# DISTRICT SURVEY REPORT
**(CACHAR)**

**(ON MINING OF MINOR MINERALS UNDER 'Y' SCHEDULE OF AMMC RULE 2013)**

**UNDER CACHAR FOREST DIVISIONAL JURISDICTION**

**PREPARED:-**

**Under the provision of paragraph 7(iii) (a) of Appendix-VII of the Notification dtd.15th January 2016 of MoEF & Climate Change, bringing certain amendment in the EIA Notification 2006**

**By:**

**Divisional Forest Officer, Cachar Division: Silchar**

**(SAND)**

# DECLARATION

This is to certify that the District Survey Report (DSR) for Cachar District in respect to Mining Units (for Minor Minerals under "Y" Schedule) located within the jurisdiction of Cachar Civil District for collection of Sand (Minor Mineral) has been prepared under the provision of notification of MoEF and Climate Change dated 15th January 2016, where in certain amendment made in the original EIA Notification, 2006.

It is further certified that the information furnished in the DSR are on the basis of field data as well as office records and are correct to the best of my knowledge.

Sd/-
Divisional Forest Officer,
Cachar Division: Silchar

## CONTENTS

# INTRODUCTION

The Cachar District with its surrounding hills, foot hills & valleys presents a relatively immature topography that exposes rock masses ranging in age from middle of the Tertiary period (=34 million years ago) to the present day gravelly-sandy-clayey deposits.

The District is blessed with several hilly rivers and tributaries that drain in an around riverine areas carrying huge quantity of gravel, sand and mud including bajari which are available at surface. Presence of Barail, Surma, Tipam, Dupitila, Dihing group of rocks as well as Quaternary gravels (2 million years ago) enrich the district with minor mineral deposits in the form of river born boulder, bajari and sand. In addition, replenishment of the basins occurs naturally with the high speed water flowing into the river during rainy season.

Taking the advantage of availability of the minor minerals on the rivers bed including over bank deposits and natural phenomenon of replenishment, several mohals and quarries of stone materials were selected on the stretches of river beds under Coupes and Mohals rule, 1977, long back and continued till 2012. In 2013, with the commencement of AMMC Rule, 2013 some of the quarries and mohals area were selected and constituted as Mining Lease/Permit/Contract unit of stone materials along-with few new areas under the guidelines of Hon'ble Supreme Court and as per provision of AMMC Rule, 2013.

The mining sites being open river courses free from any human habitation, vegetation, infrastructural construction including those which do not fall within any restricted areas as notified in the guideline, coupled with natural replenishment of mining materials though fluvial deposition during rainy season, offers negligible impact on the environment.

The boulder, bajari and sand extracted through surface mining of river beds are utilised for the development of infrastructures in the State. A significant growth in the socio-economic scenario of the nearby areas due to such mining activities is obvious as it generates employment opportunities. Further, sustainable mining activities in the river bed reduce the chance of flood in the district.

## OVERVIEW OF MINING ACTIVITY IN THE DISTRICT

Development of an area depends upon the infrastructure project like Roads & Bridges, Railways, Buildings, Industries and many more. Boulder, Bajari and Sand are the most essential requirement for construction of such infrastructure projects. As in other part of our country, there is a huge demand of these materials (Boulders, Bajari and Sand), for the infrastructural development works in the Cachar District and adjoining areas.

Although, the District has numerous small hills and hillocks, and contains more of boulders and gravel in different layers, often invaded with clayey alluvium and also have alternate gradation of sand and sand mixed clay; yet they were avoided as a source of sand extraction area since beginning due to availability of the materials in river basins of the District to fulfil the demand.

Rivers remain as the major producer of construction materials, like sand gravel, boulder, aggregate etc., to meet up the requirement of this region from the very beginning and today also. The Cachar District, rather the entire Barak Valley is benefitted with discharges of several hilly rivers and tributaries in and around and in between it.

The river Barak with its tributaries namely Jatinga, Chiri, Jiri, Madhura with Rukni and Dolu River remain as the major producer of Sand in the District and adjoining areas. As per the availability and suitability, some river bed stretches were selected as the sand mining sites/units and were given for mining activities after EIA clearance and observing the special conditions for river bed mining under the guideline of the Hon'ble Supreme Court and as per the provision of AMMC Rule 2013.

In case of river bed mining/excavation of minor minerals in order to ensure safety of river-beds, structures and the adjoining areas, the following special conditions shall be abided by the lessee:

(a) No mining would be permissible in river-bed up-to a distance of five times of the span of a bridge on up-stream side and ten times the span of such bridge on down-stream side, subject to a minimum of 250 metres on the up-stream and 500 meter on the downstream side.

(b) There shall be maintained an unmined block of 50 metres width after every block of 1000 metres over which mining is undertaken or at such distance as may be directed by the competent authority;

(c) The maximum depth of mining in the river bed shall not exceed three metres measured from the un-mined bed level at any point of time with proper bench formation.

(d) Mining shall be restricted within the central $3/4^{th}$ width of the river/rivulet.

(e) No mining shall be permissible in an area up to a width specified by the competent authority from the active edges of embankments;

(f) Any other conditions(s) as may be required by the competent authority in public interest.

As a result of industrialisation and progressive development, the demand of Sand has increased immensely. The existing sources will not be sufficient to fulfil such increasing demand of minor minerals and hence new areas

are required to be explored in different areas. Thus, some probable sites having **good mining potential** under the jurisdiction of Cachar Forest Division is identified with location and listed below:-

**List of probable sites enriched with Sand**

| **Sl. No.** | **Location** | **Land Status** |
|---|---|---|
| 1. | Digli, Jirighat | Digli River |
| 2. | Banskandi | Borak river |
| 3. | Harinagar-Dipucherra | Diska nala |
| 4. | Sildubi Part-II | Raiat land (Hills) |
| 5. | Silkuri Tea garden | Grant land |
| 6. | Other areas | Depending on the EIA application by intending applicants |

The list of the existing sand mining units under the jurisdiction of Cachar Forest Division is furnished in the ongoing chapter.

## THE LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA & PERIOD OF VALIDITY

Most of the sand mining areas of Cachar Forest Division of the District are located on the river courses. After intensive survey and considering the availability and suitability of operation, the mining operations were restricted only to some limited stretches of the river course confining the mining operation within the river beds only.

The Cachar Forest Division has notified **11 nos.** of sand mining units under Cachar District and **4 Nos.** of sand mining units in Kalain Range under Karimganj Division under the provision of relevant Rules and Guidelines.

However, for new application/areas for mining vide Govt. Notification No S.O.141(E) Dtd.15$^{th}$ January, 2016, powers for granting EIA for B2 category projects (below 5 Hect.) has been delegated to the District EIA after the scrutiny of the EIA application by the DEAC.

The list of sand mining units with location and Geo-Coordinates, area, validity etc. along with its present status is furnished as follows:-

**LIST OF SAND MINING CONTRACT UNITS UNDER CACHAR FOREST DIVISION OF DISTRICT OF CACHAR**

| Sl. No. | Name of Mining/lease/contract unit/Permit | Location, boundary description with Geo-coordinates | Area of the mining lease/contract unit/permit | Stipulated Quantity (In m3) | Validity of mining lease/ extraction/ permit | Remarks |
|---|---|---|---|---|---|---|
| 1 | Madhura River Minor Mineral Unit - 1 (Sand ) | The boundary of the Madhura River Minor Mineral Unit No.1 (Sand) starts from the western side of the Madhura river at confluence of the Nakti Nala in Madhura river at Geo-co-ordinate N- $24^0$55'22.4" E - $92^0$54'46.1" and runs along the downstream of the River Madhura in the southern direction upto Tikolmukh at Geo-co-ordinate N -$24^0$53'58.3" E-$92^0$54'22.5" | 6 Hect. | 21000 | 7 years | Was under operation on EIA clearances vide No. SEIAA. 394/ 2015/ EC/ 16-A Dtd. 02-01-2015. But due to non-payment of kist money, the unit has been put to re-sale vide sale notice dtd.08-06-2016. |
| 2 | Madhura River Minor Mineral Unit - 2 (Sand ) | The boundary of the Madhura River Minor Mineral Unit No.2 (Sand) starts from the northern side of the Madhura river at Patharia (Pangram Pt.III) at Geo-co-ordinate N- $24^0$53'39.1" E - $92^0$54'10.2" and then runs along downstream of River Madhura in the southern direction upto Moinerbond near Railway Bridge over Madhura River in Geo-co-ordinate N -$24^0$51'10.2" E-$92^0$50'37.9" | 9 Hect. | 15750 | 7 years | Under operation on EIA clearance vide No. SEIAA.554/ 2015/EC/16-A/318 Dtd.20th November 2015 |
| 3 | Jatinga River Minor Mineral Unit - 1 (Sand) | The boundary of the Jatinga river Minor Mineral Unit No.1(Sand) starts from the Northern side of the Jatinga river nearby Balacherra Ferryghat on Jatinga River at Geo-co-ordinate N- $24^0$57'45.2" E - $92^0$45'23.2" and then runs along the downstream of the River in the southern direction upto the confluence of Jatinga River at Jatingamukh at Geo-co-ordinate N -$24^0$53'11.1"E- $92^0$44'14.4" | 10.5 Hect. | 14000 | 7 years | Under process of settlement |
| 4 | Daloo River Minor Mineral Unit - 1 (Sand ) | The boundary of the Dolu river Minor Mineral Unit No.1 (Sand) starts from the northern side of the Dolu river at the confluence of the Abong nala and Dolu River in Geo-co-ordinate N- $24^0$56'20.3" E - $92^0$47'22.5"and runs along the downstream in the South West Direction upto the confluence of Dolu river with River Jatinga near Badarpur Village at Geo-co-ordinate N -$24^0$54'45.6" E- $92^0$45'40.8". | 7.5 Hect. | 35000 | 7 years | Under operation on EIA clearance vide No.SEIAA.178/2014/56-A Dtd.20-05-2014 |

| Sl. No. | Name of Mining/lease/contract unit/Permit | Location, boundary description with Geo-coordinates | Area of the mining lease/contract unit/permit | Stipulated Quantity (In m3) | Validity of mining lease/ extraction/permit | Remarks |
|---|---|---|---|---|---|---|
| 5 | Chiri River Minor Mineral Unit - 1 (Sand ) | The boundary of the Chiri River Minor Mineral Unit No. 1(Sand) starts from Urabil Schoolghat at Geo Co-ordinate N-24$^0$49'57.1" E- 93$^0$02'26.4" and then runs along the downstream in the southwest direction ending at Chiripar-Borbil at Geo Co-ordinate N-24$^0$48'17.7" E-93$^0$00'56.8" near Chiri Ferryghat leaving aside the villages Labakpar on the Eastern bank and Urabil, Poilapool, Kontagram on the western bank. It covers a distance of approx. 6 Km with workable length of 4 Km and average extractable width of 20mtrs. | 8.0 Hect. | 63000 | 7 years | Was under operation on EIA clearances vide No. SEIAA. 254/2014/ 43-A Dtd. 28/07/ 2014. But, due to non-payment of kist money, the unit has been put to re-sale vide sale notice dtd.08-06-2016. Further the re-sale is kept in abeyance as per Hon'ble Gauhati High Court Order Dtd. 28-06-2016. |
| 6 | Chiri River Minor Mineral Unit-2 (Sand) | The boundary of the Chiri River Minor Mineral Unit No.2(Sand) starts from the upstream of Kanakpurghat (Joypur) in Chiri River at Geo Co-ordinate N-24$^0$53'25.4" E-93$^0$04'01.2" and runs along the downstream in southern and then south-western direction upto Sonamonighat at Geo Co-ordinate N-24$^0$50'34.4"E-93$^0$02'56.6" covering a distance 8.5 Km ( workable length – 5.0 Km) leaving aside Kanakpur, Mangalpur villages on the eastern bank and Joypur Nutanbazar, Modinagar, Kamranga on the western bank.( workable width 15 m) | 7.5 Hect. | 31500 | 7 years | Under operation on EIA clearance vide No. No.SEIAA.252/2014/45-A Dtd.28/07/2014. |
| 7 | Rukni River Sand (Channighat) Minor Mineral Unit - 1 (Sand ) | The Boundary of the Rukni River Sand (Channighat) Minor Mineral Unit - 1 (Sand ) starts from Hawaithang Ferryghat at Geo-co-ordinate N-24$^0$30'23.3"E -92$^0$48'34.8" over river Rukni and runs along the downstream of the river towards northern direction having being Haradhanpur Village in Eastern Bank and village Channighat in Western Bank till its meet the end point at Geo-co-ordinate 24$^0$31'19.9" E- 92$^0$49'16.7" near Puran "It Bhatta"( Old Brick clan ) covering a distance of about 3.10 Km with an average extractable width of 20mtrs. | 6.2 Hect. | 28000 | 7 years | Sub judice under Hon'ble Gauhati High Court in W.P.(c) No.7138/2013 and 2997/2014 |
| 8 | Rukni River Sand (Bhagabazar) Minor Mineral Unit - 2 (Sand ) | The Boundary of Rukni River Sand (Bhagabazar) Minor Mineral Unit – 2(Sand) starts from nearby Bam Vidyapeeth High School, Bongram at Geo Co-ordinates N 24$^0$31'50.1"E - 92$^0$49'40.2"and runs along the downstream of the river in the Northern direction leaving aside village saraspur and Khaspur in Eastern bank and Bhaga Bazar/Bongram in Western bank and ends at Geo Co-ordinates N -24$^0$32'50.8" E- 92$^0$50'22.9" near Mozaid Ali High School, Telisifa village covering a distance of about 2.70 Km with an average extractable width of 20mtrs. | 5.4 Hect. | 42000 | 7 years | Under operation vide EIA clearance No.SEIAA.138/ 2014/59-A Dtd.27-03-2014 |

| Sl. No. | Name of Mining/lease/contract unit/Permit | Location, boundary description with Geo-coordinates | Area of the mining lease/contract unit/permit | Stipulated Quantity (In m3) | Validity of mining lease/ extraction/ permit | Remarks |
|---|---|---|---|---|---|---|
| 9 | Rukni River Sand (Saptagram) Minor Mineral Unit - 3 (Sand ) | The Boundary of the Rukni River Sand (Saptagram) Minor Mineral Unit - 3 (Sand ) starts from Gojalghat Ferryghat, Saptagram (Near Gojalghat M.E. School) at Geo Co-ordinate N- $24^0$33'55.5"E - $92^0$50'38.6"and runs along the downstream of the river towards northern direction leaving aside the village like Gojalghat, Debipur in the Eastern bank while Saptagram, Dholai in the Western bank till it finds the end point at Geo-Co-ordinates N -$24^0$34'11.1" E- $92^0$50'46.3" near Dholai Ferryghat. It covers a length of approx. 940 mtrs. With an average extractable width of 20mtrs. | 1.88 Hect. | 2000 | 2 years | Under process of settlement |
| 10 | Balicherra-Borjalenga Minor Mineral Unit - 1 (Sand ) | The boundary of the Balicherra-Borjalenga Minor Mineral Unit No.1(Sand) starts from nearby Taranathpur at Geo Co-ordinates N-$24^0$37'06.9"E -$92^0$45'08.1"and runs along the downstream of Balicherra Nala in the North-Western direction at the point 250 mtrs upstream of PWD Bridge nearby Dak Bunglow on Silchar-Hailakandi Roat at Geo Co-ordinate N- $24^0$40'30.9"E- $92^0$44'47.9". | 2.1 Hect. | 4200 | 2 years | Under process of EIA |
| 11 | Choto Jalenga Minor Mineral Unit - 2 (Sand ) | The boundary of Chotojalenga Minor Mineral Unit No.2(Sand) starts from the 500 mtrs downstream of PWD culvert over Sonacherra near Barik Office at Geo Co-ordinate N-$24^0$36'26.1"E -$92^0$43'39.1" and then runs along the downstream in the north-western direction upto 250 mtrs upstream of the PWD Bridge over Sonacherra at Silchar-Hailakandi PWD road at Geo Co-ordinates N- $24^0$39'19.5" E- $92^0$43'07.1" | 1.8 Hect. | 4200 | 2 years | Under process of settlement |

## LIST OF SAND MINING UNITS UNDER CACHAR CIVIL DISTRICT OF KARIMGANJ FOREST DIVISION

| Sl. No. | Name of Mining Lease/ Contract Unit/ Permit | Location, boundary description with Geo Coordinates | Area of the mining lease/ contract unit/ permit | Stipulated Quantity (in $m^3$) | Validity of mining lease/ contract unit/ permit | Remarks |
|---|---|---|---|---|---|---|
| 1 | Borak Sand Minor Mineral Unit No. 1 | The boundary of the contract area starts from Jatingamukh at GPS Co-ordinates N 24º 52' 98.1' E 92º 44' 15.8' and runs towards downstream in south-north, east-west and south-west direction upto Ranighat bridge at Borak river at GPS Co-ordinates N 24º 54' 02.3' E 92º 42' 63.7', from that point leaving a span of 300 Mtr. upstream & 500 Mtr. downstream the mining area runs along the downstream via Buribail upto Rajnagar Ferighat being the ending point at GPS Co ordinates N 24º 51' 73.6' E 92º 41' 15.3' of village Ganigram Pt-IV of Borak River. | 35 Ha. | 21000 | 7(seven) years | Under operation |
| 2 | Borak Sand Minor Mineral Unit No. 2 | The boundary of the contract area starts from Ganigram Pt-III (Bajniakhal) at GPS Co-ordinates N 24º 51' 60.4' E 92º 41' 04.4' and runs towards downstream in southern & east-western direction via Santipur, Sripur, Sibnarayanpur upto Sealtek Beat at Katigorah Chourangi being the ending point of Borak River at GPS Co-ordinates N 24º 52' 71.2' E 92º 35' 45.2'. | 37 Ha. | 17500 | 7(seven) years | Under operation |
| 3 | Borak Sand Minor Mineral Unit No. 3 | The boundary of the contract area starts from 500 Mtr. downstream at GPS Co-ordinates N 24º 52' 57.5' E 92º 34' 55.0' of Railway Bridge at Badarpurghat over Borak River and runs towards downstream in western direction via Katigorah, Rajatilla & Harinagar upto BSF Camp at GPS Co-ordinates N 24º 52' 70.6' E 92º 29' 62.7' being the ending point of the Borak minor mineral unit 3. | 30.36 Ha. | 14000 | 7(seven) years | Under operation |
| 4 | Arang Sand Minor Mineral Unit No. 1 | The boundary of the contract area starts from 500 Mtr. downstream of Jhulonpul over the Arang River at GPS Co ordinates N 24º 57' 91.1' E 92º 40' 08.3' and runs towards downstream in southern direction upto 250 Mtr. upstream from Railway Bridge being the ending point at GPS Co ordinates N 24º 57' 44.8' E 92º 40' 20.3' over Arang River at Dinanathpur. | 9.53 Ha. | 28000 | 7(seven) years | No regular Tender received even after repeated Sale |

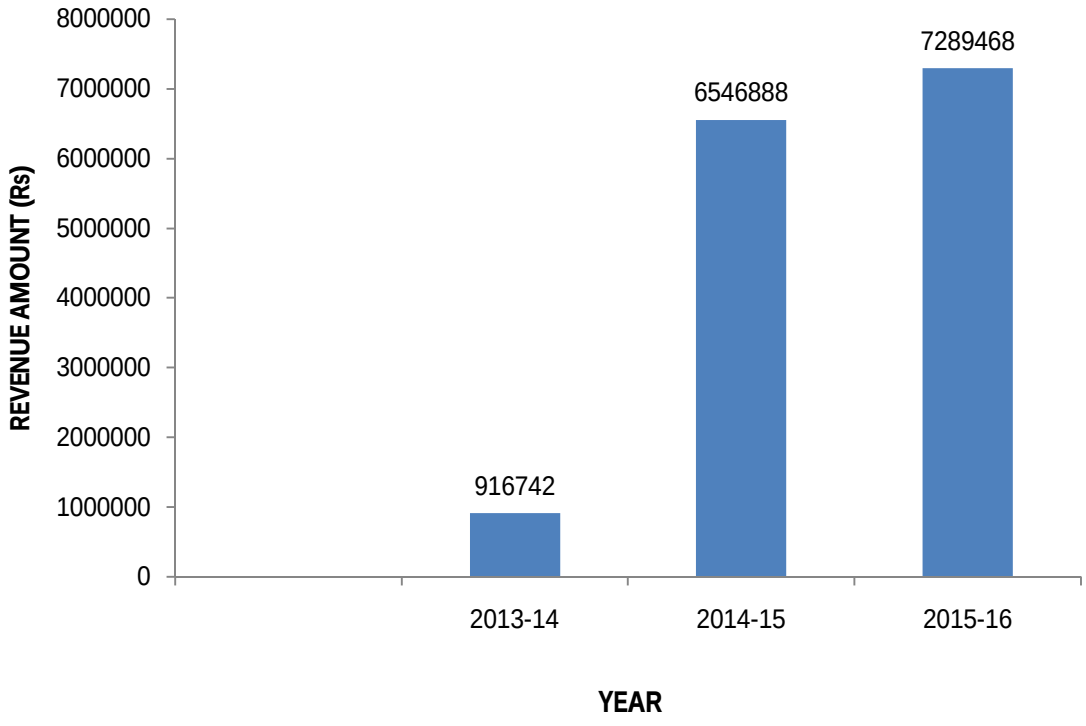
## DETAIL OF ROYALTY/REVENUE RECEIVED IN LAST 3 (THREE) YEARS (SAND)

With the progress of infrastructure development works in the region, the demand for the essential minor minerals like stone, sand, silt and earth etc. is raising very high. As a result, the Govt. is also fetching a handsome amount of Revenue out of it.

The Revenue realised from Sand under Cachar Forest division during last 3 (three) years are:-

| Year | Revenue Amount (Sand) |
|---|---|
| 2013-2014 | Rs. 9,16,742/- |
| 2014-2015 | Rs. 65,46,888/- |
| 2015-2016 | Rs. 72,89,468/- |

**Graphical representation**



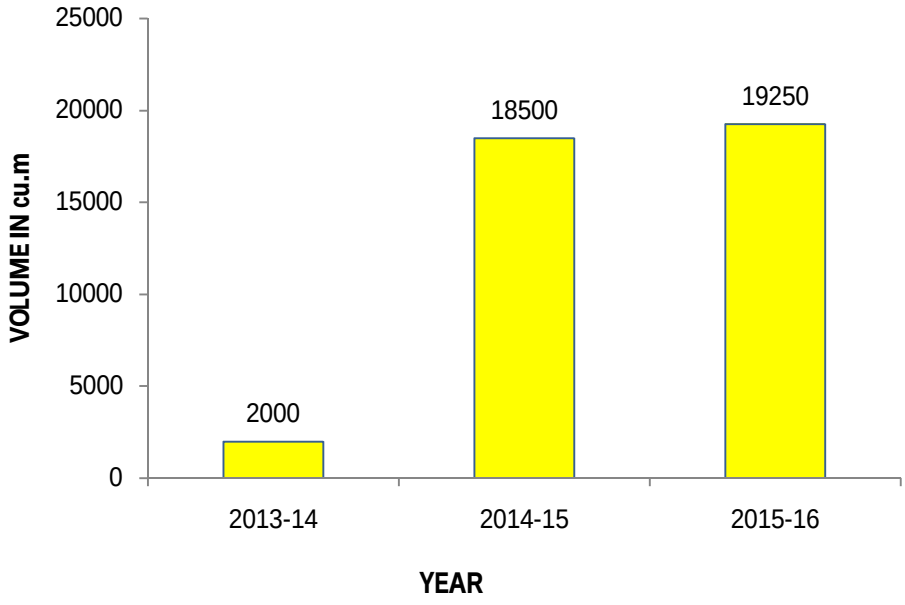
## DETAILS OF PRODUCTION OF SAND IN LAST 3 (THREE) YEARS

The Cachar Forest Divisional jurisdiction of the Cachar District is facilitated with discharges of several hilly rivers and their Tributaries producing plenty of minor minerals like sand, silt etc. The main river Barak and its tributaries namely Chiri, Madhura, Jatinga along with Rukni and Dolu rivers are the main producer of sand in the District.

The production of **sand** during last 3 (three) years in the Cachar Forest Division are given below –

| **Years** | **Sand** |
|---|---|
| 2013-2014 | 2000.0cu.m |
| 2014-2015 | 18,500.0 cu.m |
| 2015-2016 | 19,250.0 cu.m |

**Graphical representation**



## PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS OF THE DISTRICT

The mining areas of Boulder/Sand/Bajari are presently confined to river courses. Since all the rivers are originating from hills and passing through hilly terrain running downstream to approach the plains, the accumulation of Boulder, Sand and Bajari etc. on the river beds occur by natural phenomenon. During rainy season, high runoff along the rivers and its tributaries causes transportation and deposition of huge quantity of sediments all along the river course.

Owing to the geological set up of the Cachar District including areas under the jurisdiction of Cachar Forest Division, huge accumulation of river sediments (boulder, sand, bajari and clay) offers good opportunity of environmental friendly, mining activities of minor minerals in the District.

# GENERAL PROFILE OF THE DISTRICT: CACHAR

Located in the Southern most part of Assam, the Cachar District covers an area of approximately 3775 Sq. Km bounded between the latitude $24^0$ 22' to $25^0$07' North and longitude $92^0$ 38' to $93^0$ 16' East. The Cachar district is surrounded by hill ranges on three sides, i.e., North, South, and East while the Western boundary falls in plains as shown below:-

The Geographical boundaries of Cachar District are:-

North - Barail Hill Range & District of Dima Hasao

South - Lusai Hills & State of Mizoram

East - Manipur Hills & State of Manipur & Part of Lusai Hills

West - Districts of Karimganj & Hailakandi

The Barak is the most prominent and largest river passing through the district. It originates from the Angami Hills of Barail Range stretching South of Kohima in Nagaland. It surfaces into the plains of Cachar district, a few kilometres near South of Jiribam on the Cachar-Manipur border and receives discharges from several hilly rivers and tributaries within the District territories and ultimately split into the Kusiyara and the Surma rivers near the Assam-Bangladesh Border in Karimganj District.

The main rivers discharging into river Barak in the civil jurisdiction of Cachar District are Jiri, Chiri, Sonai, Madhura, Jatinga, Katakhal apart from innumerable rivulets/nalas/cherras etc. The overall physiography of the district may be characterized by a series of **N-S** hills with intervening narrow as well as wide and flat valleys.

The combination of all these surrounding hills and foot hills and valleys receiving medium to heavy rainfall are a host to the thick forest cover, tea gardens, fertile cultivable land, river networks, diverse flora and fauna life and makes the region very picturesque and endows it with a good deal of natural beauty.

The district of Cachar exhibits a wide diversity of ethnic groups and their admixture. There have been influxes of people from both the valley and across the hills. They have brought in a large

measure of ethnic monoglot groups, forming a wide mixture of North Eastern population. Of late, during the last 3-4 decades there has also been influx of people from neighbouring country like Bangladesh.

Although the District has huge potential with its plenty of natural resources, but no major industries were set up in the District/region perhaps due to its bottleneck in communication system. The Paper Mill, HPC in Panchgram is at the border of Cachar District and some Tea gardens and factories are the prominent industries which exist here.

**Geology**

The Cachar area forms a part of north – south trending compressed thrust fold belt of Assam - Arakan basin having an area of 7000 sq.km. The structural style of sedimentary cover in this area is depicted by a series of NNE – SSW trending, sub- parallel, arcuate, elongated narrow, tightly folded, doubly plunging and highly faulted anticlines. These anticlines are en-echelon to each other. The anticlines are asymmetrical & are separated by the synclines. Characteristically, the folding intensity shows a gradual increase from west to east. The area has a huge sedimentary cover of approximately 10-11 km. The sediment thickness increases from west to east. This consists of alternating sandstone, siltstone, shale and claystone beds ranging in age from Eocene to Recent.

**Regional Stratigraphy**

The Tertiary deposits constitute bulk of the sediments of Assam-Arakan Basin. Ther is a contrast in the nature of sedimentary facies among the Palaeogene sequences and hence devided into Shelf facies (Shallow marine) and Geosynclinal facies (Deep marine).

The shelf facies is exposed in Garo, Khasi, Jaintia and parts of North Cachar and Mikir Hills and is also known to occur in subsurface of West Bengal, Upper Assam & Bangladesh.

The Geosynclinal facies is developed in Naga Hills, part of North Cachar Hills, Manipur and expected to occur in subsurface of Surma Valley (south of Cachar area), Bangladesh, Tripura, Mizo Hills, Chittaganj Hills and Arakan coast of Burma.

The shelf facies is well established due to faunal control and availability of sufficient data in contrast to geosynclinal facies. The Cachar region exposes mainly sediments of Neogene age. A generalized lithostratigraphic sequence with unit thickness based on surface and sub-surface data (excluding Shelf region) after ONGC is given in Table below:

| **Chronostratigraphy** | | **Lithostratigraphy** | | **Lithology** | **Thickness (Meters)** | **Depositional Environment** |
|---|---|---|---|---|---|---|
| ***Period*** | ***Epoch*** | ***Group*** | ***Formation*** | | | |
| Quaternary | Recent - Pleistocene | | Dihing | Pebble beds, conglomerates and Sandstones with thin bands of clay | 400 | Fluvial |
| | **U N C O N F O R M I T Y** | | | | | |
| Neogene | Pliocene | Dupitila | | Coarse, Pebbly sandstone & mottled clay | 1000 | Fluvial |
| | **U N C O N F O R M I T Y** | | | | | |
| | Mio-Pliocene | Tipam | Girujan Clay | Variegated soft & sticky clays, often silty | 1500 - 1700 | Fluvial |
| | | | Tipam Sandstone | Sandstone with sandy clays & claystone | | |
| | Miocene | Surma | Bokabil | Claystone & silt with thin beds of fine grained sandstone | 700 - 1500 | Brackish / Marginal Marine |
| | | | Upper Bhuban | Sandstone & sandy claystone laminations | 650 - 1200 | Brackish / Marginal Marine |
| | | | Middle Bhuban | Shale and occasional fine grained sandstone | 650 - 1200 | Outer Shelf / Open Marine |
| | | | Lower Bhuban | Alternations of sandstone & shale | 700- 1000 | Brackish / Marginal marine |
| | **U N C O N F O R M I T Y** | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Palaeogene | Oligocene – Upper Eocene | Barail | Renji | Dominantly sandstone with thin shale beds | 700-1000 | Brackish / Marginal marine |
| | | | Jenum | Shale & occasional fine grained sandstone | 900-1500 | Brackish / Marginal marine |
| | | | Laisong | Alternation of thin bedded sandstone & shale | 1500-2400 | Brackish / Marginal marine |
| | Eocene | Disang | | Dark grey shale with thin beds of sandstone | 1750 | Reducing Marine |
| | **B A S E N O T E X P O S E D** | | | | | |

## Topography

Topographical configuration of Cachar District can be broadly divided into two parts. The Central Narrow Valley of plains comprising mainly the alluvial deposition of river Barak and its tributaries, and bounded on 3 sides by the outer undulating regions of foot hills of different hill Ranges.

The District topography is highly undulating with numerous hills/hillocks. Most of the hillocks are under Tea cultivation and a good number of hillocks are covered by tress and many are un-surveyed revenue land. The overall morphology of the district consists of a series of **N-S** hills with intervening narrow as well as wide and flat valley.

## Climate

The District has a subtropical climate with high humidity and medium to heavy rain fall spread over a long period and high temperature without much variation during summer and has a distinct winter period when the temperature falls. Climatically the seasons are well defined with a comparatively cooler winter from November to February; hot and humid summer from March to May and a rainy season from May to October. Sometimes pre-monsoon rain starts immediately after winter and the rainfall is distributed throughout the summer. The district generally experience flood during the rainy season. Humidity is high throughout the year and never falls below an average of 40% even in the driest month of December.

Annual Average rainfall is 3015 mm.

Annual Average humidity is 79%.

Average maximum daily temperature is $37.3^0$ centigrade.

Average minimum daily temperature is $8.6^0$ centigrade.

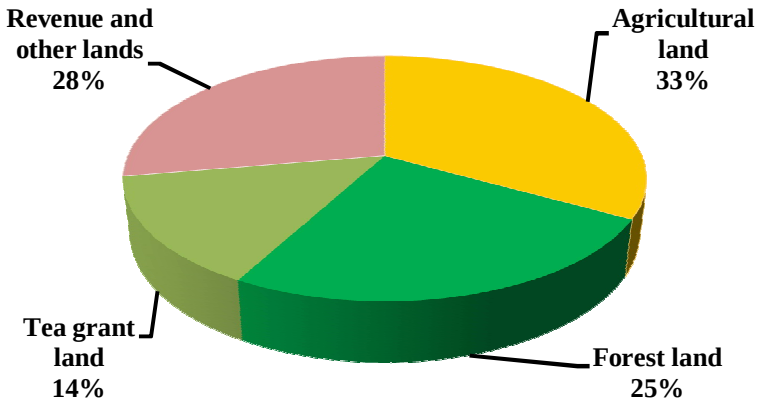
## LAND UTILIZATION PATTERN UNDER CACHAR DISTRICT

The Cachar District with its total geographical area of 3775 Sq K.m. possess a combination of undulating configuration by the surrounding hills and foot hills with intervening narrow as well as wide and flat valley of fertile land comprising 1/3$^{rd}$ the of total land as Agriculture land. The undulating configuration being suitable for Tea plantation occupies approximately 1/7$^{th}$ of the total land of the district. Almost all the hills are covered with dense vegetation and 1/4$^{th}$ part of the total land is under forest cover. Land utilised under mining of sand component is very negligible and equivalent to 0.00% and is very negligible to be distinctly represented graphically.

However, the baseline information on the existing land use pattern of the district is as follows:

---

| Particulars | Description |
|---|---|
| 1) Agriculture land | 1250.00 Sq. K.M. |
| 2) Forest land | 935.00 Sq. K.M. |
| 3) Tea grant land | 543.69 Sq. K.M. |
| 4) Township, Govt. Institute, homestead land, revenue land, un-surveyed land, beels and hawars, roads and paths, railway tracks etc. | 1044.46 Sq. K.M. |
| 5) Land under mining of sand (Minor Minerals) | 0.66 Sq. K.M. |




**Pie cart representation**