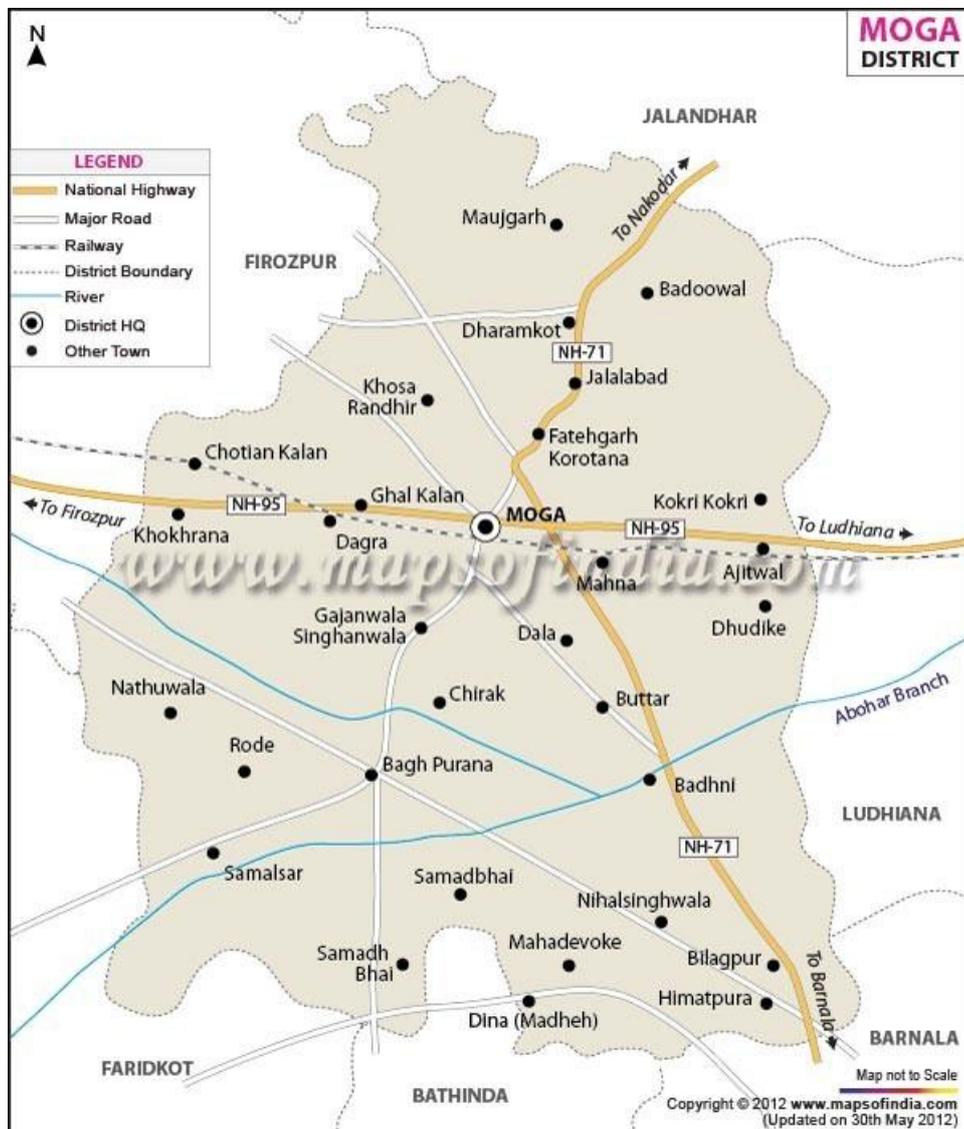


**DISTRICT SURVEY**  
**REPORT**  
**MOGA**





**DISTRICT SURVEY REPORT IN COMPLIANCE TO  
THE NOTIFICATION DATED 15.01.2016 AND 20.01.2016  
ISSUED BY MINISTRY OF ENVIRONMENT, FOREST  
AND CLIMATE CHANGE, GOVERNMENT OF INDIA**



Ministry of Environment, Forest and Climate Change issued notification on 15.01.2016, for the preparation of District Survey Report of River bed mining and other minor minerals. This report is in accordance with Appendix 10 of the notification. It is also mentioned here that the procedure of preparation is as per notification.

### **Sutlej River**



## **DISTRICT SURVEY REPORT, MOGA**

With reference to Gazette notification of 15th January 2016 of 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 mining of minor minerals. The DEIAA and DEAC will scrutinize and recommend the prior environmental clearance of mining of minor minerals on the basis of District Survey Report. This will be a model and guiding document which is a compendium of available mineral resources, geographical set up, environmental and ecological set up of the district and is based on data of various departments, published reports, journals and websites.

### **INTRODUCTION :-**

Moga district became the seventeenth district on the map of Punjab State on 24th day of November 1995. Before this, Moga was the Sub-Division of Faridkot District. Moga town which is the head quarter of the District is situated on Ferozepur - Ludhiana road. Area of Dharamkot Block with 150 villages has been merged in Moga District vide Punjab Govt. Notification No.2/36/98-R. 2(1) 6408 dated 05/11/1999.

## **1. Location**

Moga District falls under the jurisdiction of Ferozpur Division. Its boundary touches the boundaries of district Jalandhar in the north, district Ludhiana in east, district Sangrur in the south and districts Faridkot & Ferozpur in the West. It stretches between longitudes  $75^{\circ}15'$  E to  $75^{\circ}25'$  E and between latitudes  $30^{\circ}35'$  N to  $31^{\circ}15'$  N.

It spreads over an area of 2235 km<sup>2</sup> which comes to 4.44% of the area of Punjab State.

## **1. Administrative Set up**

From administrative point of view, the district is divided into four Sub- Divisions (i.e. Moga, Baghapurana, Nihal Singh Wala and Dharamkot) and five Blocks. The details are as under:-

<u>Sr. No.</u>	<u>Sub- Division</u>	<u>Block</u>
1	Moga	Moga-1 & Moga-2
2	Baghapurana	Baghapurana
3	Nihal Singh Wala	Nihal Singh Wala
4	Dharamkot	Dharamkot

## **3. Towns**

The District consists of five towns namely Moga, Baghapurana,

Badhni Kalan, Nihal Singh Wala & Dharamkot. Moga is the biggest and Badhni Kalan is the smallest amongst the towns.

#### **4. No. of Inhabited Villages**

There are 328 inhabited villages in the district. Total number of Panchayats in the district is 337. All the villages are electrified and connected with metaled roads.



## **5. Municipal Council**

<b>Sr. No.</b>	<b>Municipality Name</b>
1	Moga Municipal Corporation

## **6. Education**

<b>Sr. No.</b>	<b>Type of Institute</b>	<b>Number</b>
1	Primary School	362
2	Middle School	84
3	Higher Sr. Sec. School	155
4	Govt. ITI	01
5	Govt. Polytechnic	01
6	Private Polytechnic	08
7	Colleges	70

## **7. Population**

As per 2011 census, total population of the district is 995746 which is 3.59% of the total population of the Punjab State. Out of the total population, 525920 are males and 469826 are females. The rural

population of the district comes to be 768500 which is 77.18% of the district population & urban population accounted to 227246 which is 22.82% of the district population.

## **8. Occupation and area distribution**

Moga is an economically well off city as compared to many other towns of Punjab and Haryana. Economic Development of the district depends upon agriculture. From employment point of view 79.95% population belongs to rural area and is engaged with agriculture and allied activities. Area of the villages in the district is reported 223040 hectares. Moga economy also depends upon the manufacturing of agricultural implements. Now the main economy of Moga is based on Sand Mines. The district is located near the Sutlej river which runs in the plains of Moga carrying sand which settles as the river enters the area of district Moga.

## **9. Agriculture and cropping pattern**

### **Agricultural Land**

Sr.No.	Statistics	Area in Hectares
1	Net Area Sown	195247
2	Area sown more than once	192455
3	Total cropped area	387705

4	% of Gross irrigated to Gross cropped area	99.99
5	% of Net irrigated area to Net area sown	100
6	% of Net irrigated area to Net area sown for wheat	89.37
7	% of Net irrigated area to Net area sown for rice	93.21
8	% of Net irrigated area to Net area sown for sugarcane	Nil
9	Production of wheat (in tons)	806
10	Production of rice (in tons)	852
11	Production of sugarcane (in tons)	Nil
12	Yield of wheat (in kg)	4617
13	Yield of rice (in kg)	4843
14	Yield of sugarcane (in kg)	Nil
15	Intensity of cropping	198

## **10. Geomorphology and Climate**

Moga has an average elevation of 329 meters (1,080ft). It is densely populated town surrounded by the Sutlej stream. National Highway NH- 95 along with NH-71 serves as a crucial lifeline for the people of Moga and all those who come to Moga.

### **Climate patterns:**

**Spring:** The climate remains the most enjoyable part of the year during the spring season (from mid-February to mid-April).

Temperature varies between (max) 16° C to 27°C and (min) 9°C to 28°C.

**Autumn:** In autumn (from mid- September to mid- November), the temperature may rise to a maximum of 30°C. Temperatures usually remain between 16°C to 27°C in autumn. The minimum temperature is around 11°C.

**Summer:** The temperature in summer (from mid-May to mid- June) may rise to a maximum of 48°C (rarely). Temperatures generally remain between 35° C to 45°C.

**Monsoon:** During monsoon (from mid-June to mid-September), Moga receives moderate rainfall and sometimes heavy to very heavy rainfall (generally during the months of July to September). Usually the rain bearing monsoon winds blow from south-west to south-east. Mostly the city receives heavy rain from southwest monsoon winds (which is mainly a persistent rain). In winter the district may receive rains from the Westerly Disturbances coming in from the Mediterranean sea.

**Winter:** Winters (November to Mid-March) are mild but it can sometimes get quite chilly in Moga. Average temperatures in the winter remain at (max) 7°C to 15°C and (min) 0°C to 8°C.

**Rainfall:** The south-west monsoon generally arrives in the first week of July and continues up to the end of August. About 70% of the rainfall in the district is received during the period from June to September and as much as about 18% rainfall occurs during the period from December to February.

The following table shows the average annual rainfall of Moga District:

Sr. No.	Year	Average annual rainfall
1	2011-12	472.01 mm
2	2012-13	472.10 mm
3	2013-14	218.90 mm
4	2014-15	619.70 mm
5	2015-16	441.4 mm
6	2016-17	590.0 mm
7	2017-18	534.3 mm
8	2018-19	524.07 mm

**Humidity:** Relative humidity is generally high in the mornings, exceeding 70 percent except during the summer season when it is less than 50 per cent. The humidity is comparatively less in the afternoons. The driest part of the year is the summer season when the relative humidity in the afternoons is about 25 percent or less.

**Winds:** Winds are generally light with some strengthening in the summer and early part of the monsoon season. In the post- monsoon and cold season winds that are light and variable in direction in the morning and mostly from the west or north-west in the afternoons. In April and May, winds are mainly from direction between north-west and north –east in the mornings and between west and north –east in the afternoons. By June, easterlies and south- easterlies also blow and in the south-west monsoon season, winds are more commonly from directions between north-east and south- east.

## **OVERVIEW OF MINING ACTIVITY**

Mainly three types of Minor Mineral constituents such as Stone, Bajri and Sand are required for any type of construction apart from other materials like cement and steel. In the earlier times, the mud houses/buildings were constructed with the use of mud. However with the passage of time, new technique of development activities were started and as such the demand of Minor Mineral started is an increasing trend. In order to meet the requirement of raw material for construction, the extraction of sand is carried out exclusively from the river beds and outside river beds. The demand of sand is mainly met through by river borne sand.

The local residents used to lift sand from the river beds to meet out

their bonafide requirement. However after notifying the Punjab Minor Mineral rules 1964, and ammended rules in 2013, the mining is regulated in accordance with the rules. At present about 09 number of mining quarries have been granted under the above said rules in the Dharamkot tehsil of the district and out of which 02 quarries are currently in operational and 01quarry is under the process of auction.

**LIST OF MINING QUARRIES IN THE DISTRICT**  
**AND LOCATION AREA AND PERIOD OF**  
**VALIDITY:-**

<b>Sr.No.</b>	<b>LOCATION</b>	<b>AREA</b>	<b>Khasra No.</b>	<b>PERIOD OF VALIDITY</b>	<b>Riverbed/ Dry</b>
1	2	3		4	5
1	Chak Singh Pura	0.74 Ha	11//7 min.(6-16), 15(8-0)	01/12/2017 to 30/11/2019	Dry
2	Bassian	8.30 Ha	3//8,9,10,11,12,13,18,19,20,21,22,23,10//7/2, 10/16, 10/17, 25/1, 10/6, 10/15, 10/2, 10/3, 10/4, 10/5, 10/7	11/02/2016 to 10/02/2021	Riverbed
3	Chak Tarewala	1.56 Ha	4//6(3-5), 4//15(5-2), 4//16	01/12/2017 to 30/11/2022	Riverbed

			(6-18), 5//10/2 (1-10), 5//11/1 (0-3), 6//14/2(6-0), 6//17 (8-0)		
4	Chak Bhora	4.73 Ha	8//8 (9-18), 8//13 (8-0), 8//18 (8-0), 8//19/1 (4-0), 8//19/2 (4-0), 8//15 (8-0), 8//14 (8-0), 16/1 (8-0), 2(7-4), 8/1(3-7), 9/1(3-7), 16//19 (6-0), 16//20(8-0), 16//21 (7-14)	01/12/2017 to 30/11/2022	Riverbed
5	Gatti Jattan	3.23 Ha	4/22(8-0), 10//1(8-0), 2(8-0), 9(8-0), 10(8-0), 11(8-0), 12(8-0), 13(7-16)	19/12/2017 to 18/12/2022	Riverbed
6	Ramgarh	3.90 Ha	24//11(8-0), 24//12(8-0), 24//13(8-0), 24//14(8-0), 24//15/2(5-2), 24//20(8-0), 24//16(8-0), 24//17(8-0), 24//18(8-0), 24//19(8-0)	13/07/2018 to 12/07/2020	Dry
7	Jaspur Gehliwala Block- I	4.92 Ha	2//22(7-2), 5//2(6-10), 5//7(1-13), 5//8/1(0-19), 5//8/2(4-2), 5//9(7-8), 5//12(8-0), 5//13(8-0), 5//14(4-18),	04/05/2018 to 03/05/2020	Dry

			5//17/1(1-8), 5//19(8-0), 2//19/1(7-8), 3//16(8-0), 3//25(8-0), 3//15(8-0), 4//5(8-0)		
8	Jaspur Gehliwala Block- II	3.23 Ha	15//20/1/2(4-0), 15//20/1/1(1-7), 15//20/2(2-13), 15//21(8-0), 16//21(8-0), 16//22(8-0), 16//23/2/1(4-0), 16//23/1(2-14), 16//23/2/2(1-6), 16//24(8-0), 17//16(8-0), 17//25(8-0)	04/05/2018 to 03/05/2020	Dry
9	Sanghera	17.89 Ha	13//6,23//1,2,3/1 ,4,5/1,7/2,13//7, 13,14,15,16,17, 18,19,22,23,24, 25/1,15//16,25/1 ,14//4,7,8,11,12, 13,15/2,17,18/1, 19/1,20/2,28//8/ 2,13,14,15,16,1 8,21//16,17,24,2 9//5/1,5/2,22//1 1/2,20,1,2/1,9/2, 12,10,20//21,30/ 1,2/1/1	Newly auctioned	Riverb ed

Total deposits of sand that can be extracted from these mines per year in district Moga are 487640 tons.

Revenue of Rs.8,30,28,866/- has been received in the last three years.

Detail of production of sand or minor mineral in last three years in the district:

Sr. No.	Year	Sand (in MT)	Gravel (in MT)
1	2016	154909	Nil
2	2017	114213	Nil
3	2018	102686	Nil

## **PROCESS OF DEPOSITION OF SEDIMENTS**

### **About river Sutlej:**

Sutlej is one of the major river of Indus system. It originates at Mansarovar, Tibet and enters in India near Namigia. It flows through Himachal Pradesh and Punjab states of India near the Nangal Town. Sutlej enters the Anandpur Dun, a valley/plain area between the Siwalik and the outer range of the Himalayas. This valley runs from Nangal in the North to Kakrala village in the South over a distance of about 50 km (31 miles) and has an average width of 10 km (6 miles). With elevations ranging between 366m (1200ft) and 278m (900ft) above MSL, it has a North- South gradient of 2 m per km (10.6ft per miles). The river flows along the valley's longer axis finally to leave it near Ropar. The Soan Nadi joins the Sutlej in the upper sections of this valley from the North- West and the Sirsa Nadi merges with it in

the Southern part of the valley left bank (Eastern bank). Due to its general gradient, the Sutlej along with its tributaries runs through a braided course. Elongated strips of land between the river and the peripheral hills have a general slope towards the Sutlej. These parts of Dun are traveled by a large number of seasonal torrents, locally called Khads, which descend quickly from the neighboring hills. Some of the important streams, which contribute their flow to the Sutlej on its way to Ropar are Donala Khad, Dabawali Khad, Charan Ganga Khad, Lohand Khad and Kundlu Ki Khad. Some small flashy streams also outfall in the Sutlej at the right-bank above Ropar. After flowing sluggishly through Anandpur Dun, the Sutlej debauches from the Shiwaliks just above Ropar, and emerges on to the plains of Punjab. There used to be a weir at Ropar with falling shutters and undersluices for the diversion of water into Sirhind canal. This was later replaced with a barrage as a component of the Bhakra- Nangal Project in fifties. Another canal, named as Bist Doab canal, takes off from the right-bank of the river. Several natural streams and man- made drains join the Sutlej between Ropar and Ferozepur. There is a group of streams below Ropar which flow in a NE- SW direction. Siswan Nadi is another important seasonal stream, which initially flows NE to SW, but gradually turns NW to merge with Sutlej near Khizarpur village after traversing a distance of over 40 km over the plains.

Immediately under the high bank along the old course of the Sutlej, runs a perennial stream called Budha Nala, which rises at Chamkaur in Ropar district. It enters Ludhiana district near Bahlolpur.

Passing just below the town of Ludhiana, it flows into the Sutlej in Tehsil Jagraon, a few km east of the Ludhiana- Moga district boundary. East Beas and West Beas merge with the Sutlej from the right bank, upstream of its confluence with the Beas, which joins Sutlej at Harike. A number of surface drains have been constructed to facilitate drainage of the catchments in the plains. These outfall in the Sutlej and contribute to its discharge during the rainy season of July to September. After Nangal Dam (Punjab), Sutlej enters in plains. The land through which Sutlej flows, is alluvial in nature. The inundation spreads over low lands on both sides during high stages of the river, i.e., medium and high floods. The river courses were very unstable and were subject to constant shifting. On an average, the width of the flood plains was in the range of 7 to 8 km (WAPCOS, 1996). A heavy flood occurred in the year 1988. The heavy rainfall downstream of Bhakra dam had resulted in locally generated floods. Releases from Bhakra with local floods resulted in acute flooding in the downstream areas. Like all Punjab rivers, Sutlej constantly shifts its course. During the twenty years (1882 to 1903) it has moved about 1.6 km at several points. When the discharge is at its lowest in the middle of the winter, the river is very shallow. The width of the main stream seldom exceeds 150 meters and the depth is about 1 to 1.5m. During floods, it used to spread 3 to 5 km wide over the country. Even where confined to its narrowest by the Phillaur Bridge works, its width is about 1.6 km. The opening of the Sirhind canal has considerably reduced the volume of water in the river except during flood. The main physical

divisions of the district are a low-lying alluvial tract along the river, called Bet, and the uplands called Dhaia. About 120 years ago, it is said to have flowed just under the ridge which separates the Dhaia from the Bet. The old towns and villages of Bahlolpur, Machhiwara, Kum etc. were built on its banks. The division between uplands and low lands is distinctly marked everywhere by the ridge or high bank. The bet lies between the high bank and the present bed of the river. In the east of the district, the river and the high bank are 5 to 10 km apart, and this is the width of the Bet for the first 48 km (30 miles).

A perusal of various studies conducted at different time on river Sutlej revealed that erosion from this river varied from 0.46 KM to 1 KM whereas the deposition varied from 0.5KM to 1.2 KM. So there is a balance of sedimentation deposit in the river every year and extraction of sand /silt will never lead to over exploitation of mineral deposits.

### **Deposition Process:**

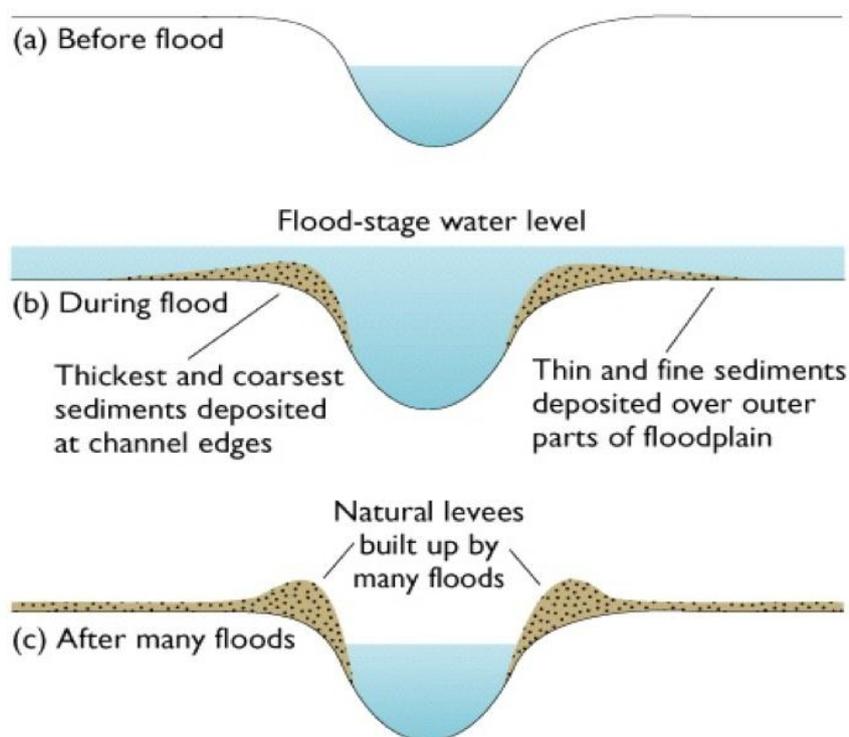
Deposition is the process where material being transported by a river is deposited. Deposition occurs when a river loses energy. This can be when a river enters a shallow area (this could be when it floods and comes into contact with the flood plain) or towards its mouth where it meets another body of water.

Rivers flood on a regular basis. The area over which they flood is known as the floodplain and this often coincides with regions where meanders form. Meanders support the formation of flood plains through lateral erosion.

When rivers flood, the velocity of water slows. As a result of this, the capacity of the river to transport material is reduced and deposition occurs. This deposition leaves a layer of sediment across the whole floodplain. After a series of floods, layers of sediment form along the flood plain.

As a result of increased friction with the flood plains, the velocity of the river reduces and its ability to transport material is further reduced. This leaves a ridge of higher material next to the river channel on both banks of the river known as a levee.

## Formation of Natural Levees



Field studies out right from Patran - Khanauri, the southern end of Punjab upto the present course of the Sutlej river, over an area of

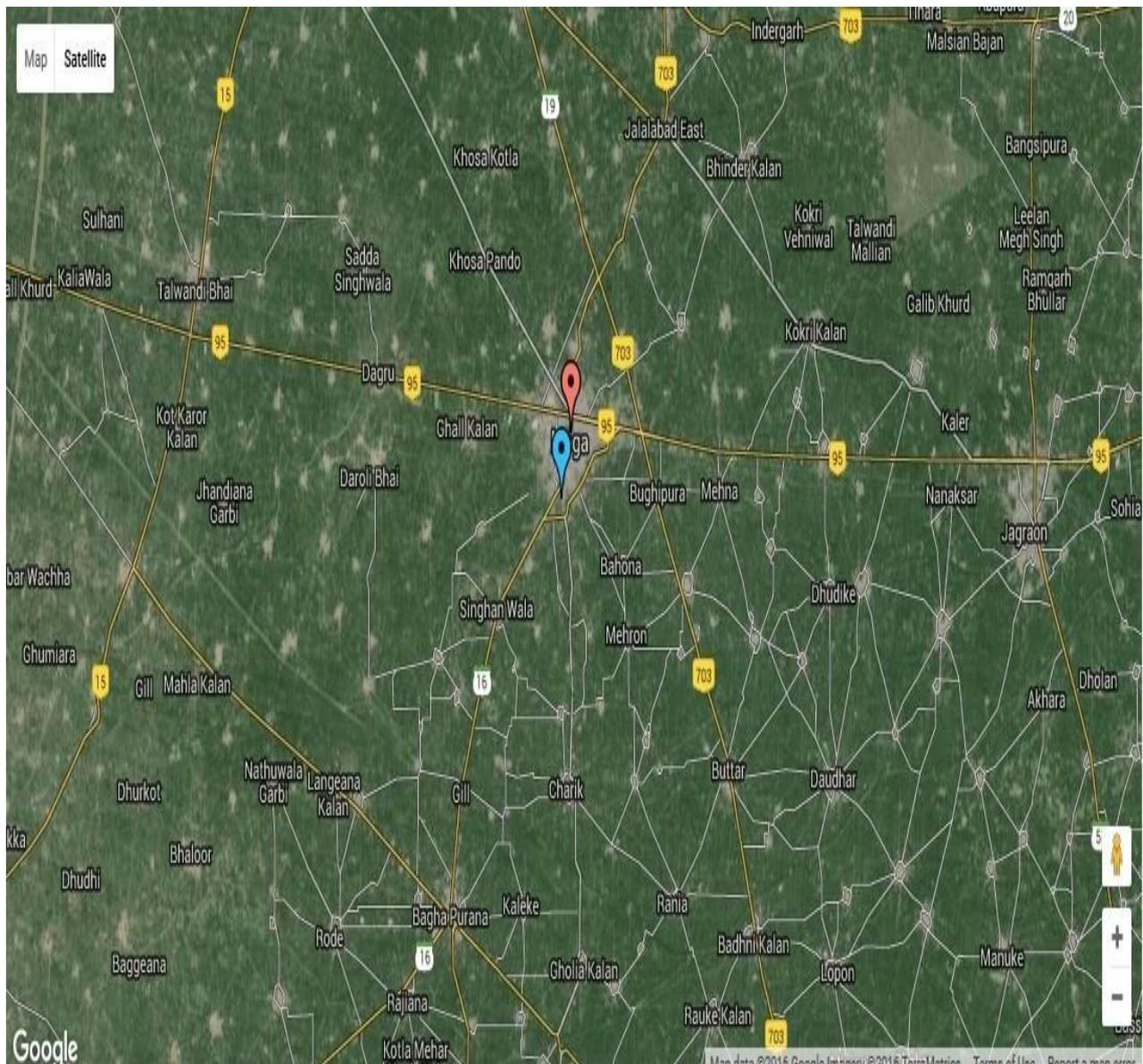
8000 sq.km covering parts of Patiala, Sangrur, Faridkot and Ferozepur districts of Punjab indicate that the sediments of sand dunes and aeolian spreads in these areas are derived from local fluvial sediments of the area. It has been observed in the entire area that the sand dunes are occurring largely along the Palaeo- channels of Ghaggar and Satluj rivers through which the rivers used to flow in the recent past. In these areas alluvial grey sand is generally present below the brownish layer of earth.

Deposition of sediments in aggrading channels generally takes place along high floods in the form of point bars, channel bars, levees and flood plain deposits. These sediments after drying up are exposed to aeolian activity over a prolonged period and in turn become the source material for sand dunes and aeolian sheets/spreads. Such sand dunes, formed locally by reworking of fluvial sands by wind activity, are comparable with the ones described along the Red river in U.S.A. (Reineck and Singh, 1973). Sediment studies also indicate that the sediments of fluvial and aeolian deposits do not indicate any broad variation in their textural parameters. The cumulative frequency curves drawn for the sediments of both aeolian and fluvial origin are of similar nature. The percentage of finer material is same in almost all the samples. From all this, it appears that aeolian and alluvial sediments of the area have some genetic relationship. The presence of mica, sand and silt suggest that the aeolian sediment have not suffered from large- scale wind activity and thus still retain some characters of fluvial sediments. It appears that loose sand of alluvial sediments, i.e.,

point bars, channel bars, levees, and flood plain deposits of old Sutlej river were lifted and blown by wind and redeposited in the form of sand dunes and Aeolian spreads. Sedimentological studies of some recent aeolian deposits in parts of Hissar and Sirsa districts, Haryana (Hari Singh 1987) also indicate that the probability curves representing active dunes, stabilized dunes, aeolian flat and alluvium exhibit almost identical shapes, thus suggesting their genetic relationship like the present area. He also recorded grey micaceous sediments besides silt and clay in some sand dunes in the Tohana area. These observations made him infer that loose sand of alluvial system were lifted by winds and redeposited as aeolian landforms. According to him there are no definite geomorphic evidences either to support extensive sand migration from the Thar Desert. To sum up, authors are of the opinion that Aeolian deposits of the area are locally derived from fluvial deposits themselves. Therefore, the view that there is a large- scale migration of sand from the adjoining Rajasthan desert, posing a serious environmental problem to the fertile Punjab plains is not tenable.

## About Sutlej River:-

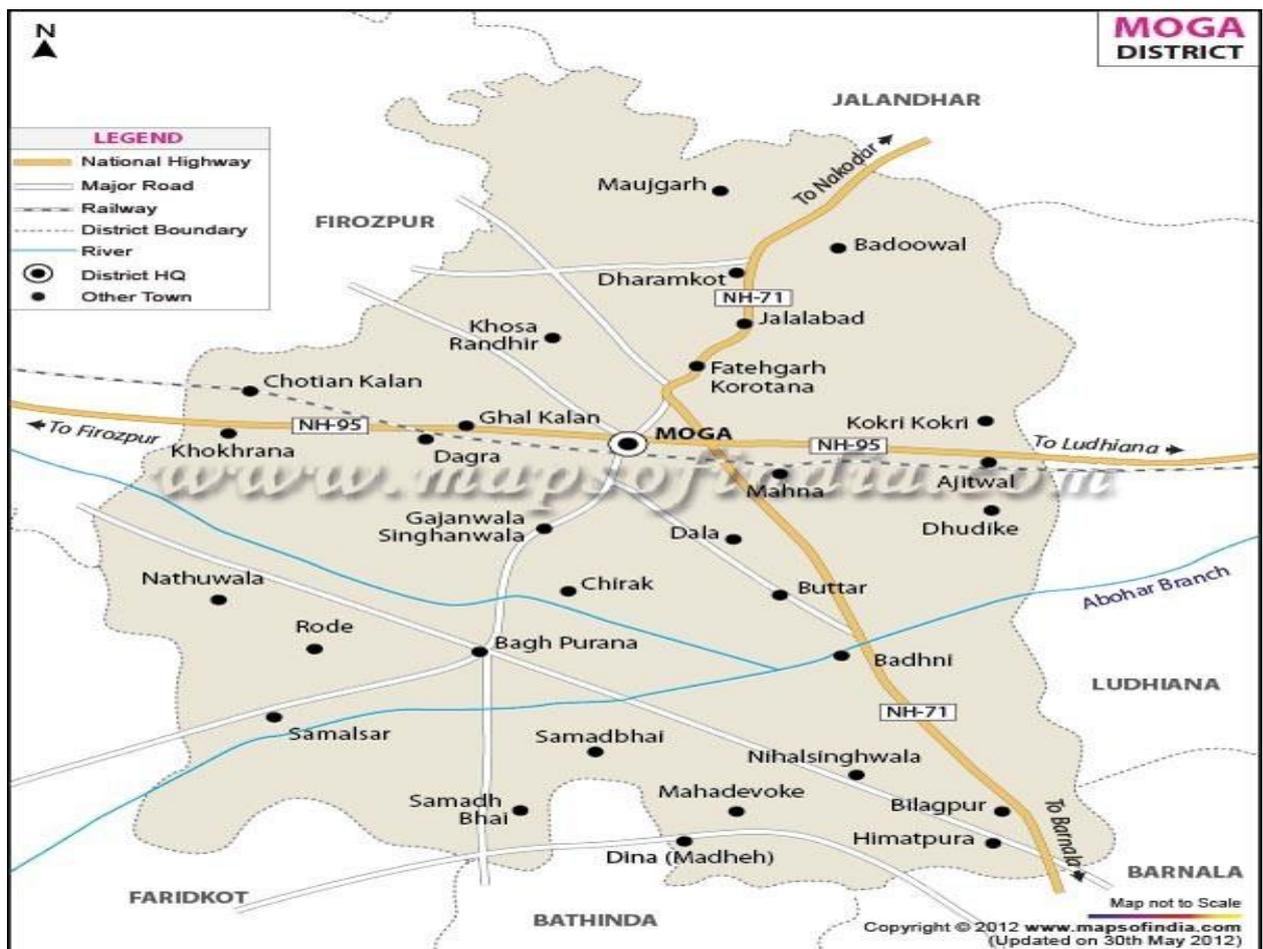
Satellite image District Moga



## SUTLEJ RIVER IN MOGA

The district area forms a part of Indo Gangetic plains and Sutlej sub basin of main Indus basin. The area as a whole is almost flat with a gentle slope towards the Western and Northwestern direction. The Sutlej River enters in the district from North East side along with the boundary of Jalandhar district. It enters from the village Kania Khurd and enters the Ferozepur district from village Khana in Kot-Ise-Khan block and the total length of the Sutlej River in Moga district is 27.43 kms.

## SHOWING SUTLEJ RIVER CATCHMENT IN MOGA:



## **GENERAL PROFILE OF THE DISTRICT**

Moga district became the seventeenth district on the map of Punjab State on 24th day of November 1995. Before this, Moga was the Sub-Division of Faridkot District. Moga town is the head quarter of the District which is situated on Ferozepur - Ludhiana national highway. Area of Dharamkot Block with 150 villages has been merged in Moga District vide Punjab Govt. Notification No.2/36/98-R. 2(1) 6408 dated 05/11/1999. It falls under the jurisdiction of Ferozpur Division. Its boundary touches the boundaries of district Jalandhar in the north, district Ludhiana in east, district Sangrur in the south and districts Faridkot & Ferozepur in the West. It stretches between longitudes 75°15' E to 75°25' E and between latitudes 30°35'N to 31°15'N.

### **Tehsils:**

<b>Sr. No.</b>	<b>Tehsil</b>	<b>No. of Villages</b>
<b>1</b>	<b>Moga</b>	<b>224</b>
<b>2</b>	<b>Baghapurana</b>	<b>56</b>
<b>3</b>	<b>Nihal Singh Wala</b>	<b>39</b>
<b>4</b>	<b>Dharamkot</b>	<b>150</b>

### **Sub-Tehsils:**

Sr. No.	Sub- Tehsil Name
1	Kot Ise Khan
2	Badhni Kalan

### **Religion:**

Sikhs are the largest religious group in the District, followed by Hindus. Moga also has highest share of Muslim population in the state.

Sikhs	82.24%
Hindus	15.91%
Muslims	0.94%
Others	0.91%

### **LAND UTILISATION PATTERN IN THE DISTRICT**

Total area of the Distt. is 2,23,500 Ha

1. FOREST :- 2175 Ha.
2. AGRICULTURE:- 195247 Ha
3. HORTICULTURE- 2165 Ha

4. MINING:- 200 Ha.

DISTRICT	FOREST Area(in Ha.)	AGRICULTURE Area(in Ha.)	HORTICULTURE Area (in Ha.)	MINING Area (in Ha.)
Moga	2175	195247	2165	200

**Forest:**

The district is rich in animals and birds which include some of the rare species. There is a variety of birds in the district like Monal pheasant, Juguriam, Peacock, Ring dove, Spotted dove, parrot, tawny eagle, green pigeon, pigeon, gritton vulture, tits, nut cracker, pies, Wood pecker, crow, green fly catcher etc. which are found in the tract of this district.

**Agriculture:-**

Agriculture is the main occupation of the people in the District, having different types of soil and agro-climatic conditions which are quite suitable for the growing of various types of cereals, vegetables, fruits and other crops. The major crops grown in the district are Wheat, Paddy, Maize, Barley and Millets. Besides these, potato and a variety of vegetable like green-peas, cauliflower, cabbage, spinach,

tomatoes etc. are also grown in the district. The economy is mostly agrarian and majority of population is depending on agriculture and activities allied to it for earning their lively hood. Some of the land is un-irrigated and depends upon the rainy season for irrigation. Soil in the district varies from sandy loam to clay. Most parts of the land are irrigated and the irrigation facilities are provided by lifting water from streams, shallow, dug wells and medium to deep tube wells in the valley area.

## **PHYSIOGRAPHY OF THE DISTRICT**

During floods, plains of the Sutlej are separated from the upland plain by sharp river-cut bluffs. They are low lying, with slightly uneven topography. Sand dominates in the soil structure of the flood plains, but it diminishes in both quantity and coarseness in the upland plain. The upland plain covers a large part of the district particularly. Its elevation ranges from about 305 meters above sea level in the north-east to about 213 meters above sea level in the south-west, with a gentle gradient of about 1 meter in 1.6 km. This is the most important physiographic unit in the district.

### **Climate**

There are mainly two seasons i.e. summer and winter. The summer

season falls between the months of April to July and the winter November to March. In summer season the temperature touches 44 °C and sometimes higher. June is the hottest month and January is the coldest one. Mostly the rain falls in the month of July. The winter rains are experienced during January and February. Dust storms occurs in the month of May and June.

### **Rainfall**

The south-west monsoon generally arrives in the first week of July and continues up to the end of August. Seventy percent of the rainfall occurs during this period.

### **Ecology**

The changes in ecology system are inevitable, consequences of the development process. The denudation of forests due to increasing population, urbanization and industrialization has accelerated the process of environmental degradation in the district. Therefore, preservation of the ecology is one of the most important goals of the district planning. The vegetation varies in the district depending on the soil, topography and elevation. In the plains, large scale of forestation has been undertaken by the forest department. Where water facilities are available, Shisham, mulberry, eucalyptus and poplar are being planted. In the Kallar area, kikar prosopis and eucalyptus has been planted. Besides mango and mulberry, other fruit

trees are cultivated in the district including orange, kinnow lemon and others.

### **Hydrology**

The ground water in this region is suitable for irrigational and domestic uses. The sub soil water depth ranges from 5 to 8 meters in most part of the district. Due to bandh and stepped floods, the water table has gone very low.

### **Soils**

The soils are loamy with a clay content below 10 percent. They contain small quantities of lime but the magnesium content is high. They are well supplied in potash and phosphoric acid but the quantities available are low. The agriculture is dependent to a large extent on the nature of its soils which in turn, is influenced materially by climatic factors. The soil of the district is quite alluvial and fertile.

### **Minerals**

The sand is found from the River bed of the Satluj. The demand of sand for the construction purpose is extracted from the river so that the demand can be met.

### **Infrastructure**

#### **ROADS:**

TOTAL LENGTH OF ROADS :- 1918 KM

LINK ROAD :-	802 KM.
PLAIN ROADS:-	939KM
NATIONAL HIGHWAY:-	130 KM
STATE HIGHWAY:-	47.12 KM.

## **DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVERS**

SR.NO	NAME OF THE RIVER	AREA DRAINED (Sq.Km)	% AREA DRAINED IN THE DISTRICT
1	Satluj	700	42 %

The annual replenishment in the river is dependent upon the velocity of the river. Annual replenishment is also dependent upon the period of rainy season and rainfall at different places of the flow of River. To calculate the replenishment data at this stage is very difficult. It is suggested that before considering the report for environment clearance Joint inspection Team report must be collected as per Punjab Minor Mineral rules 2013 because of the regular demand of sand for the development activities in this respective areas. Before approval of the quarries it is suggested that joint inspection committee report may be demanded as per Punjab Minor Mineral rules 2013.

## **General recommendations/ conclusions:**

During the preparation of the present report prominent rivers/ streams have been studied in detail, as the rest of the streams/rivers either have very insignificant annual replenishment/ approachability problem or are very narrow at most of the places and as such are not fit for grant of mineral concession for mineral based industries, however it is also important to mention here that because of the regular demand of sand for the developmental activities in the respective areas, such streams are prone to illegal mining, It is suggested that the auction of quarries be done regularly to meet out the mineral local demand subject to the approval from the joint Inspection Committee as per Punjab Minor Mineral 2013. These mineral concessions shall also reduce demand load and will be helpful to minimize illegal extraction of minerals, failure of which may result in illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology.

Irrespective of it following geo scientific considerations are also suggested to be taken into account during the river bed mining in a particular area:

1. Abandoned stream channels or terrace and inactive floodplains may be preferred rather than active channels and their deltas and floodplains.
2. Stream should not be diverted to form inactive channel.

3. Mining below subterranean water level should be avoided as a safeguard against environmental contamination and over exploitation of resources.
4. Large rivers and streams whose periodic sediment replenishment capacities are larger, may be preferred to smaller rivers.
5. Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
6. Mining at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way so as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.
7. Continued riverbed material mining in a given segment of the river will induce seasonal scouring and intensify the erosion activity within the channel. This will have an adverse effect not only within the mining area but also both in upstream and downstream of the river course. Hazardous effects of such scouring and enhanced erosion due to riverbed mining should be evaluated periodically and avoided for sustainable mining activities.
8. Mining area should be demarcated on the ground with Pucca pillars so as to avoid illegal and unscientific mining.
9. The auction shall be done as per the recommendation/approval of

the Sub-Divisional Level Committee and as per Punjab Minor Mineral rules 2013.





































