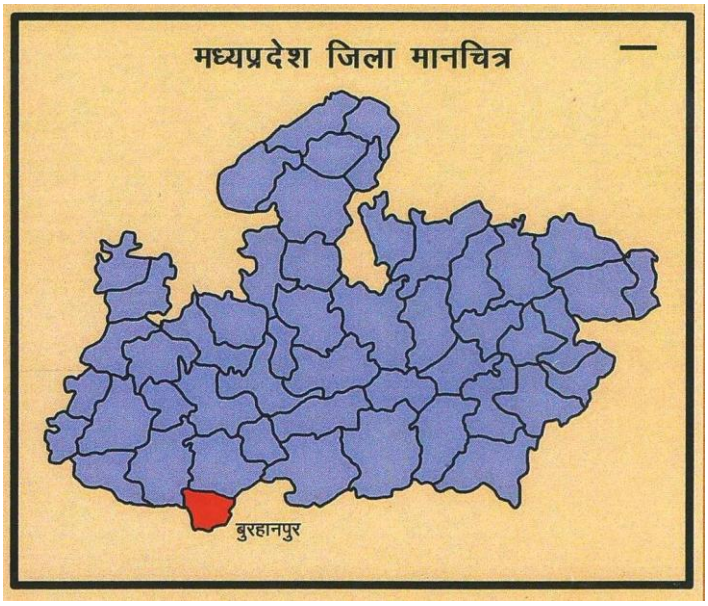
DISTRICT SURVEY REPORT OF BURHANPUR DISTRICT

AS PER NOTIFICATION NO. S.O. 141(E) NEW DELHI, THE 15TH JANUARY, 2016 OF MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE



DIRECTORATE OF GEOLOGY & MINING

REGIONAL OFFICE INDORE

1-: INTRODUCTION

The present report is prepared in the light of notification no. S.O. 141(E) New Delhi, the 15th January, 2016 of MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE. This will a model and guiding document, which is compendium of available mineral resources, geographical set up, environmental and ecological set up of the district and replenishment of minerals.

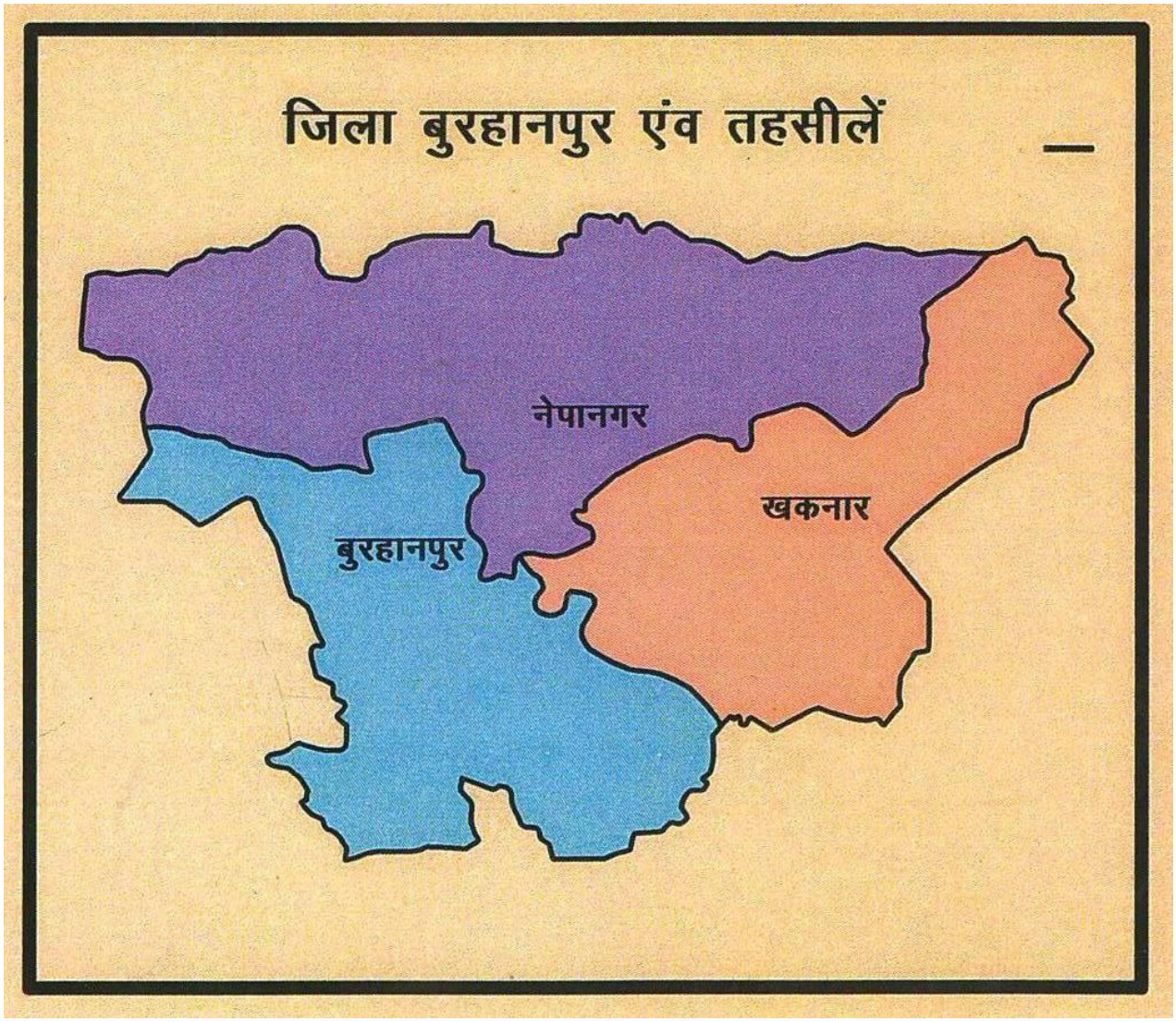
River channels and their floodplains are important sources of construction grade aggregate materials like sand and gravel. The durability of river-borne coarser clastics (e.g. sand and gravel) and their sorting by fluvial action make them best suitable raw materials / ingredients for building constructions. Most of the rivers in the world are overexploited for living and non-living resources and today the challenge posed to the society is to restore its natural ecology. As transportation and construction infrastructure expanded since the mid-twentieth century, the demand for construction grade sand also increased exponentially. The market demand of river sand is high throughout the world and Madhya Pradesh is not an exception.

Burhanpur district is located in the south western part of Madhya Pradesh .The present Burhanpur district is carved out from the then East Nimar(Khandwa) district on august,15, 2003. The district has an area of 3427 km². The district lies between north latitude $21^0$11' to $21^0$34' and east longitude of $75^0$59' and $76^0$48" and falls under the Survey of India Topo Sheet No. 46 O & 55C. The district is bounded in the North by Khandwa district, in the East by Amaravati district of Maharashtra State, in the South by Buldana and Jalgoan districts of Maharashtra state and in the West by West Nimar district of Madhya Pradesh. The district is divided into two development blocks namely Burhanpur and Khaknar. As per Census 2011, the total population of the district is 756993.

2-: OVERVIEW OF MINING ACTIVITY IN THE DISTRICT

Land and water are the basic aspects of development of any economy. Economic development is the output of development of these natural resources in a sustainable manner. District is well endowed with fabulous amount of minor minerals i.e. building stone and sand.

In all a sum total of 38 quarry leases of stone and 10 auction leases of sand with a sum total of 238.834 hectare area, which is 0.0384% of the area of the district, have been sanctioned in the Khandwa district of M.P. and fetches 2.72 crores of revenue during 2014-15. Calcite is the only major mineral known to occur in the district.



3-: THE LIST OF MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY

बुरहानपुर जिले में स्थित स्वीकृत उत्खनिपट्टो की सूची					
क्र.	ग्राम एवं तहसील	ख.क्र.	रकबा	वैधता अवधि	लेटीट्यूड / लांगीट्यूड (अंक्षांश / देशांश)
1	मोहम्मदपुरा बुरहानपुर	689/1	2.000	29/05/2016	A 21 17 00.63 76 12 41.92, B 21 17 01.99 76 12 46.41 C 21 17 05.40 76 12 47.39, D 21 17 06.67 76 12 41.58
2	डोंगरगांव बुरहानपुर	12	2.000	08/03/2017	A 21 16 15.99 76 19 10.96, B 21 16 16.45 76 19 18.34 C 21 16 21.13 76 19 16.86, D 21 16 20.86 76 19 10.61
3	एमागिर्द बुरहानपुर	635/3	0.85	26/10/2017	
4	देडतलाई खकनार	116	2.000	26/10/2017	A 21 29 34.87 76 44 58.50, B 21 29 35.02 76 45 00.60 C 21 29 37.30 76 45 00.59, D 21 29 37.81 76 44 58.33
5	बोहड़ला बुरहानपुर	36	2.000	30/05/2017	LA-21-16' 16.8" LO- 76-18'58.5"
6	बहादरपुर बुरहानपुर	655, 656	2.000	07/06/2019	A 21 16 56.86 76 10 14.03, B 21 16 55.80 76 10 20.93 C 21 17 2.01 76 10 22.79, D 21 17 3.14 76 10 15.52
7	खडकोद बुरहानपुर	659	4.000	21/08/2017	LA -21-16'-37.7"N, LO-76-16'-37.7"E
8	देडतलाई खकनार	116	2.000	18/09/2018	A 21 28 49.96 76 47 23.11, B 21 28 50.27 76 47 30.86 C 21 28 56.49 76 47 31.08, D 21 28 57.09 76 47 22.80
9	डबालीखुर्द नेपानगर	67	2.000	09/07/2019	A 21 24 24.60 76 22 13.82, B 21 24 24.95 76 22 19.45 C 21 24 30.32 76 22 19.52, D 21 24 30.15 76 22 13.62
10	डोंगरगांव बुरहानपुर	9	2.000	05/01/2019	A 21 16 21.96 76 18 51.01, B 21 16 21.82 76 18 55.98 C 21 16 24.58 76 18 56.27, D 21 16 24.71 76 18 50.87
11	खडकोद बुरहानपुर	671	2.000	27/01/2019	A 21 16 25.81 76 16 38.21,B 21 16 35.12 76 16 45.02 C 21 16 35.17 76 16 42.33 D 21 16 28.83 76 16 38.23
12	खडकोद बुरहानपुर	676	2.000	27/01/2019	A 21 16 42.53 76 16 46.88, B 21 16 47.26 76 16 51.93 C 21 16 50.27 76 16 48.54, D 21 16 51.14 76 16 40.20
13	डोंगरगांव बुरहानपुर	12	2.000	22/07/2019	A 21 16 17.24 76 19 01.77, B 21 16 17.11 76 19 08.87 C 21 16 25.18 76 19 05.87, D 21 16 25.83 76 19 03.67
14	दर्यापुर बुरहानपुर	619, 620/2	1.680	25/11/2019	
15	खडकोद बुरहानपुर	671	1.600	20/02/2020	A 21 16 28.70 7 16 40.28, B 21 16 28.69 76 16 43.17 C 21 16 35.14 76 16 42.26, D 21 16 34.37 76 16 39.77
16	खडकोद बुरहानपुर	667, 669	1.320	23/11/2019	A 21 16 40.86 76 16 35.88, B 21 16 40.12 76 16 38.39 C 21 16 47.07 76 16 33.77, D 21 16 45.87 76 16 32.14
17	हसीनाबाद खकनार	149/1	1.000	05/05/2020	A 21 17 37.19 76 23 25.99, B 21 17 36.92 76 23 29.33 C 21 17 40.66 76 23 30.00,D 21 17 42.58 76 23 25.94
18	खडकोद बुरहानपुर	642	1.500	25/06/2020	A 21 16 33.85 76 16 13.95, B 21 16 33.36 76 16 17.93 C 21 16 35.05 76 16 17.93, D 21 16 36.61 76 16 13.62
19	हसीनाबाद खकनार	9	0.830	15/08/2020	A 21 18 40.68 76 31 25.00, B 21 18 41.03 76 31 27.77 C 21 18 43.06 76 31 27.83, D 21 18 42.51 76 31 24.88
20	खडकोद बुरहानपुर	659	2.000	24/11/2020	A 21 16 34.47 76 16 24.41 B 21 16 37.03 76 16 27.38 C 21 16 41.41 76 16 23.18, D 21 16 38.75 76 16 20.29

21	हसीनाबाद खकनार	233/3	2.000	11/01/2021	LA.- 21-17'-08.6"N LO.- 76-23'-35.4"E
22	बहादरपुर बुरहानपुर	655	1.000	23/02/2021	LA - 21-16'-52.4"N, LO-76-11'-08.7"E
23	डोंगरगांव बुरहानपुर	9	1.000	14/03/2021	A 21 16 15.35 76 19 14.23, B 21 16 16.98 76 19 19.65 C 21 16 20.52 76 19 19.98, D 21 16 20.50 76 19 14.20
24	सातपायरी तह. नेपानगर	480	2.000	05/03/2016	A 21 26 47.69 76 23 22.24, B 21 26 47.93 76 23 26.81 C 21 26 52.12 76 23 26.81,D 21 26 51.48 76 23 22.05
25	दर्यापुर बुरहानपुर	479/1, 479/2	1.000	29/04/2021	A 21 16 49.17 76 18 55.79, B 21 16 49.34 76 19 00.12 C 21 16 52.48 76 18 58.13, D 21 16 52.49 76 18 55.80
26	खडकोद बुरहानपुर	675/2	0.900	11/04/2016	A 21 16 43.00 76 16 41.44, B 21 16 43.27 76 16 45.25 C 21 16 45.16 76 16 44.41, D 21 16 45.49 76 16 41.35
27	बोहरडा बुरहानपुर	191	1.400	19/10/2011	A 21 17 03.43 76 12 40.13, B 21 17 05.98 76 12 48.96 C 21 17 07.32 76 12 49.39, D 21 17 06.40 76 12 37.43
28	दर्यापुर बुरहानपुर	628/4	1.000	21/12/2021	A 21 17 37.73 76 16 05.86, B 21 17 39.25 76 16 10.83 C 21 17 40.33 76 16 10.68, D 21 17 39.10 76 16 05.96
29	बोहरडा बुरहानपुर	183	2.000	15/02/2022	A 21 16 43.75 76 12 49.28 , B 21 16 44.02 76 12 56.08 C 21 16 48.29 76 12 56.02 , D 21 16 47.99 76 12 50.93
30	रेहटा बुरहानपुर	16	1.500	27/04/2021	A 21 16 03.65 76 16 33.77, B 21 16 00.70 76 16 39.98 C 21 16 07.13 76 16 42.22
31	खडकोद बुरहानपुर	677/1	0.750	30/12/2019	LA-21-16'36.6"N, LO-76-16'49.0"E
32	बाड़ाजैनाबाद नेपानगर	185	2.030	23/01/2025	A 21 21 06.64 76 19 51.96, B 21 21 07.77 76 19 58.15 C 21 21 03.21 76 19 58.80, D 21 21 02.76 76 19 57.93 E 21 21 03.67 76 19 57.73, F 21 21 03.20 76 19 55.75 G 21 21 04.04 76 19 52.56
33	फोफनारखुर्द बुरहानपुर	182/1	2.000	23/04/2025	LA-21-14'-33.04"N, LO-76-19'-41.41"E
34	खड़कोद	671	2.000	14/09/2025	LA-21-16'-47.9"N, LO-76-16'-37.6"E
35	हसीनाबाद बुरहानपुर	215/2, 216/2	1.700	13/10/2025	A 21 17 20.14 76 23 11.66, B 21 17 23.52 76 23 9.48 C 21 17 19.92 76 23 8.76, D 21 17 23.54 76 23 8.28
36	डबालीखुर्द नेपानगर	53	7.200	29/11/2025	LA-21-24'-31.3, LO-76-22'-43.7"E
37	डबालीखुर्द नेपानगर	67	1.907	25/11/2025	A 21 24 24.59 76 22 13.14, B 21 24 24.99 76 22 22.19 C 21 24 34.62 76 22 21.92, D 21 24 30.87 76 22 12.20
38	रायतलाई खकनार	54	0.850	07/12/2021	A 21 26 27.93 76 40 58.79, B 21 26 25.89 76 41 07.73 C 21 26 30.61 76 41 09.95, D 21 26 29.53 76 41 04.61
39	मोरदड़खुर्द	30, 35	3.40	22/02/2026	A 21 16 29.93 76 16 50.50, B 21 16 29.67 76 16 56.55 C 21 16 26.80 76 16 56.33 D 21 16 26.23 76 16 53.38 E 21 16 20.53 76 16 53 28 F 21 16 25.72 76 16 46.91 G 21 16 25.93 76 16 49.95

बुरहानपुर जिले में स्वीकृत रेत खदानों की सूची						
क.	ग्राम एवं तहसील	नदी	ख.क.	रकबा	वैधता अवधि	लेटीट्यूड / लांगीट्यूड (अंक्षांश / देशांश)
1	सुखपुरी	मोहना नदी	331, 242	5.50	16.09.2015 से 31.03.2020 तक	N 21 31 12.06 E 76 07 16.68
2	रेहटा	मोहना नदी	51,96	5.00	30.01.2016 से 31.03.2019 तक	N 21 15 27.0 E 76 16 11.2
3	हतनूर	ताप्ती नदी	442	5.00	16.09.2015 से 31.03.2020 तक	N 21 15 25.3 E 76 12 30.0
4	गव्हाना	ताप्ती नदी	122, 318, 52, 1	6.00	07.11.2015 से 31.03.2020 तक	N 21 15 13.3 E 76 11 05.2
5	बोरगांवखुर्द	उतावली नदी	271	5.00	16.09.2015 से 31.03.2020 तक	N 21 21 04.0 E 76 13 30.7
6	दर्यापुर	ताप्ती नदी	209	8.11	16.09.2015 से 31.03.2020 तक	N 21 25 01.4 E 76 36 20.0
7	नाचनखेडा	ताप्ती नदी	1	7.00	अनुबंध नही हुआ है।	N 21 14 12.2 E 76 08 28.4
8	बोरगांवखुर्द	उतावली नदी	272	5.00	अनुबंध नही हुआ है।	-
9	बसाड़	ताप्ती नदी	101	10.500	अनुबंध नही हुआ है।	-
10	जैनाबाद ताप्ती जैंसिंगपुरा	ताप्ती नदी	291 / 1, 346 एवं 1	12.220	अनुबंध नही हुआ है।	-

4. DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS

विवरण	वर्ष 2012–13	2013–14	2014–15
गौण खनिज	4,14,97,299 / –	2,57,70,929 / –	2,72,24,171 / –

5. DETAILS OF PRODUCTION OF SAND OR BAJRI OR MINOR MINERAL IN LAST THREE YEARS

विवरण		वर्ष 2012–13 घ.मी.	2013–14 घ.मी.	2014–15 घ.मी.
गौण खनिज	गिट्टी	205820	127311	77027
	मुरम	182218	91106	42794
	रेत	341077	310216	135648

6. PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS

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. The intensity of lateral and vertical erosion is dictated by the stage in the river's course, discussed in more detail here but essentially, 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 *corrasion*. 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 *saltation*. 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 much load 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-: THE GENERAL PROFILE OF THE DISTRICT

S. No.	Items	Statistic
1	**General Information**	
	(i) Geological Area	3427 km²
	(ii) Administrative Division :	
	Number of Tehsils	3
	Number of Blocks	2
	Number of villages	263
	(iii) Population	757847
	(iv) Normal Annual Rainfall (mm)	812.00
2	**Geomorphology**	
	Major Physiographic Units :	Structural hills of deccan traps, flood plain, valley fills, inter montane depression ,pediment (Volcanic)

	Major Drainages	Tapti, Chhota Tawa, Sukta, Bhim Nadi	
3	**Land Use in Ha ('000)**		
	(a) Forest Area	201.919 Ha	
	(b) Net area sown	104.016 Ha	
	(c) Gross cropped area	124.672 Ha	
4	**Major Soil Types**	Black Cotton soil and alluvium	
5	**Principal Crops**	Paddy, Wheat, Jowar, Maize, Gram , soyabean,Banana & Sugarcane	
6	**Irrigation by Different Sources**	**Nos.**	**Irrigated Area (Ha '000)**
	Dug wells	14761	25.90
	Tube well/Bore wells	3386	15.00
	Micro Irrigation	23	15.40
	Tanks/Ponds		-
	Total Irrigated Area	-	43.40
7	**Predominant Geological Formations :**	Deccan Trap basalt and Alluvium.	
8	**Pre-Monsoon** Depth to water level during 2012 **Post-Monsoon** Depth to water level during 2012 Long Term water level trend in 10 years (2003-2012)	6.38 m to 32.35 m 1.47 m to 32.35 m Pre monsoon: Rising trend: 10.83 –12.31 cm/yr Post Monsoon Declining trend: 5 –10.14 cm/yr	

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

Total Area and Classification of Area in Dhar District of MADHYAPRADESH State for the year ending 2013- 14 (in Hectares)

District	Reporting Area For Land Utilization Statistics	Area Under Mining activities	Forests	Not Available For Cultivation			Other Uncultivated Land Excluding Fallow Land				Fallow Land			Net Area Sown	Total Cropped Area	Area Sown More than Once
				Area Under Non Agricultural Uses	Barren and Un-Cultivable Land	Total	Permanent Pastures and Other Grazing Lands	Land Under Misc Tree Crops and Groves not Included in Net Area	Cultivable Waste Land	Total	Fallow Lands Other than Current Fallows	Current Fallow	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
BURHANPUR	342741	3156.818 (0.385%)	201919	15393	6363	21756	12510	-	-	12510	1822	718	2540	104016	124672	20656

9-: PHYSIOGRAPHY OF THE DISTRICT

The area of the district exhibits an undulating topography which includes highly dissected plateau, linear ridges, residual hills and low lying plains. It can be divided into two distinct physiographic units Viz., the northern and southern uplands and the Central low lands. A prominent hill range (Satpura Range) traverses the southern part of the district. The highest elevation in the district is 715 m msl in the amba reserve forest, on the Satpura Range in the Western part. The river Tapti carves out a narrow valley bifurcating this range into two parts . The northern area exhibits a low rising hill range and the area in the central part is generally plain dotted with isolated residual hills. The lowest elevation is around 249 m a msl, along Tapti River, southwest of Burhanpur town. Alluvium consisting of sand, clay and gravels occurs along Tapi river course. Black cotton soil is found as a thin surface soil cover mainly in a country mainly covered with Deccan Trap.

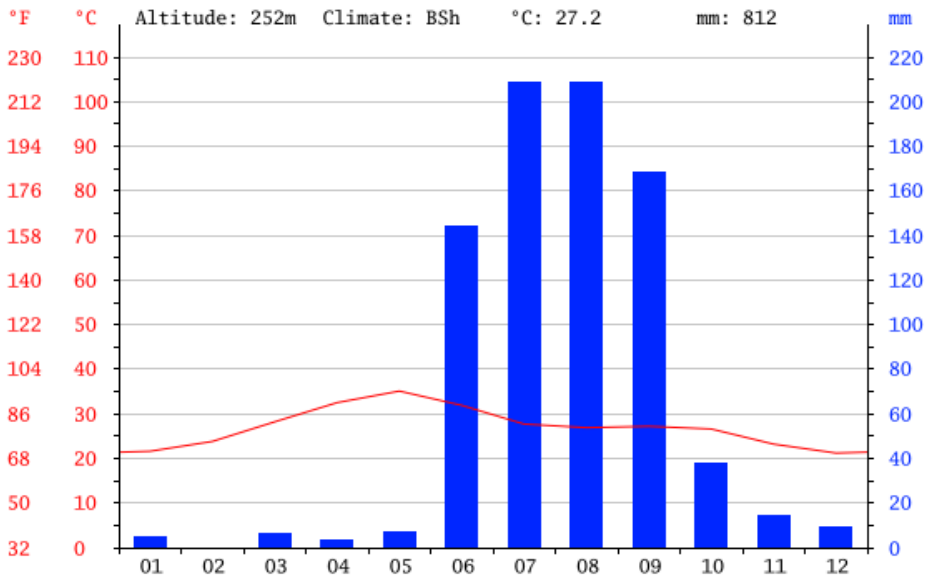
10-: RAINFALL: MONTH-WISE

The normal annual rainfall of the district is 812mm. About 89% of the annual rainfall takes place during the southwest monsoon. July is the wettest month of the year and about 28% of the annual rainfall takes place only during this month. During the southwest monsoon season, the relative humidity generally exceeds 84% (August month) and the rest of the year is drier. The driest part of the year is the summer season,when relative humidity is less than 41%.The wind velocity is higher during the pre-monsoon period as compared to post-monsoon period. The maximum wind velocity, 15.8 km/hr observed during the month of June and minimum, 4.3 km/hr during the month of November.

MONTH-WISE

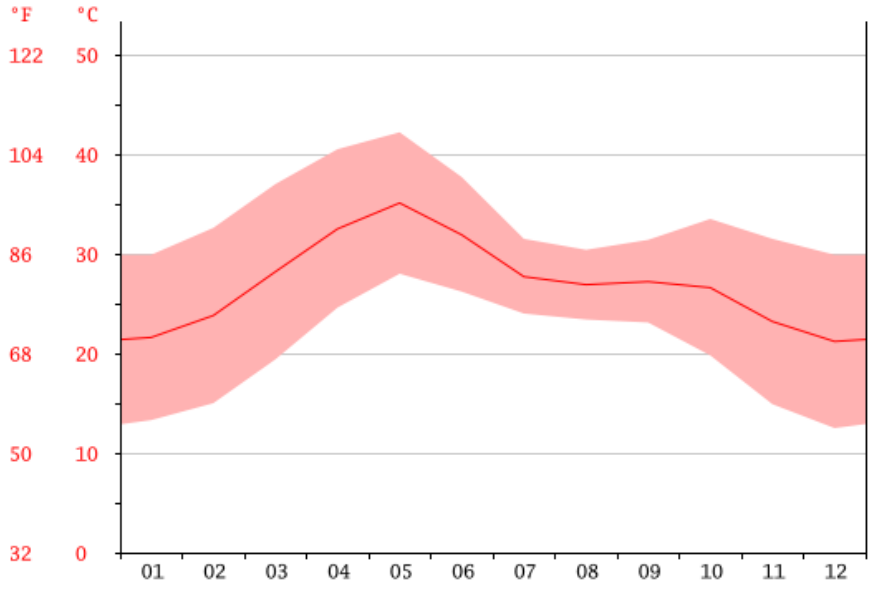
	RAINFALL IN MILIMETERS		
Month	2013	2014	2015
January	0.00	9.40	41.50
February	0.00	23.40	13.10
March	0.00	12.30	81.50
April	0.00	23.40	21.47
May	0.00	0.70	5.30
June	344.10	48.80	148.00
July	439.00	590.50	167.80
August	387.90	384.10	355.80
September	194.60	242.00	116.60
October	97.80	0.00	3.00
November	0.00	14.10	0.00
December	1.70	36.40	0.00
TOTAL	1465.10	1385.10	954.07

Climategraph



Precipitation is the lowest in February, with an average of 0 mm. In July, the precipitation reaches its peak, with an average of 209 mm.

Temperature graph

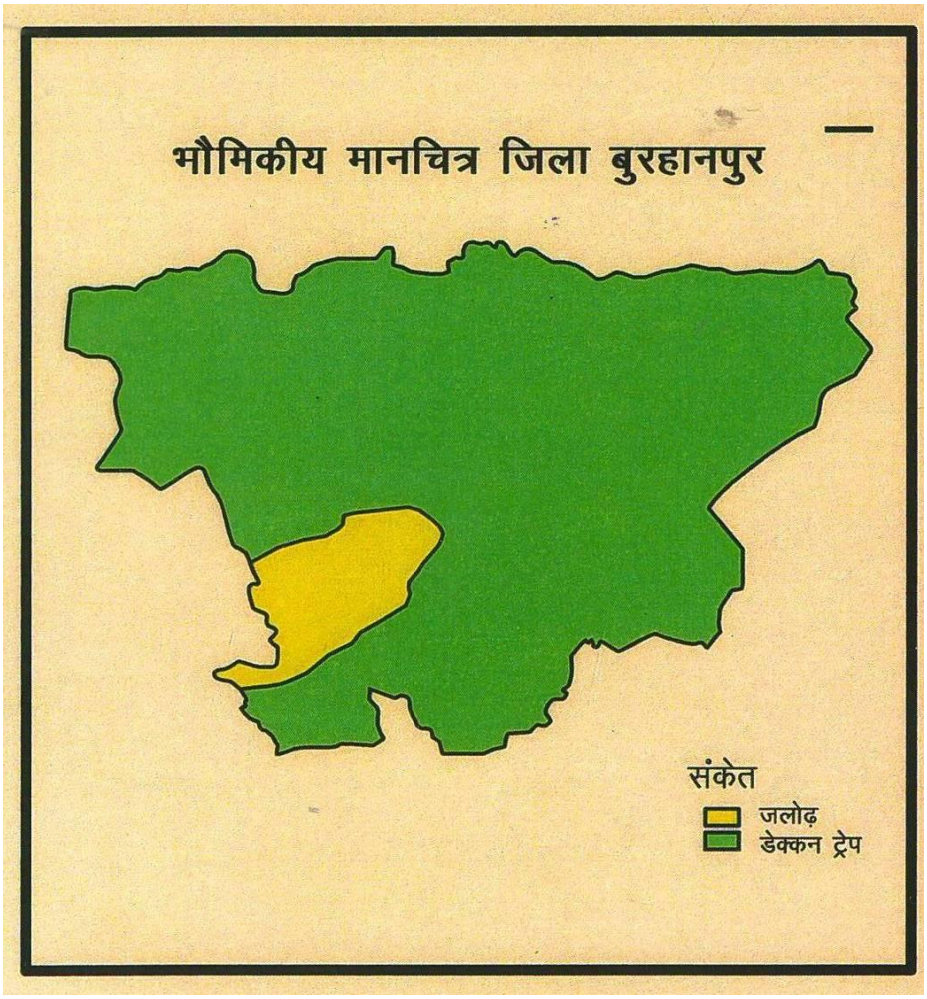


At an average temperature of 35.1 °C, May is the hottest month of the year. At 21.2 °C on average, December is the coldest month of the year.

11-: GEOLOGY AND MINERAL WEALTH

The area constitutes part of Tapi and purana river basins & characterised by thick pile of various basaltic flows.The geological sequence of the district is as given below :-

Age	Formation	Rock Type
Recent	Tapti Alluvium	
Eocene Cretaceous	Deccan trap.	Basalt with Intertrappean lime stone and Calcite vein.



2.1 DECCAN TRAP BASALT :-

The Burhanpur district is characterized by the presence of thick pile of basaltic flows belonging to Deccan trap basalt.Alluvium in the district occurs as narrow strip along the Tapi river and as an extensive blanket over the traps south of Gawilgarh hill range forming the Purana alluvium. The individuals flows are 15 to 20 meter thick. Older flows are highly weathered and transformed into fertile soils. The basalts are fine grained, hard compact rock. Colour varies from light grey to dark grey. Deccan trap are generally regarded as fissure eruptions. Amygdaloidal types with infillings of various

forms of silica and zeolites and vesicles or spherules or nodules of green earth (Celadonite) also occur. Spheroidal weathering is characteristic feature of Deccan Trap basalt. This can be observed in entire area. Spheroid from 10mm to 30mm diameter.Three sets of vertical joints have been observed measuring N 135^0, N 75^0 and N-S. These joint planes have infilling of calcite and quartz at places.An attempt has been made to demarcate different flows of basalt in the area of topo sheet No. 55 C/2.

Individual flow can be recognised by following criteria. (a) In each flow the upper and lower portions are vesiclar with a nonvesicular inner portion. (b) Grain size of top and bottom portions of flow. (C) Presence of red bole bed in between adjacent flow. Six flows have been identified at Asirgarh hill. Description of individual flow is as follows :-

BASAL FLOW :

This flow is composed of hard, compact, black to dark grey in colour and is fine grained. Collumnar jointing can be observed in this flow in nala and river beds. Maximum area of this flow is covered by black cotton soil.

FLOW I :

It is light grey, somewhat coarser than the basal flow. At the contacts, vesicular basalt is occuring. Vesicles are filled with zeolites and quartz. This flow is weathered in most of the area and gives rise to brownish soil and murrum.

FLOW II :

This is dark grey, fine grained, traversed by three sets of vertical joints. Joints are striking N 135^0 N-S and N 75^0. This flow has been mapped in southern part of topo sheet No. 55 C/2.

FLOW III :

This is hard, compact, grey in colur and porphyritic in texture. The Phenocrysts of feldspar and augite are present. Spheroidal weathering is common. This flow has been mapped in southern portion of topo sheet No. 55 C/2.

FLOW IV :

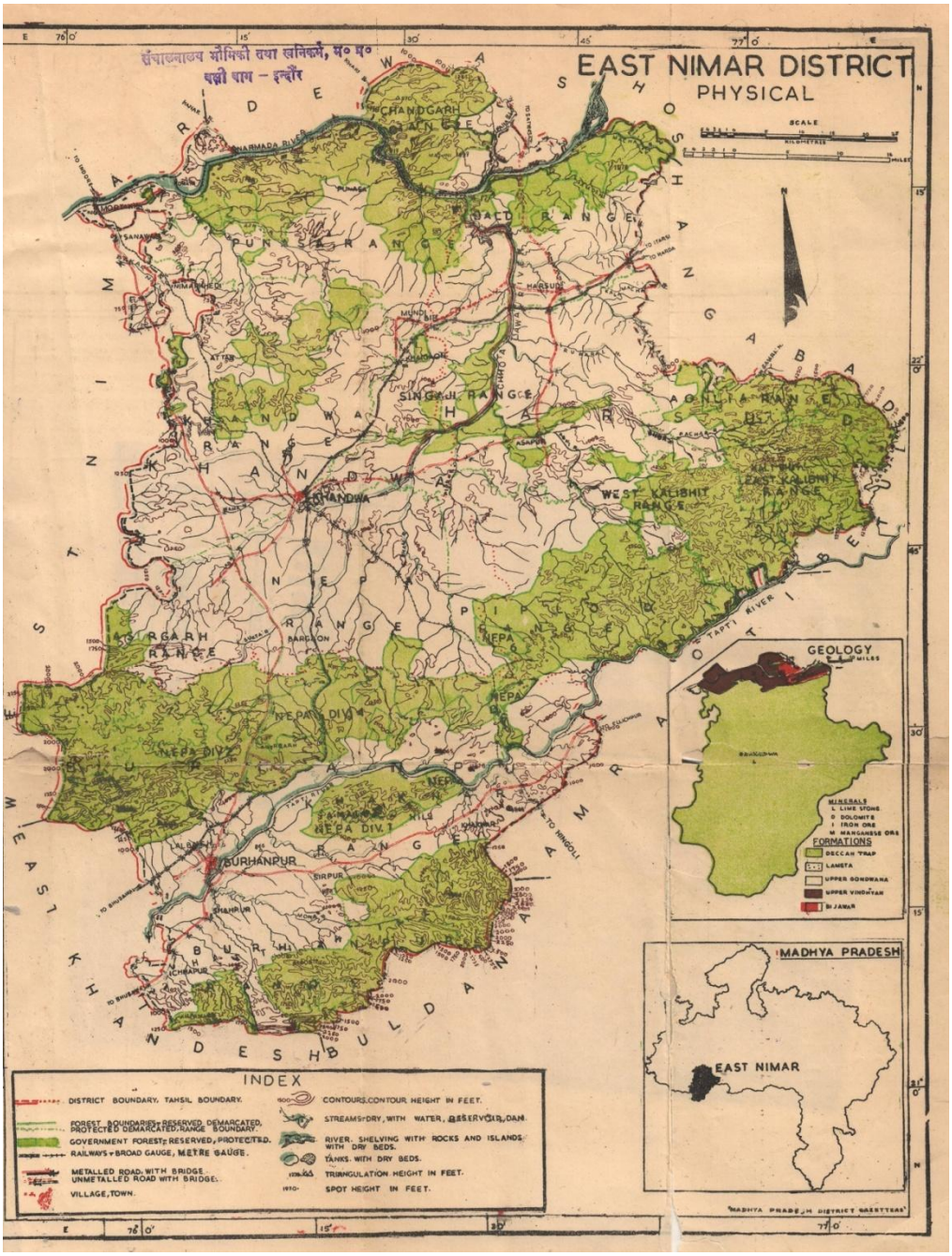
This is again light to dark grey. Porphyritic in texture, with Phenocrests of augite and feldspar and is separated by the presence of red bole bed from Flow III. At the contacts the basalt has gone much vesicular.

2.2 INTER TRAPPEAN :-

Thin lenticular beds of fossiliferous intertrappean limestone have been noticed at near Jhiri and Jhanjhar village (55 C/7).The limestone is off white and argillaceous in nature. It is weathered and converted into clay in nala section. Physa are recovered from this bed.The limestone is offwhite and argillaceous in nature. Thickness of limestone is 3 to 3.5 m. in this area. Due to ground water activity the tuffaceous limestone has also been formed in the small fractures. The extension of the intertrappean limestone is about 1.5 kms. up to Jhanjhar village. The limestone is off white to light grey in colour. Brecciation is also noticed. Old workings have been seen near east of village Jhiri.

The major portion of the district is occupied by Deccan trap Basalts. Small quantity of Calcite, Quartz, Zeolites occur as a cavity and fracture filling in the Deccan traps Basalts. These are invariably uneconomical. However, calcite veins of variable dimensions, intruding into Deccan trap Basalt have been reported around villages Dewatiya, Komal Khera, Gardev,

Basali, Boribuzurg, Utambi and Sarai-Garhi in the forest area. These calcite veins can be exploited economically. The Basalts are being utilized in building and road construction. In Basaltic areas black cotton soil and brownish soil are being used in making bricks.



A DISTRICT WISE DETAIL OF RIVER OR STREAM AND OTHER SAND SOURCE

Drainage system with description of main rivers

SERIAL NO.	NAME OF THE RIVER	AREA DRAINED(KM^2)	%AREA DRAINED IN THE DISTRICT
01	Tapi	65145 km^2	about 100% of the area of district is drained by Tapi rivers through its tributaries.
02	Utavli	Originate in the district	about 10% of the area of district is drained by Utavli river and ultimately joins river Tapi.
03	Sukhi	Originate in the district	about 15% of the area of district is drained by Sukhi river and ultimately joins river Tapi.
04	Mohna	Originate in the district	about 15% of the area of district is drained by Mohna river and ultimately joins river Tapi.

Salient Features of Important Rivers and Streams

SERIAL NO.	NAME OF THE RIVER OR STREAM	TOTAL LENGTH IN THE DISTRICT(IN KM)	PLACE OF ORIGIN	ALTITUDE AT ORIGIN
01	Tapi	Approx.115 km across the district in E-W direction.	Multai in Betul dist.	752 Meter
02	Utavli	Approx.30	Utavli peak in reserve forest	573 meter
03	Sukhi	Approx.22	Bhalana peak in reserve forest	843 Meter
04	Mohna	Approx.40	Raypur peak in reserve forest	838 Meter

PORTION OF THE DISTRICT OR STREAM RECOMMENDED FOR MINERAL CONCESSION	Village	Tehsil	AREA RECOMMENDED FOR MINERAL CONCESSION (IN HECTARE)	MINEABLE MINERAL POTENTIAL(IN METRIC TONE) (60% OF TOTAL MINERAL POTENTIAL)
331, 242	सुखपुरी	बुरहानपुर	5.50	15,000
51,96	रेहटा	बुरहानपुर	5.00	10,000
442	हतनूर	बुरहानपुर	5.00	50,000
122, 318, 52, 1	गव्हाना	बुरहानपुर	6.00	40,000

271	बोरगांवखुर्द	बुरहानपुर	5.00	20,000
209	दर्यापुर	नेपानगर	8.11	40,000
1	नाचनखेडा	बुरहानपुर	7.00	40,000
272	बोरगांवखुर्द	बुरहानपुर	5.00	25,385
101	बसाड़	बुरहानपुर	10.500	50,000
291/1, 346 एवं 1	जैनाबाद ताप्ती जैंसिंगपुरा	बुरहानपुर	12.220	51,760

MINERAL POTENTIAL

Boulder(MT)	Bajri(MT)	Sand (MT)	Total Mineable mineral potential(MT)
Huge as majority of the district is occupied by the minor minerals i.e. basalt. But as per figures received from District Mining Section 77027 M^3 of aggregate and 42794 M^3 of Murum was produced in 2014-15	It is associated with river sand	It is found mainly in Tapti, Mohna and Utavli rivers, though the resources as per their area in the district is huge, the production of sand and bajri is 135648M^3 in 2014-15	Huge, immense as most of the district is occupied by minor minerals which include basalt .and granite and other stones as road metal and soil. Thus mineral potentials are immense.

ANNUAL DEPOSITION

Sr. no.	River or stream	Portion of the district or stream recommended for mineral concession	Area recommended for mineral concession (in Hectare)	Mineable mineral potential(in metric tone) (60% of total mineral potential
1	Tapti	Along the River banks in khasra nos. 122, 318,52&1 of village Guvahana, khasra nos. 1 of village Nachankheda, khasra nos. 209 of village Daryapur, khasra nos. 101 of village Basad and khasra no. 291/1,346&1 of village Jainabad Jaisinghpura	48. 83	221760 M^3
2	Mohna	Along the river banks in khasra nos. 331, 242 of village Sukhpuri, khasra nos. 51, 96 of village Rehta and khasra no. 442 of village Hatnur parts of the district	15.50	75000 M^3
3	Utavli	Along the river banks in khasra nos. 271 & 272 of village Borgaon Khurd	10.50	45385 M^3
		TOTAL	74.83 Hectare	342145 M^3