District is bounded by River Mahanadi and Angul District to the north, Kandhamal District to the south, Nayagarh District to the east and River and Subarnapur District to the west. Covering a geographical area of 3444.8 sq km, the District lies 20 degree 22' to 20 degree 50' North Latitude and 83 degree 34' to 84 degree 49' East Longitude. Its district headquarter located at the town of boudh.

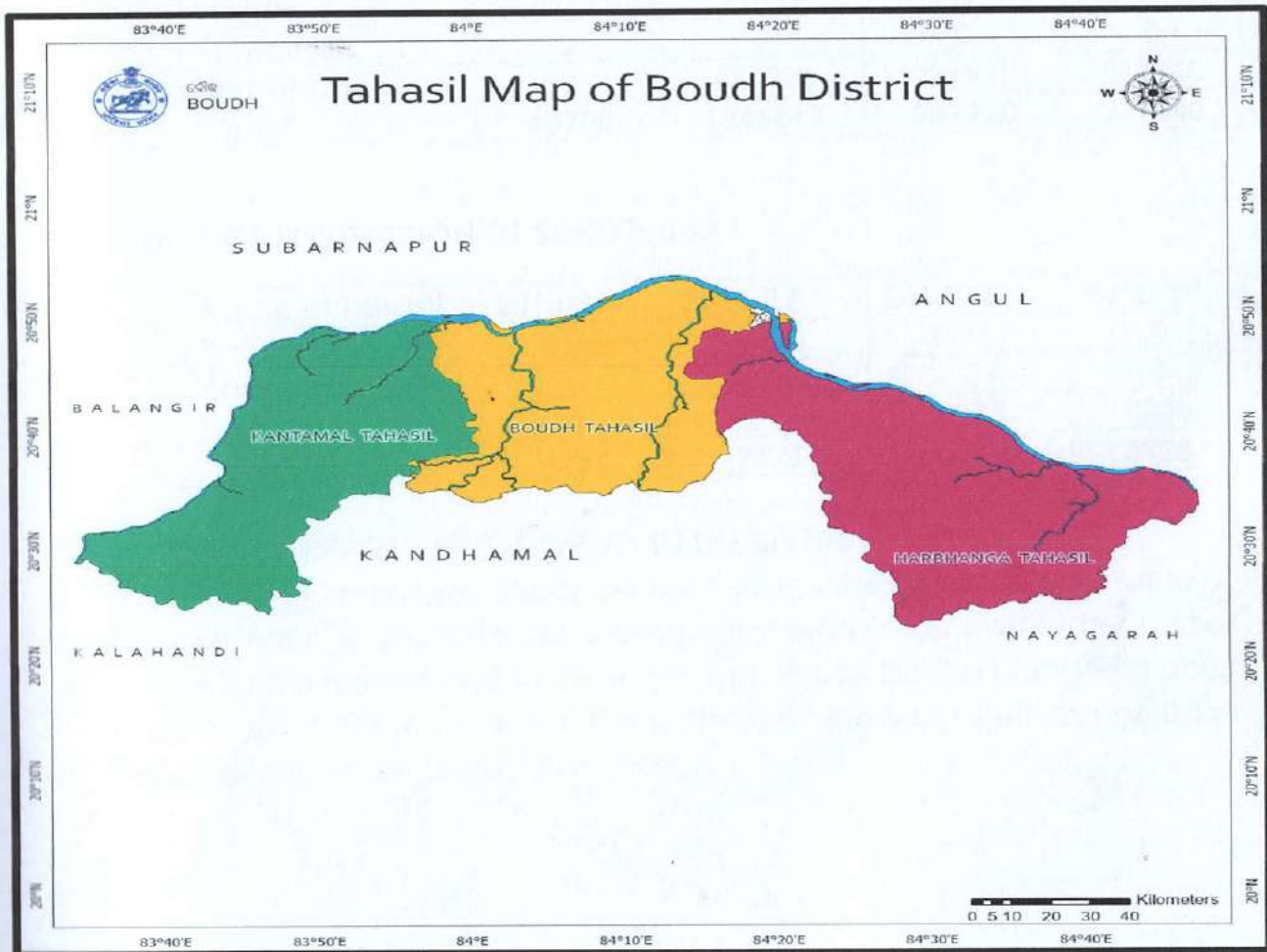
Administration is concerned, there is one sub division namely Boudh, 3 Tahasils, 3 Blocks, 1186 Villages and 69 Gram Panchayats functioning in the District.

The climatic condition of Boudh is much varied. The district comes under the ambit of Western Central Table Land characterized by hot and moist sub-humid climate. It has mainly 4 seasons. The summer season is from March to Mid June, the period from Mid June to September is the Rainy season, October and November constitute the post monsoon season and winter is from December to February. The best time to visit this district is during winter. There is a meteorological observatory in the district. The data of this observatory may be taken as representative of the meteorological condition of the whole district. The month of May as the hottest month reach to a daily maximum temperature of 44 degree Celsius. In association with the passage of western

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

disturbances across north India during winter months, short spells of cold occur and the temperature drops down to 10 degree Celsius. The average annual rainfall of the district is 1510.33 mm. However there is a great variation of rainfall from year to year.

Majority of the land area of Boudh district is under gross crop area i.e. 1, 36,000 hectors (as per Statistical records 2012) and forest area covers 94, 952.11 hectors. The district is well connected with other districts. The bounties of nature has endowed the district with rich forest abound in Sal, Sisal, Bija, Asana, Mahua flower trees etc. Forest produce of economic importance of the district mainly consists of Kendu Leaf, Tamarind, Mahua Flower and Seeds, Sal Seeds etc. tigers, elephants and spotted dears are the wild animal species residing in Boudh district. Collection of minor forest produce is the major source of livelihood of the people in the district. There is a crocodile sanctuary namely Satakoshia Ganda at Tikarpada that attracts tourists from far places.



2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT

Out of the 32 sairats sources present in the district, 20 have been leased out and the operationalized while 12 sources (5 sand and 7 stone quarries) remain non-operationalized. Steps are being taken to lease out the remaining Sairat sources so as to add to Govt. revenue and prevent illegal theft of minor minerals.

There are very few mineral deposits in the district. They are Lime Stone, Graphite and Quartz, which are found in Harabhanga and Boudh Blocks. But the commercial Production/exploitation of these minerals are not Viable.

3. LIST OF LEASES WITH LOCATION, AREA AND PERIOD OF VALIDITY

Enclosed as Annexure I

4. DETAILS OF ROYALTY COLLECTED (Rs)

Sl. No	Name of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Boudh	43700	1714692	0	0
2	Kantamal	0	0	0	0
3	Harabhanga	0	231920	231920	377840
Total		43700	1946612	231920	377840

5. DETAILS OF PRODUCTION OF SAND (cum)

Sl. No	Name of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Boudh	1150	1150	8600	0
2	Kantamal	0	0	0	0
3	Harabhanga	0	6275	6275	8938
Total		1150	7425	14875	8938

6. PROCESS OF DEPOSIT OF SEDIMENTS IN THE RIVERS

There are four main rivers streams flows through this District. They are main River Mahanadi and River Tel. During rainy season the river water carries sand which is formed due to disintegration of rock bodies along with other suspensions. After recession of the water flow the sand gets deposited in the locations where there is less energy.

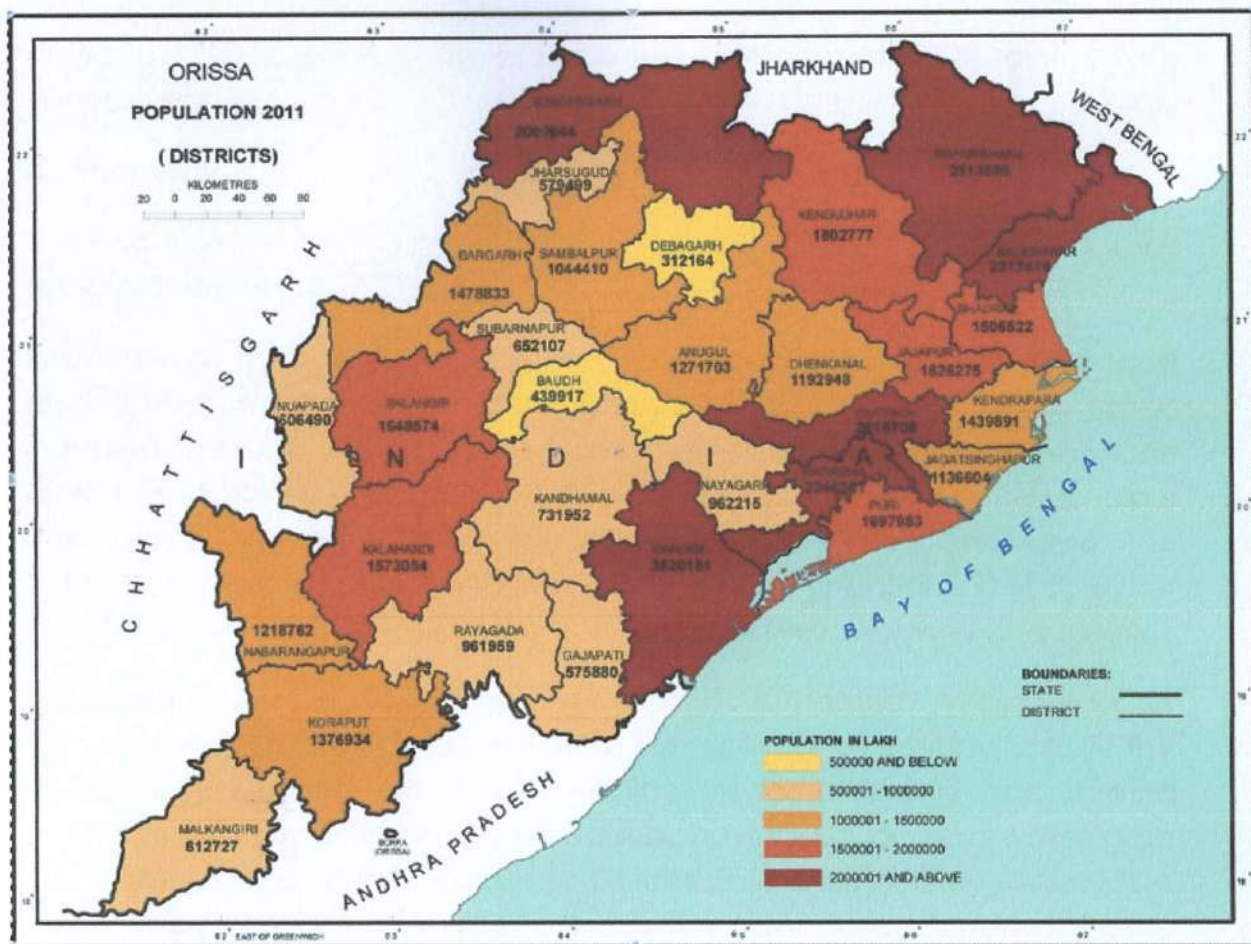
7. GENERAL PROFILE**a. Administrative set up:**

SI No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	83°34' to 84°49' East
	Latitude	Degree	20°22' to 20°50' North
2	Geographical area	Sq.Km.	3098
3	Sub-division	Numbers	1
4	Tahasils	Numbers	3
5	Blocks	Numbers	3
6	NACs	Numbers	1
7	Police Station	Numbers	6
8	Gram Panchayats	Numbers	69
9	Villages	Numbers	1182
10	Assembly Constituencies	Numbers	2
	Location		
	Longitude	Degree	83°34' to 84°49' East
11	Latitude	Degree	20°22' to 20°50' North

b. Area and Population:

The district has an area of 3098 sq.kms, per the demography is concerned, the District has got total population of 441162 people with sex ratio 991 Females per 1000 Males (2011 Census), including total 221625 male population and 219537 female population. It ranks Boudh is 22nd in size and 29th in population among the thirty districts of Odisha. Total SC population of the District is 104934 and ST population is 55364 as per 2011 census.

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT



c. Climate:

The climatic condition of Boudh is much varied. The district comes under the ambit of Western Central Table Land characterized by hot and moist sub-humid climate. It has mainly 4 seasons. The summer season is from March to Mid June, the period from Mid June to September is the Rainy season, October and November constitute the post monsoon season and winter is from December to February. The best time to visit this district is during winter.

There is a meteorological observatory in the district. The data of this observatory may be taken as representative of the meteorological condition of the whole district. The month of May as the hottest month reach to a daily maximum temperature of 44 degree Celsius. In association with the passage of western disturbances across north India during winter months, short spells of cold occur and the temperature drops down to 10 degree Celsius. The average annual rainfall of the

district is 1510.33 mm. However there is a great variation of rainfall from year to year

d. Economy:

The economy of Boudh district is supported both by agriculture and small scale industries.

Economy of Boudh district is primarily agrarian in nature. Fisheries and animal husbandry also contribute greatly to the economy. Small scales industries are also a booming sector in the economic scenario of Boudh district especially the textiles and mining industries. Paddy is the principle crop and is grown in about 75% of the total cultivated land area. The different irrigation projects include Salki Medium Irrigation project, Minor Irrigation project, Lift Irrigation project, Diversion weir, Dugwell and others.

Fisheries are a huge profit making sector of Boudh district. Available water resources have helped to enhance the growth of pisciculture in the district. Boudh fish farm is one of the good breeding and rearing government farm of the state of Odisha, having 8.5 acre of water area comprising 4.80 acre of breeder tanks and 3.70 acre nursery tanks. FFDA (fish farmers development agency) has been set up at Boudh district to popularise fish culture as an alternative way of employment generation and eradication of poverty. The institution provides training to the selected beneficiaries, assists in construction and renovation water resources, arrange credit from nationalised banks. The most important gain from FFDA is that aquaculture as a commercially gainful activity has been fully established.

Animal husbandry is an indispensable part of Boudh district's economic system. The prime objective of this sector is to boost the production of milk, egg and meat by adopting modern scientific method. To improve the socio-economic condition by providing self-employment opportunities to unemployed youth and to raise the family income is also an important part of their agenda. More than 75% of the rural households own livestock and earn their supplementary income. Livestock production is an essential part of the rural livelihood systems. Livestock production takes place in millions of small holders, scattered throughout Boudh District. Improvement in livestock production is an important alley for increasing the income of marginal and small farmers and landless labourers, for the uncertainties of

crop production. Animal health care service, breeding service, feed and fodder development, and marketing facilities are among the services provided by this sector.

e. Industry:

Industries are an upcoming sector to boost the economy of Boudh district. Small scale industries of boudh district include food based industries, chemical based industries, engineering based industries, textile based industries, forest based industries and metallurgical based industries. The mining industry is quite a profit making industry.

f. Agriculture:

Boudh district is situated at the central parts of the state. The main stay of the people of the district is agriculture and this continues to be practiced in a traditional method. The yield rate of the district is not also encouraging like any other districts of the state. As most of the people are depending on agriculture and the productivity in agriculture and allied sector is very low, the per capita income is very low. Paddy is the major crop of the district. Besides, vegetables, pulses, cereals and oilseeds are also grown in most parts of the district. The cash crop of the district is onion, groundnut, potato, tomato and sugarcane. Due to continuous drought and uneven rain fall, there has been no significant improvement in crop production, despite the sincere effort of all promotional agencies in the district. The district is situated on the Bank of River Mahanadi and Tel. Many factors are responsible for the industrial backwardness of the district, which needs special attention. The climate of the district is soft tropical and hot-dry in summer, cold-dry in winter and humid during raining season. Though, primary activity of the people is cultivation, many of the people depend upon collection of minor forest produce as well:

g. Power:

There is one electrical division operating in the district of Boudh to maintain power supply system. Boudh has jurisdiction over Boudh, Kantamal and Harbhanga. This electrical division encompasses 2 sub-division; Boudh and Manamunda under Kantamal Block.

Details of different category of consumers are presented below.

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

Sl. No.	Consumer category	No. of consumers
01.	DOM	21864
02.	KTJ	50215
03.	GP(LT)	1619
04.	PUB.LTG	20
05.	PLI	1245
06.	OLI	59
07.	PWW	129
08.	LTIND(S)	170
09.	HTIND(M)	8
10.	SPP	366
11.	LIND	16

Power Supply:

Boudh district gets power supply through SOUTHCO from 132/33KV grid Sub- Station Boudh.

Sub transmission and distribution system:

There are 2 number of 132/33 KV substations with 88 KV capacity and 23 distribution transformers. There are 23 numbers of 11KV feeder lines of 1042.92

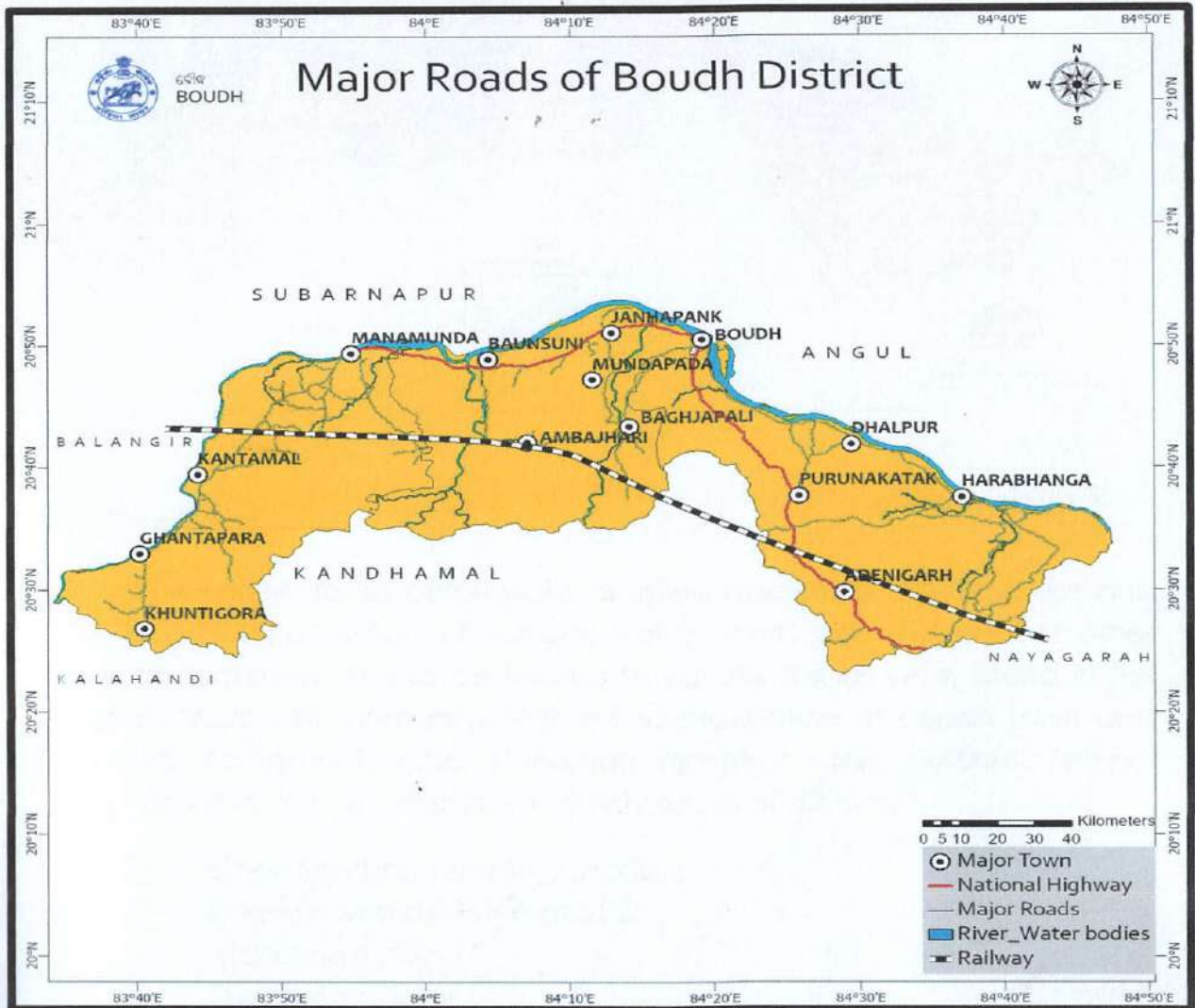
h. Transport & Communication:

Road Name	Distance in Km
Forest road	245
National Highway	109
State Highway	64
Major district road	53
Other dist road	34
Rural road	480
Inter village road	4494
Intra village road	208

Boudh is well connected with road and rail with other district headquarter and the state capital Bhubaneswar. The distance of Boudh from Bhubaneswar is 240 Km. One can come to Boudh via National Highway No.224 (Khurdha-Balangir) via Nayagarh and Charichhak or can come by

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

National Highway No. 42 . Via- Angul. Regular train services are available from Bhubaneswar viz. Bhubaneswar to Sambalpur Intercity Express, Hirakud Express etc. To reach Boudh one has to get down at Rairakhole station. From here one has to travel around 27 Km. either by Bus or taxi to reach Boudh. The nearest Airport is at Bhubaneswar.



i. Health

The medical facilities are provided by different agencies like Govt. Private individuals and voluntary organizations in the district. There are mainly five community health centre such as CHC, Baunsuni, CHC Harabhanga, CHC Kantamal, CHC Manamunda and CHC Purunakatak with its DDH at Boudh.

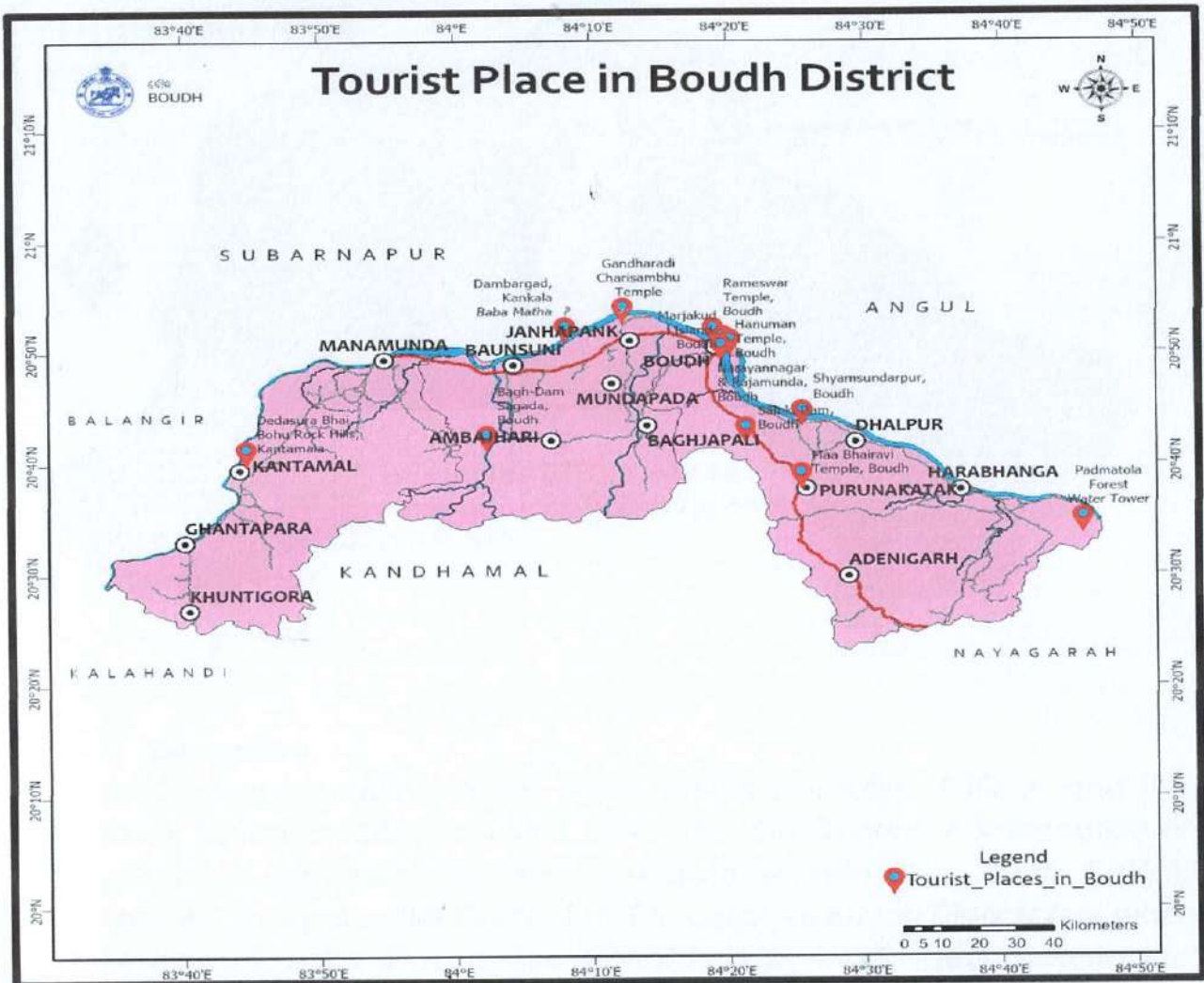
DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT



j. Tourist places:

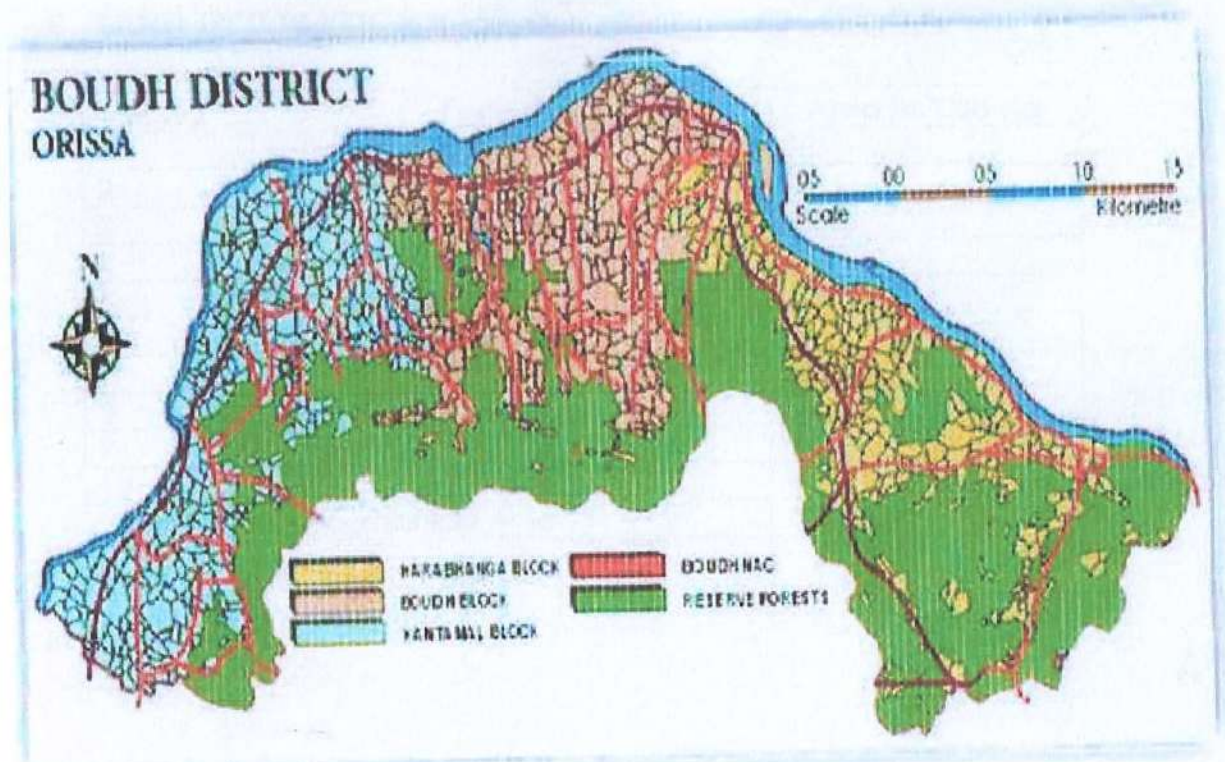
Boudh is known for its century-old temples, ancient Buddha statues and caves. With the spread of saivism, Vaishnavism and numbers of other culture numerous shrines dedicated to various deities were found in this region. There are three remarkable Buddha statues in Boudh town and around, Ramnath Temple, Hanuman Temple, Madan Mohan Temple Jogindra villa places considered tourist places of district.

- (i) Chari Sambhu Temple, Jakatipur
- (ii) Bhairabi Mandir, Purunakatak
- (iii) Marjakuda Island
- (iv) Shyamsundarpur
- (v) Bagha Dam, Sagada
- (vi) Salnki Dam
- (vii) Hanuman Temple
- (viii) Dambarugada
- (ix) Narayan Nagar & Rajamunda
- (x) Rameswar Temple
- (xi) Padmatola Forest water Tower
- (xii) Dedhaswr Bhai Bohu Rock hills, Kantamal



k. Forest areas:

The total forest area of the district is 1277.17 Sq. kilometer which is 41.22% to total Forest area indicating more than the state average and ideal average i.e. 30% of the total geographical area of the district. The forest produce of economic importance in the district are Bamboo, Kendu Leaves, Mahua Flowers/Seeds, Siali Leaves, Timber, Fire wood, Myrabolam, Gendulingama and Tamarind. Over the years, forest suffered serious depletion due to relentless pressure arising forever increasing demand for fuel wood, fodder, and timber.



1. Education

The District Education Office, Addl. District Education Officer, and the Block Education Officers Boudh looks after the General Administration of schools under school and Mass education Department in Boudh District. The DPC looks after the Elementary Education of Boudh District. A number of educational Institutions are established to impart education to the children of this District. The following figure shows the no. of Educational Institutions.

No .of elementary school	767
No of high school	41
No. of colleges	22

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

8. LAND UTILIZATION PATTERN

SI No	Land use	Area in '000 Ha
1	Forest Area	281
2	Misc. trees & Grooves	18
3	Permanent Pasture	26
4	Culturable Waste	22
5	Land put to Non Agril Use	124
6	Barren & Unculturable Land	38
7	Current Fallow	19
8	Other Fallow	5
9	Net area Sown	174
10	Mining	
	Geographical Area	707



9. PHYSIOGRAPHY

The district has varied geomorphological features. The geomorphic units are

- (i) Lateritic Upland
- (ii) Pediplane

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

- (iii) Denudational Hills
- (iv) Flood Plain
- (v) Structural Hills
- (vi) Inselberg
- (vii) Mesa & Butte
- (viii) Residual Hills
- (ix) Intermonane Valleys
- (x) Bazada

10. RAINFALL

The climate of the district is typically to sub tropical with three district seasons e.g. summer, winter and Monsoon. December is the coldest month with mean daily average temperature of 20 degree celcius which reaches 42 degree celcius in May. The rain fall in the area is mostly from the South west monsoon lats from middle of june to October. The average annal rainfall varies varies from 1031.21 mm to 1569.50 mm.

MONTH WISE RAINFALL (mm) DATE OF THE DISTRICT (Last 3 Years) (DISTRICT OFFICE)													
F. Year /month	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
2006	0	0	50.67	18	88.33	174.33	425.2	788.3	154.03	11	20.67	0	1730.53
2007	0	0	0	11.33	45	436.31	243.13	207.95	431.93	9	0	0	1384.65
2008	51.33	3	8.67	18.67	0	366.15	306.87	407.33	350.17	17	0.67	0	1529.86
2009	0	0	0	0	0	51.23	641.07	352	155.27	26.87	0	0	1226.44
2010	3	0	0	0	61.33	153.67	273.57	249.23	225.27	74.47	21.07	24.87	1086.48
2011	0	24.2	0	27.53	37.73	116.98	139.07	473.93	444.4	0	0	0	1218.75
2012	0	0	0	0	0	167.13	325.7	468.25	153.33	78.67	25.67	0	1170.19
2013	0	0	0	5	14.34	274.03	266.23	185.03	147.93	277.63	0	0	1690.64
2014	0	0	0	0	125.47	36.47	669.33	458.63	342.97	57.77	0	0	1098.6
2015	0.33	0	0.71	74	22.83	287.83	267.33	274.53	152.57	1.1	0	0	1164.15
2016	0	1.33	20	0	16.13	147.87	202.6	368.06	337.43	70.73	0	0	1172.82
2017	0	0	3.73	0	1.33	322.63	282	192.03	202.23	152.87	16	0	1621.92
2018	0	0	0	29.63	57.33	156.1	507.87	359.13	300.4	137.33	2	72.13	1532.08
2019	2.33	23.43	34.8	34.4	26.43	164.5	294.13	519.83	337.9	94.33	0		

11. GEOLOGY

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 forecent age. Khondalite group of rocks are of metasedimentary origin and represented by quartz garnet-sillimanite schist and gneisses without graphite, sillimanite quartzite and quartz sillimanite sericite schist occurring as enclaves within granite. Occurrences of basic Charnockite are very restricted as bands or lensoid patches within the

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

granites. Intermediate or acidcharnockite are common being distributed throughout the hilly area Migmatite group comprising augen gnesis, 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.

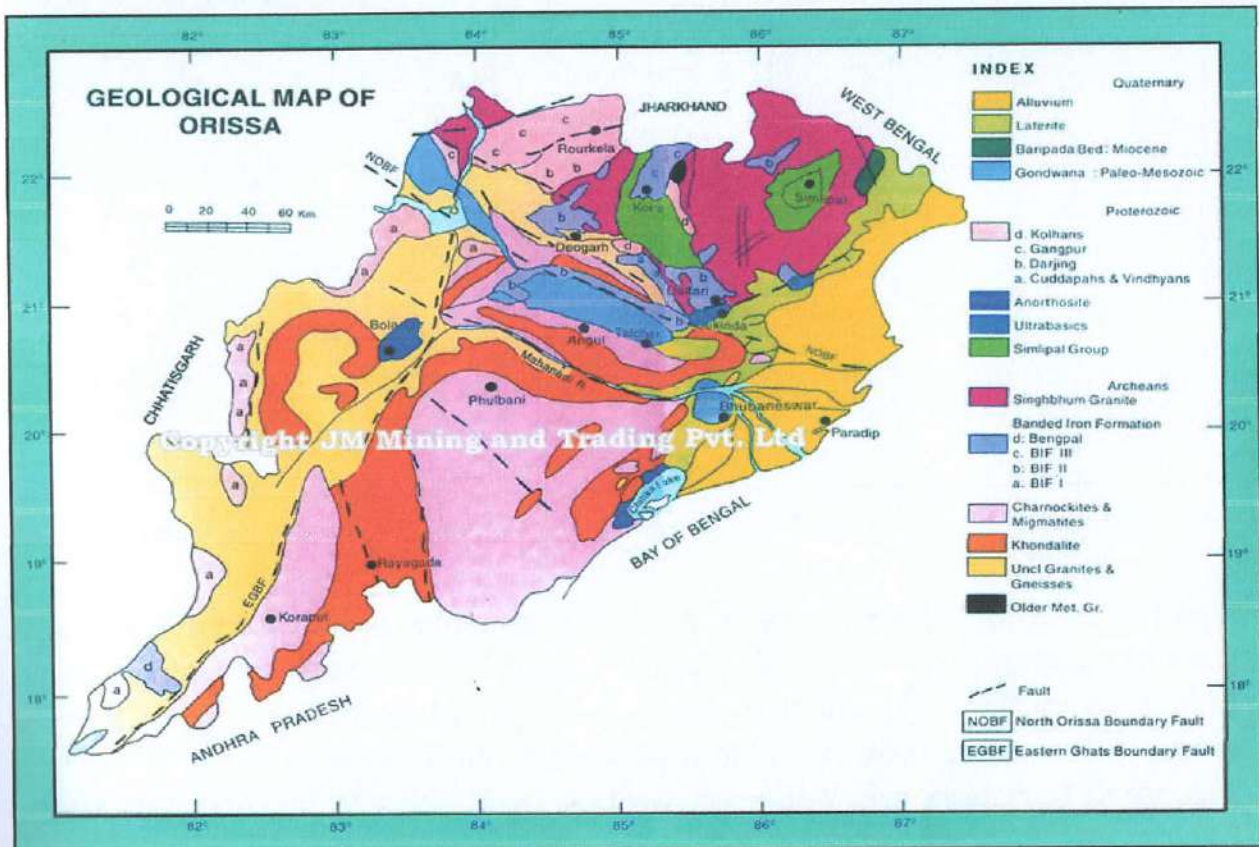
The general strike of the foliation is WNW-ESE to ENE-WSW through NE-SW and NS. The amount of dip ranges between 500 to sub-vertical. There is one major shear zone near Ranipathar area. Mylonite and silicification occur along this zone at several places. Both vertical as well as inclined joint planes 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 lands at imageries. Two major sets of these lineaments are deciphered running along NW-SE to NNW-SSE and NS directions.

STRATIGRAPHY:

Age	Super Group	Group	Lithology
Late Holocene		Present day Flood plain Deposit	Soil/ Alluvium
Archaean	Eastern Ghat Super Group	Charnockite Group	Laterite/ Lateritic bauxite
		Khondalite Group	Garnetiferous Granite gneiss Leptynite Acid/ intermediate charnockite Basic charnockite Quartz-granet- Sillimanite Schist/ gneiss- Quartzite Calc silicate

DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

- Detail of river/ stream/ other sand source- Sand mining in the district is confined to tributaries of the main River Salki and River Bagh.
- Availability of maximum sand or gravel or aggregate resources- sand 20,40,720 cum (Annexure II), Gravel- Nil, Aggregate- Nill.
- Detail of existing mining leases of sand and aggregates- For sand pl refer Annexure I. Aggregate-Nil.



12. DRAINAGE SYSTEM AND DESCRIPTION OF SALIENT FEATURES OF MAIN RIVERS AND STREAMS

DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVER									
Sl. No	Name of the River	Place of origin	Attitude of origin	Total length in the district (in km)	Area drained (sq km)	% Area drained in the district	Process of deposition of sediments	Volume of sand deposited in last 3yrs(year wise)	Any important note
a	b	c	d	e	f	g	h	i	j
1	Salki	Baliguda	Lat 20.85 89.09/ Log. 84 24'30.78	83	209.17 /1767.192	6.07%	0	0	
2	Bagh	Eastern Ghat	Lat. 18 50 23.96/ Log. 83 00 03.86	78	108.74 /1106.00	3.15%	0	0	
3	Mahanadi	Nagri Town Chhattisgarh	North						
4	Tel		West						

Boudh district is rich in water resources. A series of check dams have been constructed across various distinct nallahs for in-stream storage, ground water recharge, incidental irrigation during late kharif and Rabi by storing water at the end of monsoon mainly through lifting devices as well as canal flow, irrigation use of water flowing down drainage channels, and other uses like bathing, washing, recreation etc. By the end of July 2019, 861 nos. of Check Dams have been accorded administrative approval. Out of these, 789 nos. of check dams have been completed achieving an ayacut of 4973 Ha., 52 nos of Check Dams are in progress and 20 nos of Check dams are dropped due to various reasons.

River System of Orissa
showing
Major Basins

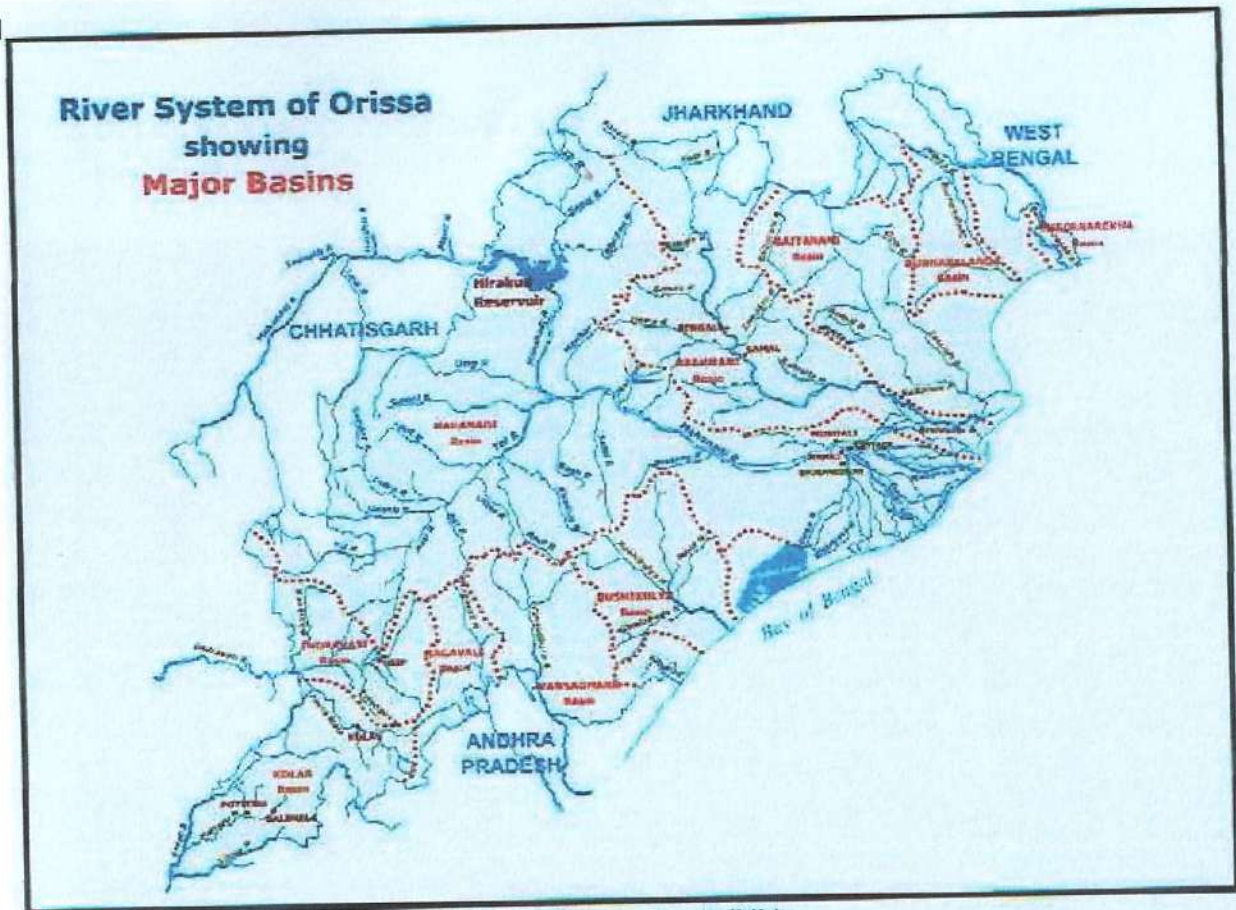
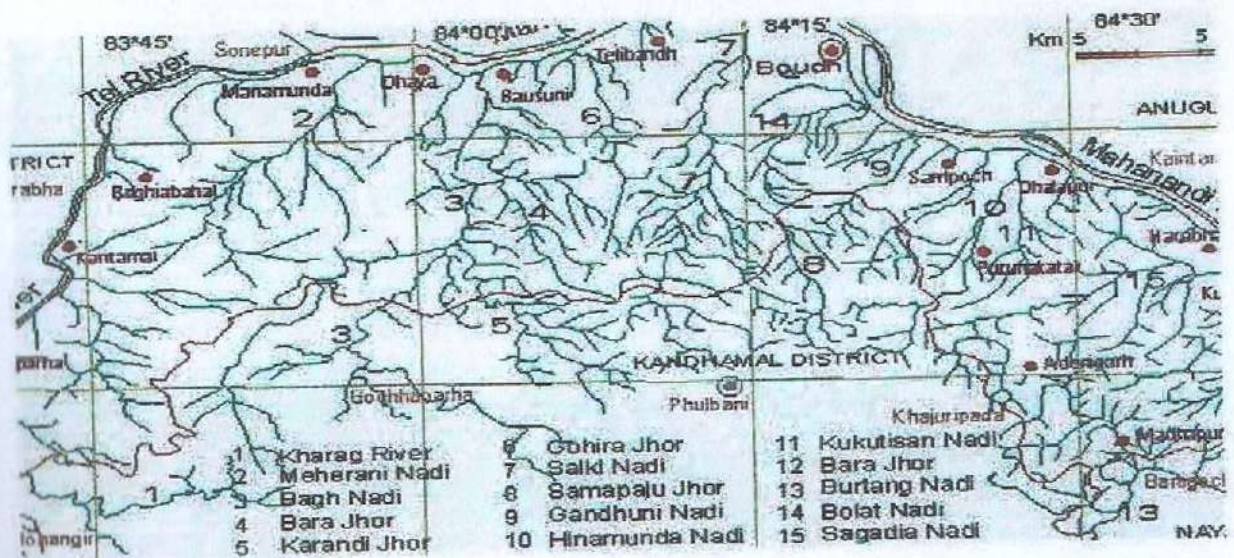


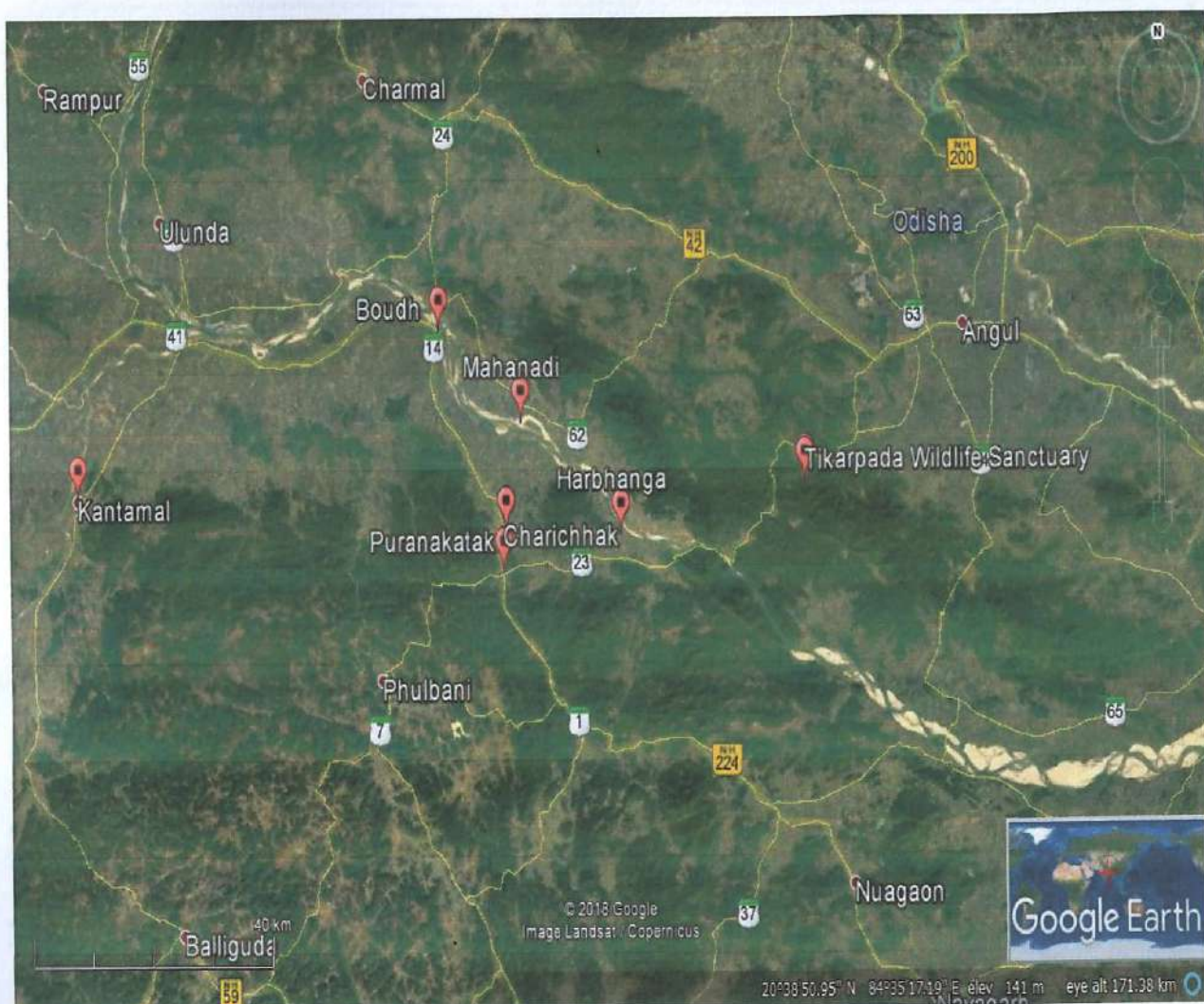
Figure 2 River system in Odisha

DRAINAGE MAP OF BOUDH DISTRICT

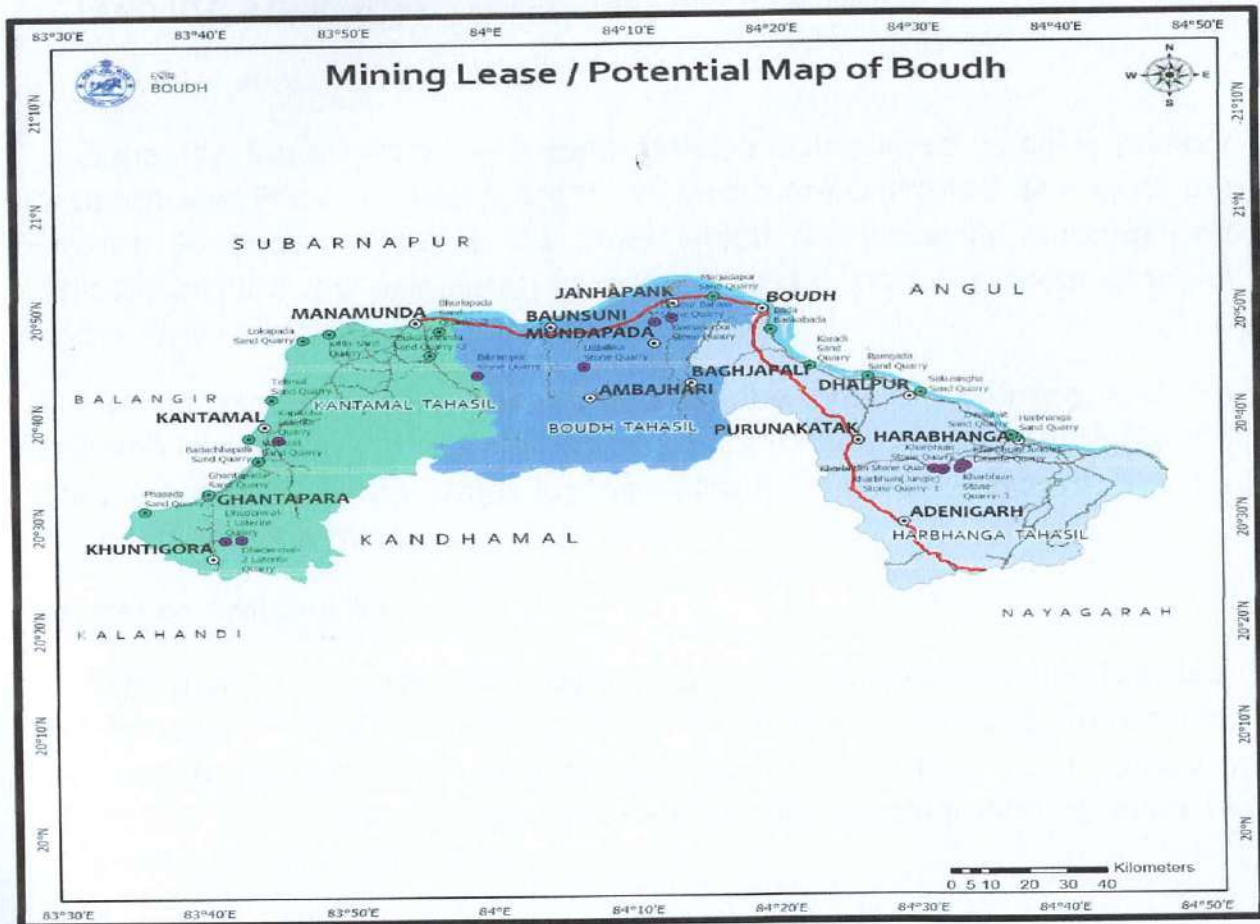


13. DETAILS OF ECO-SENSITIVE AREA

Not applicable



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



15. LIST OF LOI HOLDERS ALONG WITH VALIDITY

List enclosed as Annexure- II.

16. QUALITY/ GRADE OF MINERAL

17. USE OF MINERAL

18. DEMAND & SUPPLY OF THE MINERAL

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

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

Activities attributed to Mining:-

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

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

Impact on Ambient Air

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

The major air pollutions 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 No_x , SO_2 and CO emissions, usually at low levels. Dust can be of significant nuance surrounding land user and potential health risk in some circumstances.

Water Impact

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

Noise Impact

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

Impact on Land Environment

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

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of it's diverse and dynamic characteristics.

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

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

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

Air

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

- Dust generation shall be reduced by using sharp teeth of shovels.
- Wet drilling shall be carried out to contain the dust particles.
- Controlled blasting techniques shall be adopted.
- Water spraying on haul roads, service roads and overburden dumps will help in reducing considerable dust pollution.
- Proper and regular maintenance of mining equipment's have to be undertaken.
- Transport of materials in trucks to be covered with tarpaulin.

- The mine pit water can be utilized for dust suppression in and around mine area.
- Information on wind direction 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 fugitive dust transmission from the project area in order to create clean & healthy environment.

Water

- Construction of garland drains and setting tanks to divert surface runoff of the mining area to the natural drainage.
 - Construction of check dams/ gully plugs at strategic places to arrest silt wash off from broken up area.
 - Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off. The mined out pits shall be covered 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 to exposed to high noise generating activities like blasting, excavation site etc. Worker and operators at work sites will be provided with earmuffs.
- Conducting periodical medical checkup of all workers for any noise related health problems.
- Proper training to personnel to create awareness about adverse noise related effects.

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- 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.

22. ANY OTHER INFORMATION

Nil

ANNEXURE I

SAND SAIRATS ALREADY LEASED OUT AND EXECUTED

Sl no.	Name of Tahasil	River or stream and Name of Village & date of Registration of lease deed	Status	Portion of the River or Stream leased for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Length of area leased for mineral concession (in km)	Average width of area leased for mineral concession (in km)	Area leased for mineral concession (in sqm)	Mineable mineral potential as per approved mining plan (in cum)
1	2	3	4	5	6	7	8	9
1	Boudh	River	Running	Tutusingha Sand Quarry Kh No-518 Plot No-1	203.43	46	46	0
2	Boudh	River	Running	Tutusingha B Sand Quarry Kh No-518 Plot No- 1/B	52609	210	14.4	8000
3	Boudh	River	Running	Marjadpur Sand Bed Kh No-132, Plot No-463	1618.74	133	0.4	1150
4	Boudh	River	Running	Amurda Sand Bed Kh No- 113 Plot No-9	2034	0.054	0.12	
5	Kantamal	River	Running	Lokapada Sand Quarry KH No-175, Plot No-253			49980	99960
6	Kantamal	River	Running	Mallikud Sand Bed KH No- 197, Plot No-418,1			49980	99960
7	Kantamal	River	Running	Ghantapada Sand Quarry KH No-275, Plot No-1			50587	101175
8	Kantamal	Nala	Running	Bukuramunda Sand Quarry KH No-71, Plot No-	129 mtr	62mtr	20040	40080cu m

9	Kantamal	River			Running	228,372,373,705				49980	99960
10	Harabhan ga	River			Running	Tileimal Sand Bed KH No- 99, Plot No-382				20235	40470
11	Harabhan ga	River			Running	Kharasankulai Sand Bed KH No-107, Plot No-100				54634	109269
12	Harabhan ga	River			Running	Badabankapada Sand Quarry KH No-113, Plot No-372		78mtr	24.48mtr	23862	47725cum
13	Harabhan ga	River			Running	Dianghat Sand Quarry KH No-92 Plot No-76/A		70mtr	35.9mtr	3762	7524cum
14	Harabhan ga	River				Uanal Sand Bed Kh No-81 Plot No-224				48564	97128
15	Harabhan ga	River				Harabhanga Sand Quarry KH No-383 Plot No-1641				50182	100365
						Karadi Sand Bed KH No-151 Plot No-466/A					

ANNEXURE III

POTENTIAL SAND SAIRATS OF THE DISTRICT

Sl. No.	Name of Tahasil	River or stream	Status	Portion of the River or Stream recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Name of village	Length of area recommended for mineral concession (in km)	Average width of area recommended for mineral concession (in km)	Area recommended for mineral concession (in sqm)	Maximum Mineable sand (in cum) (60% of total potential)
1	2	4	3	5	6	7	8	9	10
1	Boudh	Mahanadi	Running	Tutusingha Sand Quarry Kh No-518 Plot No-1	Tutusingha	2023.43	46	46	0
2	Boudh	Mahanadi	Running	Tutusingha B Sand Quarry Kh No-518 Plot No-1/B	Tutusingha B	52609	210	14.4	8000
3	Boudh	Salunki	Running	Marjapur Sand Bed Kh No-132, Plot No-463	Marjapur	1618.74	133	0.4	1150
4	Boudh	Mahanadi		Amurda Sand Bed Kh No-113 Plot No-9	Amurda	20234	0.054	0.12	
5	Kantama	Tel	Running	Lokapada Sand Quarry KH No-175,	Lokapada			49980	99960

6	Kantama	Tel	Running	Plot No-253 Malikud Sand Bed KH No- 197, Plot No-418,1	Malikud			49980	99960
7	Kantama	Tel	Running	Kirlla Sand Bed Kh No-137, Plot No-214	Kirlla			101175	202350
8	Kantama	Tel	Running	Ghantapada Sand Quarry KH No- 275, Plot No-1	Ghantapada			50587	101175
9	Kantama	Tel	Running	Brachhapali Sand Bed Kh No- 276,Plot No-309	Barchhapali			50587	101175
10	Kantama	Tel	Running	Phaseda sand Bed Kh No- 144,Plot No- 109,110,590	Phaseda			91866	183733
11	Kantama	Nala	Running	Bukuramunda Sand Quarry KH No-71, Plot No- 228,372,373,705	Bukuramunda	129 mtr	62mtr	20040	40080
12	Kantama	Tel	Running	Tileimal Sand Bed KH No- 99, Plot No-382	Tileimal			49980	99960
13	Kantama	Nala	Running	Bhurkipada-2 Sand Bed KH No-86, Plot No-1074	Bhurkipada				
13	Harabha nga	Mahanadi	Running	Kharasankulai Sand Bed KH No-107, Plot No-100	Badaban kapada			20235	40470
14	Harabha nga	Mahanadi	Running	Badabankapada Sand Quarry KH No-113, Plot No-372	Badaban kapada			54634	109269
15	Harabha nga	Mahanadi	Running	Dianghat Sand Quarry KH No-92 Plot No-76/A	Dianghat	78mtr	24.48mtr	23862	47725

16	Harabha nga	Mahanad	Running	Uanal Sand Bed Kh No-81 Plot No-224	Uanal	70 mtr	35.9mtr	3762	7524
17	Harabha nga	Mahanad		Harabhangha Sand Quarry KH No-383 Plot No-1641	Harabha nga			48564	97128
18	Kantama	Mahanad		Karadi Sand Bed KH No-151 Plot No- 466/A	Karadi			50182	100365
19	Kantama	Mahanad	Running	Ramaguda Sand bed Kh No-232, Plot No-3	Ramagud a			50587	101175
20	Kantama	Mahanad	Running	Sukusinga Sand Bed KH No-166, Plot No- 240	Sukusing a			50587	101175