

शुद्धि-पत्र

सर्व साधारण को सूचित किया जाता है कि शासनादेश सं० 715/86-17-57(स०)/2017 दिनांक 22.04.2017 में दिये गये प्रविधानों के अनुसार नदी तल में उपलब्ध बालू के क्षेत्रों को ई-निविदा प्रणाली द्वारा अल्प अवधि 06 माह हेतु खनन अनुज्ञा स्वीकृति किये जाने हेतु बालू खनन क्षेत्र ग्राम कटरी बक्सर तहसील बीघापुर जनपद उन्नाव के District Survey Report में कतिपय स्थानों पर लिपिकीय त्रुटिवश उक्त बालू खनन क्षेत्र के सम्मुख के पेज सं० 12 के बिन्दु सं० 3 के सीरियल न० 2 में अंकित गाटा सं० 436 Ghha के स्थान पर 436 Jha तथा क्षेत्रफल 9.469 हे० के स्थान पर क्षेत्रफल 9.4736 हे० पढा जाये।

खान अधिकारी
सचिव डी०ई०एस०सी०
उन्नाव।

कार्यालय जिलाधिकारी उन्नाव।
(खनिज अनुभाग)

संख्या 393 / तीस-खनन/

दिनांक 18 जनवरी, 2018

- प्रतिलिपि:-
- 1- जिलाधिकारी महोदय उन्नाव को सादर अवलोकनार्थ प्रेषित।
 - 2- प्रभागीय वनाधिकारी उन्नाव को सादर अवलोकनार्थ प्रेषित।
 - 3- उपजिलाधिकारी उन्नाव/सचिव, डी०ई०आई०ए० उन्नाव को सादर सूचनार्थ प्रेषित।
 - 4- अधिशाषी अभियन्ता सिंचाई खण्ड उन्नाव को सादर सूचनार्थ प्रेषित।
 - 5- जिला सूचना एवं विज्ञान अधिकारी उन्नाव को इस अनुरोध के साथ कि उक्त शुद्धि-पत्र को जनपद उन्नाव की वेबसाइट जिला सर्वेक्षण रिपोर्ट के साथ अपलोड करने का कष्ट करे।

18.1.18
खान अधिकारी
सचिव डी०ई०एस०सी०
उन्नाव।

कार्यालय जिलाधिकारी, उन्नाव।

(खनन अनुभाग)

संख्या 152/तीस-खनिज लि0/विज्ञप्ति-बालू/2017-18

दिनांक 26 सितम्बर, 2017

विज्ञप्ति

ई-निविदा सह-ई-नीलामी आमंत्रण हेतु सुझाव

सर्व साधारण को सूचित किया जाता है कि जनपद उन्नाव में नदी तल में उपलब्ध बालू, मौरम, बजरी आदि निम्न विवरण के अनुसार खनन क्षेत्रों को उ0प्र0 उपखनिज (परिहार) नियमावली-1963 के उपनियम 23 (1) के अन्तर्गत उपलब्ध घोषित किया जाता है। शासनादेश सं0 1875/86-2017-57(सा)/2017 टी0सी0-1 दिनांक 14.08.2017 में दिये गये निर्देशानुसार उक्त नियमावली के अध्याय-4 के अन्तर्गत ई-निविदा सह-ई-नीलामी प्रणाली के माध्यम से खनन पट्टा पर स्वीकृत किये जाने हेतु विज्ञप्ति कार्यालय के पत्र सं0-111/तीस-खनिज लिपिक/विज्ञप्ति-बालू/2017-18 दिनांक 30.08.2017 द्वारा प्रकाशित की गई जिसका विवरण निम्नवत है:-

क्षेत्र का विवरण:-

क्र0सं0	उप खनिज का नाम	नदी का नाम	क्षेत्र का विवरण				नियमावली-1963 के अनुसूची 1 के अनुसार रायल्टी दर (रु0 प्रति घ0मी0)	खनन योग्य आंकलित उपखनिज का भण्डार (घ0मी0 प्रति वर्ष)	प्रथम वर्ष में आंकलित भण्डार की कुल रायल्टी रूप्ये में (कालम 9 में अंकित घ0मी0 प्रतिवर्ष को कालम 8 में अंकित रायल्टी की दर से गुणा करने पर उपलब्ध सकल धनराशि) (रुपये में)	अर्नेस्ट मनी (कालम 10 में अंकित सकल धनराशि का 25 प्रतिशत) (रुपये में)
			तहसील	ग्राम	गाटा सं0/खण्ड सं0/जोन सं0	क्षे0फ0 हे0 में				
1	2	3	4	5	6	7	8	9	10	11
1	बालू	गंगा नदी	सदर	कटरी बदरका तुर्किया	523	38.5400	65	867172	56366180/-	14091545/-
2	बालू	गंगा नदी	सदर	कटरी हरिहरपुर एहतमाली	102	15.0890	65	339455	22064575/-	5516144/-
3	बालू	गंगा नदी	सदर	कटरी परियर	286	26.0566	65	586191	38102415/-	9525604/-
4	बालू	गंगा नदी	सदर	नेतुवा, कटरी पीपरखेडा (खण्ड-अ)	526मि0, 859मि, 2561मि0	149.7900	65	2220000	144300000/-	36075000/-
5	बालू	गंगा नदी	सदर	कटरी पीपरखेडा (खण्ड-ब)	859मि0, 2561मि0	149.7900	65	2220000	144300000/-	36075000/-
6	बालू	गंगा नदी	बांगरमऊ	कटरी पनका	1क	25.8987	65	582639	37871535/-	9467884/-
7	बालू	गंगा नदी	बीघापुर	सेढूपुर	1	7.3120	65	108360	7043400/-	1760850/-
8	बालू	गंगा नदी	बीघापुर	कटरी बक्सर	1मि0, 194	14.4000	65	213600	13884000/-	3471000/-
9	बालू	गंगा नदी	बीघापुर	मानपुर एहतमाली	13मि0	5.3660	65	79500	5167500/-	1291875/-

उपरोक्त के सम्बन्ध में District Survey Report पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार के अधिसूचना दिनांक 15 जनवरी 2016 के परिशिष्ट-10 में उल्लिखित गाइड लाइन के अनुसार तैयार है। उक्त District Survey Report जनपद उन्नाव की वेब साइट www.unnao.nic.in पर जनमानस के सुझाव हेतु 21 दिन के लिये अपलोड है यदि किसी को अपना सुझाव देना है तो वह उक्त निर्धारित दिवस में जनपद के जिलाधिकारी कार्यालय के खनन अनुभाग उन्नाव को दे सकते हैं।

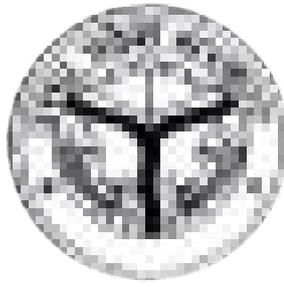
जिलाधिकारी,
उन्नाव।

पत्र संख्या:- /तददिनांक

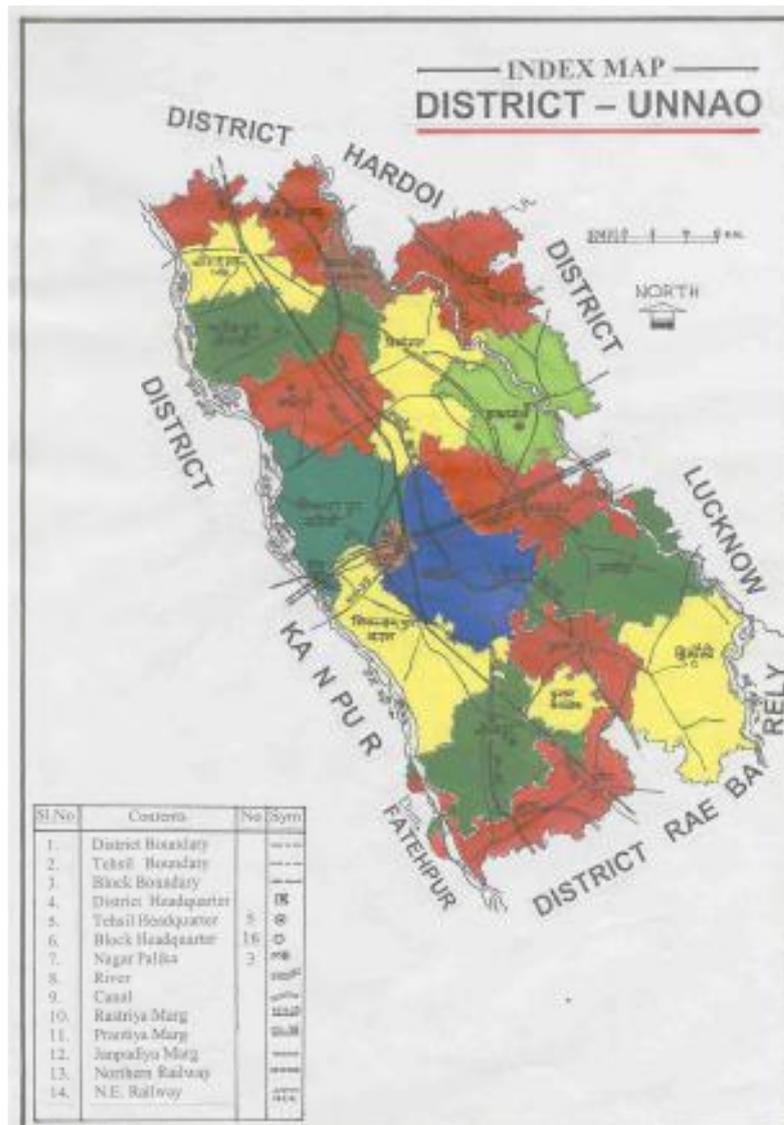
प्रतिलिपि:-निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित:-

- 1.अपर मुख्य सचिव, भूतत्व एवं खनिकर्म उ०प्र० शासन,लखनऊ।
- 2.निदेशक, भूतत्व एवं खनिकर्म निदेशालय उ०प्र०,लखनऊ।
- 3.राज्य सूचना विज्ञान अधिकारी एन०आई०सी०, उन्नाव को इस निर्देश के साथ कि जनपद की वेब साइट पर District Survey Report आज ही अपलोड कराये।
- 4.समस्त उपजिलाधिकारी/तहसीलदार जनपद उन्नाव को व्यापक प्रचार-प्रसार हेतु।
- 5.नाजिर सदर कलेक्ट्रेट उन्नाव को मुख्य सूचना पट पर चस्पा करने हेतु।
- 6.जिला सूचना अधिकारी उन्नाव को इस निर्देश के साथ कि हिन्दुस्तान समाचार पत्र में उक्त विज्ञापित आज ही प्रकाशित कराना सुनिश्चित करें।


जिलाधिकारी,
उन्नाव।



DISTRICT SURVEY REPORT (D.S.R.) OF DISTRICT-UNNAO



1. INTRODUCTION

With reference to the gazette notification dated 15th January 2016, ministry of Environment, Forest and Climate Change, the District- environment Impact Assessment Authority (DEIAA) and District- Environment Assessment Committee (DEAC) are to be constituted by the divisional commissioner for prior environmental clearance of quarry for minor minerals. The DEIAA and DEAC will scrutinize and recommend the prior environmental clearance of ministry of minor minerals on the basis of district survey report. The main purpose of preparation of District Survey Report is to identify the mineral resources and mining activities along with other relevant data of district. This report contains details of Lease, Sand mining and Revenue which comes from minerals in the district. This report is prepared on the basis of data collected from different concern departments. A survey is carried out by the members of DEIAA with the assistance of Geology Department or Irrigation Department or Forest Department or Public Works Department or Ground Water Boards or Remote Sensing Department or Mining Department etc. in the district.

DISTRICT-UNNAO

The District is roughly a parallelogram in shape and lies between Latitude 26°8' N & 27°2' N and Longitude 80°3' E & 81°3' E. It is bounded on the North by District Hardoi, on the East by District Lucknow, on the South by District Rae Bareli and on the West by the Ganga which separates it from districts of Kanpur & Fatehpur.

The town of Unnao gives its name to the district of which it forms a part. About 1200 years ago, the site of this town was covered with extensive forests. Prashan Singh Chauhan, a Chauhan Rajput, cleared the forests, probably in the third quarter of the 12th century, and founded a town called Sawai Godo, which shortly afterwards passed into the hands of the rulers of the Kannauj, who appointed Khande Singh as the Governor of the place. Unwant Singh, a Chauhan Rajput and a lieutenant of the Governor, killed him and built a fort here, renaming the place as Unnao after himself. In ancient times, the area which comprises Unnao formed part of the Kosala Mahajanapada. It was later included in Oudh. This region has

been inhabited since antiquity as traces from ancient times remain at some places in the district.

After the First War of Indian Independence in 1857, power was transferred from the British East India Company to the British Crown, by the Queen's Proclamation of 1858. Once the order was restored, the civil administration was re-established in the district which was named Unnao, with headquarters at Unnao. It assumed its present size in 1869. The same year the town of Unnao was constituted a Municipality.

There were many rulers with a small estates ruled under the constituency of Unnao proclaimed by British Constituency during early 19's till 1948 until India has been handed over to the interim government of 1948. Later, in 1956 the local throne was handed over to Pahadpur estate, one of the strongest estates in Unnao and had been ruled under Rao ShivBali Singh Bahadur Chauhan, who had served his country as Royal Indian Army personnel in British rule.

Later, in 1970's the custody of Unnao had been succeeded by his descendant and his very own son Rao Ramsajeevan Singh Bahadur Chauhan, who also had served his country in Royal Indian Army. He is blessed with 5 children, 2 Daughters and 3 son and had married to Daughter of Raja Bahadur Singh of Dalpatkheda estate. These all were the unsung parts of history which is available in the history of Unnao book.

The Ganga, Kalyani and Sai are the main rivers of the district, the former making its western and southern boundaries and the latter, for the greater part of its course, forming its northern & eastern boundaries. Among the other mainstreams of the district are Kalyani, the Tanai, the Loni and the Morahi (Naurahi), all tributaries of the Ganga. These rivers generally run dry during the hot weather, but hold water during the greater part of the year and are utilized for irrigation.

River Ganga:

The only great river of the district is the Ganga which first touches the district near the village of Purwa Gahir, in pargana Bangarmau and flows south-eastward, separating this district from districts Kanpur and Fatehpur. Generally it flows from north-west to the south-east, but it makes several sharp bends such as those near Umriya Bhagwantpur, and Rustampur in tehsil Safipur, Rautapur in tehsil Unnao and Ratua Khera and Duli Khera in tehsil Purwa. The Ganga receives the Morahi near Baksar where it flows close to its old high bank. It leaves the district at a short distance from Baksar.

The river is not, however, put too much use either as a waterway or as a source of irrigation. There are several ferries for pedestrians and pilgrims but none of them approaches what may be termed a trade route. The river cannot, as a rule be utilised for irrigation owing to the height of the bank but certain of its small drainage channels or sotas, which run inland for a considerable distance in some parganas, are sometimes used to irrigate crops grown in lowlying alluvial lands. Otherwise, cultivated lands lie at great distances and cannot be irrigated from the river whose water would, in order to irrigate these lands, have to be passed through the sands on the sides of the river, and in the process be greatly washed, if not altogether absorbed. The main channel of the river is subject to constant variation and the cultivation in its immediate neighbourhood is, therefore of a shifting kind.

It appears from its old high bank that the river has a general tendency to shift its course to the west. In the days of Akbar, the river skirted the village of Ghatampur but has since then so altered its course that it now runs about 8 km to the south-west of this village.

Lakes

There is unusually large number of swamps & lakes of great size and value, particularly in the southern & eastern parts of the district. The larger lakes, which hold water all the year round, are the Kundra Samundar near Jhalotar, the lake near Nawalganj, the wide expanse of water near Kantha and the long chain

of lakes in pargana Mauranwan. In Tehsil Safipur, the more important tanks are those at Mawai-Bhari and Kursat and the Harial Tal near Mustafabad. In Tehsil Hasanganj, besides the Kundra Samundar at Mawai, there are the Kulli Bani and Jalesar tanks near Ajgain and the chain of lakes called Basaha, which it seems, partakes of certain characteristics of a stream also, travelling a distance of 96 km in the district and eventually leaving it for district Rae Bareli where it is reckoned as a tributary of the river Sai. In the western part of the Tehsil are the Katgari lake near Asiwan and the stretches of water at Amarpur, Sambha, Sheothana, Marenda & Asakhera, but in its northern and eastern parts, there are only small and very shallow tanks which dry up when rainfall is deficient. In Tehsil Unnao there are no important lakes, but a number of very shallow depressions, which get filled up with water during the rains and yield excellent crop of rice.

In Tehsil Purwa there are many lakes, situated in a well defined belt stretching along the whole length of the tehsil. The main among them are the lakes at Kantha, Bhadain, Unchagaon, Qila, Akhori, Miri, Zorawarganj and Sarwan. The Barhna tank near Sagauli, the Mohan and Sukrar lakes near Mauranwan, and several others, like the Bharda lake, skirting district Rae Bareli. Besides these, there are the tanks at Sahrawan, the Bhundi tank at Gulariha, and the Kumbha tank at Bhagwantnagar. The lakes at Kantha, Sagauli, and Barela contain water all the year round, while the others generally provide irrigation for the Rabi crops only, drying up in the years of drought. These lakes and tanks abound in fish, and singhara (water chestnut) is very extensively grown in them.

Topology

Unnao lies in the great plains of the Ganges and hence the land is highly fertile. The soil is mostly alluvial. The Ganges separates Unnao from Kanpur district.

The district is bounded by river Ganges in the west and the river Sai in the east. The entire district falling in Sai Sub-basin of the Ganges basin represents flat

topography. The irrigation in the district takes place through Sharda Canal network system and tubewells.

About 92% of the district area is under cultivation. The district has a subtropical climate. The district is mainly drained by the river Ganges and its tributaries Kalyani, Khar, Loni and Marahai in the western part of the district, and by Sai River in the eastern part of the district. All these rivers are perennial in nature.

About 87% area of the net sown area (3,00,000 hectares) is irrigated both by surface water (Sharda Canal network system) and ground water through shallow and moderately deep tubewells. The share of surface water irrigation is 48% while that of ground water is 52%. The economy of the district mainly depends on agriculture.

As per data of 2011 census, Unnao had a population of 3,108,367 out of which males were 1,630,087 and females were 1,478,280. The literacy rate was 66.37 per cent.

Tanning is the biggest industry in Unnao. Unnao is known for its leather industry and leather goods. Superhouse Group, Mirza Tanners, Rahman Exports, and Zamzam Tanners, Mahavir Spinfab Pvt. Ltd., Parash Nathtech Garments Pvt. Ltd., Real enterprises (part of Baqai exports Gujarat) in large factories in Unnao. Banthar Leather Technology Park, Magarwara Industrial area and Unnao Industrial area developed by UPSIDC are major industrial suburbs of Unnao. Unnao is known for printing & dyeing for 'Lihaf'(Quilts) and mosquito net production and major producers are Haq and sons dyeing and printing company and other major producers include F.R dyeing and printing works.

Transport

Rail- Unnao is seamlessly connected through Indian Railways. Unnao railway station is the junction point for Rae Bareilly, Allahabad, Hardoi, Balrampur situated at Lucknow-Kanpur stretch. Trains for major cities like Agra, Ahmedabad, Bangalore, Bhopal, Nagpur, Vijaywada, Chennai, Coimbatore, Palakkad, Bhubaneswar, Bhadrakh, Cuttack, Chennai, Chandigarh, Chitrakoot, Cochin, Delhi, Gorakhpur, Ernakulam, Hyderabad, Jaipur, Jammu Tawi, Jhansi, Jalandhar, Amritsar, Panipat, Gorakhpur, Gwalior, Darbhanga, Kota, Mumbai, Nagpur, Patna, Puri, Surat, Trivandrum, Vadodara, Ujjain, Varanasi, Vadodara, can be boarded here. The railway stations in Unnao Urban Agglomeration are:-

- Unnao Railway Station- This is the major junction railway station in the city of Unnao and is connected to major cities of India with many express/mail trains.
- Magarwara Railway Station- This is a passenger/EMU train station in the industrial suburb of Magarwara.
- Sonik Railway Station- This is a railway station towards East of Unnao city near UPSIDC Industrial Area and has only passenger/EMU trains stoppage.
- Kanpur Bridge Left Bank Station- This is a station within the municipal limits of Shuklaganj, the twin city of Unnao and has only passenger/EMU stoppage.

Kanpur Lucknow High Speed Railway

Unnao will be the only railway station between Kanpur and Lucknow of the planned high speed railways.

Road: The major national highway NH-25 passes through Unnao which has bypass from Unnao. The State Highway which is 78 km encompasses Unnao is in good condition. Lucknow-Agra Expressway which will be India's longest access-controlled expressway will pass through Unnao district and the work is under construction. It will be a six lane expressway.

Air Port

The nearest airport is Lucknow International Airport towards east (approx. 50 km) and Kanpur Airport towards west (approx. 25 km).

Divisions

Unnao district is divided into 6 tehsils: Unnao, Hasanganj, Safipur, Purwa, Bighapur, and Bangarmau.

There are 16 development blocks: Ganj Moradabad, Bangarmau, Fatehpur Chaurasi, Safipur, Miyanganj, Auras, Hasanganj, Nawabganj, Purwa, Asoha, Hilauli, Bighapur, Sumerpur, Bichia, Sikandarpur Sirausi, and Sikandarpur Karan.

The district had 6 Vidhan Sabha seats, namely Unnao, Purwa, Bhagwantnagar, Mohan, Safipur and Bangarmau. However, after delimitation in 2008, areas under Harha were merged with other Vidhan Sabha seats.

Thus, the district now has only 6 Vidhan Sabha seats. Other prominent Qasba of Unnao include Karowan B.K., Safipur, Neotani, Asiwan, Bangarmau, Mohaan, Magarwara, Shuklaganj, Purwa Maurawan, and Baksar. The district magistrate is Surendra Singh.

The Unnao Lok Sabha Constituency has the highest number of registered voters for the 2009 Lok Sabha elections, post de-limitation, with about 1.9 million voters.

District is covered by the survey of India Topo sheets, either fully or partly by 63B-1, 2, 5, 6, 7, 9, 10, 11, 12, 14, 15, 16 & 63F-2, 3 & 63A-8, 12.

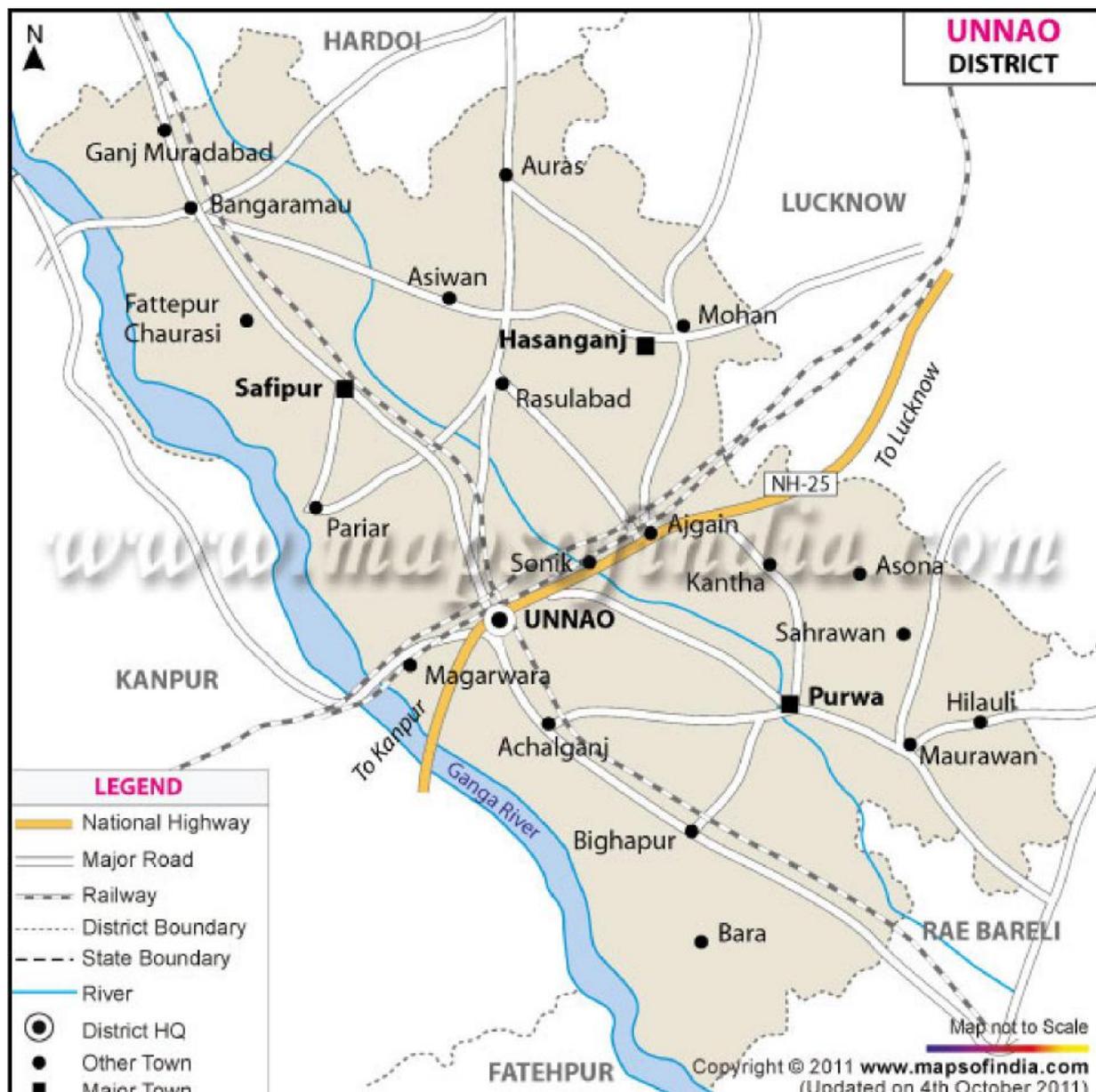


Plate-1 Physical Map of Unnao



Plate-2 Tehsil Map of Unnao

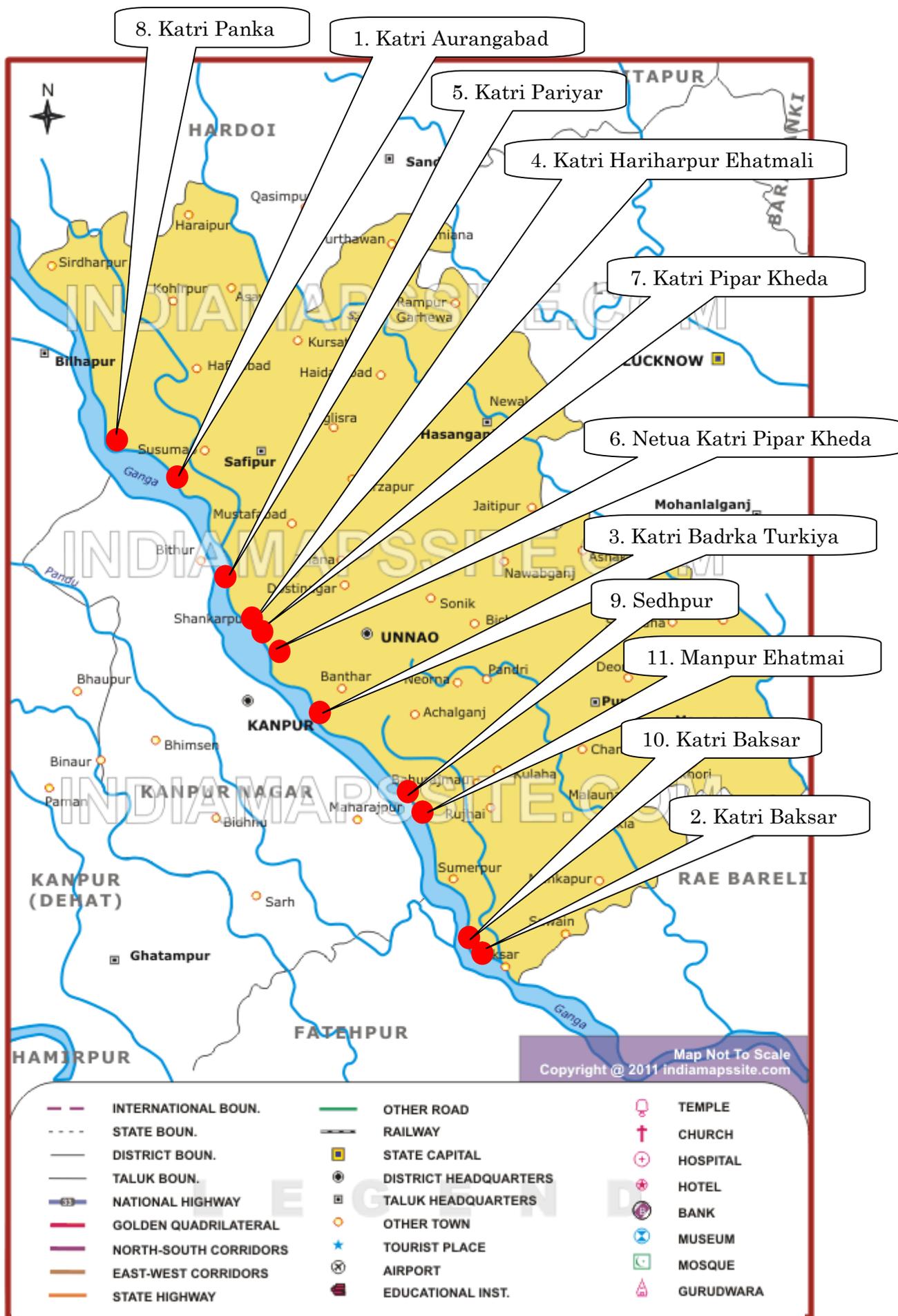


Plate-3, Drainage Map of Unnao Showing the allotted leases

2. OVERVIEW OF MINING ACTIVITY OF DISTRICT

Although, Unnao district is famous for its Tanning Industry. But, Mining of sand / ordinary sand along the major river Ganga as well as along their tributaries such as Kalyani, the Tanai, the Loni and the Morahi (Naurahi), all tributaries of the Ganga. These rivers generally run dry during the hot weather, but hold water during the greater part of the year and are utilized for irrigation & contribute a major potentiality of sand mining along which about three potential area has been notified for e- tendering & given short term Mining permits in these areas at different villages and material like ordinary sand are also permitted for quarrying of material at number of places.

3. LIST OF MINING LEASES/ SHORT TERM PERMIT OF SAND IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY.

List of leases are tabled below and marked on Plate-3 Drainage map of District:

S. No.	Village & Tehsil	Gata No.	Area (ha)	Mineable Reserve M ³	Period
1.	Vill- Katri Aurangabad, Tehsil- Shafipur	137Gha, 130Chha	4.74	1,06,837	6 month
2.	Vill- Katri Baksar, Tehsil- Bighapur	436Ghha, 437, 438	9.469	2,13,127	6 month
3.	Vill- Katri Badrka Turkiya, Tehsil-Sadar	523	38.54	867172	5 Years
4.	Vill-Katri Hariharpur Ehatmali, Tehsil- Sadar	102	15.0890	339455	5 Years
5.	Vill- Katri Pariyar, Tehsil- Sadar	286	26.0566	586191	5 Years
6.	Vill. Netua Katri Pipar Kheda (Khand-Aa), Tehsil – Sadar	526Mi, 859Mi, 2561Mi	149.79	2220000	5 Years
7.	Vill. - Katri Pipar Kheda (Khand-Ba),	859Mi, 2561Mi	149.79	2220000	5 Years

	Tehsil -Maholi				
8.	Vill.- Katri Panka, Tehsil- Bangarmau	1Ka	25.8987	582639	5 Years
9.	Vill.- Sedhpur, Tehsil- Bighapur	1	7.312	108360	5 Years
10.	Vill.- Katri Baksar, Tehsil- Bighapur	1Mi, 194	14.40	213600	5 Years
11.	Vill.- Manpur Ehatmai, Tehsil- Bighapur	13Mi	5.366	79500	5 Years

4. DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEAR MINOR MINERALS

Total Royalty or Revenue Received from Minor Minerals is tabled bellow-

Financial Year	Revenue (in lacs.)
2014-15	377.62
2015-16	1684.38
2016-17	1562.56
Upto Aug. 2017	988.42
TOTAL	4612.98

5 DETAIL OF PRODUCTION OF SAND OR BAJARI OR MINOR MINERAL IN LAST THREE YEARS

No mining lease has been allotted in last three years. Hence the production of sand or bajari is nil. Whereas the production details of ordinary soil and brick earth is given below-

Sr. No.	Year	Production in cum.
1.	2014-15	2679288
2.	2015-16	12031286
3.	2016-17	5208533
4.	Upto Aug. 2017	3294733

6. PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS

Sedimentation Process-

Rivers have a lot of energy and because they have energy, they do stuff. The obvious things rivers do with their energy is flow but, besides this, they also transport load, erode load and erode the channel through which they flow.

Erosion- Erosion is the breaking down of material by an agent. In the case of a river, the agent is water. The water can erode the river's channel and the river's load. A river's load is bits of eroded material, generally rocks, which the river transports until it deposits its load.

A river's channel is eroded laterally and vertically making the channel wider and deeper. In the upper stage of the river's course (close to the source of the river) there is little horizontal erosion and lots of vertical erosion. In the middle and lower stages vertical erosion is reduced and more horizontal erosion takes place.

There are several different ways that a river erodes its bed and banks. The first is hydraulic action, where the force of the water removes rock particles from the bed and banks. This type of erosion is strongest at rapids and waterfalls where the water has a high velocity. The next type of erosion is corrosion. This is where the river's load acts almost like sandpaper, removing pieces of rock as the load rubs against the bed & banks. This sort of erosion is strongest when the river is transporting large chunks of rock or after heavy rainfall when the river's flow is turbulent. Corrosion is a special type of erosion that only affects certain types of rocks. Water, being ever so slightly acidic, will react with certain rocks and dissolve them. Corrosion is highly effective if the rock type of the channel is chalk or limestone (anything containing calcium carbonate) otherwise, it doesn't have much of an effect.

Cavitation is an interesting method of erosion. Air bubbles trapped in the water get compressed into small spaces like cracks in the river's banks. These bubbles eventually implode creating a small shockwave that weakens the rocks. The shockwaves are very weak but over time the rock will be weakened to the point at which it falls apart.

The final type of erosion is attrition. Attrition is a way of eroding the river's load, not the bed and banks. Attrition is where pieces of rock in the river's load knock together, breaking chunks of rock off of one another and gradually rounding and shrinking the load.

Transportation -When a river erodes the eroded material becomes the river's load and the river will then transport this load through its course until it deposits the load. There are a few different ways that a river will transport load depending on how much energy the river has and how big the load is.

The largest of particles such as boulders are transported by traction. These particles are rolled along the bed of the river, eroding the bed and the particles in the process, because the river doesn't have enough energy to move these large particles in any other way. Slightly smaller particles, such as pebbles and gravel, are transported by salvation. This is where the load bounces along the bed of the river because the river has enough energy to lift the particles off the bed but the particles are too heavy to travel by suspension.

Fine particles like clay and silt are transported in suspension; they are suspended in the water. Most of a river's load is transported by suspension. Solution is a special method of transportation. This is where particles are dissolved into the water so only rocks that are soluble, such as limestone or chalk, can be transported in solution.

Capacity & Competence Rivers can only carry so many loads depending on their energy. The maximum volume of load that a river can carry at a specific point in its course is called the river's capacity. The biggest sized particle that a river could carry at a specific point is called the river's competence.

Deposition -To transport load a river needs to have energy so when a river loses energy it is forced to deposit its load. There's several reasons why a river could lose energy. If the river's discharge is reduced then the river will lose energy because it isn't flowing as quickly anymore. This could happen because of a lack of precipitation or an increase in evaporation. Increased human use (abstraction) of a river could also reduce its discharge forcing it deposit its load. If the gradient of the river's course flattens out, the river will deposit its load because it will be travelling a lot slower. When a river meets the sea a river will deposit its load

because the gradient is generally reduced at sea level and the sea will absorb a lot of energy. As rivers get nearer to their mouths they flow in increasingly wide, gentle sided valleys. The channel increases in size to hold the extra water which the river has to receive from its tributaries. As the river gets bigger it can carry larger amounts of material. This material will be small in size, as larger rocks will have broken up on their way from the mountains. Much of the material will be carried in suspension and will erode the river banks by abrasion. When rivers flow over flatter land, they develop large bends called meanders. As a river goes around a bend most of the water is pushed towards the outside causing increased erosion. The river is now eroding sideways into its banks rather than downwards into its bed, a process called lateral erosion. On the inside of the bend, in contrast, there is much less water. The river will therefore be shallow and slow-flowing. It cannot carry as much material and so sand and shingle will be deposited. This is called a point bar or slip off slope. Due to erosion on the outside of a bend and deposition on the inside, the shape of a meander will change over a period of time. Notice how erosion narrows the neck of the land within the meander. In time, and usually during a flood, the river will cut right through the neck. The river will then take the new, shorter route. The fastest current, called the thalweg, will now tend to be in the centre of the river, and so deposition is likely to occur in gentler water next to the banks. Eventually deposition will block off the old meander to leave an oxbow lake. The oxbow lake will slowly dry up, only refilling after heavy rain or during a flood. Streams lose velocity and make deposits when their gradient decreases, when the volume of water decreases, when there is an increase in cross section, when they encounter obstructions, or when they enter still water. They deposit alluvial fans, alluvial cones, piedmont alluvial plains, channel fill, bars, flood plains and deltas.

7. GENERAL PROFILE OF THE DISTRICT

S.No.	Particulars	Statistics
1	General Information	
	Geographical Area	Geographical Area 4589 km ²
	Geographical Position	Latitude 26°8' N & 27°2' N and Longitude 80°3' E & 81°3' E. It is bounded on the North by District Hardoi, on the East by District Lucknow, on the South by District Rae Bareli and on the West by the Ganga which separates it from districts of Kanpur & Fatehpur.
	Administrative Division/Number of Tehsil	Administrative Division –Lucknow Unnao district is divided into 6 tehsils: Unnao, Hasanganj, Safipur, Purwa, Bighapur, and Bangarmau. There are 16 development blocks: Ganj Moradabad, Bangarmau, Fatehpur Chaurasi, Safipur, Miyanganj, Auras, Hasanganj, Nawabganj, Purwa, Asoha, Hilauli, Bighapur, Sumerpur, Bichia, Sikandarpur Sirausi, and Sikandarpur Karan.
	No. of Development Blocks	There are 16 development blocks: Ganj Moradabad, Bangarmau, Fatehpur Chaurasi, Safipur,

		Miyanganj, Auras, Hasanganj, Nawabganj, Purwa, Asoha, Hilauli, Bighapur, Sumerpur, Bichia, Sikandarpur Sirausi, and Sikandarpur Karan.
	Population (As Per Census 2011)	District Unnao has population of 3,108,367 of 1,630,087 Male and Females were 1,478,280. The literacy rate was 66.37 per cent.
2	Geographology	
	Major Physiographic Units	The alluvium formation of the district, comprising sand, silt & clay with occasional gravel, is of the early quaternary to sub-recent age
	Major Drainage	The Ganga, Kalyani and Sai are the main rivers of the district, form the main drainage system.
	Temperature	Its minimum temperature is 6°C & maximum 43.34°C
3	Land use (ha)	
	Geographical area (ha)	460200
	Forest area (ha)	17000
	Cultivable area (ha)	372800
	Land under non-agricultural use (ha)	55400
4	Major Soil Types	Bhur or Sandy soils, Matiar or Clayey soils, and Dumat or Loam soils.

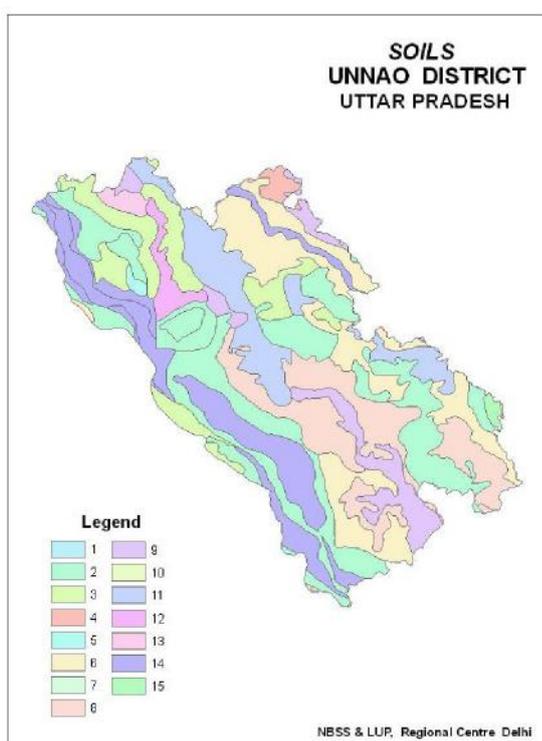
5	Number of Ground Water Monitoring Stations of CGWB (10.05.2016)		
6	Hydrogeology		
	Pre-Monsoon depth of water level During 2007	2.15 to 14.13 mbgl	
	Post Monsoon depth of water level during 2007	2.06 to 13.33 mbgl	
7	Mining Scenario		
	Total No. Notified Sand Lease	11 (2 Short Term Permit + 9 Leases for 5 years)	
	Total Area of Sand Leases	446.72 (ha)	
	Total Royalty or Revenue Received from Minor Minerals	Financial Year	Revenue (in lacs.)
		2014-15	377.62
		2015-16	1684.38
		2016-17	1562.56
		Upto Aug. 2017	988.42
		TOTAL	4612.98

8. LAND UTILIZATION PATTERN IN THE DISTRICT: FOREST, AGRICULTURE, HORTICULTURE, MINING ETC.

Land-Use Pattern:

Land use pattern of the district (Latest statistics)	Geographical area	Cultivable area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
Area in (000 ha)	460.2	372.8	17.0	55.4	3.4	11.0	2.7	11.7	27.0	23.14

SOILS OF UNNAO DISTRICT (U.P.):



Major soils of Districts are Deep sandy soil having an area of 78,300 ha., Deep, stratified loamy soils are 67,100 ha. & Deep, fine soils are of an area of 52,200 ha.

The image reflects the soil profile of district on the basis of slope

(slope: 1-3%)

1. Deep, loamy soils and slightly eroded

Alluvial plain (0-1% slope)

2. Deep, loamy soils and slightly eroded.

3. Deep, loamy soils and slightly eroded associated with silty soils.

4. Deep, fine soils and slightly saline/sodic associated with loamy soils with slightly salinity/sodicity.

Plate-4 Soil Map of Unnao

5. Deep, fine soils moderately saline and sodic associated with loamy soils, slightly eroded.
6. Deep, fine soils and slightly eroded associated with loamy soils slightly saline and moderately sodic.
7. Deep, fine soils and slightly eroded associated with loamy soils.
8. Deep, loamy soils and slightly eroded associated with loamy soils with moderate salinity and sodicity and moderate water logging.
9. Deep, loamy soils and slightly eroded associated with loamy soils slightly saline/sodic.
10. Deep, loamy soils and slightly eroded associated with silty soils slightly saline/sodic and moderately sodic.

Old Alluvial plain with river left out channels/Oxbows/point bars (1-3% slope)

11. Deep, fine soils, moderately saline/sodic associated with loamy soils with moderate salinity/sodicity

Recent Alluvial Plain (1-3% slope)

12. Deep, loamy soils, slightly eroded associated with silty soils and slightly eroded
13. Deep, silty soils, moderately saline and sodic associated with loam soils and slightly eroded

Active Flood Plain (1-3% slope)

14. Deep, sandy soils with moderate flooding associated with stratified loamy soils and slight flooding.
15. Deep, stratified loamy soils, with severe flooding associated with loamy soils with moderate flooding.

9. PHYSIOGRAPHY OF THE DISTRICT:

Lowlands : These tracts comprising about 23.7 % of the total area of the district, lie along the Ganga in the west and along the Sai in the extreme north and east. The lowland of the Ganga also known as the *tarai* or *khadar*, lies between the main channel of the river, and its old high bank. It varies in width from a km to about 10 km getting wide wherever the Ganga meets its tributaries eg. in the north-west and in pargana Pariyar. The narrowest section of the tract lies in the pargana Unnao near the railway bridge over the Ganga. The Lowland is liable to frequent floods and is thinly populated. A considerable area of the tract is overgrown with grass and babul trees. The characteristic soil is stiff clay except where sand has been deposited by fluvial action. The lowland produces usually a precarious Kharif harvest and good Rabi crops in a succession of dry years but it is disappointing in a wet cycle. Along the immediate bank of the river, there is a narrow strip of alluvial land, constantly subject to inundations. The Ganga lowlands comprise 19% of the total area of the district. The lowland of Sai is similar though smaller in extent. It contains mostly a stiff and moist soil liable to get waterlogged in wet years and produces *reh* which considerably reduces its fertility.

Upland : Extending from the old high bank of Ganga to the Sai valley, the upland comprises about 76% of the area of the district. The course of the high bank, though irregular, is well defined. On top of the high bank, there is a belt of high soil, with a width of 1.5 km to 7 km. In the upland, the surface is gently undulating, the water table low, and the irrigation facilities scanty. Another belt of similar light soil is met with along the banks of the Sai. The soil occasionally rises to *bhur* and, in parganas Sikandarpur & Faterpur Chaurasi, there are substantial sandy bluffs projecting into the *Tarai*. Further inland, the tract is mainly of fertile stiff loam broken by large usar wastes and shallow rice depressions. At places, ridges of sandy soil cause large depressions in which clay predominates. The deeper of these depressions form permanent lakes & tanks. The depths and sizes of these lakes and tanks increases as one proceeds from north to south. The streams running through the tract are comparatively

unimportant, with the exception of the Basha and Loni streams. The country on either side of of the former, which springs in the *bhur* tract in the north west of pargana Jhalotar-Ajgain and runs, like a stream, through parganas Gorinda-Parsandan, Purwa & Mauranwan and then leaves the district for Rae Bareli, is characterised by frequent outcrops of *bhur*. It provides a cheap and easy means of irrigation and excellent crops of rice are, in many places, grown in its bed. The Loni is shallow at its source, but during the rains, it flows in a wide bed in which excellent crops of transplanted paddy are grown.

10. RAINFALL OF DISTRICT UNNAO MONTH WISE

The average annual rainfall is 840.8 mm and mainly occurred from July to October. Remaining months of the year are mainly dry. During monsoon surplus water is available for deep percolation to ground water

The whole year may be mainly divided into four seasons:

- Summer season from April to June;
- Monsoon season from July to October;
- Post monsoon season from October to November; and
- Winter season from December to February.

Rainfall	Normal Rainfall (mm)	Normal Rainy Days (Number)	Normal Onset (Specify week and month)	Normal Cessation (Specify week and month)
SW monsoon (June-sep)	742.3	47	2nd week of June	4th week of September
Post monsoon (Oct-Dec)	41.0	10	-	-
Winter (Jan-March)	41.2	-	-	-
Pre monsoon (Apr-May)	16.3	-	-	-
ANNUAL	840.8	57		

11. GEOLOGY AND MINERAL WEALTH

1. Geology:- Geologically the district forms part of the vast Indo-Gangetic alluvial tract, of which the origin is attributed to a sag in the earth's crust, formed, in the upper eocene times, between the northwardly drifting Gondwanaland and the rising Himalayan belt, and gradually filled in by sediments so as to constitute a level plane with a very gentle seaward slope.

The alluvium formation of the district, comprising sand, silt & clay with occasional gravel, is of the early quaternary to sub-recent age. The older alluvium called bhangar, forms slightly elevated terraces usually above the flood levels. It is rather dark in colour generally rich in concretions and nodules of impure calcium carbonate, locally known as kankar. The newer alluvium, called khandar, forming the lowlands between the Ganga and Bhangar, is light coloured, poor in calcareous content and composed of lenticular beds of sand, gravel and clays. The economic minerals found in the district are kankar, reh and sand.

1.1 Regional Geology:-

The Unnao district is a part of the Central Ganga alluvial plain mainly constituted of clay, silt, sand, gravel and kankar sediments of Quaternary age. These alluvial deposits of the area may be broadly classified into newer and older litho-units on the basis of sedimentary constitution, depositional and developmental geological history.

The older alluvial litho-unit is mainly constituted of the cyclic sedimentary formations of oxidized clay, silt and grey to brown sand occasionally mixed with kankar and ferro-magnesium nodules. The major part of the study area is occupied by this litho-unit. This litho-unit had developed in the river-channel depositional environment between Middle to Upper Pleistocene Age. The Varanasi older alluvial plain is the main litho geomorphic unit developed in this older alluvium. This older alluvial unit may be further classified into clayey and sandy facies, as per their sedimentary constitution. The newer alluvium litho-unit constitutes mainly the present flood plain channel alluvium & sand bars etc. The

newer alluvium had developed mainly during the Holocene period. This litho-unit is also constituted of the cyclic sedimentary formations of oxidized clay, silt and grey fine to medium grained sand.

The geological succession of Unnao Region:

The generalized sub-surface geological sequence is as follows:

Age	Litho -Unit	Sedimentary Constitution
Holocene	Newer Alluvium	Channel Alluvium Levee Alluvium
-----Disconconformity-----		
Middle to Upper Pleistocene	Varanasi Older Alluvium	Clayey Facies Sandy Facies
-----Unconformity----- (Basement Rock)		

2. Local Geology

The main mineral wealth of the district is sand and the local geology of the area is sandy.

The facieses of the river bank deposits are sandy, silty, and clayey. The sandy older alluvium is located at an elevation of 10–20 m above the river level and makes the higher interfluves areas. It is free from frequent flooding and therefore most suitable for settlement and agriculture. Newer alluvium forms the river valley terrace and is located at an elevation of 5–7m above river level. This terrace is not suitable for settlement but can be used for agriculture, as it is often affected by flood. The flood plain is located at an elevation of 2–5 m above the river level. Water reaches almost every year on this plain. It is neither suitable for settlement nor for agriculture (Bhardwaj et al. 2010a, b). Only sand can be extracted as a building material supplement. The facieses is prominent in the lower and middle

part measuring about 120- to 200-cm thick unit is devoid of sedimentary structures, only faint low-angle discordances are visible at some places.

The sandy unit is underlain by 0.60- to 0.50-m thick silt-soil unit in river channel while, along bank it is up to 2.00m thick. The upper most part is 10- to 20-cm thick clayey unit. The facieses of the river bank deposits are laterally persistent, only thickness and percentage of different litho units may vary from place to place.

MINERAL WEALTH :

The main mineral wealth of the district is sand. 446.62 ha. area has been marked having potential of 11305322 MT sand production. the list of marked area has already been detailed in section 3 in detail.

In addition to the above details are tabulated here for additional detail

a) District wise detail of river or stream and other sand source

Drainage system with description of main rivers

S. No.	Name of the River	Area drained (Sq. Km)	% Area drained in the District
1.	Ganga	2000	43%

Salient Features of Important Rivers and Streams:

S. No.	Name of the River or Stream	Total Length in the District (in Km)	Place of origin
1.	Ganga	118.0	Gaumukh, Gangotri Glacier at an elevation of 3892 mt. MSL.

Portion of the River or Stream Recommended for Mineral Concession	Length of area recommended for mineral concession (in kilometer)	Average width of Area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)
446.62 ha.	4.96 km.	900	4467200

b) District wise availability of sand or gravel or aggregate resources

Mineral Potential

Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineral (MT)	Mineable Potential
Nil	Nil	18842202	11305322	

S. No.	River or Stream	Portion of the river or stream recommended for mineral concession	Length of area Recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
1.	Ganga	446.72 ha.	4.96	900	4467200	11305322 MT
Total for the District		446.72 ha.	4.96	900	4467200	11305322 MT

c) District wise detail of existing mining leases of sand and aggregates.

All the allotted leases are under process of Environmental Clearance and there is no existing mining lease in the district.
