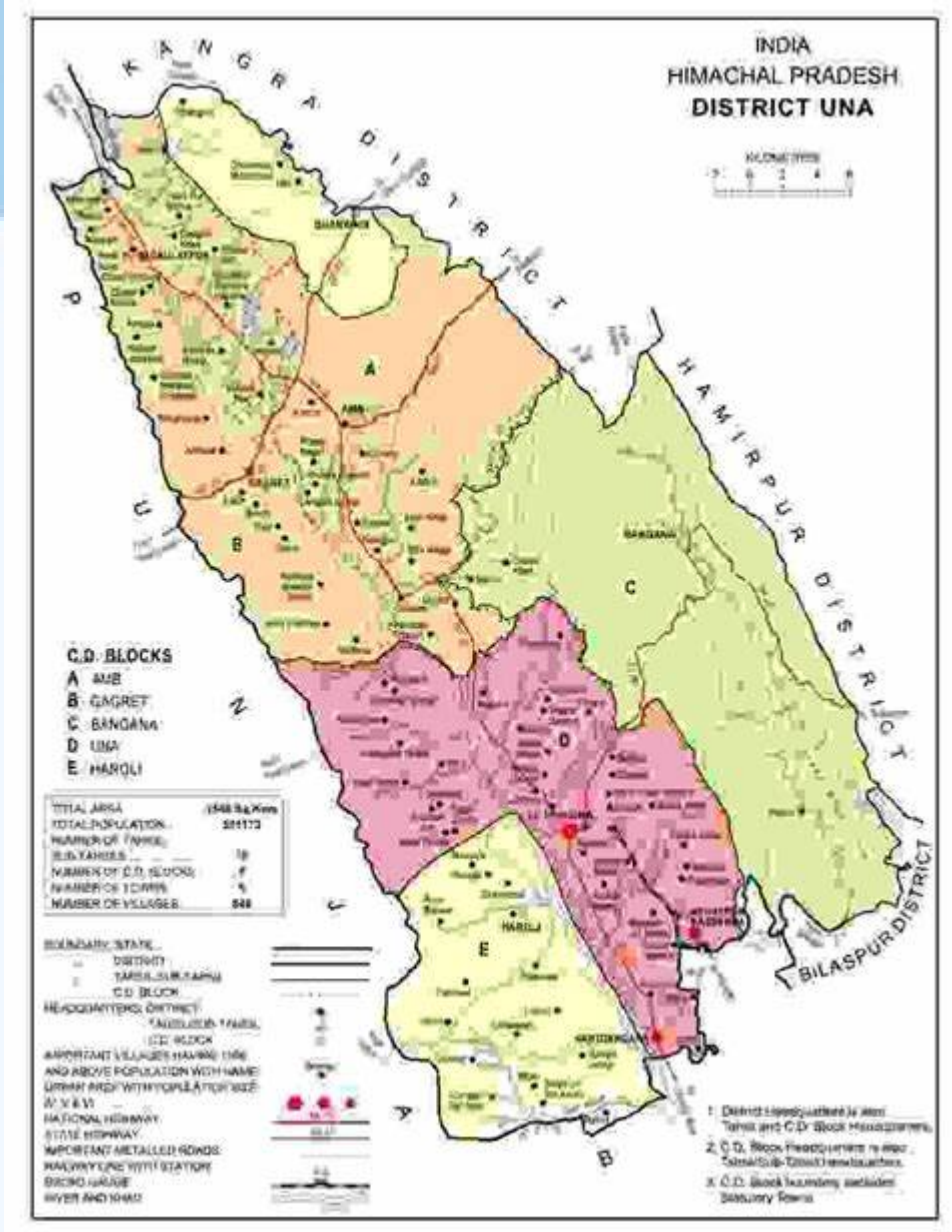
DISTRICT SURVEY REPORT-2024
District- Una Himachal Pradesh



DISTRICT SURVEY REPORT FOR SAND MINING OR RIVER BED MINING *AND OF MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING.*

Prepared and submitted by Department of Industries, Himachal Pradesh

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Finalized & approved by SEIAA, Himachal Pradesh in its 70th meeting (PARIVESH-1) held on dated 30th Sept., 2024 vide Agenda Item No. 1.

Executive Summary DSR

District Survey Report (DSR) is a comprehensive document prepared to regulate riverbed and hill slope mining activities within the district. This report is essential for sustainable management of riverbed mining, ensuring that the extraction of minerals is conducted in an environmentally sound and socially responsible manner. The preparation of DSRs is mandated under the Sustainable Sand Mining Management Guidelines, 2016.

District Survey Report of riverbed mining are indispensable tools for the sustainable management of riverine mineral resources. They offer a structured approach to resource assessment, environmental protection, regulatory compliance, and stakeholder engagement. By fostering sustainable mining practices, DSRs contribute significantly to environmental conservation, socio-economic development, and the overall well-being of communities dependent on river ecosystems.

As per the EIA Notification, 2006 and its subsequent amendment vide S.O. 3611(E) dated 25th July, 2018 issued by MoEF&CC, GoI, the main objective of the preparation of District Survey Report (as per the Sustainable Sand Mining Guideline) is to ensure the identification of areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.

- Key Aspects of District Survey Report

1. Assessment of Resources: DSR provide a detailed assessment of available mineral resources in the riverbeds within the district. This includes data on the quantity, quality, and distribution of sand and other minor minerals. By accurately estimating these resources, the report aids in preventing over-extraction and depletion of minerals.
2. Environmental Impact Analysis: The report include an analysis of the environmental impact of riverbed mining. This encompasses the effects on river morphology, hydrology, aquatic ecosystems, and biodiversity. Understanding these impacts is crucial for mitigating adverse environmental effects and preserving riverine ecosystems.
3. Regulation and Compliance: DSR serve as a regulatory framework for riverbed mining operations. They outline guidelines and standards for mining practices, ensuring compliance with national and state environmental laws. This helps in curbing illegal mining activities and promoting legal and regulated mining.
4. Sustainable Mining Practices: By recommending sustainable mining practices, DSR help in minimizing environmental degradation. These practices may include controlled mining depths, restricted extraction zones, and periodic replenishment studies to maintain the ecological balance of river systems.
5. Socio-Economic Considerations: The report also takes into account the socio-economic aspects of riverbed mining, including the impact on local communities. This includes evaluating benefits such as employment generation and revenue for local governments, as well as addressing negative consequences like displacement and loss of livelihoods.
6. Data-Driven Decision Making: DSR provide a scientific basis for decision-making regarding riverbed mining. The inclusion of geospatial data, remote sensing images, and field surveys enhances the accuracy and reliability of information. This data-driven approach supports informed policy-making and resource management.
7. Stakeholder Involvement: The preparation of DSR involves consultation with various stakeholders, including government agencies, local communities, environmentalists, and industry representatives. This inclusive process ensures that multiple perspectives are considered, leading to balanced and equitable mining practices.

- Benefits of District Survey Report

1. Environmental Protection: By identifying and mitigating the environmental impacts of riverbed mining, DSR play a crucial role in protecting river ecosystems, reducing erosion, and maintaining water quality.
2. Resource Management: Effective management of mineral resources is achieved through regulated extraction, preventing over-exploitation and ensuring the longevity of resources for future use.
3. Legal Compliance: DSR help in ensuring that mining activities adhere to legal requirements, reducing the incidence of illegal mining and associated environmental damage.
4. Community Welfare: By considering the socio-economic impacts, DSR help in safeguarding the interests of local communities, ensuring that they benefit from mining activities without suffering undue harm.
5. Sustainable Development: The integration of sustainable practices in mining operations contributes to the broader goals of sustainable development, balancing economic growth with environmental stewardship.

- While issuing any fresh permission for mining activity in the district the same is permissible only when the identified stretch is reflected in the DSR with its geo coordinates, quantity and geological profiling.
- The SEIAA/ SEAC while considering the cases for grant of EC need to assess with the help of DSR the proposed mining activity is within the identified stretches of river/ streams/ khads, matching the geo coordinates of proposed site and river stretch where the mineral is available by using ***kml*** files.
- In the DSR 'No Mining Zones' are also listed which clearly give a view of stretches where no mining activity will be allowed and remain restricted.

"*No Mining Zones*" (NMZs) are critical areas identified within riverbeds where mining activities are strictly prohibited. These zones are delineated based on various environmental, ecological, and social criteria to ensure the protection of sensitive areas. The identification of NMZs is a key component of District Survey Report (DSR) for riverbed mining in India, aimed at promoting sustainable and responsible mining practices.

Criteria for Identifying No Mining Zones in DSR

1. Ecological Sensitivity: Areas with high ecological value, such as habitats for endangered species, breeding grounds for aquatic life, and regions with significant biodiversity, are designated as NMZs. Protecting these areas is crucial for maintaining ecological balance and biodiversity.
2. Hydrological Importance: Zones critical for maintaining river flow and groundwater recharge are marked as NMZs. This includes regions near riverbanks, floodplains, and areas prone to erosion. Preserving these areas helps in sustaining water quality and quantity.
3. Proximity to Infrastructure: Areas close to infrastructure such as bridges, roads, dams, and human settlements are identified as NMZs to prevent structural damage and ensure the safety of human life and property.
4. Cultural and Archaeological Significance: Regions with cultural, historical, or archaeological importance are protected as NMZs to preserve heritage sites and prevent any damage due to mining activities.
5. Community Dependence: Areas that are vital for the livelihood of local communities, such as regions used for fishing, agriculture, and other traditional activities, are designated as NMZs. This ensures the sustenance of community livelihoods and social well-being.

Basis for appraisal of EC (River Bed Mining Projects)

Sl. No.	PP Details	Location with khasra Nos.	River/ Stream location	Coordinates (Lat Long)	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease	
						From	To	Form	To
1	2	3	4	5	6	7	8	9	10

Details of River/ Stream

S. No.	Name of the River or Stream	Total Length in the District (in Km)	Place of origin	Altitude at Origin
(1)				
(2)				

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)

Mineral Potential

Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)

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)						
(2)						
Total for the District						

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1 INTRODUCTION

The Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India, made Environmental Clearance (EC) mandatory for mining of minerals through its Notification dated 27th January, 1994 under the provisions of Environment Protection Act, 1986 which was applicable only for the category of Major Minerals having lease area more than 5 hac. In the year 2004, the State of Himachal Pradesh issued the "River/Stream Bed Mining Policy Guidelines for the State of Himachal Pradesh, 2004" for regulation and control of mining operation, wherein, a survey document of existing River/Stream bed mining in each district of the State was required to be prepared. In the said policy guidelines, it was provided that the district level river/stream bed mining action plan shall be based on a survey document of the existing river/stream bed mining in each district and also to assess its direct and indirect benefits and identification of the potential threats to the individual rivers/streams in the State.

This survey shall contain: -

a) District wise detail of Rivers/Streams/Khallas; and
b) District wise details of existing mining leases/ contracts in river/stream/khalla beds.

Based on this survey, the action plan shall divide the rivers/stream of the State into the following two categories; -

a) Rivers/ Streams or the River/Stream sections selected for extraction of minor minerals and
b) Rivers/ Streams or the River/Stream sections prohibited for extraction of minor minerals.

Thereafter, in order to cover the minor minerals also into the preview of the Ministry of Environment, Forests & Climate Change (MoEF&CC), the Ministry, came out with statutory order bearing Notification No. SO 1533 (E), dated 14th September 2006 wherein Environmet Clearance was made mandatory for Major & Minor Mineral having area of mining lease more than 5 hac. However, the Hon'ble Supreme Court in its Judgment dated the 27th February 2012 in I.A. No.12- 13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc. made prior Environment Clearance mandatory for mining of minor minerals irrespective of the area of mining lease. In order to comply with the judgment of Hon'ble Supreme Court, the Ministry issued S.O.141 (E) dated 15.01.2016 vide which the District Level Environment Assessment Committee (DEAC) and District level Environment Imapact Assessmenyt Authority (DEIAA) were constituted. In the said Notification at point No.7 (iii) the procedure to prepare the District Survey Report (DSR) was laid down providing that a survey shall be carried out by the DEIAA with the assistance of Geology/Irrigation/Forest/PWD etc. departments. As, per the aforesaid, Notification dated 15.01.2016 the Geological Wing, assisted the DEIAA in the preparation of District Survey Report during the year 2016 and the said District Survey Report prepared for District Una was approved by the DEIAA, after following the procedure laid down in the aforesaid Notification. It is also provided in the Notification No. S.O. 141 (E) dated 15th January, 2016 that the District Survey Report (DSR) shall form the basis for application for Environment Clearence, preparation of reports and appraisal of Projects.The report shall be updated once every 5 years.

However, it is also important to mention here that the Hon'ble National Green Tribunal in O.A. No.520/2016 vide order dated 13.09.2018 and Executive Application No. 55/2018 dated 11.12.2018 suspended the operation of the Notification dated 15.01.2016 and directed the Ministry of Environment, Forests & Climate Change (MoEF&CC) to take appropriate steps to revise the procedure laid down in the impugned Notification dated 15.01.2016.

In the meanwhile, the Ministry of Environment, Forests & Climate Change (MoEF&CC) came out with the Notification dated 25.07.2018 wherein the procedure for the preparation of the District Survey Document has been provided. Accordingly, the survey report for district Una has been updated. This District Survey Report has been updated by covering the mineral bearing areas and overviews of mining activities in the district with all the relevant features

pertaining to geology and mineral wealth in replenish-able and non-replenish-able areas of rivers, stream and other sources. The mineral potential has been calculated based on field investigations taking in to consideration the geology of the catchment area of the river/streams and other sources pertaing to hill slopes.

2 OVERVIEW OF MINING ACTIVITY IN THE DISTRICT UNA

The three types of minor mineral constituents such as sand, stone and bajri are required for any type of construction apart from other material like cement and steel. In earlier times, the houses/ buildings were constructed in form of small dwellings with walls made up of mud plaster, stone and interlocking provided with wooden frames and there were negligible commercial as well as developmental activities resulting less demand of building material. However, with the passage of time when the district was carved out during 1972, new vistas of developmental activities were started and as such the demand of minor minerals in the district started an increasing trend.

In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds. The demand of sand is mainly met through river borne sand whereas the demand of bajri/grit is either met through river borne collection or through manufactured grit by stone crushers. The demand of dressed or undressed stone is met through the broken rock material from the hill slope. In Una District minor minerals such as sand, stone and bajri are available in plenty in various river/stream beds. However, in some of the streams like Hum Khad, Palkwah, Bathri etc. white quartzite boulders are also available in small proportion. These white quartzite boulders are segregated during mining operation and are pulverized for manufacture of white quartzite powder used for glass industry. The quartzites boulders available in the river/stream beds are white, spotted white, greenish white, blackish grey, pink, purple to greyish green. Quartzite fragments are rounded, sub-rounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder. During the monsoons, these beds are replenished to a very large extent from the Siwalik rocks due to erosion by heavy flows.

The result of chemical analysis is tabulated below in following Table.

Table No. 1: Showing Chemical analysis of Silica Boulders of the Una District

Constituent	Pure white boulders	Spotted white boulders	Greenish boulders
SiO_2	98.035 %	98.053 %	97.678 %
Al_2O_3	1.386 %	1.274 %	1.50 %
Fe_2O_3	0.110%	0.133 %	0.21 %
TiO_2	nil	nil	Nil
CaO	0.1 %	0.135 %	0.17 %
MgO	0.056 %	0.056%	0.109 %
Loss of Ignition	0.0286 %	0.319%	0.306 %

Photograph No. 1: Silica Boulders of Hum Khad, District Una

The local residents used to lift gravel etc. from the river beds to meet out their bonafide requirement; however, after coming into force the Himachal Pradesh Minor Mineral Concession Revised Rules, 1971, and thereafter Himachal *Pradesh* Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015, the mining is regulated in accordace with the rules. At present 76 Nos of mining leases have been granted under Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevension of Illegal Mining, Storage and Transportation) Rules, 2015.

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

Sr. No.	Name & Address of the Mining Lease	Area	Period of mining lease with date	Annaul Production (TPA)	Location
1	M/s Himachal Chemicals & Silicate Works Vpo. Bathu Tehsil Haroli	08-25-60 Hect.	25-07-2005 to 24-07-2025	39,518	31°19'18" N 76°16'24" E

	District Una (H.P.) Partner: Sh. J. S. Sidhu & Sh. M. S. Sidhu S/o Sh. Barinder Singh Sidhu R/o H. No. 1169, Sector -7, Panchkulla Haryana				31°19'24"N 76°16'36"E
2	M/s Himachal Chemicals & Silicate Works Vpo. Bathu Tehsil Haroli District Una (H.P.) Partner: Sh. J.S. Sidhu & Sh. M.S. Sidhu S/o Sh. Brinder Singh Sidhu R/o H.No.1169, Sector -7, Panchkulla Haryana	27-80-16 Hect.	27-07-2005 to 26-07-2025	43,060	31°19'35"N 76°17'32"E 31°19'35"N 76°17'32"E 31°19'20"N 76°17'32" 31°16'20"N 76°17' 38"E
3	M/s Lakhwinder Singh Stone Crusher VPO Pollian Tehsil Haroli District Una H.P. Unit-I, Prop. Sh. Lakwinder Singh S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	03-89-94 Hect.	20-01-2018 to 19-01-2033	54,000	31°23'27.44"N 76°10'31.90"E
4	M/s Lakhwinder Singh Stone Crusher VPO Pollian Tehsil Haroli District Una H.P. Unit-I, Prop. Sh. Lakwinder Singh S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	05-95-47 Hect.	27-01-2018 to 26-01-2033	1,57,000	31°23'16.87"N 76°10'26.64'E
5	M/s Lakhwinder Singh Stone Crusher Vpo Pollian Tehsil Haroli District Una (H.P.) Unit-I) Prop. Sh. Lakhwinder Singh, S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	07-24-93 Hect.	08-04-2015 to 07-04-2030	1,75,000	31°23' 22"N 76°11'30"E
6.	M/s Lakhwinder Singh Stone Crusher Vpo Kungrat-II, Tehsil Haroli, Distrit Una H.P. Prop. Sh. Lakhwinder Singh, S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	13-57-15 Hect.	18-08-2016 to 17-08-2031	7,30,000	31°21'52.32"N 76°13'54.81"E
7	M/s Lakhwinder Singh Stone Crusher Vpo Kungrat, Tehsil Haroli District Una (H.P.) Unit-II. Prop. Sh. Lakhwinder Singh, S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	04-17-79 Hect.	18-11-2011 to 17-11-2026	7,7,950	31°24'15"N 76°14'15"E
8	M/s Lakhwinder Singh Stone Crusher Vpo Gondpur Bulla, Tehsil Haroli District Una (H.P.) Unit-III. Prop. Sh. Lakhwinder Singh, S/o Sh. Jagmail Singh, HIG-824, Phase-II, Mohali, Punjab	04-80-63 Hect.	10-10-2017 to 09-10-2032	2,25,000	31°24'1.71"N 76°10'28"E 31°23'57.36"N 76°10'27.41"E
9	Sh. Abhishek Choudhary Kothi No 518 Sector 8B Chandigrah M/s Mohantan Mining & Manufacturing Co.Pvt. Ltd. VPO Batrhri Tehsil Haroli District Una (H.P.) Mob. No: 092163-94909	08-98-35 Hect.	25-10-2008 to 24-10-2028	54000	31°19'00"N 76°16'48"E 31°19'05"N 76°16'56"E
10	Sh Ramesh Chand S/o Sh. Karma	04-33-39 Hect.	13-03-2014 to	56,153	31°18'54"N

	Chand Village Bangarh P.O. Jakhera Tehsil and District Una Prop: M/s Shiv Shakti Stone Crusher Vpo Singha (Soor Kalan), Tehsil Haroli District Una (H.P.) Mob. No: 98161-72268		12-03-2029		76°15'59"E
11	Smt. Vanita D/o Smt. Kusumlata R/o Shrigul Mahal Gaderan Tehsil Pachhad District Sirmour, H.P. Prop. M/s Sai Stone Crusher Vpo Bhadiaran PO Dulehar, Tehsil Haroli District Una (H.P.)	04-39-37 Hect.	18-01-2016 to 17-01-2031	83,167	31°19'31.1"N 76°11'14.9"E 31°19'32.2"N 76°11'15.7"E
12	M/s Jagdambay Stone Crusher & Screening Plant Vpo Gondpur Jaichand Nichla Tehsil Haroli District Una	02-75-53 Hect.	07-04-2016 to 06-04-2031	28,120	31°18'31.6"N 76°14'10.3"E 31°18'30.7"N 76°14'21.1"E
13	Sh. Rakesh Chander S/o Sh. Parkash Chander VPO Kutharbeet Tehsil Haroli District Una H.P. Prop. Aar Ess Stone Crusher Vpo Gondpur Bulla Tehsil Haroli District Una Unit Install in Khasra no. 1200/3	04-45-08 Hect.	06-07-2016 to 05-07-2031	1,09,160	31°18'699"N 76°11'237"E
14	Mrs Vanita Kumar D/o Sh. Subhash Chand Kapoor R/O Shrigul Tehsil Pacchad District Sirmour H.P. Prop. M/s Building Stretch Crushing Zone Vpo Pubowal Tehsil Haroli District Una	03-66-46 Hect.	24-10-2016 to 23-10-2031	70020	31°23'39.96"N 76°10'49.06"E 31°23'32.06"N 76°10'54.10"E
15	Sh. Rajinder Gupta & Sh. Yash Pal Goel, Partner M/s Himachal Crushing Co. Village & P.O. Gondpur Jai Chand Tehsil Haroli District Una H.P. Mob. No: 098155-12653	01-46-20 Hect.	24-07-2017 to 23-07-2032	25,200	31°18'36.5"N 76°14'35"E
16	M/s Om Stone Cursher, VPO Kuthar Beet Tehsil Haroli Prop. Smt.Sudershana Rani Sharma, H.No.249 Giani Zail Singh Nagar, Ropar Punjab	02-17-83 Hect.	21-06-2017 to 20-06-2032	30,713	31°24'1.71"N 76°10'28.00"E 31°23'57.36"N 76°10'27.41"E
17	Sh. Sandan Sharma, Prop. M/s Mahadev Stone Crusher, VPO Bathu Tehsil Haroli, District Una H.P.	04-61-11 Hect.	10-10-2017 to 09-10-2032	59,650	31°18'21.79"N 31°18'26.06"N 76°16'17.40"E 76°16'21.13"E
18	Sh. Anuj Chhabra S/o Sh. S.K. Chhabra, 152-153 Phase-I B, Shivalik Avenue Naya Nangal, Distt. Ropar (PB)	65-14 Kanal	29-07-2019 to 28-07-2024	46,080	31°28'17.9"N 76°13'42.1"E 31°28'15.3"E 76°13'47.3"E
19	Bhakra Stone Crusher Prop. Anuj Chhabra, Village Gondpur Bulla, Tehsil Haroli, Distt. Una HP	03-96-45 Hect.	29-07-2019 to 28-07-2034	95,353	31°19'26.4"N 76°11'55.2"E 31°19'21.7"N 76°12'00.01"E
20	M/S Thakur Enterprises Stone Crusher Unit III Gondpur Jaichand Tehsil Haroli District Una	02-22-85 Hect.	06-08-2019 to05-08-2034	57,000	31°18'18.96"N 76°11'41.22"E

21	Sh. Rohit Kumar Mehta Prop. M/s Sai Stone Crusher VPO Badera Rajputan Tehsil Ghanari Distt. Una	02-03-21 Hect.	20-07-2020 to 19-07-2035	29,327	31°33'53.9"N 76°09'42.3"E
22	Sh. Kanwar Sandeep Singh, Prop. Thakur Stone Crusher VPO Nagnoli Har Tehsil Haroli District Una	04-12-99 Hect.	03-03-2021 to 02-03-2026	92,510	31°33'48.99"N 31°33'55.93"N 76°9'54.16"E 76°10'11.35"E
23	M/s Shree Shakti Stone Crusher Prop. Sh. Ashok Kumar	01-30-79 Hect.	24-02-2021 to 23-02-2036	30141	31°20'5.22"N 76°15'2.15"E 31°20'8.33"N 76°15'2.06"E
24	M/s S S Stone crusher & Screening Plant Prop. Sh. Manjeet Singh Village haleran PO Heeran Tehsil Haroli Distt. Una H.P.	03-28-21 Hect.	19-07-2021 to 18-07-2036	94,140	31°22'28.96"N 76°13'07.63"E 31°22'33.04"N 76°13'02.43"E 31°22'28.80"N 76°13'02.30"E 31°22'29.41"N 76°12'57.31"E
25	Sh. Kapil Sharma Prop. Shree Shree Rudra Stone Crusher VPO Ghaluwal Tehsil Haroli Distt. Una	00-57-07 Hect.	27-08-2021 to 26-08-2026	7,510	31°25'51.53"N 76°12'26.32"E 31°25'47.86"N 76°12'28.78"E
26	Sh. Raman Kapoor S/o Sh. Sukh Dev raj Kapoor R/o B-216 Amritsar Road, Kapurthala Punjab Prop. M/s Jai Shankar Stone Crusher VPO Chandpur, tehsil Haroli Distt. Una HP	02-76-30 Hect.	22-11-2021 to 21-11-2026	46,695	31°23'2.93"N 76°14'9.81"E 31°22'58.92"N 76°14'14.02"E 31°23'9.73N 76°14'19.48"E 31°23'9.85"N 76°14'17.42"E
27	Sh. Ravinder Kumar Prop. M/s Jagdambay Stone Crusher & Screening unit, VPO Ghaluwal Subtehsil Ispur distt. Una HP	02-89-02 Hect.	19-05-2022 to 18-05-2032	65,025	31°29'11.19"N 76°12'58.71"E 31°29'4.90"N 76°13'4.67"E
28	Smt. Nidhi Kuthiala Prop. Maan Naina Devi Stone Crusher VPO Palakwah Tehsil Haroli Distt. Una HP	04-04-04 Hect.	30-06-2022 to 29-06-2037	81,000	31°23'55.45"N 76°14'2.90"E 31°23'54.33"N 76°14'7.44"E 31°23'48.98N 76°14'1.63"E 31°23'50.53"N 76°13'49.95"E
29	Sh. Bahadur Singh Prop. M/s Mahadev Stone Crusher VPO Nangal Khurd Tehsil Haroli Distt. Una HP	01-36-30 Hect.	27-04-2023 to 26-04-2028	44,000	31°21'54.04"N 76°14'44.1"E 31°23'29.23"N 76°10'32.01"E
30	Sh. Ravinder Kumar Prop. M/s Saraswati Stone Crusher VPO Badhauri Tehsil Haroli Distt. Una HP	01-90-71 Hect.	03-08-2023 to 02-08-2033	35,000	31°24'16.67"N 76°13'16.99"E 31°24'19.15"N 76°13'12.83"E
31	Sh. Rajender Singh Prop. M/s Thakur Enterprises Unit IV, House No. 118, Phase-4, Himuda Colony Rakkar, Tehsil Haroli Distt. Una	02-95-10 Hect.	03-08-2023 to 02-08-2033	65,250	31°27'47.20"N 76°13'58.28"E 31°27'45.46"N 76°14'2.89"E

32	Sh. Kapil Sharma Prop. M/s Shree Shree Rudra Stone Crusher Unit-II, VPO Dharampur Tehsil Haroli Distt. Una HP	02-93-58 Hect.	03-08-2023 to 02-08-2033	66056	31°27'2.66"N 76°14'44.59"E 31°26'55.7"N 76°14'44.5"E
33	Matri Stone Crusher VPO Basal Tehsil Haroli District Una HP Partner Sh. Ram Dev Duvedi & Sh. Kamal Kishore	39-16 Kanal	02-12-2023 to 01-12-2028	23,600	31°26'33.17"N 76°11'38.95"E 31°26'32.51"N 76°11'41.86"E
34	SS Stone Crusher Prop. Sh. Manjeet Singh VPO Haleran Belna Tehsil HAroli Distt. Una	04-26-01 Hect.	09-01-2024 to 08-01-2024	1,74,150	31°23'12.93"N 76°12'53.69"E 31°23'6.19"N 76°12'44.04"E
35	SS Stone Crusher Prop. Sh. Manjeet Singh VPO Haleran Belna Tehsil HAroli Distt. Una	03-52-62 Hect.	09-01-2024 to 08-01-2024	52,572	31°22'27.84"N 76°12'49.45"E 31°22'26.83"N 76°12'59.27"E 31°22'34.33"N 76°12'56.21"E 31°22'33.78"N 76°12'48.55"E
36	M/s Om Stone Crusher, VPO Kutharbeet Tehsil Haroli Distt. Una Prop. Smt. Sudershana Rani Sharma, H. No. 249 Giani Zail Singh Nagar, Ropar Punjab	04-27-75 Hect.	30-10-2023 to 29-10-2033	1,44,570	31°23'50.91" N 76°10'25.55" E 31°23'51.11" N
37	M/s Saraswati Stone Cr usher VPO Basal Tehsil & District Una HP.	02-93-51 Hect.	07-02-2024 to 06-02-2039	65,250	31°30'51.16" N 76°11'47.48"E 31°30'46.13"N 76°11'46.02"E
38	Sh. Satish Kumar S/o Sh Prakash Chand VPO Dushara Tehsil Amb District Una. Prop. M/s HSD Stone Crusher Vpo Dhushara, Tehsil Amb District Una (H.P.)	16-09-45 Hect.	06-04-2015 to 05-04-2030	1,01,250	31°36'11" N 76°09'53" E 31°36'11" N 76°10'19" E
39	Sh Satpal & Sachin Village Karluhi, Tesil Amb District Una H.P.Prop: M/s Jai Ganesh Stone Crusher Vpo Karluhi Tehsil Amb District Una (H.P.)	04-39-29 Hect.	17-07-2009 to 16-07-2024	17,000	31°41'24" N 76°05'05" E
40	Sh Rajinder Singh S/o Sh. Late. Sh. Kashmir Singh, H.No. 118, Phase-IV, Himuda Colony, Rakkar Colony, Una Tehsil & District Una H.P. Prop: M/s Thakur Enterprises Unit-II, Vpo. Kuthyari Tehsil Amb District Una (H.P.)	04-54-70 Hect.	16-09-2018 to 15-09-2033	90,000	31°36'14.71" N 76°08'59.70" E
41	Mahavir Stone Crusher VPO Takarla Tehsil Amb District Una (HP)	03-02-42 Hect.	28-02-2020 to 27-02-2035	19,370	31°36'12.7"N 76°10'16.04"E 31°36'14.3"N 76°10'25"E
42	Ruby Kumar S/o Sh. Avtar Singh VPO Deoli, Tehsil Ghanari Distt. Una (HP) Prop. M/s Thakur Stone Crusher	04-12-91 Hect.	26-06-2020 to 25-06-2035	92,905	31°41'43.60"N 76°3'46.56"E 31°41'35.05"N 76°3'58.84"E

43	Mahavir Stone Crusher VPO Takarla Tehsil Amb District Una (HP)	03-72-96 Hect.	15-10-2020 to 14-10-2030	79,515	31°33'14.6"N 76°11'29.8"E 31°33'06.0"N 76°10'42.8"E
44	Gurdev Singh Prop. M/s Rama Stone Crusher VPO Amdora Tehsil Amb District Una.	02-09-01 Hect.	14-12-2020 to 13-12-2030	46,752	31°38'21.08"N 76°5'40.68"E 31°38'14.46"N 76°5'57.63"E
45	Laxmi Stone Crusher Partner Smt. Tripta Sharma & Kamal Dev Sharma Vpo Thathal Tehsil Amb Distt. Una	05-93-07 Hect.	12-09-2022 to 11-09-27	61,875	31°39'35.73"N 76°09'09.18"E 31°39'53.08"N 76°09'34.83"E
46	Sh. Manoj Kumar Prop. Mahesh Stone Crusher VPO Karluhi Tehsil Amb Distt. Una	06-52-21 Hect.	21-02-2024 to 20-02-2029	51750	31°39'11.3"N 76°05'30.9"E 31°39'9.4"N 76°05'39.4"E
47	Sh. Kamal Thakur VPO Badoh, Tehsil Amb District Una H.P. Prop. M/s Bharat Stone Crusher & Screening Plant Vpo Mawa Sindhian, Tehsil Amb District Una (H.P.)	04-49-31 Hect.	03-05-2019 to 02-05-2034	39,400	31°37'21.20" N 76°6'59.33" E 31°37'12.70" N 76°6'58.74" E
48	Sh. Kapil Sharma S/o Sh. Sansar Chand Sharma, VPO Oel Tehsil Amb District Una H.P. Partner: M/s Shree Rudra Stone Crusher Vpo, Oel, Tehsil Amb District Una (H.P.)	02-95-63 Hect.	01-06-2016 to 31-05-2026	66,510	31°36'9.27" N 76°7'48.20" E 31°36'6.06" N 76°7'54.16" E
49	Sh. Atharv Chaddha S/o Sh. Suresh Chaddha VPO Tatehra Tehsil Amb Distric Una H.P. M/s Athrav Stone Crusher Village Tatehra PO. Oel, Tehsil Amb District Una (H.P.)	04-79-80 Hect.	30-06-2015 to 29-06-2030	44,400	31°37'56.2" N 76°06'17" E
50	Sh. Vivek Sharma, VPO Maidangarh, Tehsil Amb Distt. Una Prop. M/s Him Stone Crusher Vpo Maidangrah Tehsil Amb District Una H.P.	04-82-67 Hect.	18-07-2016 to 17-07-2031	72,000	31°48'30"N 75°59'93"E
51	Sh Rajinder Singh S/o Sh. Late. Sh. Kashmir Singh, H.No. 118, Phase -IV, Himuda Colony, Rakkar Colony, Una Tehsil & District Una H.P. Prop: M/s Thakur Enterprises Unit-II, Vpo Kuthyari Tehsil Amb District Una (H.P.)	02-43-18 Hect.	27-07-2016 to 26-07-2031	50,625	-
52	M/s J.B.B. Stone Crusher & Screening Plant, Village Jadla Koeri Tehsil Amb District Una Prop. Sh. Madan Jaswal Village & P.O. Jadla Koeri, Sub Tehsil Ghanari, District Una H.P.	04-61-12 Hect.	29-06-2017 to 28-06-2032	93300	31°24'09"N 76°9'12"E
53	M/s Ganpati Stone Crusher VPO	03-55-11 Hect.	05-08-2017 to	63788	31°40'80"N

	Oel Tehsil Amb Disterict Una H.P. Prop. Sh. Ajender Singh Bharti S/o Sh. Ram Pal Singh VPO Oel, Tehsil Amb Districtr Una H.P.		04-08-2032		76°04'59"E
54	M/s Nanika Stone Stone Crusher, Prop. Sh. Vishavjeet Singh, VPO Kadh, Tehsil Ghanari District Una H.P. Mob.No. 78070-48915	02-37-70 Hect.	20-09-2017 to 19-09-2032	66850	31°42'2.63"N 76°2'43.80"E 31°41'56.95"N 76°2'47.60"E
55	Sh. Vivek Sharma, VPO Maidangarh, Tehsil Amb Distt. Una Prop. M/s Him Stone Crusher Vpo Maidangrah Tehsil Amb District Una H.P.	14-61-59 Hect.	04-12-2018 to 03-12-2033	79875	31°49'30"N 76°00'50"E 31°49'00"N 75°59'30"E
56	M/S Thakur Enterprises Unit II V P O Kuthiari Tehsil Amb District Una	02-53-25 Hect.	06-08-2019 to 05-08-2034	51282	31°37'4"N 76°06'16"E
57	M/S Thakur Enterprises Unit II V P O Kuthiari Tehsil Amb District Una	02-43-18 Hect.	06-08-2019 to 05-08-2034		31°37'4.12"N 76°06'16.54"E
58	Krishna Stone Crusher VPO Tatehra Tehsil Gagret at Kaloh Distt. Una	01-69-23 Hect.	27-06-2016 to 26-07-2031	53,280	31°37'09.1" N 76°04'28 02" E 31°37'08.3"N 76°04'31.6"E 31°37'09.98"N 76°04'25.2"E 31°37'08.8"N 76°04'32.6"E
59	Sh. Satish Kumar Sharma, Prop. HSD Stone Crusher VPO Chururu, Tehsil Amb, District Una, H.P.	03-08-11 Hect.	28-09-2020 to 27-09-2035	61,622	31°35'45" N 76°8'32" E 31°35'40"N 76°8'54"E
60	M/s Nanika Stone Stone Crusher, Prop. Sh. Vishavjeet Singh, VPO Kadh, Tehsil Ghanari District Una H.P. Mob.No. 78070-48915	02-35-23 Hect.	08-03-2021 to 07-03-2036	52,692	31°41'56.10" N 76°2'58.38" E 31°41'46.85" N 76°3'14.26" E
61	Sahil Sharma Prop. M/s Him Flint Stone Crusher Vpo Kuthera Jaswalan Tehsil gagret Distt. Una	04-28-73 Hect.	28-08-2021 to 28-08-2036	81,994	31°36'4.14" N 76°8'2.77" E 31°36'2.02" N 76°8'11.48" E
62	Sh. Kamal Thakur VPO Badoh, Tehsil Amb District Una H.P. Prop, M/s Bharat Stone Crusher & Screening Plant Vpo Mawa Sindhian, Tehsil Amb District Una (H.P.)	07-24-63 Hect.	17-09-2021 to 16-09-2026	38,571	31°37'10.4" N 76°07'04" E 31°37'10.7" N 76°07'03" E
63	Krishna Stone Crusher VPO Tatehra Tehsil Gagret at Kaloh Distt. Una	02-94-70 Hect.	09-08-2021 to 08-08-2026	49,075	31°37'48.4" N 76°06'22.1" E 31°37'44.1" N 76°06'23.6" E
64	Sh. Kapil Sharma S/o Sh. Sansar Chand Sharma, VPO Oel Tehsil Amb District Una Partner: M/s Shree Rudra Stone Crusher Vpo. Oel, Tehsil Amb District Una (H.P.)	04-87-72 Hect.	14-01-2021 to 13-01-2026	28,306	31°38'34.67" N 76°5'30.53"E 31°38'41.27"N 76°5'44.75"E

65	Sh. Kapil Sharma S/o Sh. Sansar Chand Sharma, VPO Oel Tehsil Amb District Una H.P. Partner: M/s Shree Rudra Stone Crusher Vpo Oel, Tehsil Amb District Una (H.P.)	2-20-22 Hect.	03-08-2023 to 02-08-2033	44,550	31°39'08.78" N 76°5'40.73" E
66	Smt. Ambika D/o Sh Prem Chand Vivek Nagar Pir Nigah Road Prop M/s Saraswati Stone Crusher VPO Upper Basal Tehsil & District Una	01-48-21 Hect.	04-04-2023 to 03-04-2028	27840	31°34'27.0"N 76°15'50"E 31°35'28.30"N 76°14'52.0"E
67	M/s Matri Stone Crusher VPO Basal Tehsil & District Una H.P. Partners Sh Ram Dev Duvedi & Kamal Kishore Sharma, Vpo Bhatoli Tehsil Una District Una (H.P.)	04-75-67 Hect.	07-04-2016 to 06-04-2031	102550	31°30'46.53"N 76°12'1.38"E 31°30'42.30"N 76°11'51.53"E 31°30'41.31N 76°11'52.76"E 31°30'40.12"N 76°12'9.68"E
68	Sh Kapil Sharma Prop M/s Shree Shree Rudra Stone Crusher & Screening Plant, Vpo Basal Tehsil Una District Una (H.P.)	02-99-25 Hect.	07-04-2016 to 06-04-2031	67,275	31°30'14.67"N 76°12'21.24"E 31°30'14.42"N 76°12'27.28"E 31°30'10.94"N 76°12'24.50"E 31°30'9.19"N 76°12'26.36"E
69	Sh Raman Kumar S/o Sh Dharampal Vpo Ispur Tehsil Una District Una (H.P.) Prop. M/s Rudra Crusher Vpo Ispur Tehsil Una District Una (H.P.)	04-81-31 Hect.	26-08-2016 to 25-08-2031	90,000	31°29'58"N 76°12'28"E 31°29'51"N 76°12'41"E
70	M/s Bala ji Stone Crusher Vpo Upper Basal, Tehsil & District Una H.P. Partner: Sh. Sanjeev Saini & Sh. Yogesh Aeri,	13-49-47 Hect.	21-03-2017 to 20-03-2032	1,62,000	31°32'48"N 76°12'11"E
71	M/s Shiva Stone Crusher, VPO Dhamandari, Tehsil & District Una, HP Prop. Sh. Bhupinder Singh Thakur S/o Sh. Vikram Singh VPO Chatara	02-94-14 Hect.	06-08-2018 to 05-08-2033	39,000	31°33'5.41"N 76°16'36.68"E
72	Rakesh S/O Piare Lal R /OWard No -7 Santoshgarh Tehsil & District Una	01-40-62 Hect.	26-06-2019 to 25-06-2024	25,920	31°21'05.7"N 76°18'37.9"E 31°21'22.8"N 76°18'22.9"E 31°21'25.3"N 76°18'38.08"E
73	Manav Khanna S/o Late Sh. Kapil Mohan VPO Khanpur, Tehsil & District Una.	01-39-00 Hect.	12-07-2019 to 11-07-2024	25,725	31°22'23.2"N 76°17'51.9"E 31°22'31.5"N 76°18'01.2"E 31°22'14.6"N

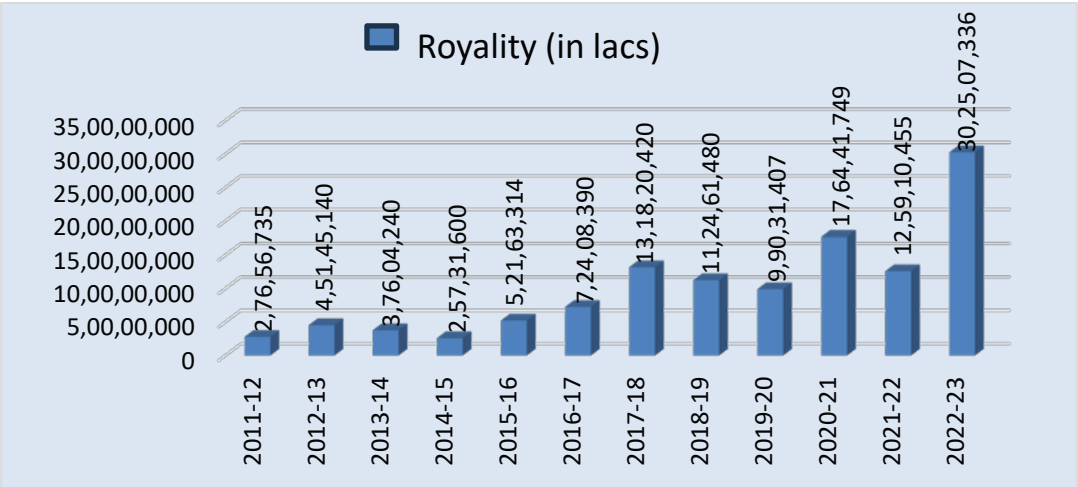
					76°17'49.04"E 31°22'16.7"N 76°17'50.6"E
74	Sh. Ravinder Kumar S/o Sh. Parmeshawar Nand VPO Santoshgarh, Tehsil & District Una (HP)	02-10-65 Hect.	04-01-2020 to 03 -01-2025	42,130	31°21'3.29"N 76°18'30.53"E 31°20'56.98"N 76°18'42.12"E
75	Sh. Umesh Kumar S/o Sh. Ravinder Kumar VPO Santoshgarh Tehsil & District Una (HP)	03-35-15 Hect.	28-05-2020 to 27-05-2025	67,030	31°21'44.75"N 76°18'11.26"E 31°21'41.09"N 76°18'25.19"E
76	Smt. Sunaina Sharma w/o Sh. Neeraj Sharma double storey building 19/2 Sharma Niwas, Near old excise office takka road, lower arniala Po Kotla kalan Tehsil & Distt. Una	01-52-20 Hect.	16-04-2021 to 15-04-2026	32,533	31°30'07.4"N 76°12'30.3"E 31°30'2.88"N 76°12'32.17"E 31°30'9.84"N 76°12'30.74"E

4 DETAILS OF ROYALTY OR REVENUE RECEIVED IN LAST THREE YEARS

In Una District royalty received from minor minerals since 2020-21 onwards is given in the following table.

Table No. 2 showing yearwise detail of Royalty of Minor Minerals

Sr No.	Year	Royalty Recieved
1	2020-2021	17,64,41,749
2	2021-2022	12,59,10,455
3	2022-2023	30,25,07,336



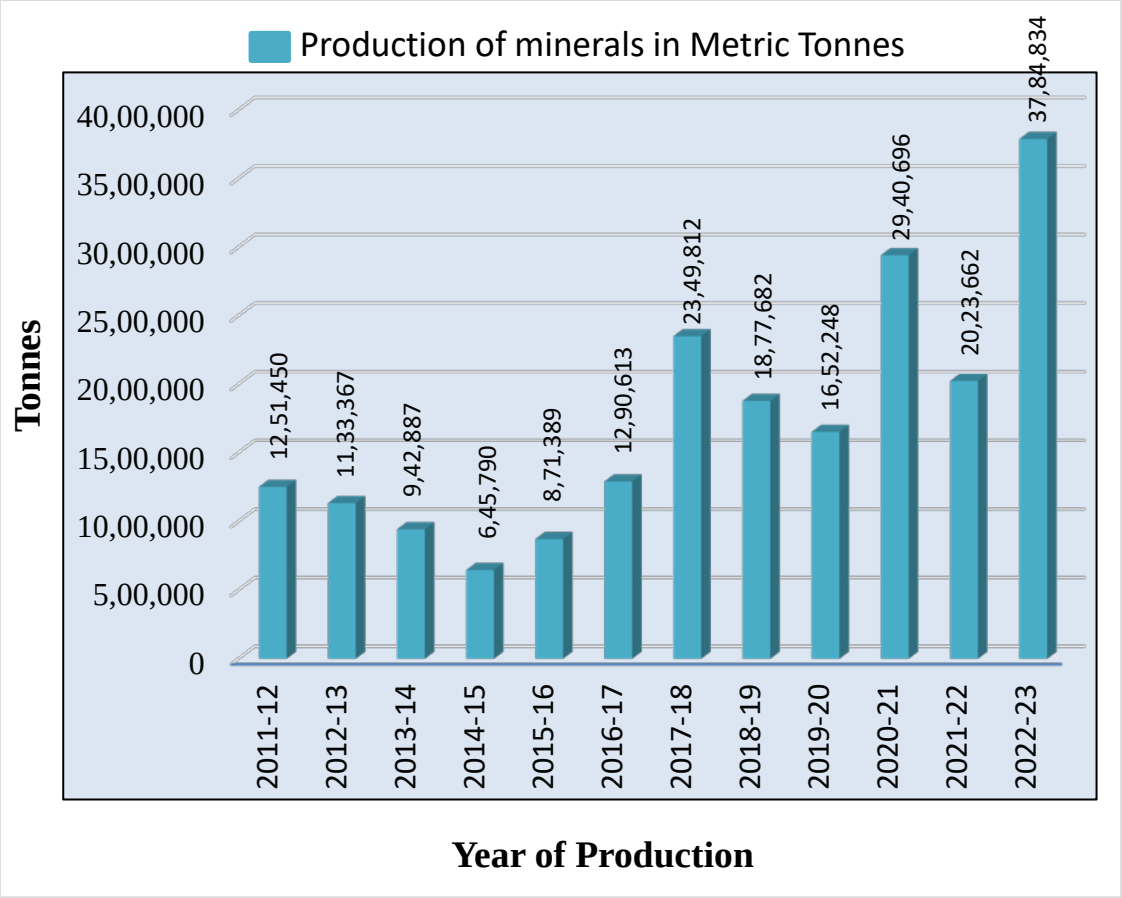
GraphShowing Yearwise Revenue Trend of District Una (in Lacs)

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

In Una District, minor minerals such as sand, stone and bajri are available in river bed areas as well as in hill slopes. Moreover, in some rivers/stream beds, white quartzite boulders are also available which are being used in glass industry. The royalty received from the aforesaid minerals from 2020-21 onwards is tabulated in the following table.

Table showing yearwise detail of Royalty and production of Minor Minerals

Sr No.	Year	Production of mineral (in metric tonnes)
1.	2020-2021	29,40,696
2.	2021-2022	20,23,662
3.	2022-2023	37,84,834



Graph Showing Yearwise Production of Minerals in District Una

6 PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS OF THE DISTRICT UNA

The process of deposition is the opposite of erosion. It is the process by which a river deposits or drops the sediments or material that it is transporting. This process is referred to as deposition. Among the many types of sediments that rivers carry, some of the most common ones are rocks, boulders, silt, mud, pebbles, and stones. In normal circumstances, the force of a river enables it to transport sediment; however, when this force is diminished, the river loses its capacity to transport sediment and instead deposits it upon the riverbed.

The work done by a river consists of the following: -

1. Erosion
2. Transport of the material produced by erosion.
3. Accumulation (deposition) of the transported material

The erosion and transport of material go hand in hand with the deposition of the latter. There is not a single river that doesn't carry fragmental material and deposit it. Even at the early stages, in the development of a river, when the erosion and transport prevail over accumulation, the material carried by the river is deposited in some of the sections. During youthful stage of the river, these deposits are unstable and when the volume of water and stream velocity increases (during flood), they may start moving again downstream. The load carried by a stream includes the rock waste supplied to it by rain wash, surface creep, slumping etc. by tributaries, external agents such as glaciers, wind,

together with, acquired by its own erosion work. The term load doesn't specifically mean the maximum amount of debris that a stream could carry in a given set of conditions, that amount is referred to as the transporting power or capacity of a river. The term load is technically defined as the total weight of solid detritus transported in unit time. The transporting capacity of a stream rises very rapidly as the discharge and the velocity increases. Experiments show that with debris of mixed shapes and sizes, the maximum load that can be carried is proportional to something between the third and fourth power of the velocity. But the fragments of a given shape, the largest size that can be moved (not the actual mass of mixed debris) is proportional to the sixth power of the velocity, provided of course that the depth of water is also adequate for the purpose. As the velocity of a river is checked, the bed load is first to come to rest with continued slackening of the flow, the larger ingredients of the suspended load are dropped, followed successibly by finer and finer particles. When the stream begins to flow more vigoursly, the finer materials are the first to move again. A river begins to sort out its load or burden as soon as it receives it. The proportion of fine to coarse amongst the deposited materials tends on average to increase downstream, but there may be interruptions of this tendency because of addition of coarse debris from tributataries or from landslides and steepening of the banks. Both discharge and load depend on the climate and geology (litholgy, structure and relief) of the river basin concerned and both co-operate in carving out the channels down and down.

6.1 General Geomorphological Characteristics of Rivers/Streams

Transport of Sediment by Streams and Rivers

The material transported by a stream can travel as:

1. Bed load
2. Suspended load
3. Dissolved load (salts, chemicals)

Stream capacity

- Maximum quantity of solid material that a stream can carry.
- Related to velocity (discharge)
- Higher after a rain (more sediment in water)

Stream competence (or competency)

- It is a measure of the maximum size of particles the stream can transport.
- Predict erosive capabilities.

Type of rivers or streams

1. Meandering

These streams are very sinuous and tend to migrate back and forth across the floodplain (or meander), over time. The word "meander" comes from the name of a sinuous river in Turkey, named the Menderes.

Braided

These streams have lots of lenticular-shaped in-channel bars. The stream channel bifurcates around these bars and follows a pattern resembling braided hair.

Fluvial Geomorphology

Erosion is the set of all processes by which soil and rock are loosened and move downhill or downslope. The most important process of erosion is due to running water. Erosion by running water acts in two basic forms: *overland flow* and *channel flow.*

Splash Erosion

Most running water starts off as rain. Rain drops have diameters between 0.5 to 7 mm and hit the ground at the rate of 1 - 9 m/sec. The force of the impact loosens material and throws it into the air. This is called splash erosion. In violent thunderstorms, over 200 tonnes/hectare can be disturbed. On a sloping surface, soil is shifted downhill as grains move slightly greater distances downhill than uphill. More importantly, however, it leads to a decrease in the permeability of the surface due to openings being sealed by particles. There is therefore less infiltration and an increase in overland flow.

Overland Flow

Runoff starts as a broad sheet. The sheet exerts a drag force over the ground surface and some weathered products may be removed. This is sheet erosion. Generally, after travelling a short distance, small channels or rills are formed, which coalesce into gullies, concentrating the erosive action.
The amount of erosion on a slope depends on:

- The length and steepness of the slope.
- The rainfall intensity.
- The permeability and structure of the surface.
- The amount of vegetation cover

Channel flow

Stream erosion is "the progressive removal of mineral matter from the surface of a stream channel which itself may consist of bedrock or regolith. Erosion will only occur when the stream has an excess of energy. In mountainous streams, the rough channel walls may amount to 96% of the potential energy of the stream. Some energy is also spent on transporting load previously acquired. The quantity of water passing through the channel is termed as discharge (m^2/sec) and is eqaul to the channel cross-sectional area (m^2) times the average stream velocity (m/sec).

The amount of sediment carried by the stream is called the stream load (kg/m^3).

Sub-processes of Erosion

Hydraulic Action

This is very important in weak alluvial deposits, especially in times of flood, when fast flowing, turbulent water undermines the channel banks.

Abrasion

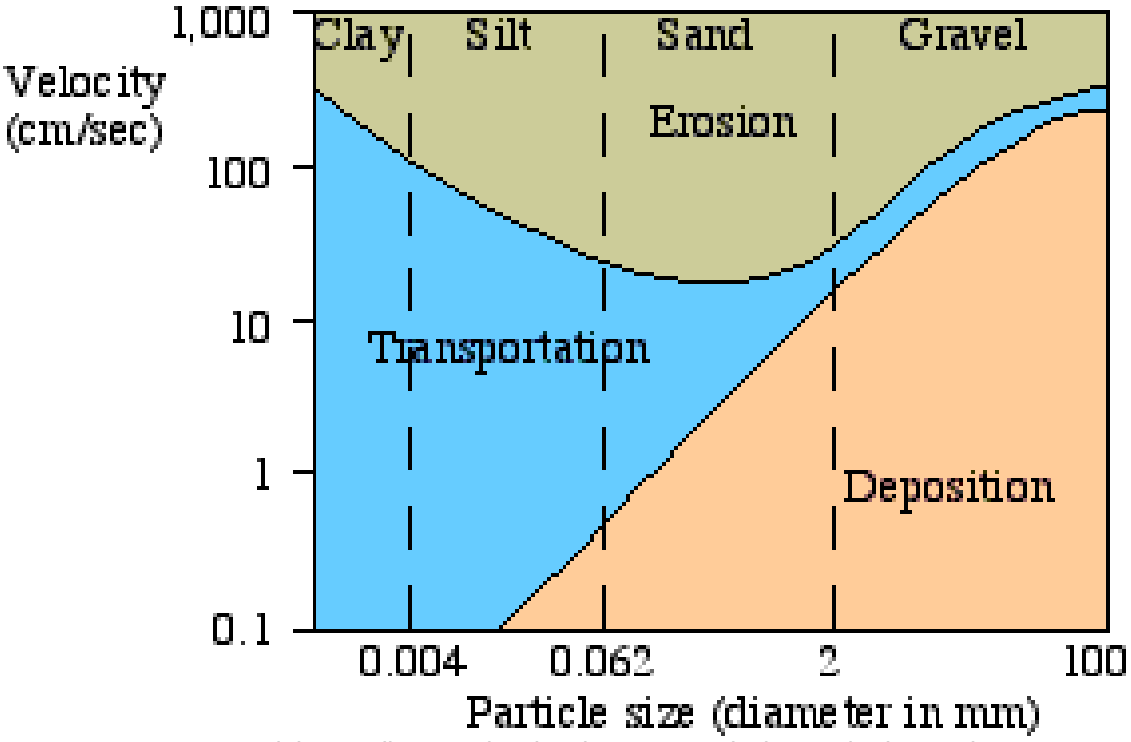
The scouring is caused by the impact of rock particles that are being transported. Abrasion features include plunge pools, potholes and chutes. Abrasion is proportional to velocity, so a three-fold increase in velocity leads to nine times as much abrasion. The mutual erosion of two particles is known as attrition.

Solution (Corrosion)

Chemical reactions between ions in solution and exposed minerals. It is particularly important in limestone areas or on beds of rock salt and gypsum, but all common minerals are soluble to some extent.

Erosion Velocities

The fine to medium sand grains are easiest to erode. Particles larger than this size have a higher volume to surface area ratio and are thus more difficult to erode. For clays, ionic bonding leads to increased cohesion between clay particles, making them harder to erode. Clays are also platy minerals and form smooth surfaces. Laminar flow over the smooth surface decreases the ability of the stream to erode the particles. Clays also infill between larger grains and so are protected by the larger grains. Therefore, sand can be moved during "normal" river flow, but the larger and smaller particles can only be transferred when floods increase the stream's velocity. Once the particles are being transported, there is an orderly deposition of particles with the largest being deposited first and clays being held almost indefinitely. Hence the sediment becomes sorted downstream.



Hjulstrom diagram showing the stream velocity required to erode, transport and deposit particles of various sizes.

Transportation

The particles carried by streams are known as the stream load.
Particles may be carried by
Floatation of very minor significance.

Solution: Ions of dissolved minerals that may travel downstream indefinitely. The most common are Na, Ca, K, Mg, Cl, SO_4 and HCO_3. One estimate of U.S. rivers was that they carry 300 million tonnes of dissolved load each year, and 250 million tonnes of solid load.

Suspension: the temporary support of particles when turbulence is greater than the settling velocity of the particle. Clay and silt are normally transported in suspension, but sand may be carried this way in floods.

Saltation: Intermittent "jumping" of grains that are lifted by turbulence but are too heavy to remain in suspension.

Traction: the sliding or rolling of particles along the stream floor. Particles moved in this way comprise the bed load.

Bed load normally constitutes around 10% of the solid load, but may be up to 50% during floods, when the major work of the stream is done.

Transportation is aided by the buoyancy of water, eg. quartz grains are Å 2000 times the density of air, but only two and a half times that of water. Unequal velocities at the top and bottom of boulders also assist transportation, as do steep gradients.

The total load of particles of all sizes that a stream can carry is known as its capacity. It is proportional to discharge, which is proportional to velocity. A faster flowing stream therefore has a higher capacity. If a stream's capacity is less than its load, the stream cannot carry its load, so deposition occurs. If capacity exceeds load, the stream has excess energy (gravitational, potential energy), so it can erode more sediments. Streams switch back and forth from depositional to erosional agents, depending on load vs. capacity. A stream can erode along one stretch and deposit along another, since gradient and channel shape/size vary along the course of stream. Streams can erode during periods of higher velocity or discharge (floods) and deposit during periods of lower velocity or discharge. Anything that alters the sediment load delivered to the channel or that alters the stream's capacity to carry that load will cause the stream's gradient or channel geometry to change in response.

The largest particle that a stream can transport is known as its competence. Assuming that there is sufficient depth to cover the particles, then competence is proportional to the square of velocity.
Deposition

Deposition will occur when a loss of energy results in a decrease in velocity. This may be due to such things as declining gradient, a decrease in water volume, an increase in cross-sectional area (particularly pools, lakes, and oceans), or by local obstructions. An excessive load produced by increased erosion in the drainage basin or tributary valleys, or from glaciofluvial outwash will also inevitably lead to deposition. The accumulations of stream deposits are called alluvium.

Note: There is a constant interaction between erosion, transportation and deposition. During a flood, the bed of a stream at a particular point may be eroded, but as the flood subsides the bed is filled again. Similarly, in different parts of the stream, velocity differs and hence one part of the stream may be eroding its bank, while on the opposite bank deposition is taking place.

7 GENERAL PROFILE OF UNA DISTRICT

General

Una is a small foothill district located on the Southwestern border of the State and is situated between 75°58'21"–76°28'25" East longitude and 31°17'52"–31°52'0" North latitude. The District is situated in the East-North of the state and is surrounded by District(s) Bilaspur, Hamirpur and Kangra in the North and the west. However, it is surrounded by the Districts of Rup Nagar, Hoshiarpur of the state of Punjab on the east and the South. Una is located in the western region of Himachal Pradesh, bordered by the Siwalik Hills of the Himalayas to the west and the Solah Singhi range to the east. The Satluj river flows to the south of the district, near Nangal Dam, while the Beas River flows to

the north of the district, near Pong Dam and Talwara.The elevation ranges from over 409 metres in low-lying areas to more than 1000 metres in hilly regions. The Swan River, a seasonal river also referred to as the soul of the Una district, flows for a distance of 65 km through the Jaswan Valley in a southerly direction until it merges with the Sutlej River near Anandpur.

The few important fact of the district is given below: -

Demography:

Population	5,21,173 as per 2011 census
Density per Sq Km	338
Male	2,63,692
Female	2,57,481
Rural	4,08,545
Urban	39422
Literacy Rate	86.52%
Area	1540 sqkm
Forest area	185 sqkm
Cultivated area	430 sqkm
Barren and unculturable land	226.7 sqkm
Land put to non agriculture use	294 sqkm
Permanent pastures and other grass lands	129.4 sqkm
Land under Miscellanceous trees and crops	55.4 sqkm
Irrigated area	78.4 sqkm

Administrative set up

Number of sub-divisions - 5
Una
Amb
Haroli
Bangana
Gagret
Number of Tehsils - 5
Una
Amb
Bangana
Haroli
Ghanari
Number of Sub Tehsils - 7
Bharwain
Ispur
Jol
Bihru Kalan
Dulehar
Gagret at kaloh
Mehatpur Basdehra
Development Blocks - 5
Una
Amb
Gagret

Bangana
Haroli
Noumber of Gram Panchayats - 245
Backward Panchayats - 3 (Ambehra Dheeraj, Plahta, Sihuna all under Bangana Block
Number of Villages- 866

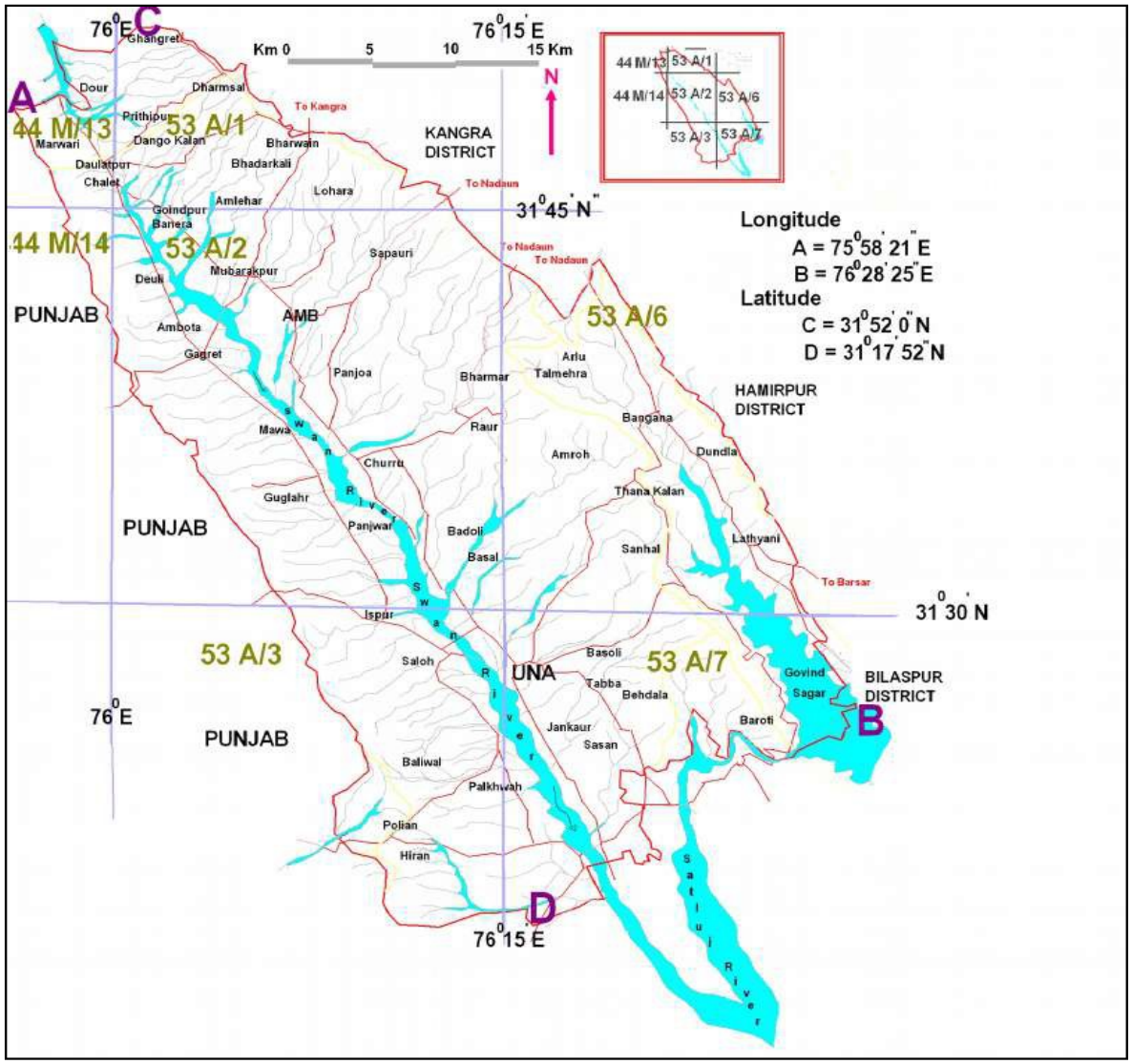
Assembly Segment – 5
Una
Haroli
Gagret
Kutlehar
Chintpurni

Location

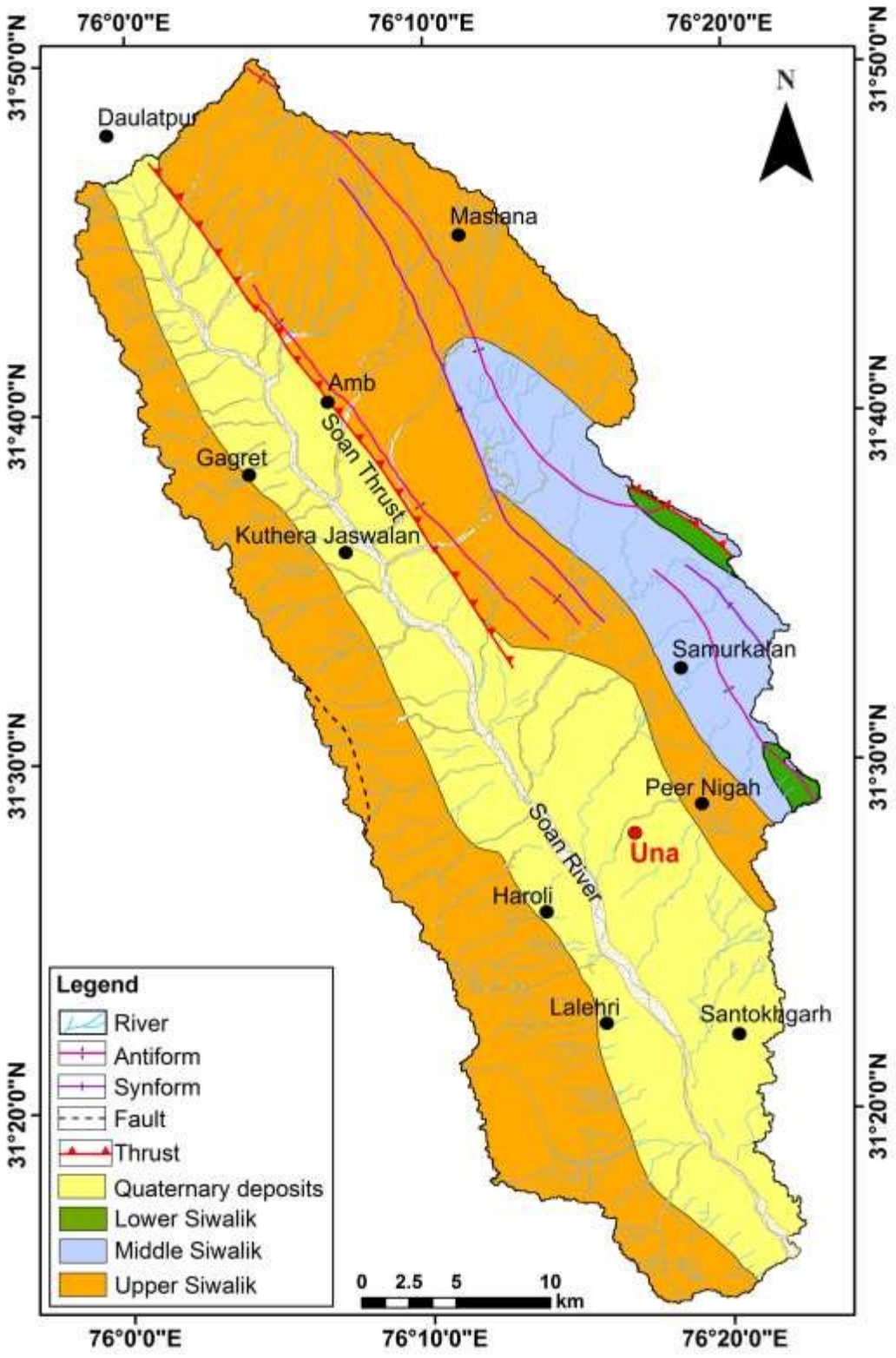
The Una District lies between 75°58'21'' –76°28'25" East longitude and 31°17'52''- 31°52'0'' North latitude and covers following 7 Nos. Survey of India Toposheet: -

44 M/13
44 M/14
53 A/1
53 A/2
53 A/3
53 A/6
53 A/7

The area of district lying on each survey sheet is shown in the following Figure



Showing the area of district lying on each Survey of India Toposheet



Geological map of the intermountain basin in Una district, Himachal Pradesh, India.

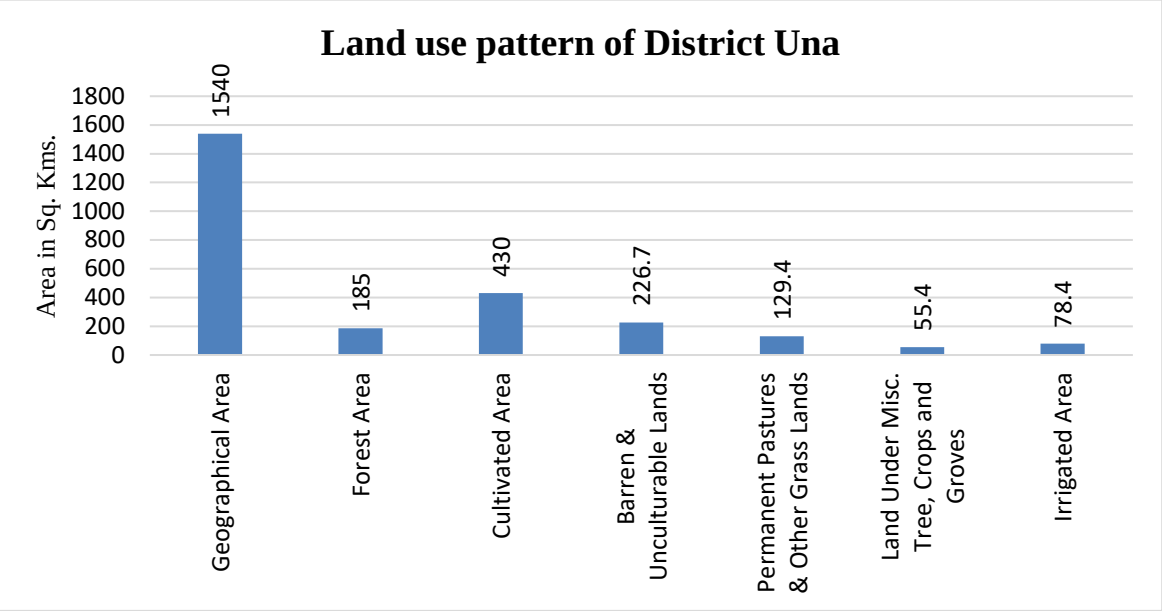
8 LAND UTILIZATION PATTERN IN THE DISTRICT: FOREST, AGRICULTURE, HORTICULTURE, MINING ETC.

Primarily the land of the district can be classified into the following four categories as shown in figure.

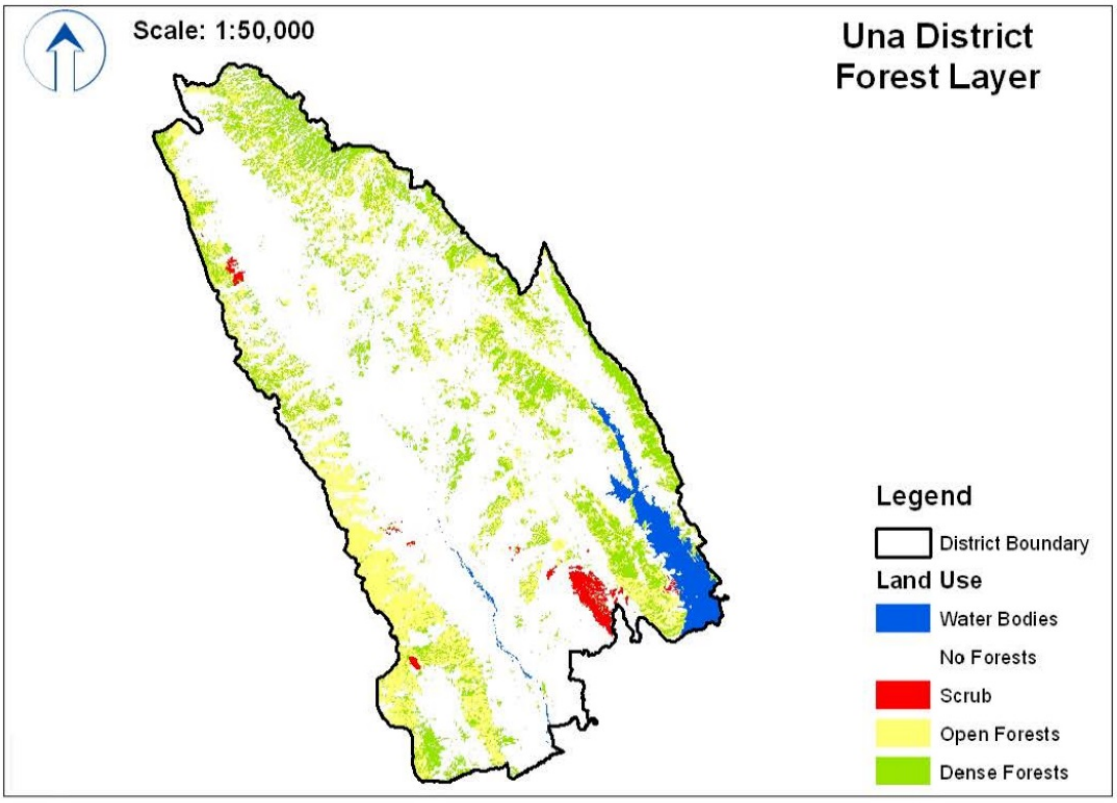
1. Forest
2. Water bodies
3. Arable land unirrigated
4. Urban settlement

Table Showing the total land of each category in Sq. Km in Una District.

1	Geographicqal Area	1540 Sq. Kms
2	Forest Area	185 Sq. Kms.
3	Cultivated Area	430 Sq. Kms.
4	Barren & Unculturable Lands	226.7 Sq. Kms.
5	Permanent Pastures & Other Grass Lands	129.4 Sq. Kms.
6	Land Under Misc. Tree, Crops and Groves	55.4 Sq. Kms.
7	Irrigated Area	78.4 Sq. Kms.



Graph Showing the Land Use Pattern of district Una.



Geological Map Showing Land Utilization in district Una

AGRICULTURE:

Most of the area of District Una consists of foothills and Swan valley up to elevation of 600 metres above mean sea level with sub tropical climate. The soil is mostly sandy loam in texture with scattered loamy patches. The area is highly prone to erosion due to weak geological formations and scanty vegetation. The moisture retention capacity is poor. The crops usually face moisture stress during the remaining period of the year due to inadequate and irregular rainfall. The irrigation facilities are provided by lifting water from streams, shallow dug wells and medium to deep tube wells in the valley area.

The source of water and irrigation in district Una can be classified into the following five classes.

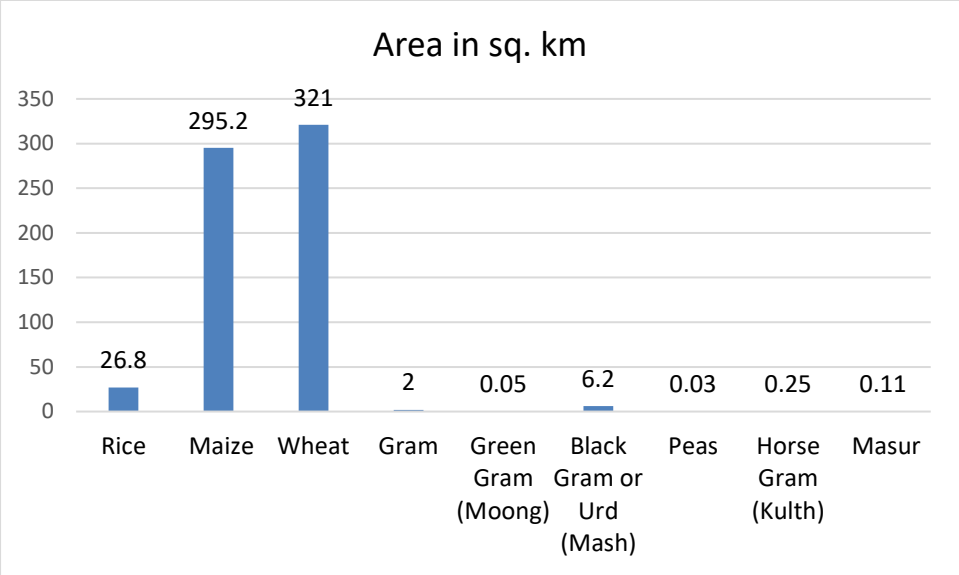
- Lift Irrigation Scheme
- Kuhls
- Well used for domestic purposes
- Well used for irrigation
- Tubewells

The main crops grown in the area are Wheat, Maize, Gram, Paddy, Mustard, Sugarcane, Patato, Vegetables, and Citrus etc. The area covered under each crop in the District Una is given below in table 7.

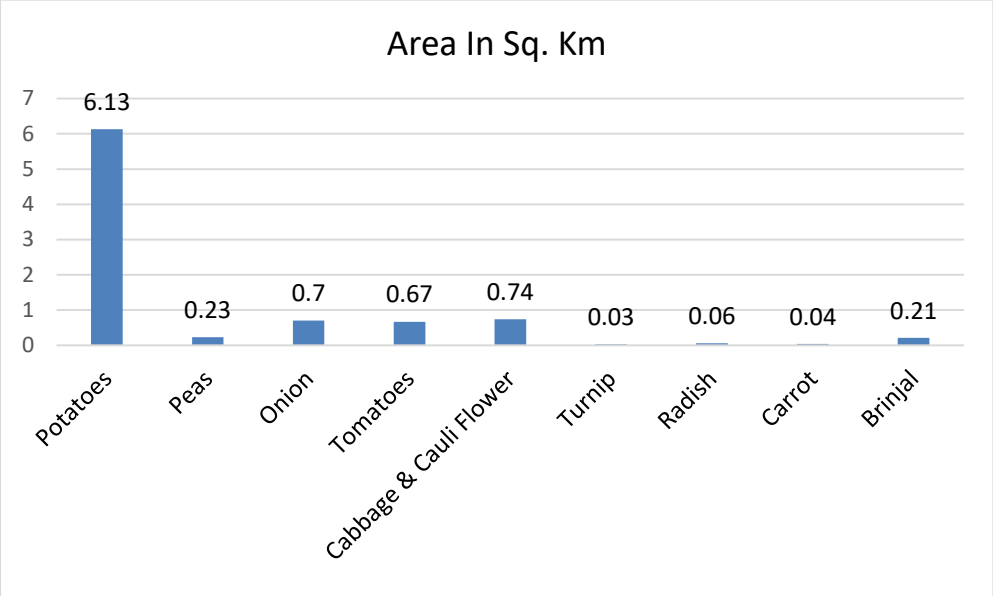
Table showing area covered under each crop in District Una

Crops	Area (Sq. Kms)

Food Crops	651.6
Rice	26.8
Maize	295.2
Wheat	321
Gram	2
5 Green Gram (Moong)	0.05
Black Gram or Urd (Mash)	6.20
Peas	0.03
Horse Gram (Kulth)	0.25
Masur	0.11
Sugarcane	6.02
Vegetables	9.77
Potatoes	6.13
Peas	0.23
Onion	0.70
Tomatoes	0.67
Cabbage & Cauli Flower	0.74
Turnip	0.03
Radish	0.06
Carrot	0.04
Brinjal	0.21
Condiments & Spices	0.45
Chillies	0.09
Ginger	0.13
Turmeric	0.07
Garlic	0.16
Non-Food Crops	44.18
Fibre	0.17
Hemp	0.17
Oil Seeds	21.92
Groundnut	0.1
Taramira	4.66
Seasamum	7.09
Rape (Toriya) Seeds	0.06
Mustard	10.01
Fodder Crops	18.42
Barseem & Lucrene	5.42
Chari	10.98
Bazra	2.02



Graph Showing Area under Different Crops in Hectares



Graph Showing Area under Different Vegetables in Hectares

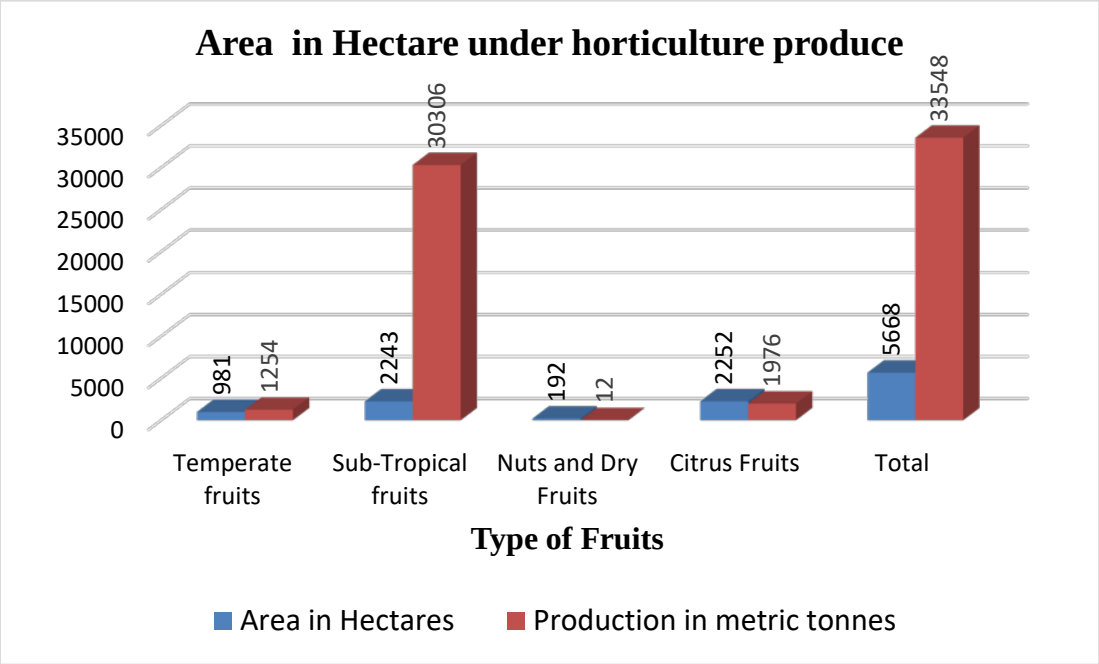
HORTICULTURE:

The main horticulture products of the area can be classified into four categories. The Table showing area covered under each category and the total production as per 2001- 2002 survey.

Table showing the %age of area in Hectares used for gxrowing the fruits

Sr. No.	Type of Fruit	Area in Hectares	Production in metric tonnes
1	Temperate fruits	981	1254
2	Sub-Tropical fruits	2243	30306

3	Nuts and Dry Fruits	192	12
4	Citrus Fruits	2252	1976
5	Total	5668	33548



Graph Showing the area of District Una under horticulture produce

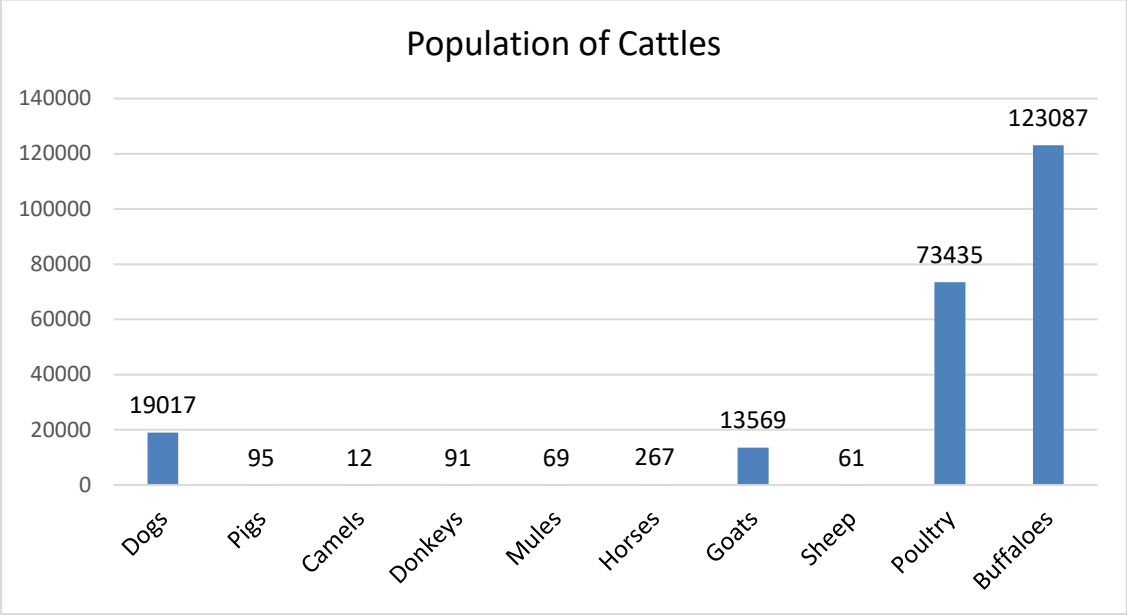
ANIMAL HUSBANDRY

Economy of the district is predominantly agrarian, but role of Animal Husbandry is equally important as the farmers have to keep the cattle for the purpose of ploughing, manure for maintaining fertility of the fields and to meet daily need of milk for their family. Table- 8, given below shows the population of cattle in district Una as per 2012 Census.

Table Showing the Population of Cattles in Una District, 2012 census.

Sr. No.	Name of Cattle	Population
1	Dogs	19017
2	Pigs	95
3	Camels	12
4	Donkeys	91
5	Mules	69
6	Horses	267
7	Goats	13569
8	Sheep	61

9	Poultry	73435
10	Buffaloes	123087



Graph Showing the Population of cattles in District Una

FISHERIES

Una is a foot hill district with arid and scanty rains. In natural fisheries resources this district comprises of a portion of Govindsagar reservoir falling in the district. Lunkar Khad spread from Dumkhar to Bhakra where considerable fish production is achieved.

There are about 130 seasonal and perennial ponds measuring about 65 hectares area in the district, which has been bought under the fish culture through different schemes.

FLORA

Trees

- Khair Siris Kachnar Semal Tun Mango Behul Shisham Ritha Tut
- Behera & Chil
- Shrubs
- Vitex Munj Ber Ipomea
- Dodonea & Bamboo.
- Grasses
- Vetiver Sanchrus Munjh.

FAUNA

The species of animals and birds commonly found in the district are: -

- Leopard (Bagher)
- Hare
- Wild Bore (Jangli Soor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- Birds
- Chakor
- Crow
- Red Jungle Fowl (Jangli Murga)
- Black Partridge (Kala Titar)
- Grey Partridge (Safed Titar)
- Woodpecker

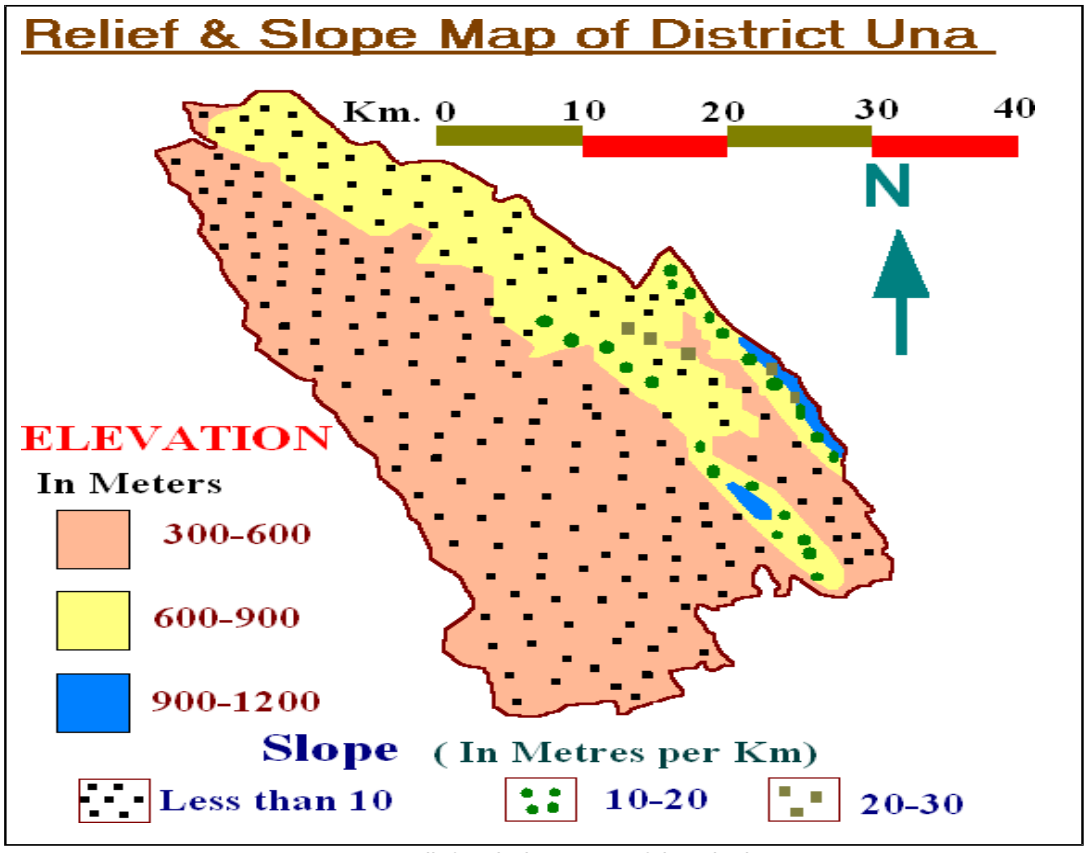
9 PHYSIOGRAPHY OF THE DISTRICT

In general, the area is a part of the Siwalik range. The Siwalik Hills are located within the political boundaries of Pakistan, India, Nepal, and Bhutan, and range between 6 to 90 km in width. They gradually become steeper and narrower in relief and width respectively, from northern Pakistan to Bhutan (over 2000 km in length). Ongoing erosion and tectonic activity have greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), earth-pillars, rilled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates. To the South of the Siwaliks are the Indo-Gangetic plains and in the north, they are bordered by the Lesser Himalayas.

Figure Showing important ranges and water divide in Una District.

Intermittently located between the Siwaliks and the Lesser Himalayas (exclusively in India and Nepal) are *duns*, flat-bottomed longitudinal structural valleys with their own drainage systems. These essentially comprise several large Himalayan piedmont alluvial fans and terraces, which formed as a result of tectonic episodes in the flanking Siwaliks. The *duns* also consist of lacustrine, fluvial, aeolian and swamp-environment deposits, and range from Middle Pleistocene to Holocene in age. During their formative stage, most of the *duns* were slightly narrower and have gradually expanded over time through the erosion of the adjacent Siwalik sediments (a continuing process). In Nepal, these *duns* were often naturally filled with alluvial sediments of lacustrine and fluvial deposits, thus burying palaeolithic sites that were later exposed through erosion.

The monsoon rains temporarily supply seasonal streams (locally known as choes, khads, or nalas) located both within the Siwalik hills and the adjacent *duns*. These stream banks and their terraces yield sizeable numbers of lithic artefacts, owing to the shared location for both water and raw material. The district is bounded by plains of Punjab in the West and Sola Singhi Dhar (Siwalik Range). The ranges trend in general NW-SE direction and between there is a longitudinal valley of the Soan River. The altitude varies from 300 metres to over 1200 metres above MSL on Sola Singhi Dhar. The width of the Jaswan Dun Valley ranges from 7 Kms to 14 Kms and the town of Una, which is nearly in the middle of the Dun valley (Jaswan Valley) is on the elevation of 427 Mts above MSL. In general, most of the district lies between 600-900 mts elevation and slope is less than 10º.



Relief and Slope Map of the District Una

10 RAINFALL

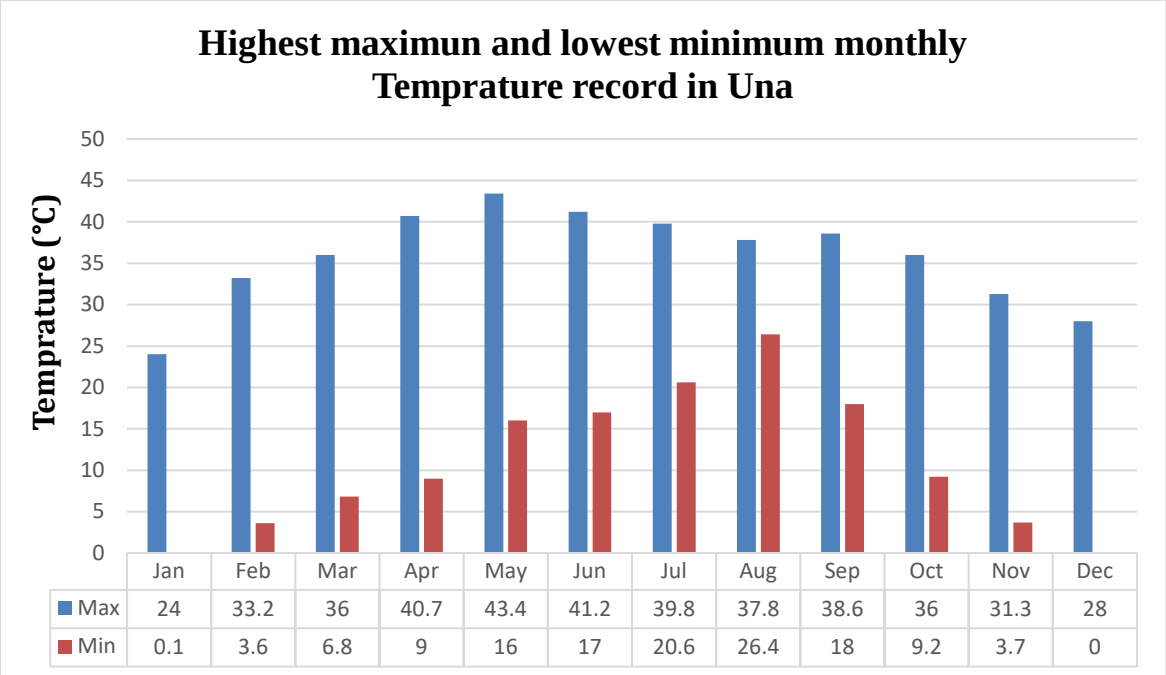
Table Showing temperature, rainfall and humidity of District Una

Climate of Una District, Himachal Pradesh				
Climate		Winter	Summer	Rainy
Period		Oct.-Mid March	Mid. March-June	July-September
Weather		Cool	Hot	Humid
Humidity		81%	55%	98%
Temperature	Max.	36.0 C	43.4 C	39.8 C
	Min.	-0.1 C	9.0 C	18.0 C
Rainfall	Max	27.2 mm	81.6 mm	353. 0 mm
	Min.	0.0 mm	9.6 mm	19.4 mm

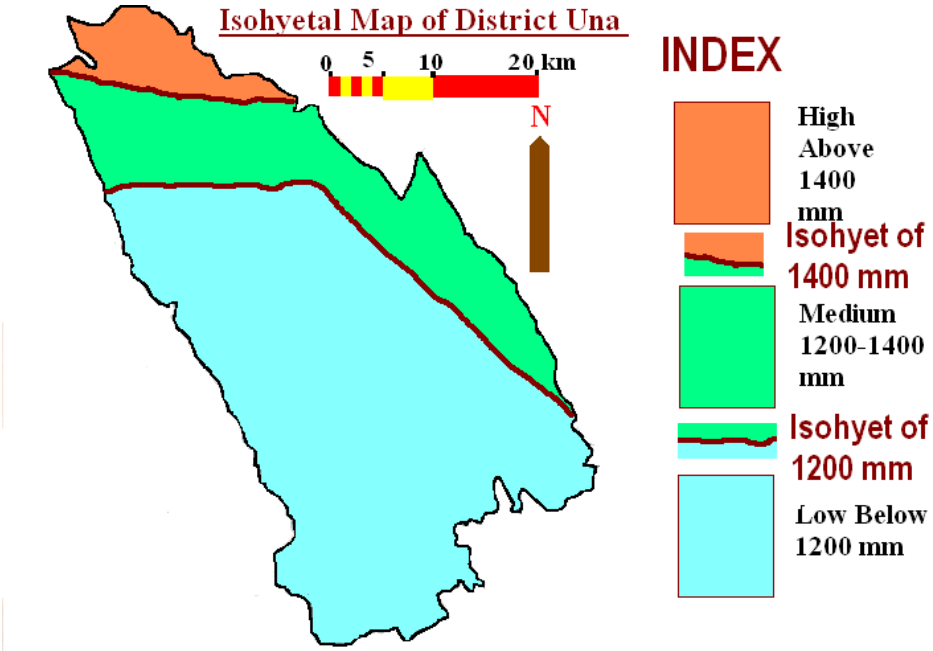
The Una district can be divided into three rainfall zones as High above 1400 mm.
Medium between 1400 and 1200mm.
Low less than 1200 mm.

Figure Shows the isohyetal map of the district.

It is clear from the isohyetal map of the district that most of the area of the district lies in the zone of low rainfall.

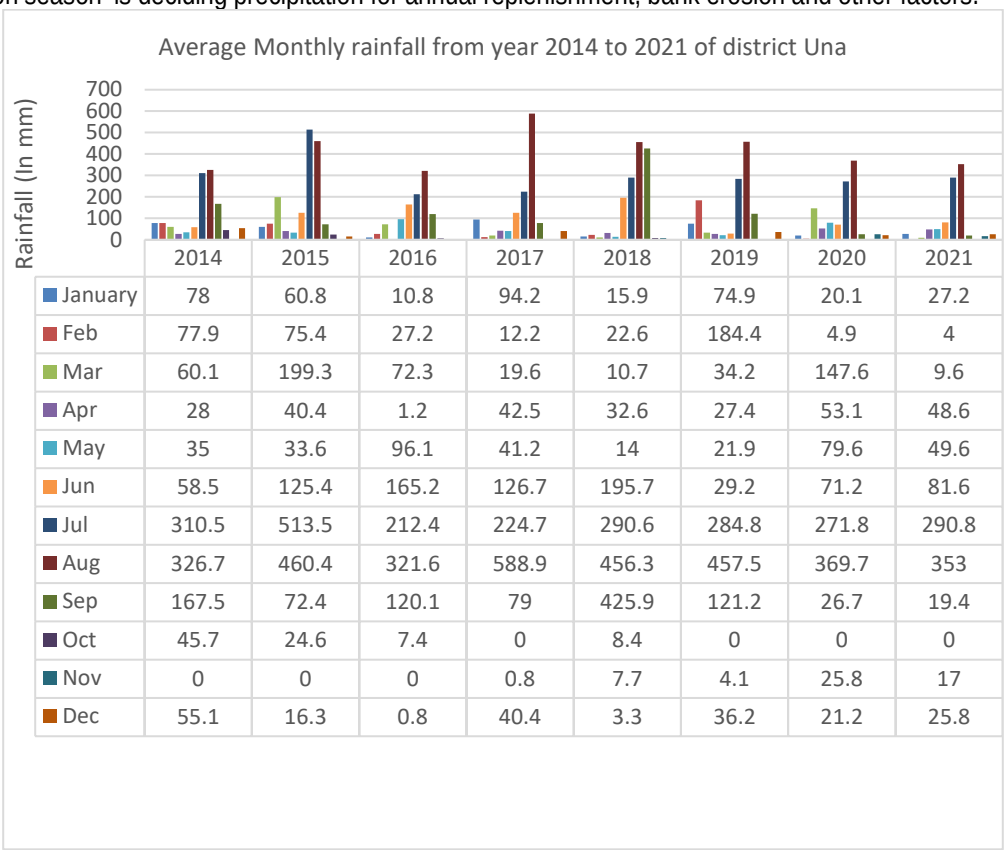


Graph Showing the Month wise Mean Maximum temprature & Mean Minimum temperature recorded in year 2021



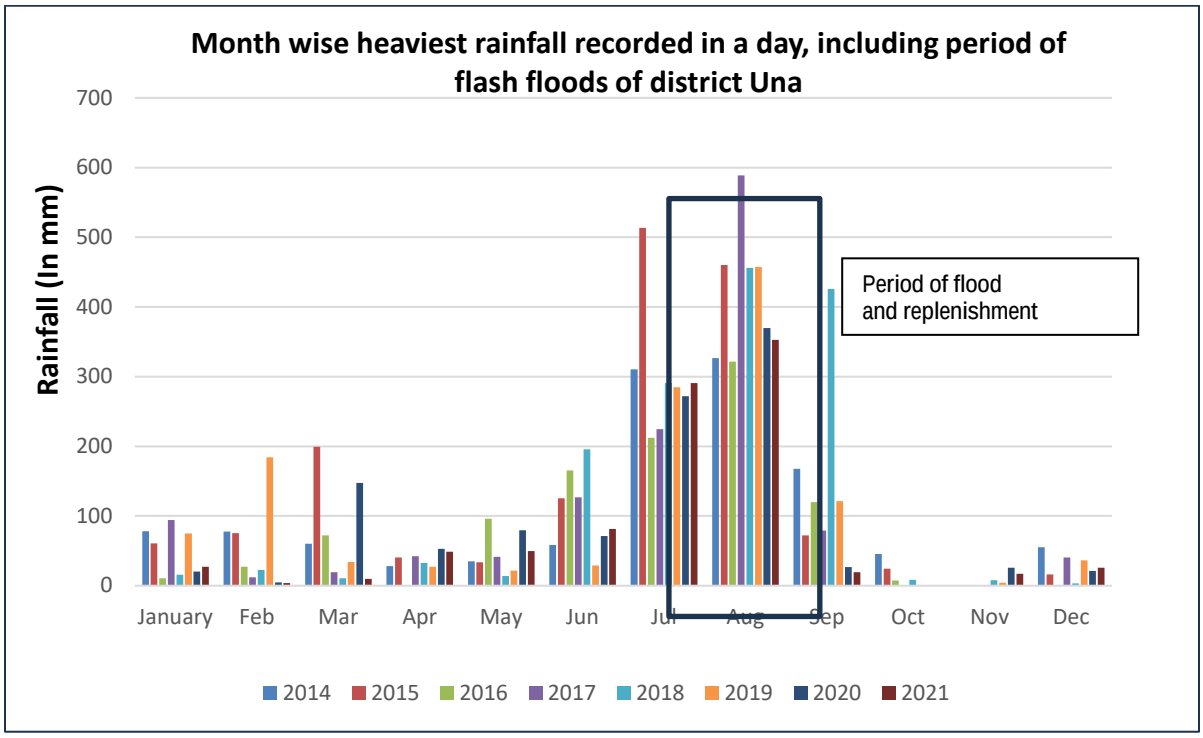
Isohyetal map of the District Una.

To have an idea about morphogenetic zone on the basis of rainfall it will not be ideal to classify it on the basis of the annual rainfall, because most of the precipitation of the year is received in the rainy season hence the precipitation of the monsoon season is deciding precipitation for annual replenishment, bank erosion and other factors.

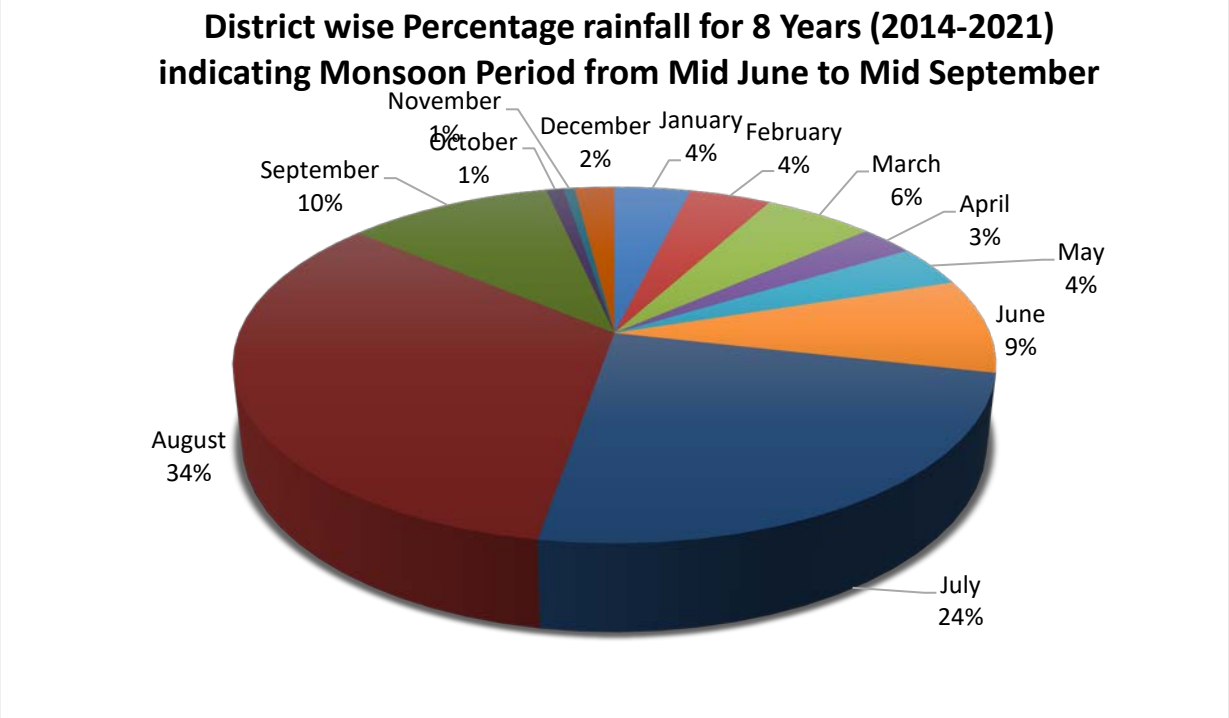


	2014	2015	2016	2017	2018	2019	2020	2021
January	78	60.8	10.8	94.2	15.9	74.9	20.1	27.2
Feb	77.9	75.4	27.2	12.2	22.6	184.4	4.9	4
Mar	60.1	199.3	72.3	19.6	10.7	34.2	147.6	9.6
Apr	28	40.4	1.2	42.5	32.6	27.4	53.1	48.6
May	35	33.6	96.1	41.2	14	21.9	79.6	49.6
Jun	58.5	125.4	165.2	126.7	195.7	29.2	71.2	81.6
Jul	310.5	513.5	212.4	224.7	290.6	284.8	271.8	290.8
Aug	326.7	460.4	321.6	588.9	456.3	457.5	369.7	353
Sep	167.5	72.4	120.1	79	425.9	121.2	26.7	19.4
Oct	45.7	24.6	7.4	0	8.4	0	0	0
Nov	0	0	0	0.8	7.7	4.1	25.8	17
Dec	55.1	16.3	0.8	40.4	3.3	36.2	21.2	25.8

Graph Showing the monthly rainfall recorded from 2014-2021 in District Una



Graph Showing the heaviest rainfall recorded in a day from 2014- 2021 in District Una



Pie Diagramme Showing the Percentagewise average monthly rainfall for six years indicating monsoon season.

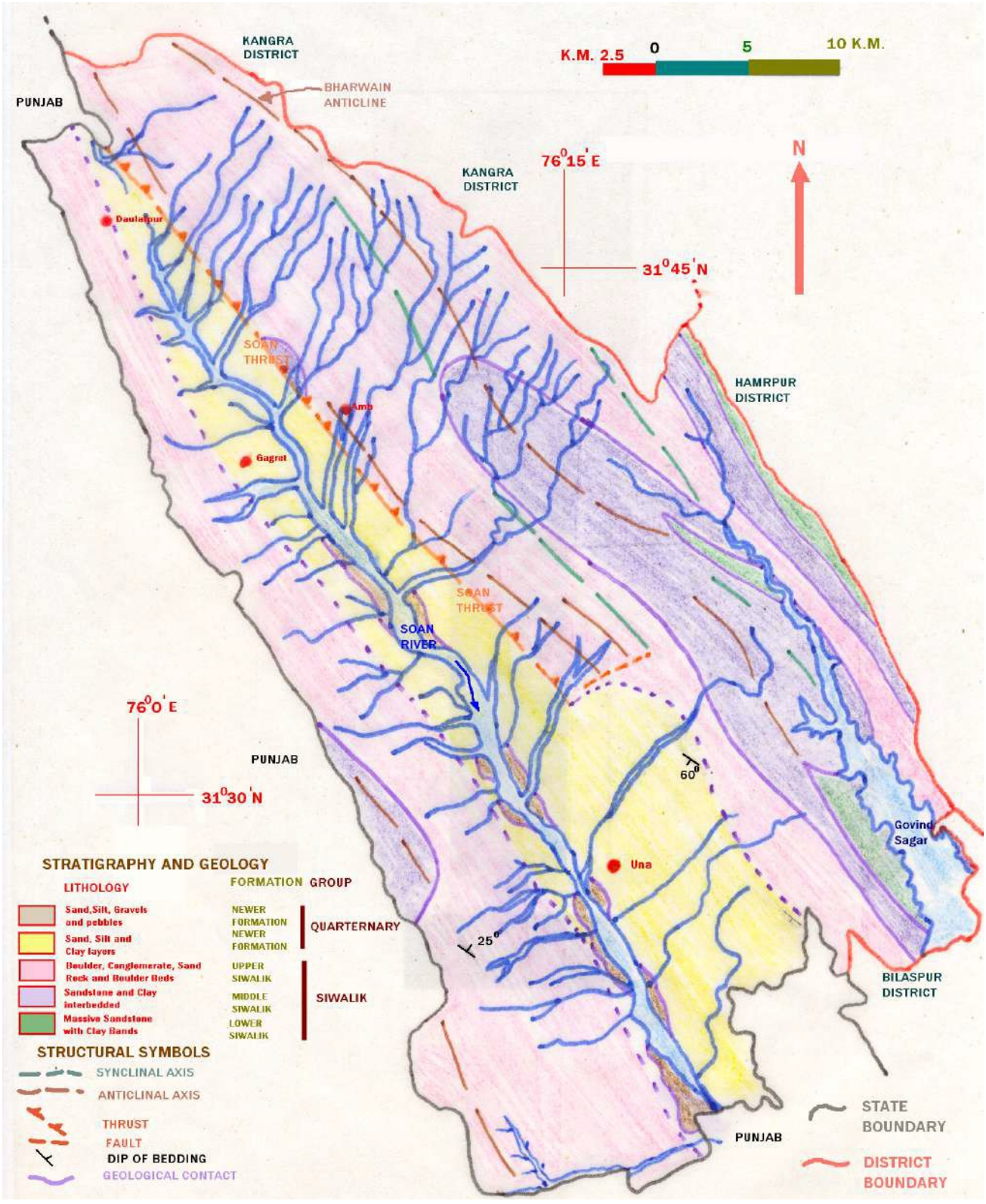
11 GEOLOGY AND MINERAL WEALTH

The majority of the rocks in the district are comprised of the Siwalik Group. In addition to this, newer alluvium of Quarternary age is also present at a few places.

Siwalik Group

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They are made up of mudstones, sandstones, and coarsely bedded conglomerates that were deposited during the Middle Miocene to the Upper Pleistocene when the region was a huge basin. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in a unique topographical entity-the Siwalik hills.

Ongoing erosion and tectonic activity have greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), earth-pillars, rilled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates. In the advent of Neogene, a depression was formed in front of the rising mountains (Proto- Himalaya). This depression becomes a repository of a thick sequence of molassic sediments of the Siwalik. The Siwalik Group comprises conglomerates, friable micaceous sandstone, siltstone and claystone. The conglomerates in general are poorly cemented but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite. The stray pebbles of granite, limestone, sandstone, breccia and lumps of claystone are also observed at places. Often the size of pebbles is large enough to be called as Boulders. The conglomerates not only occur as regular bands but also as lenticular bands alternating with micaceous sandstone and claybeds. The sediments were brought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly Rising Mountain mass of the Himalaya, in the north.The Siwalik Group is divisible into three sub-groups respectively the Lower, Middle and Upper on the basis of the lithostratigraphy.



Geological Map of District Una

11.1.a. Lower Siwalik: -

The lower Siwalik consists essentially of a sandstone-clay alternation. In district Una, the lower sequence of the lower Siwalik consists of medium grained subgraywacke interbedded with thick red clay, but higher up in sequence, sandstones are coarser and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartzite possibly derived from the Shali. The total thickness is 1600 mts.

11.1.b. Middle Siwalik: -

The Middle Siwalik Subgroup comprises of large thickness of coarse micaceous sandstone along with some interbeds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 mts.

11.1.c. Upper Siwalik:-

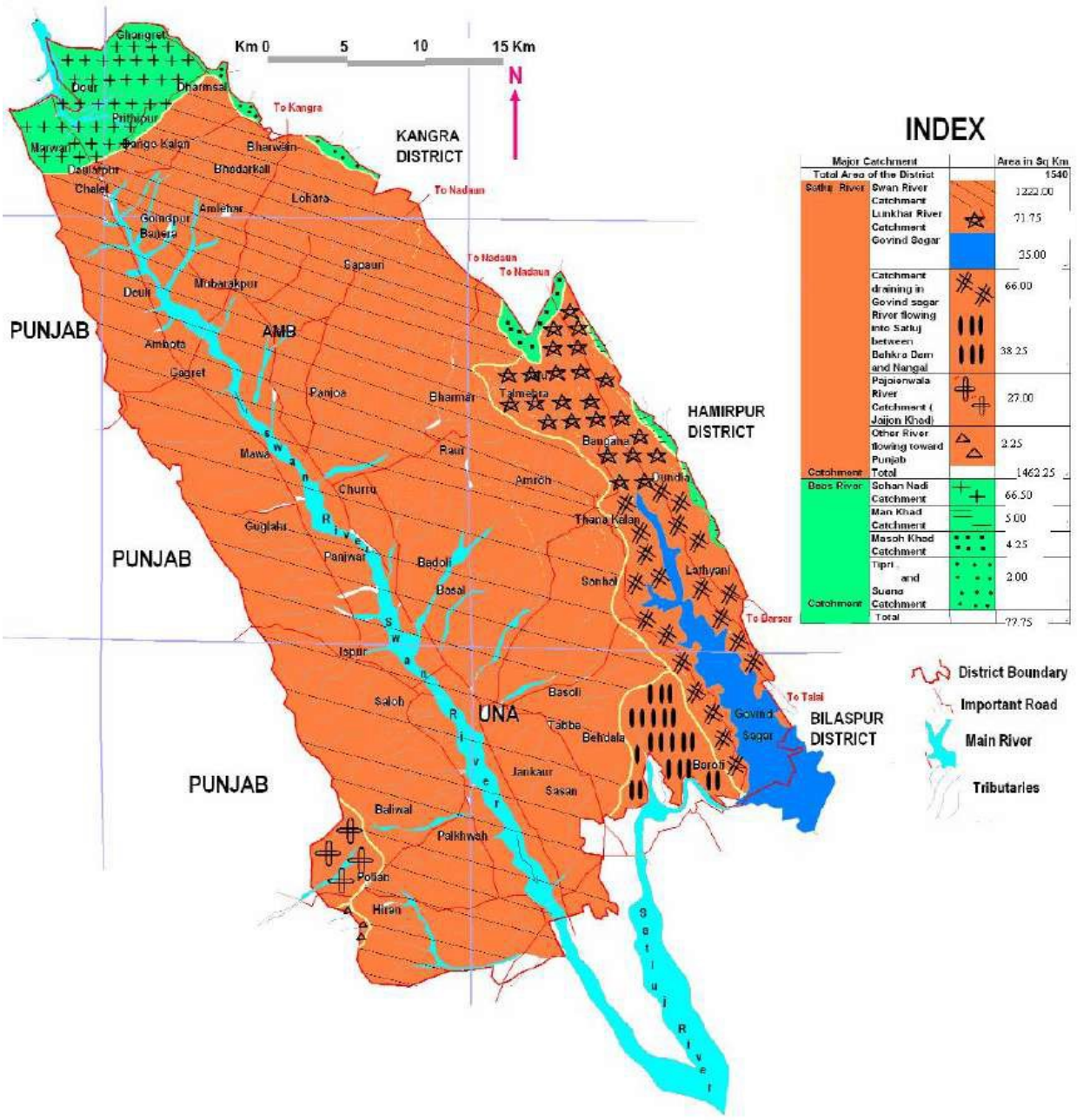
The Upper Siwalik is mainly represented by sandstone interbedded with silt and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clay intercalation. The general thickness in the district is 2300 mts.

11.2. Newer Alluvium: -

The Newer alluvium deposits occupy the wide valleys including alluvium fans and terraces of unsorted sand, silt and clay and rock fragment and boulder beds.

12 DRAINAGE SYSTEM

The general drainage pattern of the rivers/streams in the district exhibits dendritic pattern. All rivers/streams of Una district are forming part of two major river system catchments i.e. Beas River catchment and Satluj River catchment. The northern small part of the district forms the catchment area of Beas River and the remaining part form the catchment of Satluj river.



Map Showing Catchment area of River Beas and Satluj

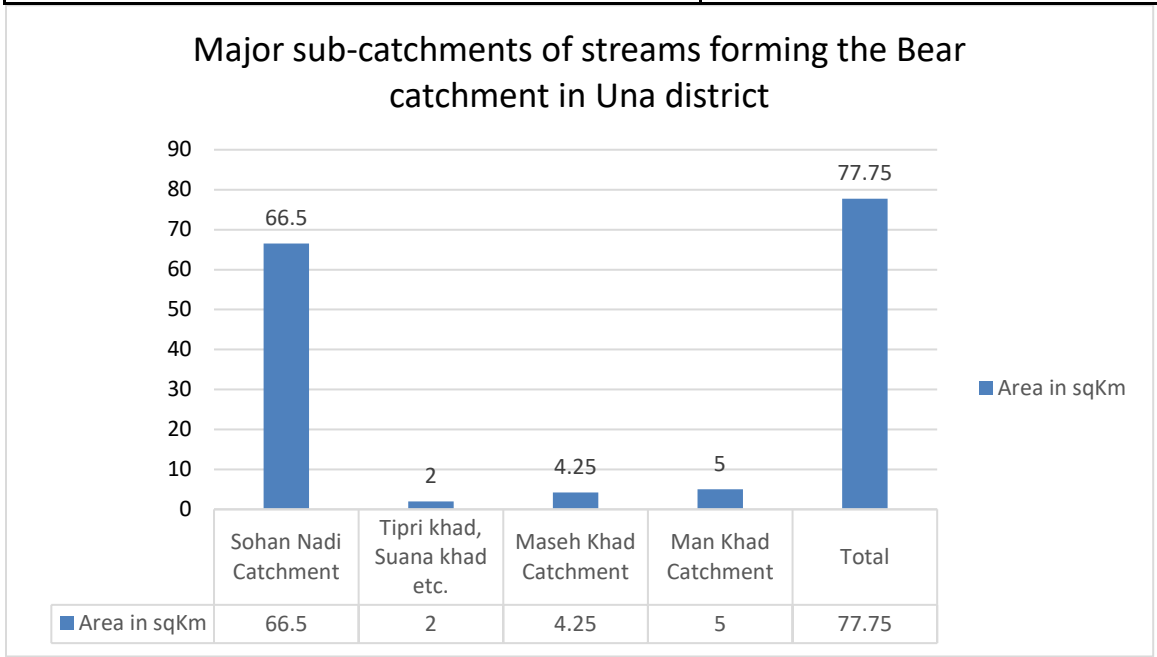
Beas River Catchment

In Una District, Sohan Nadi, Maseh Khad, Tipri and Suana and Man Khad are the major streams draining water into

the Beas River. There are other streams which are of smaller magnitude also forming part of this catchment area. The major sub-catchments of streams forming the Beas catchment in Una District from north to south are as follow: -

Table Showing catchment area of tributaries of Beas River.

Name of river	Area in sq.Km.
Sohan Nadi Catchment	66.50
Tipri khad, Suana khad etc.	2.00
Maseh Khad Catchment	4.25
Man Khad Catchment	5.00
Total	77.75



Graph Showing major sub-catchments of streams forming the Beas catchment in District Una

Sohan Nadi catchment:

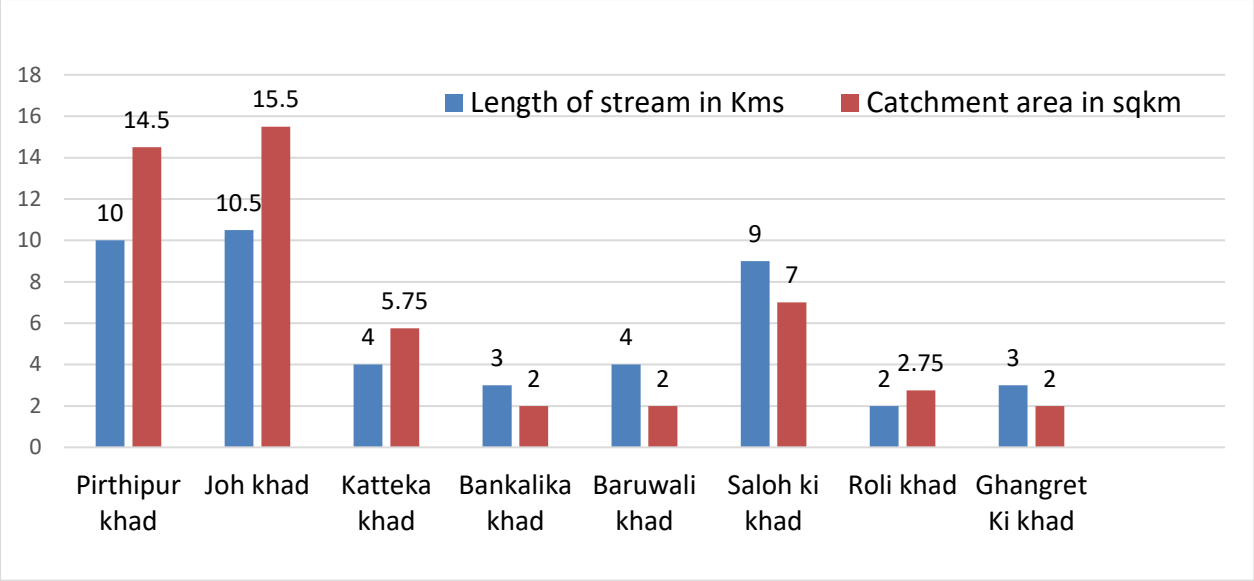
The Sohan Nadi catchment forms a very small catchment on the northern side of this district. The Sohan Nadi originates from northeast side of Pirthipur village and joins with Beas River near Sansarpur Terrace. This stream exhibits a narrow width from origin to confluence with Joh khad and further downstream the width increases. The following are the tributaries which join with Sohan Nadi in Una district.

Upstream google earth view of Sohan River near Pirthipur

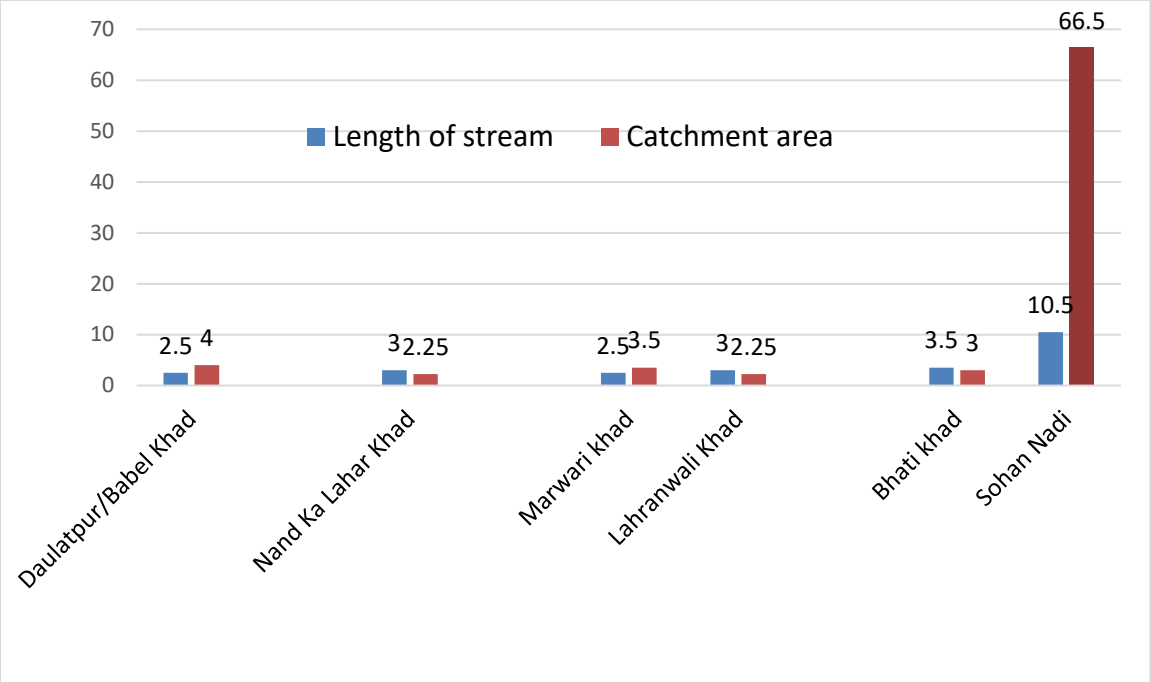
Table Showing morphological features of Sohan nadi and its tributaries.

Sr No,	Name of tributary	Length of stream (in Kms)	R.L. at origin (in metres)	R.L. at confluence (in metres)	Catchment area (in sqkm)	River bed area (in Hectares)
Right Bank						
1	Pirthipur khad	10.00	900	525	14.50	67-50-00
2	Joh khad	10.50	1018	525	15.50	90-00-00
3	Katteka khad	4.00	675	520	5.75	22-00-00
4	Bankalika khad	3.00	650	510	2.00	5-00-00
5	Baruwali khad	4.00	644	510	2.00	19-50-00
6	Saloh ki khad	9.00	947	470	7.00	50-00-00
7	Roli khad	2.00	947	460	2.75	3-50-00
8	Ghangret Ki khad	3.00	707	440	2.00	4-50-00
Left Bank						
9	Daulatpur/Babel khad	2.50	640	535	4.00	4-00-00

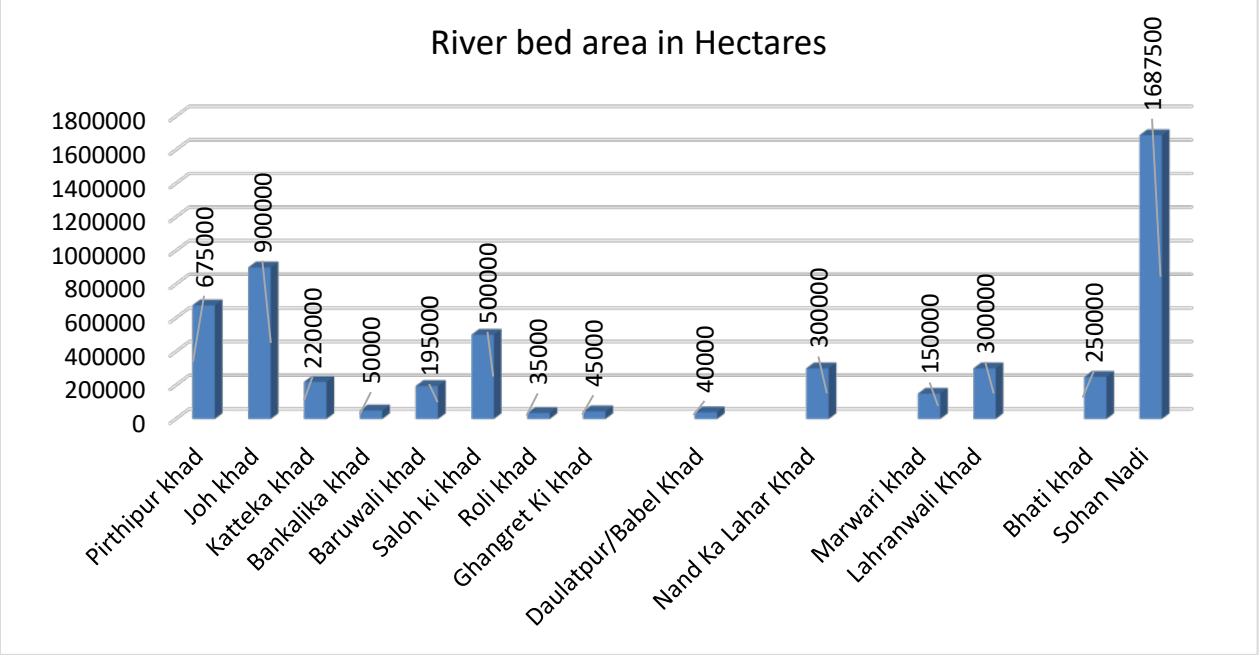
10	Nand Ka Lahar khad	3.00	628	530	2.25	30-00-00
11	Marwari khad	2.50	638	528	3.50	15-00-00
12	Lahranwali khad	3.00	644	525	2.25	30-00-00
13	Bhati khad	3.50	610	520	3.00	25-00-00
14	Sohan Nadi	10.50	900	439	66.50	168-75-00
	Total	70.50				534-75-00



Graph Showing Length and Catchment of tributaries joining on right bank of Sohan Nadi



Graph Showing Length and Catchment of tributaries joining on left bank of Sohan Nadi



Graph Showing River bed area of tributaries of Sohan Nadi

Man Khad Catchment:

This khad flows toward the east side of the District forming a catchment area around 5.00 sqkm and as such the river bed area is insignificant so far as mineral potentials are concerned. The major catchment of this stream lies in Hamirpur District.

Maseh Khad: -

This stream lies on the eastern side of this District form a small part of boundary between Hamirpur and Una with a

catchment area of only around 4.25 sqkm. This stream originates near Behlan P.F. at an altitude of 789 m R.L. and joins with Beas River near Jatoli village adjoining Nadaun. Since its river bed in District Una is very little as such mineral potentials in this river are insignificant.

Other Streams: -

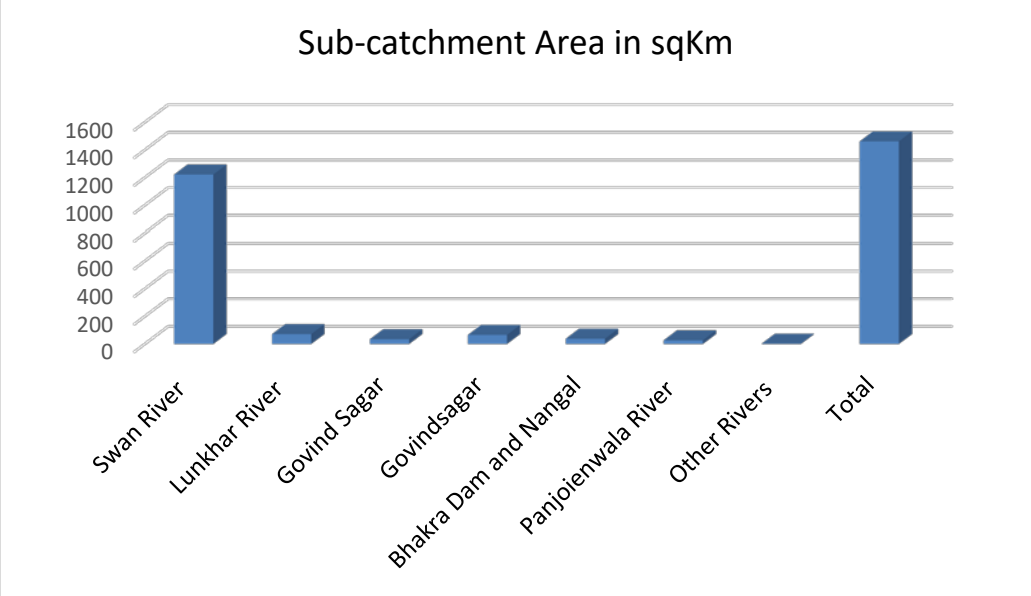
There are other streams such as Tipri, Suana Khad etc which form very small catchments in this district. These streams drain water from the northern side of Pirthipur khad catchment. The total catchment area is estimated to be around 2.00 sqkm only in this District which is insignificant so far as mineral potentials are concerned.

Satluj River Catchment: -

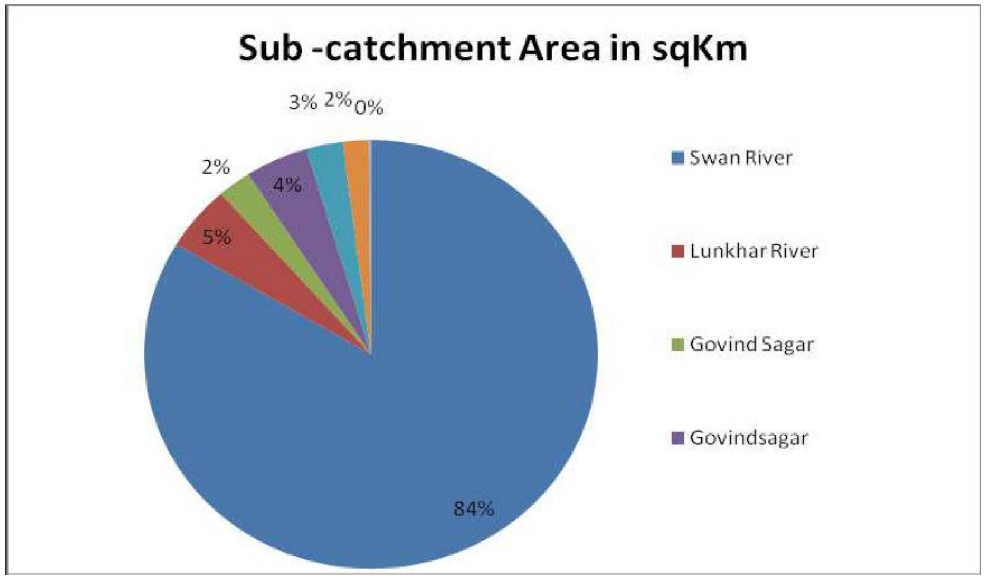
The following are major tributaries forming sub-catchment of Satluj catchment in this District.

Table Showing sub-catchment area of tributaries of Satluj River

Sr.No.	Name of river	Area in sqKm
1	Swan River Sub-Catchment	1222.00
2	Lunkhar River Sub-Catchment	71.75
3	Govind Sagar	35.00
4	Streams draining into Govindsagar	66.00
5	Streams flowing into Satluj between Bhakra Dam and Nangal	38.25
6	Panjoienwala River sub-Catchment (Jaijon Khad)	27.00
7	Other Rivers flowing toward Punjab	2.25
	Total	1462.25



Graph Showing catchment of Satluj River Tributaries in District Una



Pie Digramme Showing %age wise catchment area of Satluj River Tributaries in District Una

Swan River Sub-Catchment

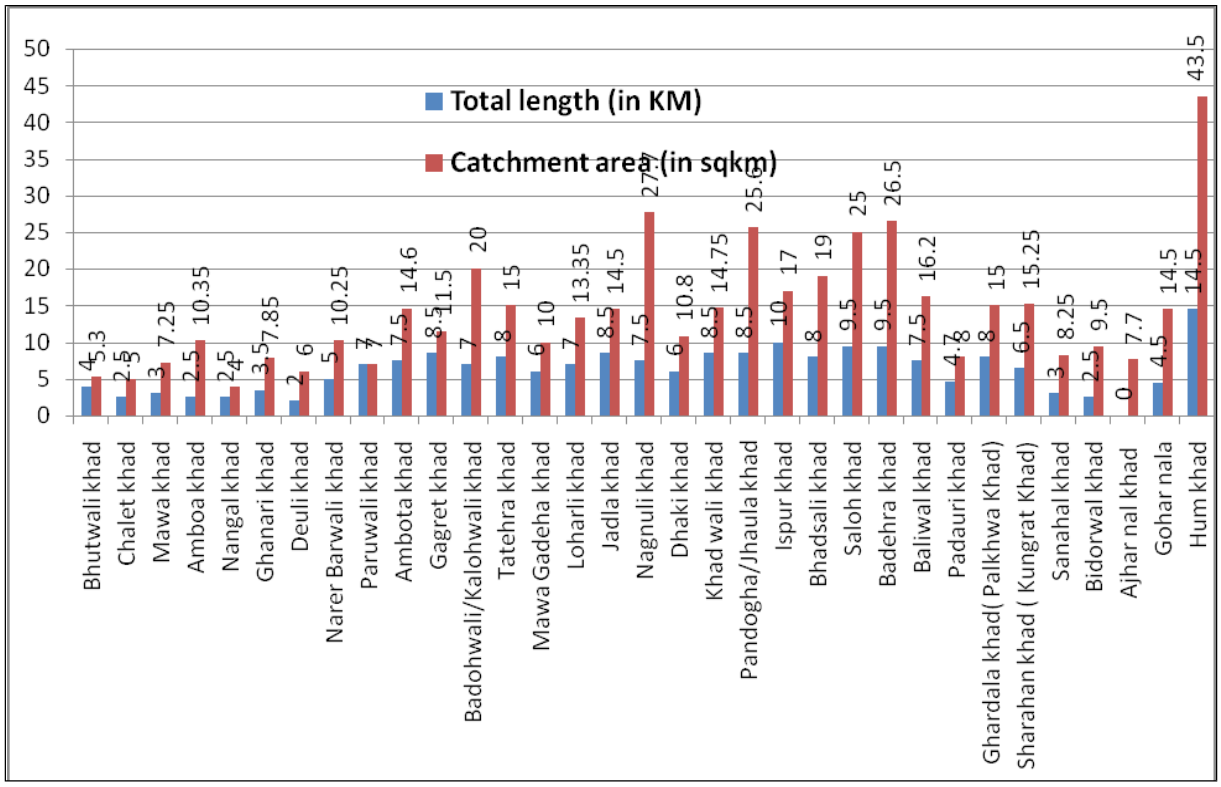
The total area of the Swan River sub-catchment is 1222 Sq Km. It is evident from the distribution of sub-catchment that number of streams on the right bank are more than the left bank but area on left bank is much more than on right bank.

Upstream google earth view of Sohan River near Pirthipur

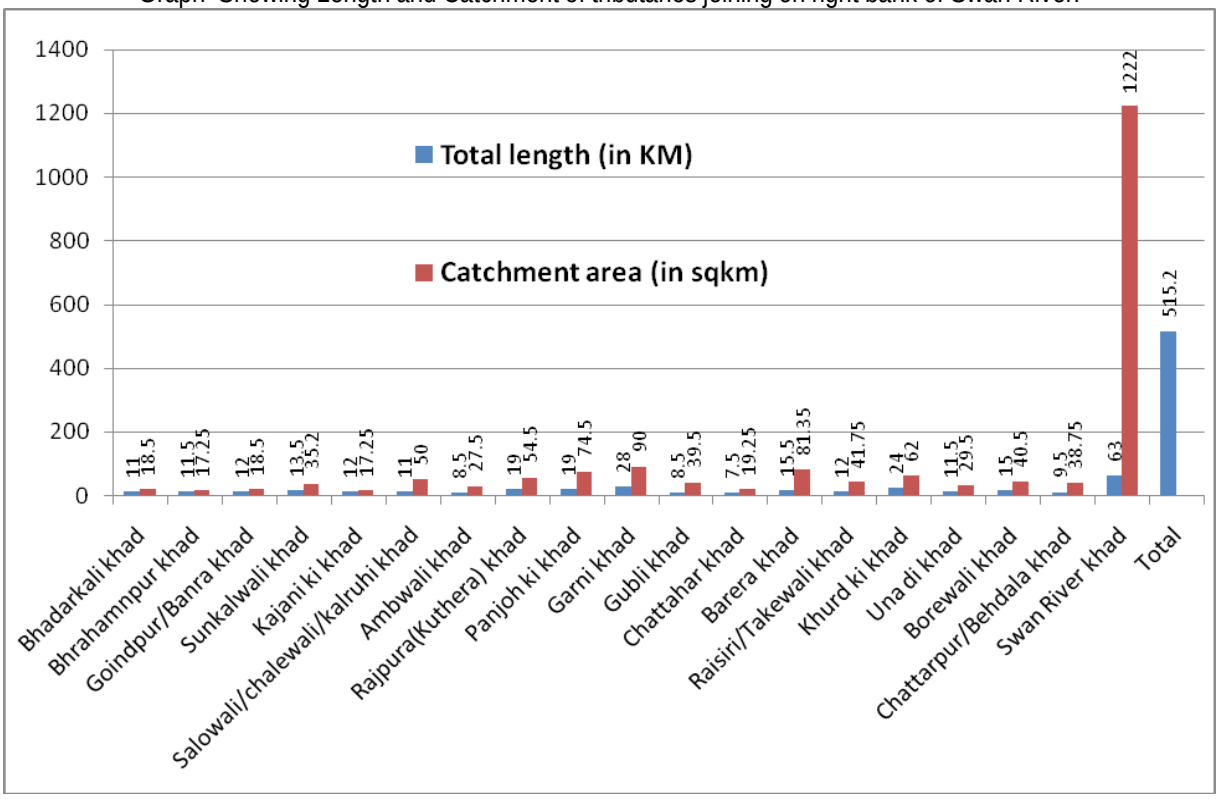
Table showing morphological features of Swan River and its tributaries.

Sr. No.	Name of River	Stream length	RL at Origin	RL at confluence	Catchment area	River bed area
		(in KM)	(in metres)	(in metres)	(in sqkm)	(in hectare)
	Swan river Catchment (Right Bank)					
1	Bhutwali khad	4.00	620	545	5.30	15-00-00
2	Chalet khad	2.50	666	534	5.00	7-00-00
3	Mawa khad	3.00	635	514	7.25	49-00-00
4	Amboa khad	2.50	610	506	10.35	53-75-00
5	Nangal khad	2.50	634	500	4.00	8-75-00
6	Ghanari khad	3.50	630	495	7.85	52-50-00
7	Deuli khad	2.00	604	493	6.00	7-00-00
8	Narer Barwali khad	5.00	600	478	10.25	50-00-00
9	Paruwali khad	7.00	625	452	7.00	55-00-00
10	Ambota khad	7.50	603	452	14.60	60-00-00
11	Gagret khad	8.50	606	442	11.50	104-00-00
12	Badohwali/Kalohwa li khad	7.00	620	439	20.00	82-50-00
13	Tatehra khad	8.00	600	435	15.00	50-00-00
14	Mawa Gadeha khad	6.00	580	432	10.00	28-00-00
15	Loharli khad	7.00	612	415	13.35	60-00-00
16	Jadla khad	8.50	609	411	14.50	72-00-00
17	Nagnuli khad	7.50	500	403	27.70	87-50-00
18	Dhaki khad	6.00	500	400	10.80	65-00-00
19	Khad wali khad	8.50	637	399	14.75	90-00-00
20	Pandogha/Jhaula khad	8.50	609	378	25.60	69-00-00
21	Ispur khad	10.00	660	377	17.00	78-00-00
22	Bhadsali khad	8.00	541	376	19.00	52-50-00
23	Saloh khad	9.50	547	370	25.00	71-50-00
24	Badehra khad	9.50	613	370	26.50	180-00-00
25	Baliwal khad	7.50	600	360	16.20	143-00-00
26	Padauri khad	4.70	573	343	8.00	84-00-00
27	Ghardala khad(Palkhwa Khad)	8.00	613	355	15.00	156-00-00
28	Sharahan khad (Kungrat Khad)	6.50	570	352	15.25	90-00-00
29	Sanahal khad	3.00	565	352	8.25	63-00-00
30	Bidorwal khad	2.50	527	350	9.50	44-00-00
31	Ajhar nal khad	3,00	530	345	7.70	58-00-00
32	Gohar nala	4.50	503	340	14.50	78-50-00
33	Hum khad	14.50	589	338	43.50	150-00-00

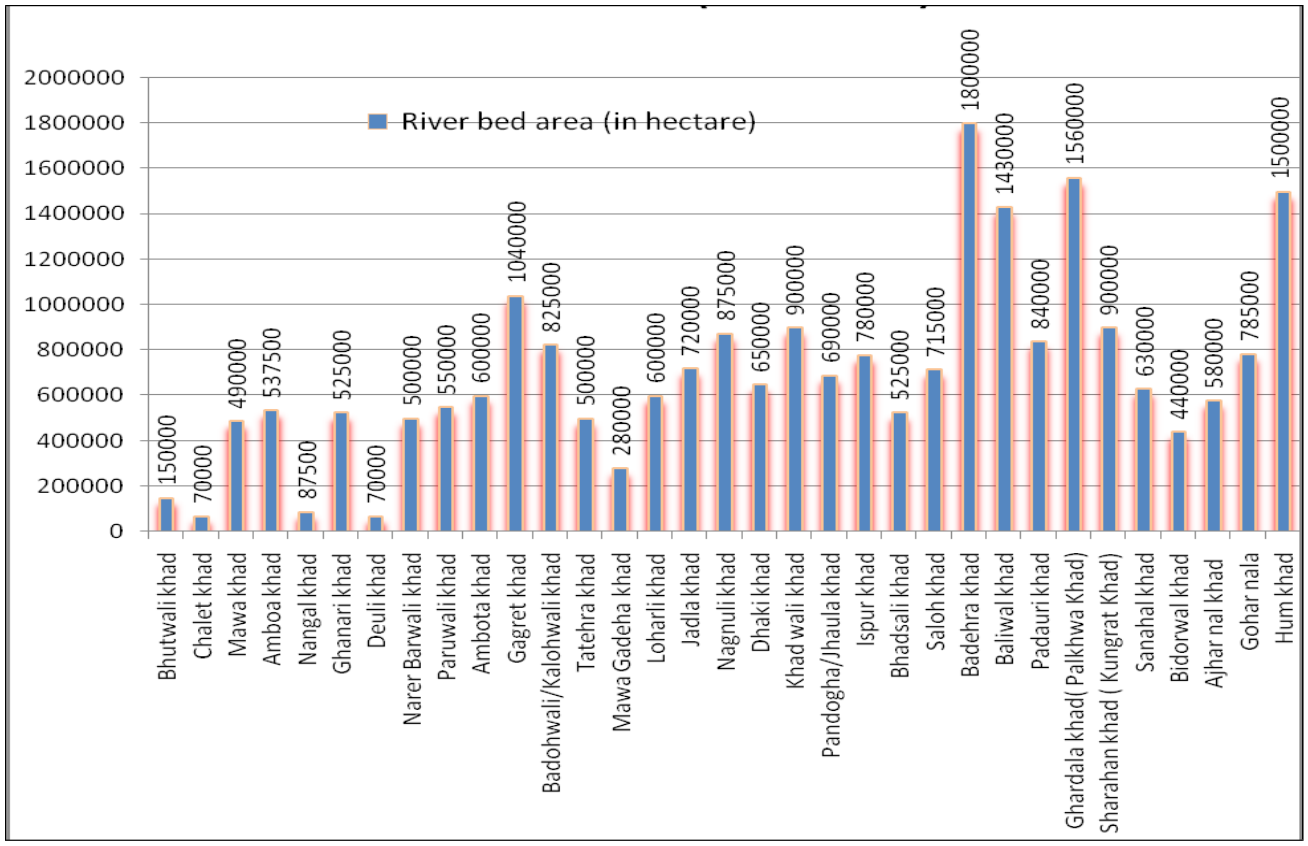
	Swan River Catchment (left bank)					
34	Bhadarkali khad	11.00	960	525	18.50	96-00-00
35	Bhrahamnpur khad	11.50	987	520	17.25	95-00-00
36	Goindpur/Banra khad	12.00	875	517	18.50	66-00-00
37	Sunkalwali khad	13.50	989	485	35.20	175-00-00
38	Kajani ki khad	12.00	981	462	17.25	46-00-00
39	Salowali/chalewali/kalruhi khad	11.00	981	437	50.00	120-00-00
40	Ambwali khad	8.50	658	433	27.50	77-00-00
41	Rajpura (Kuthera) khad	19.00	870	433	54.50	202-50-00
42	Panjoh ki khad	19.00	706	425	74.50	210-00-00
43	Garni khad	28.00	859	415	90.00	450-00-00
44	Gubli khad	8.50	553	382	39.50	66-00-00
45	Chattahar khad	7.50	486	367	19.25	60-00-00
46	Barera khad	15.50	941	365	81.35	420-00-00
47	Raisiri/Takewali khad	12.00	747	364	41.75	117-00-00
48	Khurd ki khad	24.00	848	363	62.00	270-00-00
49	Una di khad	11.50	682	360	29.50	225-00-00
50	Borewali khad	15.00	823	355	40.50	126-00-00
51	Chattarpur/Behdala khad	9.50	597	350	38.75	46-00-00
52	Swan River	63.00	801	330	1222.00	3700-00-00
	Total	515.2				8882-00-00



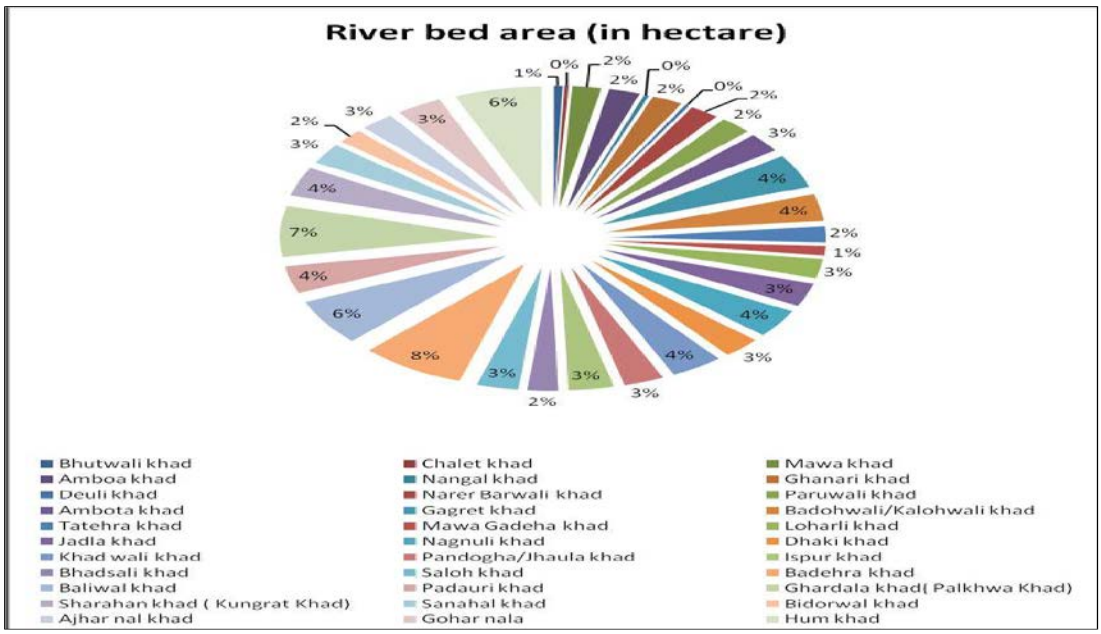
Graph Showing Length and Catchment of tributaries joining on right bank of Swan River.



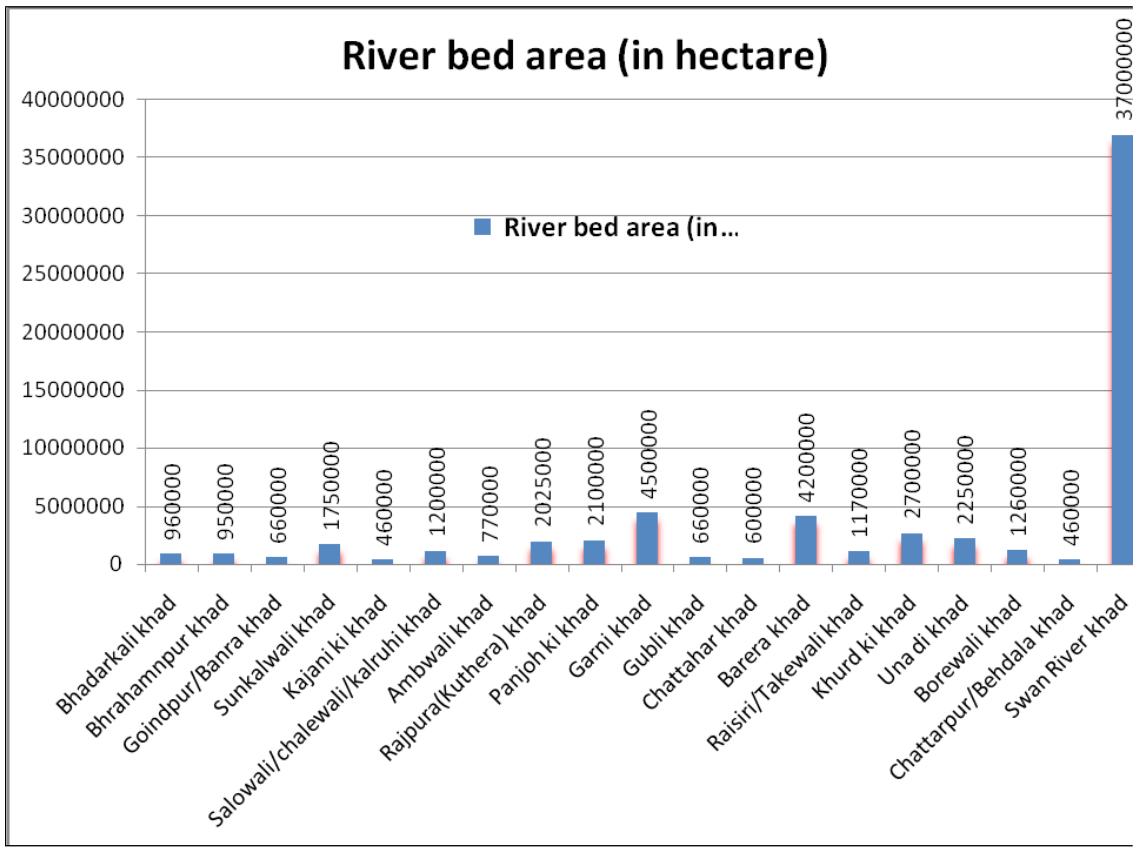
Graph Showing Length and Catchment of tributaries joining on left bank of Swan River



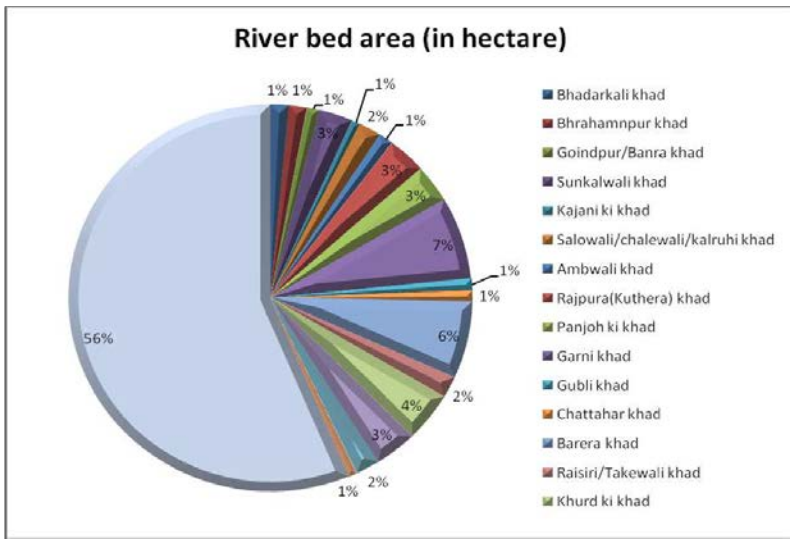
Graph Showing River bed area (in hectares) of Streams joining on right bank of Swan River.



Pie Digramme Showing %age wise river bed area of right bank Streams of Swan river



Graph Showing River bed area (in hectare) of Swan river and Streams joining on right bank of Swan river



Pie Digramme Showing %age wise river bed area of Swan river and strems joining on right bank of Swan river

Lunkhar Khad Sub Catchment

Presently more than 50% area of Lunkhar Khad Sub-catchment is submerged under Govindsagar hence the area above the Govind sagar reservoir has been taken into consideration for mineral concession. This stream flows on the eastern side of this District from south to southeast direction and then merges into Govindsagar reservoir. The catchment area of this stream is around 71.75 sqkm.

Govind Sagar Sub- Catchment

The river course of Satluj river flowing in part of District Una has been converted into a lake after construction of Bhakra dam with an area of 35 sqkm. The reservoir is full of water during monsoon season, but the water level recedes when the water is used for generation of electricity and irrigation purposes during other seasons of the year and part of land gets exposed. The exposed land is full of silt and there is no mineral worth useful.

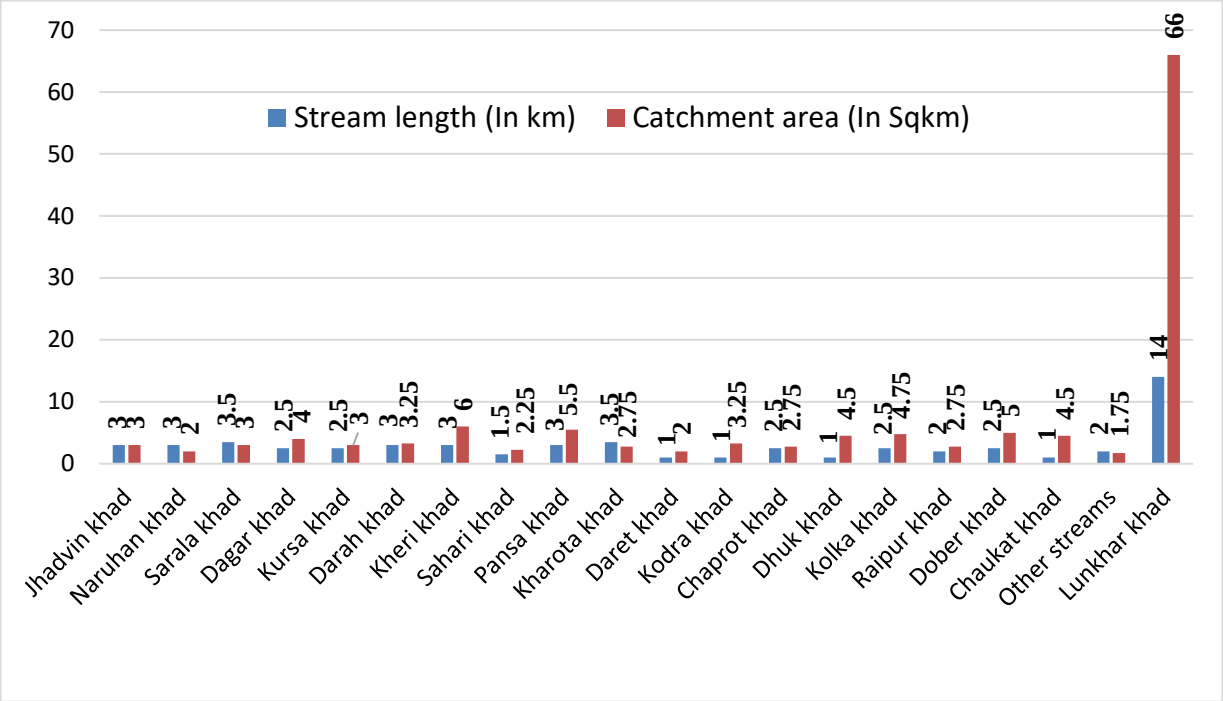
Streams draining into Govindsagar

Some of the streams are draining directly into the Govind Sagar and the details are given below:

Table Morphological features of streams draining into Govindsagar

Sr.no.	Name of River	Stream length	RL at Origin	RL at confluence	Catchment area	River bed area
		(in KM)	(in metres)	(in metres)	(in sqkm)	(in hectare)
	Govind Sagar drainage (Left bank)					
1	Jhadvin khad	3.00	1055	520	3.00	6-00-00
2	Naruhan khad	3.00	1045	520	2.00	4-50-00
3	Sarala khad	3.50	1041	520	3.00	3-00-00
4	Dagar khad	2.50	1065	520	4.00	4-50-00
5	Kursa khad	2.50	1000	520	3.00	3-00-00
6	Darah khad	3.00	1097	520	3.25	3-00-00
7	Kheri khad	3.00	1112	520	6.00	5-25-00
8	Sahari khad	1.50	640	520	2.25	1-75-00
9	Pansa khad	3.00	517	520	5.50	2-50-00
10	Kharota khad	3.50	1048	520	2.75	2-70-00
11	Daret khad	1.00	800	520	2.00	2-00-00
12	Kodra khad	1.00	974	520	3.25	1-25-00
	Govind sagar drainage (Right bank)					
13	Chaprot khad	2.50	848	520	2.75	3-00-00
14	Dhuk khad	1.00	641	520	4.50	1-75-00
15	Kolka khad	2.50	820	520	4.75	2-50-00
16	Raipur khad	2.00	945	520	2.75	1-75-00
17	Dober khad	2.50	997	520	5.00	3-50-00
18	Chaukat khad	1.00	840	520	4.50	1-00-00

19	Other streams	2.00			1.75	2-00-00
20	Lunkhar khad	14.00	789	520	66.00	136-50-00
	Total	58.00				191-45-00

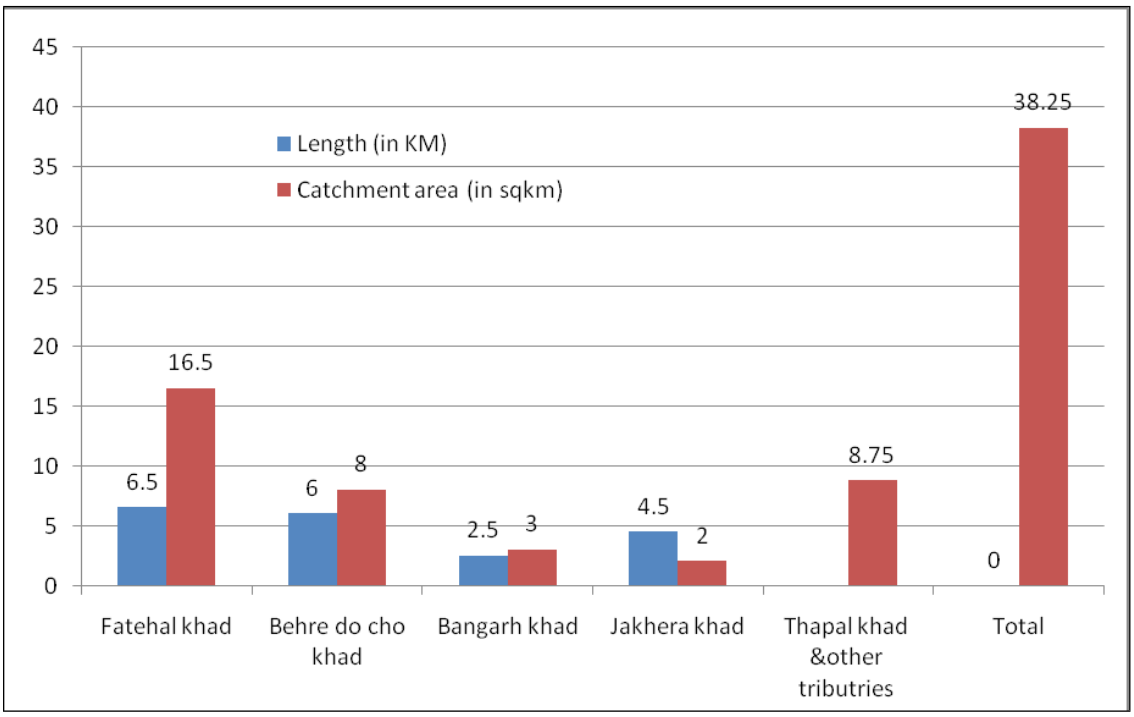


Graph Showing Length and Catchment area of tributaries of Govind Sagar

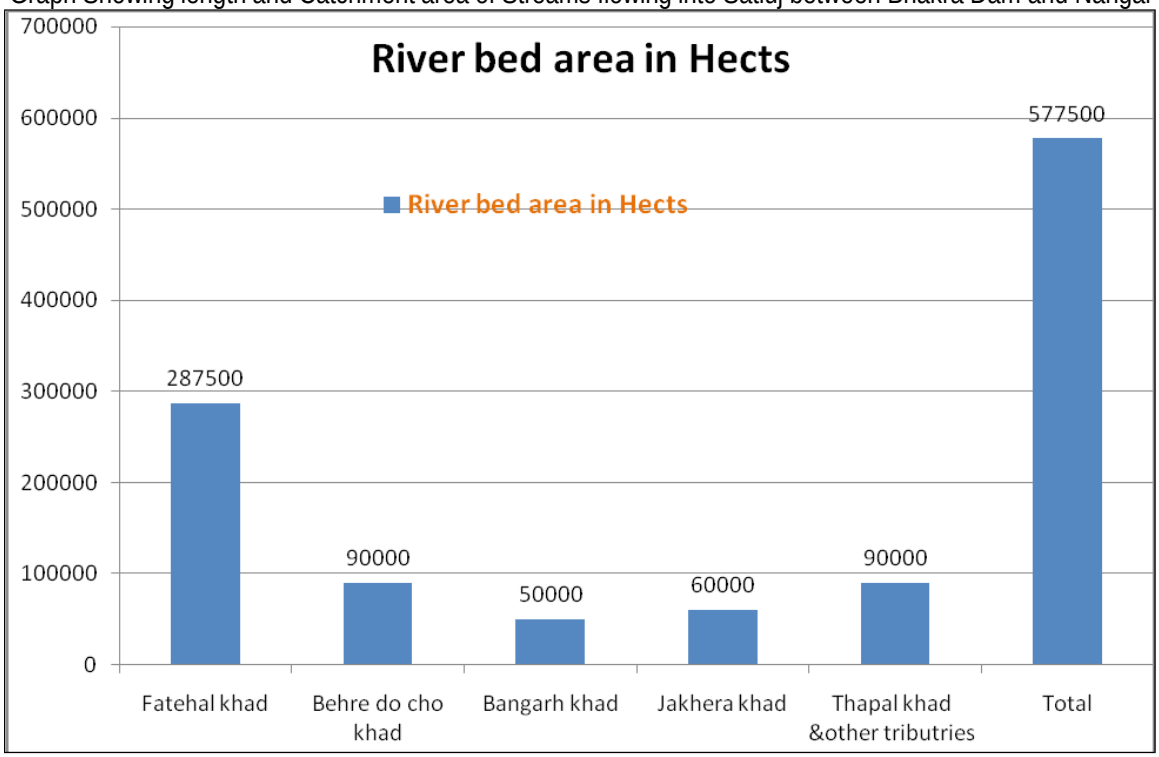
Streams flowing into Satluj between Bhakra Dam and Nangal:-

The following streams are flowing into Satluj between Bhakra Dam and Nangal
Table Showing Morphological features of streams flowing into satluj between Bhakra Dam and Nangal

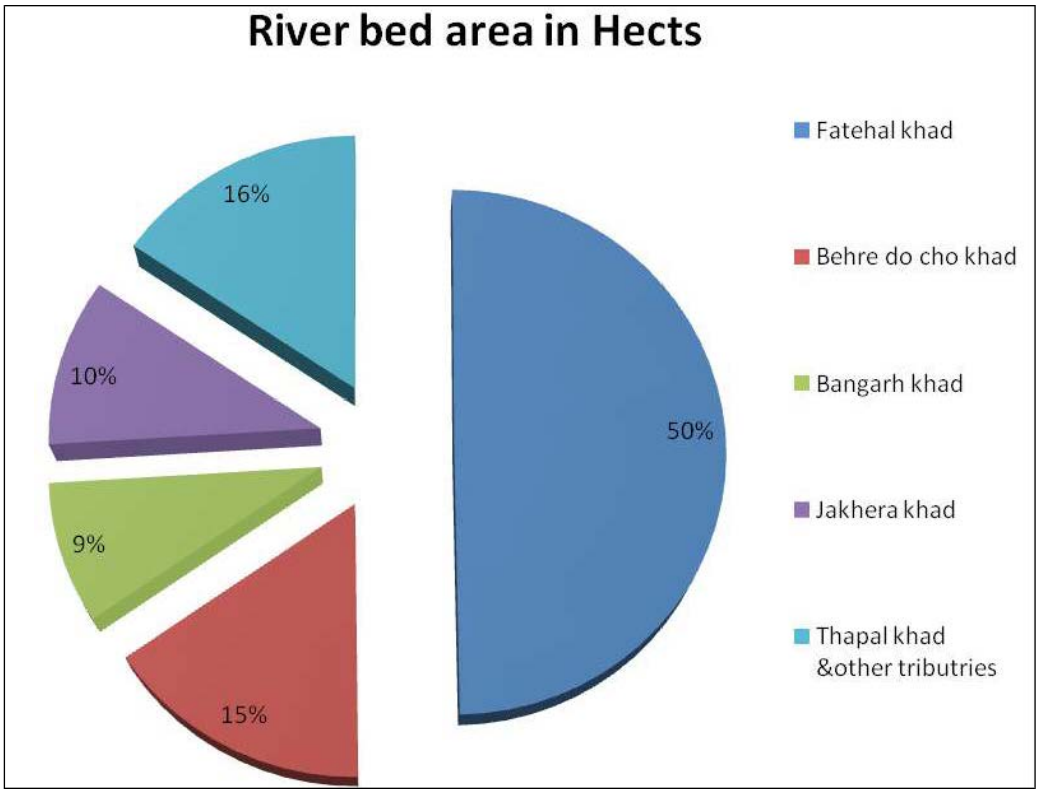
S.n o	Name of River	Stream length	RL at Origin	RL at confluence	Catchment area	Total area
		(in KM)	(in metres)	(in metres)	(in sqkm)	(in hectare)
1	Fatehal khad	6.50	1036	350	16.50	28-75-00
2	Behre do cho khad	6.00	999	350	8.00	9-00-00
3	Bangarh khad	2.50	580	350	3.00	5-00-00
4	Jakhera khad	4.50	580	350	2.00	6-00-00
5	Thapal khad &other tributries				8.75	9-00-00
6	Total	19.50			38.25	57-75-00



Graph Showing length and Catchment area of Streams flowing into Satluj between Bhakra Dam and Nangal



Graph Showing river bed area of Streams flowing into Satluj between Bhakra Dam and Nangal



Pie Digramme Showing %age wise river bed area of Streams flowing into Satluj between Bhakra Dam and Nangal

Panjoienwala River Catchment (Jaijon Khad): -

The Panjoinwala khad flows on the extreme southwestern side of this District and form catchment area around 27 sqkm.

Other Rivers flowing toward Punjab

Some small streams flow towards Punjab on the extreme southwestern side and form catchment area around 2.00 sqkm. Since the magnitude of these streams is very small, as such these are not taken into consideration for calculation of reserves.

Calculation of Mineral Deposits and Annual Deposition in the Stream Beds

As already explained, the deposition will occur when a loss of energy results in a decrease in velocity. This may be due to such things as declining gradient, a decrease in water volume, an increase in cross-sectional area (particularly pools, lakes, and oceans), or by local obstructions. An excessive load produced by increased erosion in the drainage basin or tributary valleys, or from glaciofluvial outwash will also inevitably lead to deposition. The accumulations of stream deposits are called alluvium. The alluvium in river bed is deposited containing a mixture of different constituents of various particle sizes. Wentworth's, 1935, Allen, 1936, Twenhofel, 1937 defined the limits of common grade and rock terms which are given in following table.

Table Showing Wentworth's table of particle size.

<table>
<tr><td rowspan="2">Size</td><td colspan="3">Rounded, Subrounded, Subangular</td></tr>
<tr><td colspan="2">Fragment</td><td>Aggregate</td></tr>
<tr><td rowspan="4">256 mm--

64 mm---

4 mm---</td><td>Boulder</td><td rowspan="3">“ Roundstone”</td><td>Boulder gravel Boulder conglomerate</td></tr>
<tr><td>Cobble</td><td>Cobble gravel Cobble conglomerate</td></tr>
<tr><td>Pebble</td><td>Pebble gravel Pebble conglomerate</td></tr>
<tr><td colspan="2">Granule</td><td>Granule gravel</td></tr>
<tr><td rowspan="3">2 mm--

1/16 mm---

1/256 mm-------</td><td colspan="2">Sand</td><td>Sand Sandstone</td></tr>
<tr><td colspan="2">Silt</td><td>Silt Siltstone</td></tr>
<tr><td colspan="2">clay</td><td>Clay Shale</td></tr>
</table>

The Boulder is defined as a detached rock mass somewhat rounded or otherwise modified by abrasion in transport and larger than a cobble with minimum size of 256mm (about 10 inch). A cobble is defined in the same manner as boulder except that it is restricted in size from 64 to 256mm. A pebble is a rock fragment larger than a coarse sand grain or granule and smaller than a cobble which has been rounded or otherwise abraided by the action of water, wind or ice and varies in size between 4 and 64 mm in diameter. The unconsolidated accumulation of pebbles, cobbles, or boulders is gravel which may be designated pebble-gravel, cobble-gravel etc. The term sand is used to denote an aggregate of mineral or rock grains greater than 1/16mm and less than 2mm in diameter. Wentworth (1922) proposed the term granule to cover material 4 - 2mm in size. Silt defined as from 1/16 to 1/256mm in size and clay less than 1/256mm in diameter completes the list of common size terms.

The mineral deposition in a river bed is more pronounced during rainy season although the quantum of deposition varies from stream to stream depending upon numbers of factors such as catchment lithology, discharge, river profile and geomorphology of the river course. The particle size may vary depending upon the stage of river i.e., youth, mature and old age. In Una District during field survey, it is observed that annual deposition in various streams vary from 6 cms to 10 cms. However, there are certain geomorphological features developed in the river bed such as channel bars, point bars etc. where annual deposition is much more even three to four metres. It is also important to mention here that there is a provision in the present river/stream bed mining policy guidelines that collection of material upto a depth of only 1 metre is allowed in a single season, where mineral concessions have been granted, but it is noticed that during flood season, whole of the pit, so excavated is completely filled up and as such the excavated area is replenished with new harvest of mineral. As such, mineral concession in such areas may be allowed up to a depth of 3 meters.

In order to calculate the mineral deposits in the stream beds, the mineral constituents have been categorized as clay, silt, sand, bajri and boulder and there average %age is taken into account. It is observed in different rivers/streams that % age of boulders varies from 20% to 45%, bajri from 15% to 35%, sand from 20% to 40% and silt and clay totalling from 25% to 30 %. Only boulder, bajri and sand are the resource mineral i.e. usable mineral and rest is taken as waste. Further the Survey of India Topo-Sheets were used as base map to know the extent of river course. The mineral reserves have been calculated only upto 1.00 metre depth and specific gravity of 2.25 has been taken for calculation of mineral reserves. Presently the mineral reserves have been calculated only upto a depth of 1.00 metre, but there are so many portions in the river beds such as channel bars, point bars and central islands where the annual deposition is raising the level of river bed thus causing shifting of the rivers towards banks resuting in to cutting of banks and at such locations, removal of this material upto the bed level is essential to control the river flow in its central part to check the bank cutting. While, calculating the mineral potentials, the mineral deposits lying in the sub-tributaries, of that particular stream/river has not been taken into consideration. Since, these tributaries are also adding the mineral deposits annually and especially during the rainy season in to the main river, as such the mineral deposits and annual replenishment which has been calculated presently will be much more. It is also important to mention here that, whenever, any of the area recommended for grant of mineral concession in District Survey Report is applied by the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Disisional Officer (C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations. Thereafter, as per the site-specific recommendations of the committee, the concerned Mineral concession holder has to prepare the detailed “Mining Plan” for the allotted area through Registered Qualified Person and get in approved from authorized officer of Geological Wing of the State Government. The comprehensive mining plan are prepared by RQP giving details of minerals reserves, method of mining, progressive mine closure plan, extent of proposed mining and other related details. As such, the microlevel, site specific study of the area comprising the probable and proveable mineral reserve deposition at the particular site is again conducted before the grant of mining lease.

While calculating the mineral potentials, the mineral deposits lying in the sub-tributaries of that particular stream/river have not been taken into consideration. Since these mineral deposits are adding annually to the main river, the mineral deposits will be much more.

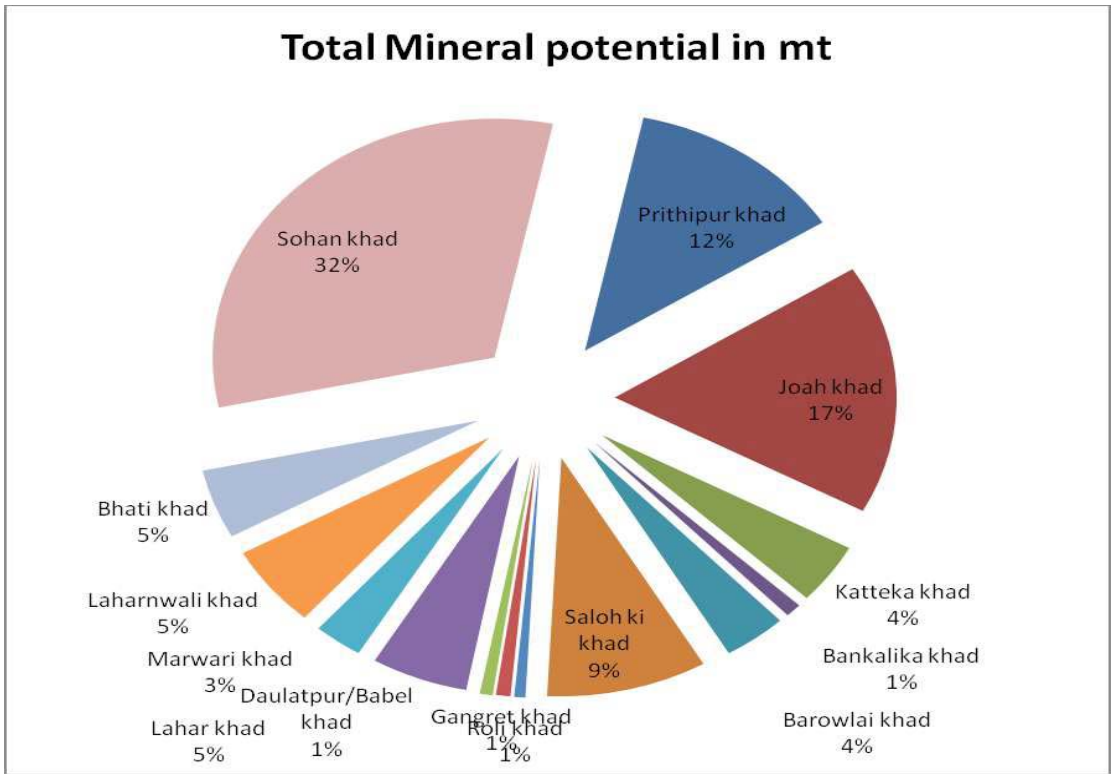
Mineral potential in Beas River.

The following mineral potentials have been calculated based on the percentage of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre leaving the clay and silt as waste totalling from 25%-30%. The annual deposition of minor minerals in the river bed has been calculated by taking into consideration the annual deposition of about 6 Cms.

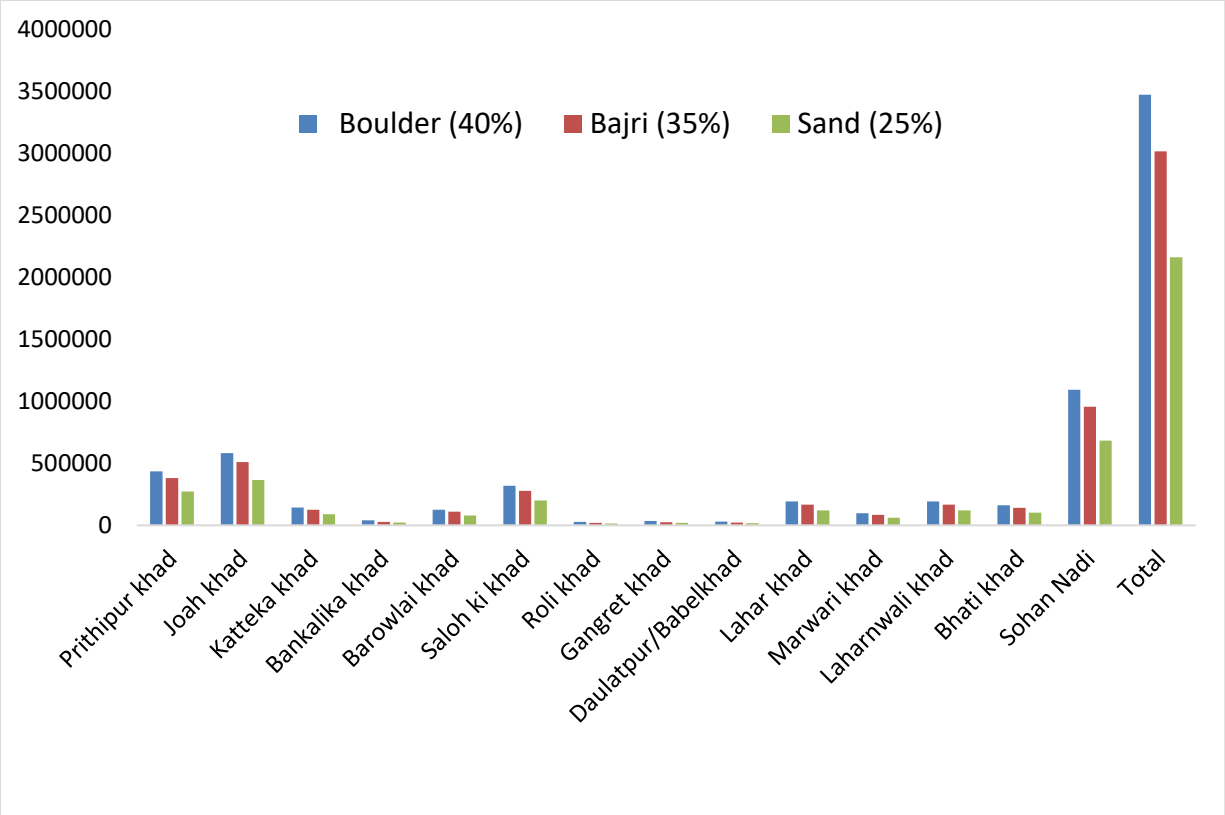
Sohan Nadi Sub-Catchment

TableShowing River bed area and Mineral potential in Sohan Nadi and its Tributaries in District Una

Sr No,	Name of tributary	River bed area (in hectares)	Mineral potentials (in metric tonnes)			Total mineral potential (in metric Tonnes)
			Boulder	Bajri	Sand	
Right Bank						
1	Prithipur khad	67-50-00	4,84,400	4,23,850	3,02,750	12,11,000
2	Joah khad	90-00-00	70,9000	5,06,000	405000	16,200,00
3	Katteka khad	22-00-00	1,42,560	1,24,740	89100	3,56400
4	Bankalika khad	5-00-00	39,000	28,000	22500	8,9500
5	Barowlai khad	19-50-00	1,25,640	1,09,935	78525	3,14,100
6	Saloh ki khad	50-00-00	3,18,600	2,78,775	199125	7,96,500
7	Roli khad	3-50-00	27,000	19,000	15000	61,000
8	Gangret khad	4-50-00	35,000	25,000	20000	8,0000
Left Bank						
9	Daulatpur/Babel khad	4-00-00	31,000	22,000	18,000	71,000
10	Lahar khad	30-00-00	19,18,80	1,67,895	119925	479700
11	Marwari khad	15-00-00	96,840	84,735	60525	242100
12	Laharnwali khad	30-00-00	1,91,880	1,67,895	119925	479700
13	Bhati khad	25-00-00	1,61,820	1,41,595	101135	404550
14	Sohan Nadi	168-75-00	1093200	956550	683250	2733000
15	Total	534-75-00	36,47,820	30,55,970	22,34,760	89,38,550



Pie Digramme Showing %age wise Mineral Potentials (in metric tones) in Sohan Nadi and its Tributaries, District Una.



Graph Showing Mineral Potential (in metric Tonnes) in Sohan nadi and its Tributaries in District Una

Mineral Potential in Satluj River and its Tributaries

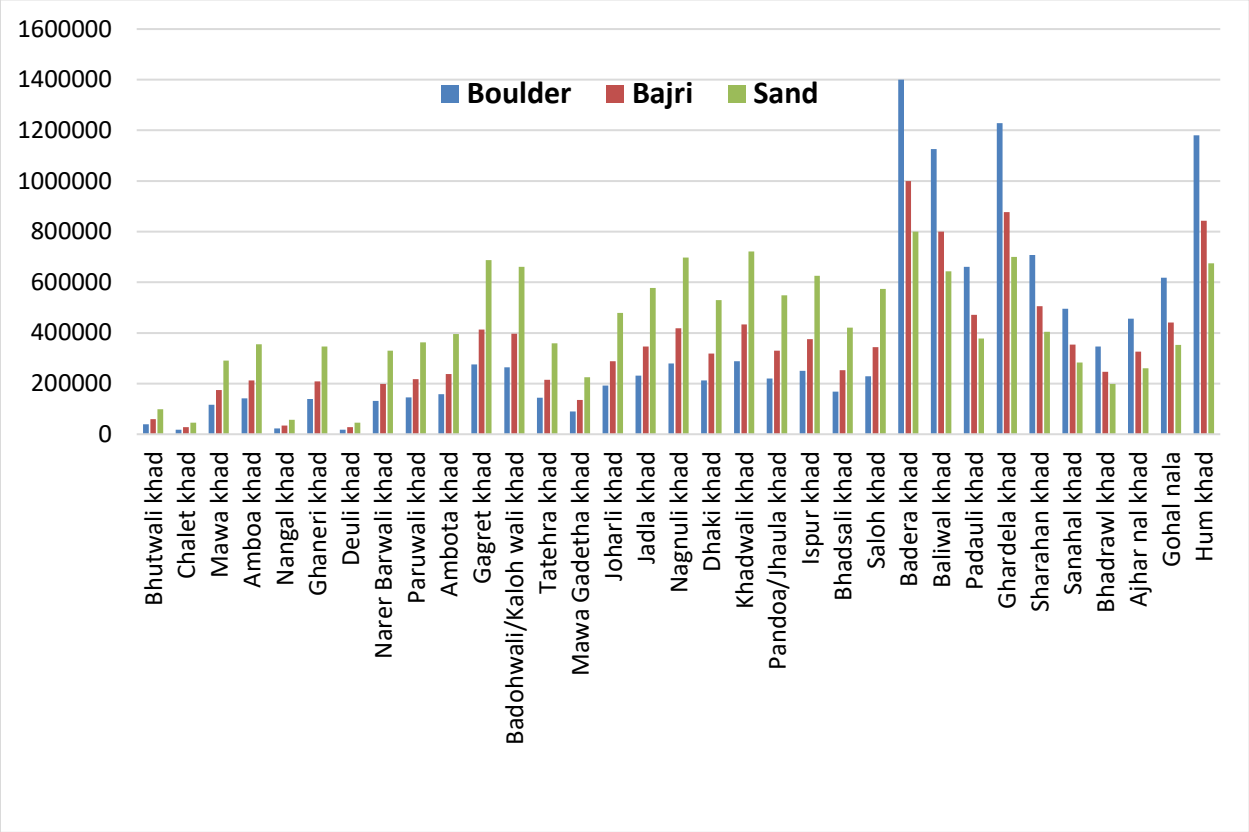
Swan (Soan) river and its Tributaries

Table Showing River bed area and Mineral potential in Swan (Soanriver) river and its Tributaries

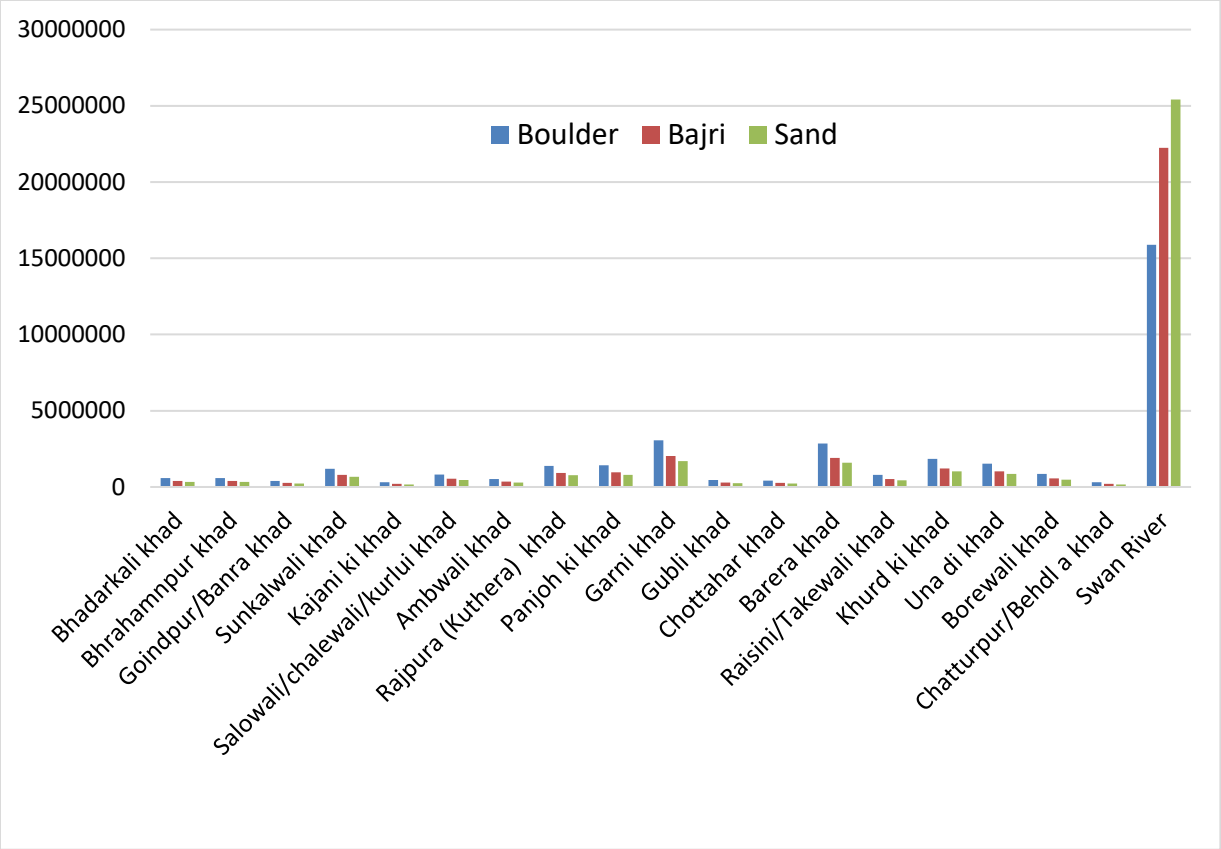
S.n o	Name of River	River bed area (in hectare)	Mineral potential in metric tonnes			
			Boulder	Bajri	Sand	Total
	Right Bank					
1	Bhutwali khad	15-00-00	39,400	59,100	98,500	1,97,000
2	Chalet khad	7-00-00	18400	27600	46000	92,000
3	Mawa khad	49-00-00	116400	174600	291000	5,82,000
4	Amboa khad	53-75-00	142000	213000	355000	710000
5	Nangal khad	8-75-00	23000	34500	57500	115000
6	Ghaneri khad	52-50-00	138800	208200	347000	694000
7	Deuli khad	7-00-00	18400	27600	46000	92000
8	Narer Barwali khad	50-00-00	132000	198000	330000	660000
9	Paruwali khad	55-00-00	145200	217800	363000	726000
10	Ambota khad	60-00-00	158200	237300	395500	791000

11	Gagret khad	104-00-00	275200	412800	688000	1376000
12	Badohwali/Kaloh wali khad	82-50-00	264600	396900	661500	1323000
13	Tatehra khad	50-00-00	143600	215400	359000	718000
14	Mawa Gadetha khad	28-00-00	90000	135000	225000	450000
15	Joharli khad	60-00-00	191800	287700	479500	959000
16	Jadla khad	72-00-00	231200	346800	578000	1156000
17	Nagnuli khad	87-50-00	279200	418800	698000	1396000
18	Dhaki khad	65-00-00	212000	318000	530000	1060000
19	Khadwali khad	90-00-00	288800	433200	722000	1444000
20	Pandoa/Jhaula khad	69-00-00	219600	329400	549000	1098000
21	Ispur khad	78-00-00	250400	375600	626000	1252000
22	Bhadsali khad	52-50-00	168400	252600	421000	842000
23	Saloh khad	71-50-00	229400	344100	573500	1147000
24	Badera khad	180-00-00	14,00,000	1000000	800000	3200000
25	Baliwal khad	143-00-00	11,26,000	800000	643000	2569000
26	Padauli khad	84-00-00	6,61,000	472000	378000	1511000
27	Ghardela khad	156-00-00	12,28,000	877000	700000	2805000
28	Sharahan khad	90-00-00	7,08,000	506000	405000	1619000
29	Sanahal khad	63-00-00	4,96,000	354000	283000	1133000
30	Bhadrawl khad	44-00-00	3,46,000	247000	198000	791000
31	Ajhar nal khad	58-00-00	4,56,000	326000	261000	1043000
32	Gohal nala	78-50-00	6,18,000	441000	353000	1412000
33	Hum khad	150-00-00	11,81,000	843000	675000	2699000
	Total	2314-50-00	1,19,96,000	1,15,30,000	1,41,36,000	3,76,62,000
	Left Bank					
34	Bhadarkali khad	96-00-00	587700	391800	326500	1306000
35	Bhrahamnpur khad	95-00-00	580950	387300	322750	1291000
36	Goindpur/Banra khad	66-00-00	403650	269100	224250	897000
37	Sunkalwali khad	175-00-00	1190250	793500	661250	2645000
38	Kajani ki khad	46-00-00	310050	206700	172250	689000
39	Salowali/chalewali/kurlui khad	120-00-00	816300	544200	453500	1814000
40	Ambwali khad	77-00-00	521100	347400	289500	1158000
41	Rajpura (Kuthera) khad	202-50-00	1377000	918000	765000	3060000
42	Panjoh ki khad	210-00-00	1428300	952200	793500	3174000
43	Garni khad	450-00-00	3061350	2040900	1700750	6803000
44	Gubli khad	66-00-00	448650	299100	249250	997000
45	Chottahar khad	60-00-00	407700	271800	226500	906000
46	Barera khad	420-00-00	2854350	1902900	1585750	6343000

47	Raisini/Takewali khad	117-00-00	795600	530400	442000	1768000
48	Khurd ki khad	270-00-00	1836450	1224300	1020250	4081000
49	Una di khad	225-00-00	1530000	1020000	850000	3400000
50	Borewali khad	126-00-00	856800	571200	476000	1904000
51	Chatturpur/Behdl a khad	46-00-00	309600	206400	172000	688000
52	Swan River	3700-00-00	15885000	22239000	25416000	6,35,40,000
	Total	6567-00-00	3,52,00,800	3,51,16,200	3,61,47,000	10,6464000



Graph Showing Mineral Potential in the Tributaries on Right Bank of Swan river

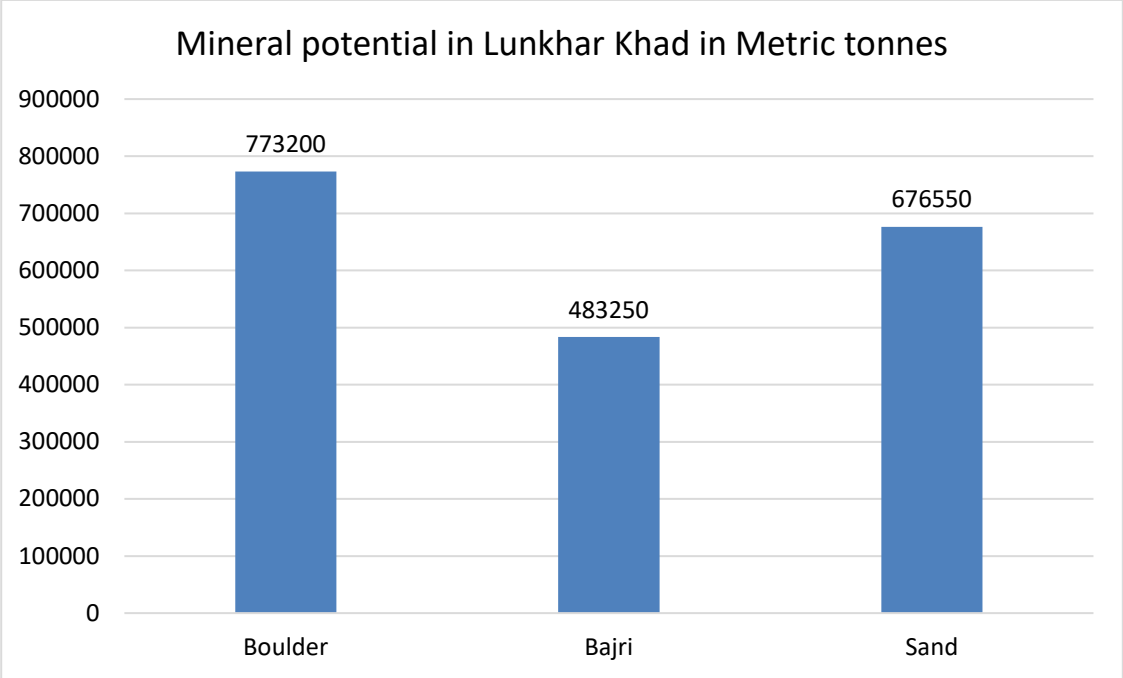


Graph Showing Mineral Potential (IN METRIC TONNES) in Swan River and its Tributaries Joining on Left Bank

Lunkhar Khad

Table Showing River bed area and Mineral potential in Lunkhar khad

Sr. No.	Name of tributary	River bed area in hectares	Mineral potential in metric tonnes			
			Boulder	Bajri	Sand	Total
1	Lunkhar khad	136-50-00	773200	483250	676550	1933000

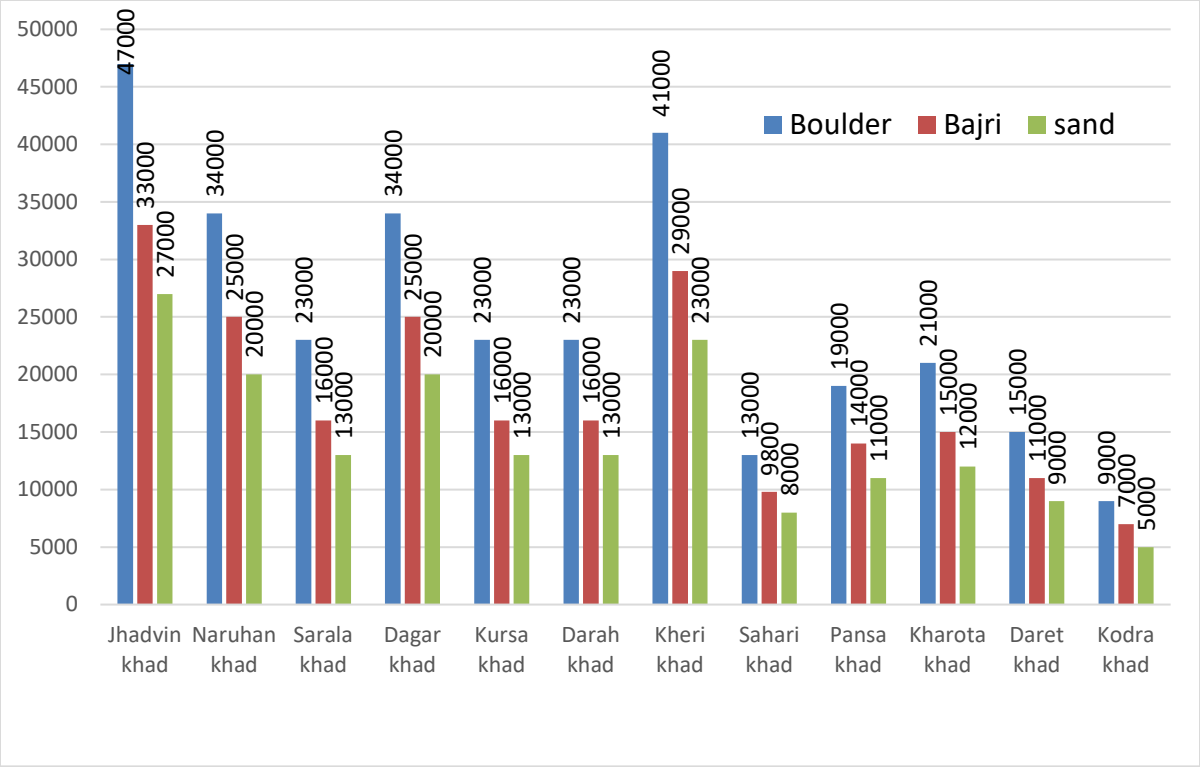


Graph Showing Mineral Potential (IN METRIC TONNES) in the Lunkhar Khad in Metric tonnes.

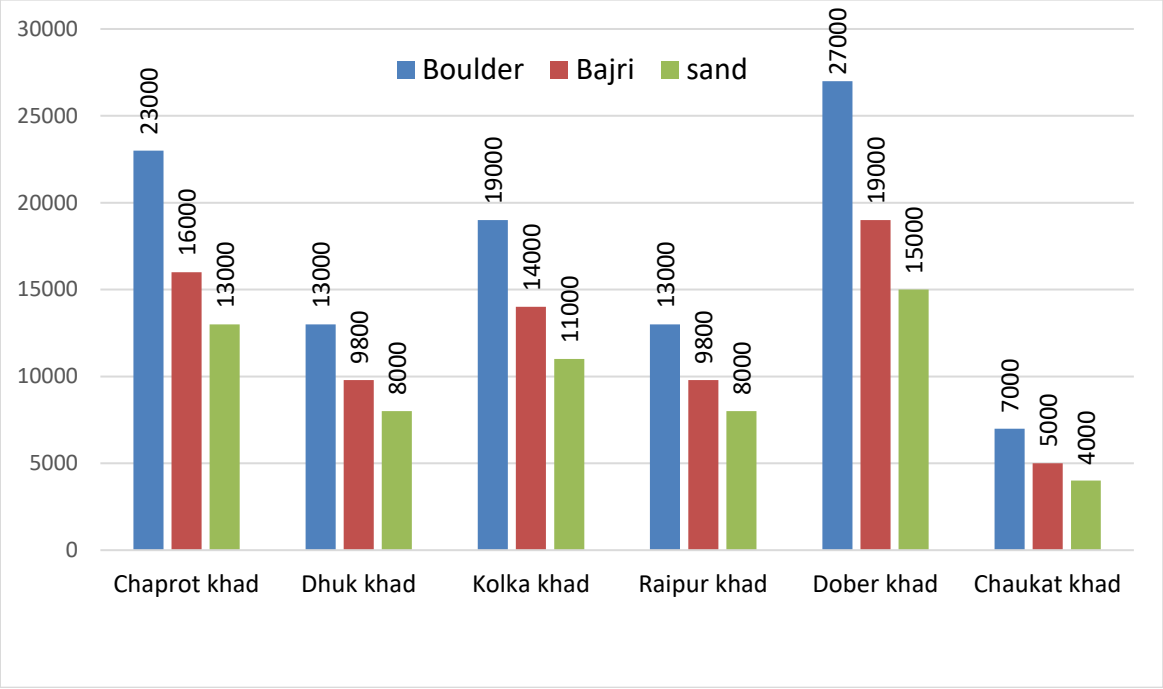
Mineral Potential in Streams Draining into Govindsagar

Table Showing River bed area and Mineral potential in streams draining into Govindsagar

Sr No,	Name of tributary	River bed area in hectares	Mineral potential in metric tonnes			
			Boulder	Bajri	sand	Total
Left Bank						
1	Jhadvin khad	6-00-00	47000	33000	27000	107000
2	Naruhan khad	4-50-00	34000	25000	20000	79000
3	Sarala khad	3-00-00	23000	16000	13000	52000
4	Dagar khad	4-50-00	34000	25000	20000	79000
5	Kursa khad	3-00-00	23000	16000	13000	52000
6	Darah khad	3-00-00	23000	16000	13000	52000
7	Kheri khad	5-25-00	41000	29000	23000	93000
8	Sahari khad	1-75-00	13000	9800	8000	30800
9	Pansa khad	2-50-00	19000	14000	11000	44000
10	Kharota khad	2-70-00	21000	15000	12000	48000
11	Daret khad	2-00-00	15000	11000	9000	35000
12	Kodra khad	1--25--00	9000	7000	5000	21000
Right Bank						
13	Chaprot khad	3-00-00	23000	16000	13000	52000
14	Dhuk khad	1-75-00	13000	9800	8000	30800
15	Kolka khad	2-50-00	19000	14000	11000	44000
16	Raipur khad	1-75-00	13000	9800	8000	30800
17	Dober khad	3-50-00	27000	19000	15000	61000
18	Chaukat khad	1-00-00	7000	5000	4000	16000
	Total	54-95-00	404000	290400	233000	927400



Graph Showing Mineral Potential (IN METRIC TONNES) in the streams drainingfrom left bank into Govindsagar

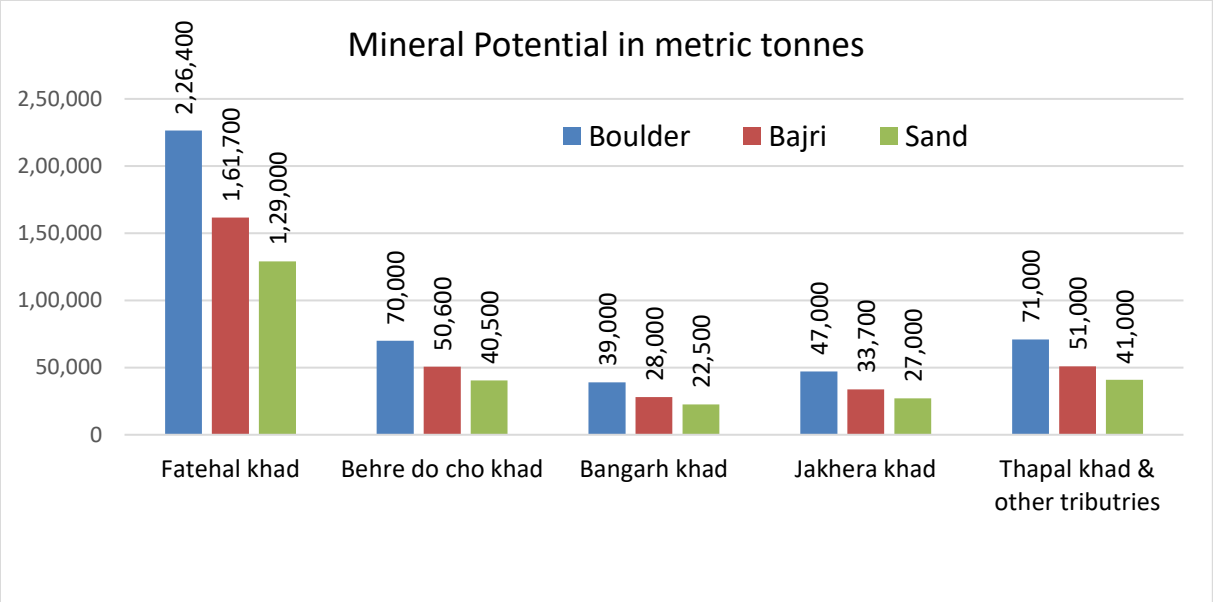


Graph Showing Mineral Potential (IN METRIC TONNES) in the streams draining from Right bank into Govindsagar

Streams flowing into Satluj between Bhakra Dam and Nangal: -

Table showing River bed area and Mineral potential in streams flowing into Satluj between Bhakra and Nangal dam

S.no	Name of River	River bed area (in hectares)	Mineral potential (in metric tonnes)			Total
			Boulder	Bajri	Sand	
1	Fatehal khad	28-75-00	2,26,400	1,61,700	1,29,000	5,17,100
2	Behre do cho khad	9-00-00	70,000	50,600	40,500	1,61,100
3	Bangarh khad	5-00-00	39,000	28,000	22,500	89,500
4	Jakhera khad	6-00-00	47,000	33,700	27,000	1,07,700
5	Thapal khad &other tributries	9-00-00	71,000	51,000	41,000	1,63,000
	Total	57-75-00	4,53,400	3,25,000	2,60,000	10,38,400

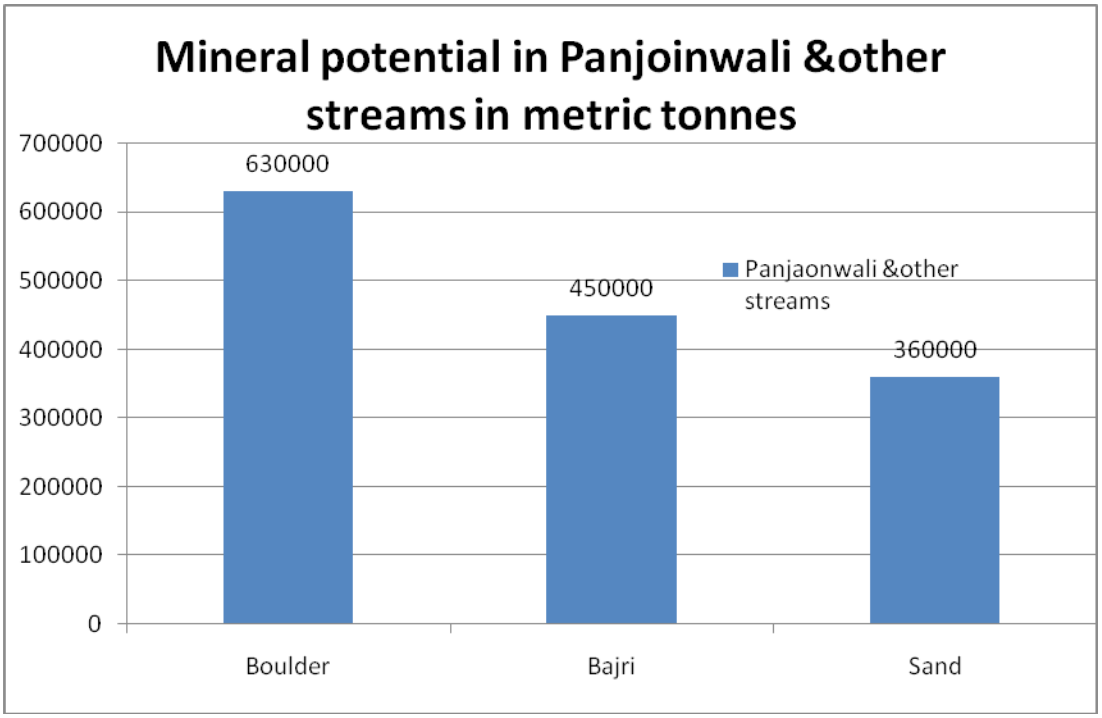


Graph Mineral Potential (IN METRIC TONNES) in Streams flowing into Satluj between Bahkra Dam and Nangal

Mineral Potentials of Panjoiwala Khad

Table Showing River bed area and Mineral potential of Panjoiwala khad

Sr. No.	Name of tributary	River bed area in hectares	Mineral potential in metric tonnes			
			Boulder	Bajri	Sand	Total
1	Panjaonwali &other streams	80-00-00	630000	450000	360000	1440000



Graph Showing Mineral Potential (IN METRIC TONNES) in Panjoinwala & Other Streams

Annual Deposition

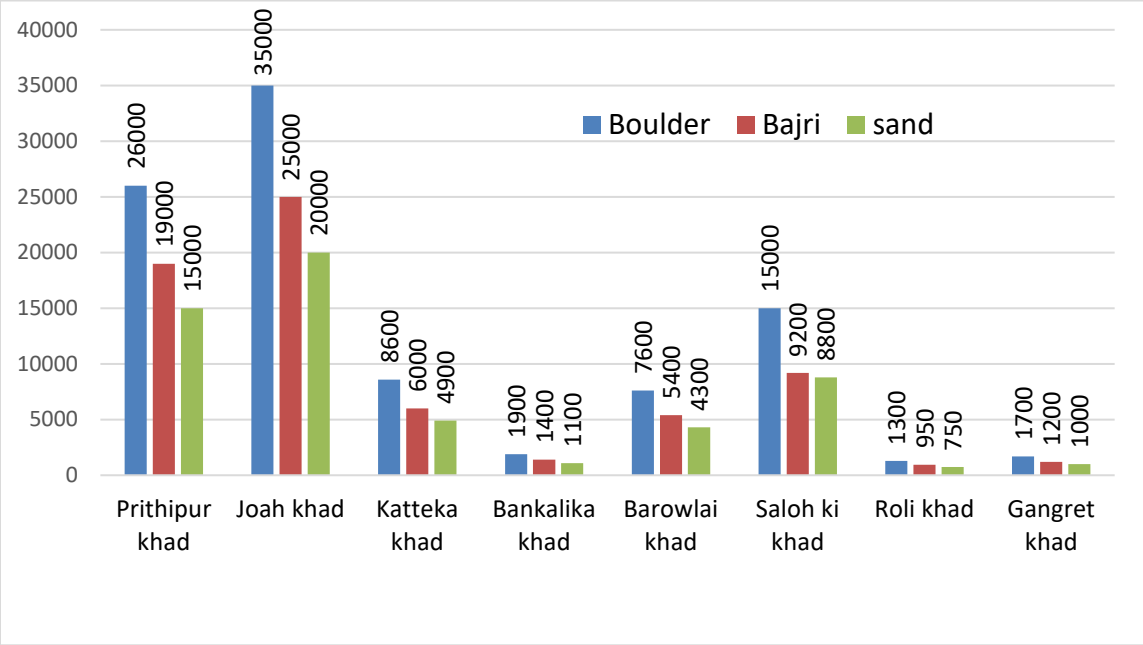
As already explained, during flood, the stream carries sediments comprising different components as per the lithlogy forming the catchment and these sediments are deposited in the bed of stream annually. This deposition for one year is known as the annual deposition. The deposition in a river bed is more pronounced during rainy season although the quantum of deposition varies from stream to stream depending upon numbers of factors such as catchment lithology, discharge, river profile and geomorphology of the river course. The particle size may vary depending upon the stage of river i.e. youth, mature and old age. In Una District during field survey, it is observed that annual deposition in various streams vary from 4 cms to 10 cms. However, there are certain geomorphological features developed in the river bed such as channel bars, point bars etc. where annual deposition is much more even two to three metres. The annual deposition in tributaries of Beas and Satluj river are calculated, and the annual mineral deposition is as under: -

Annual Deposition in Beas River Tributaries

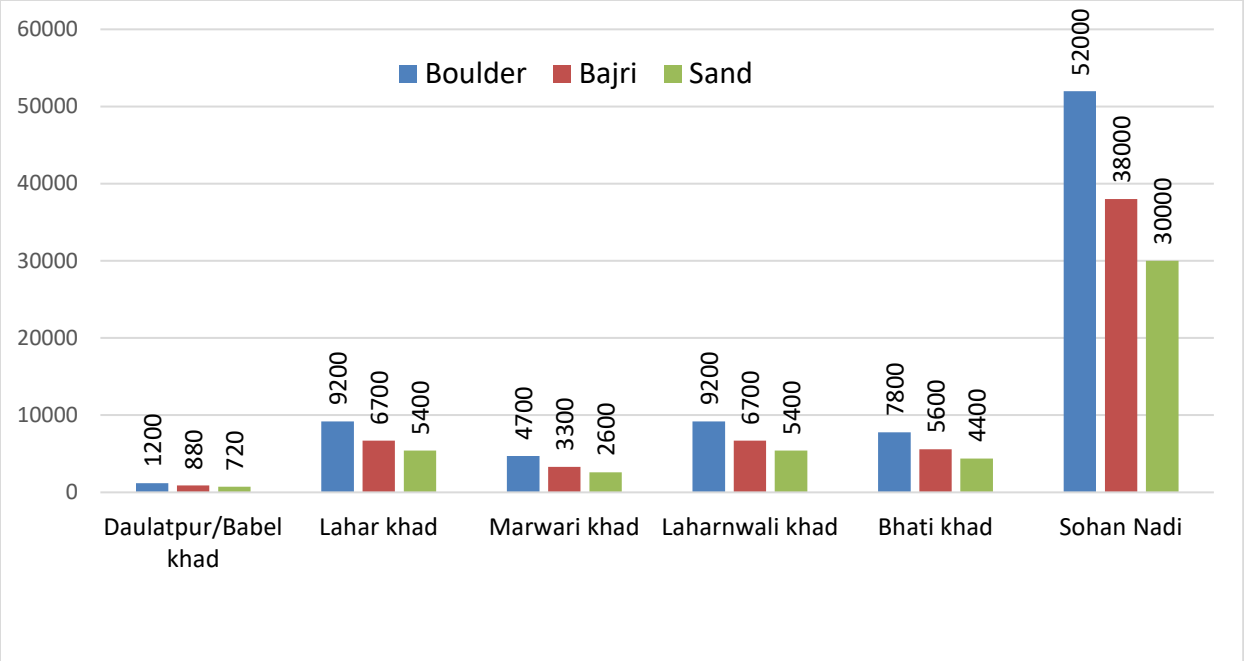
Sohan Nadi and its tributaries

Table Showing River bed area and Annual deposition (in metric tonnes) in Sohan Nadi and its Tributaries

Sr No,	Name of tributary	River bed area in hectares	Annual mineral deposition in metric tonnes			
			Boulder	Bajri	sand	Total
Right Bank						
1	Prithipur khad	67-50-00	26000	19000	15000	60000
2	Joah khad	90-00-00	35000	25000	20000	80000
3	Katteka khad	22-00-00	8600	6000	4900	19500
4	Bankalika khad	5-00-00	1900	1400	1100	4400
5	Barowlai khad	19-50-00	7600	5400	4300	17300
6	Saloh ki khad	50-00-00	15000	9200	8800	33000
7	Roli khad	3-50-00	1300	950	750	3000
8	Gangret khad	4-50-00	1700	1200	1000	3900
Left Bank						
9	Daulatpur/Babel khad	4-00-00	1200	880	720	2800
10	Lahar khad	30-00-00	9200	6700	5400	21300
11	Marwari khad	15-00-00	4700	3300	2600	10600
12	Laharnwali khad	30-00-00	9200	6700	5400	21300
13	Bhati khad	25-00-00	7800	5600	4400	17800
14	Sohan Nadi	168-75-00	52000	38000	30000	120000
	Total	534-75-00	181200	129330	104370	414900



Graph Showing Annual Mineral Deposition (IN METRIC TONNES) in the Right bank Tributaries of Sohan Nadi



Graph Showing Annual Mineral Deposition (in metric tonnes) In Sohan Nadi and its Tributaries.

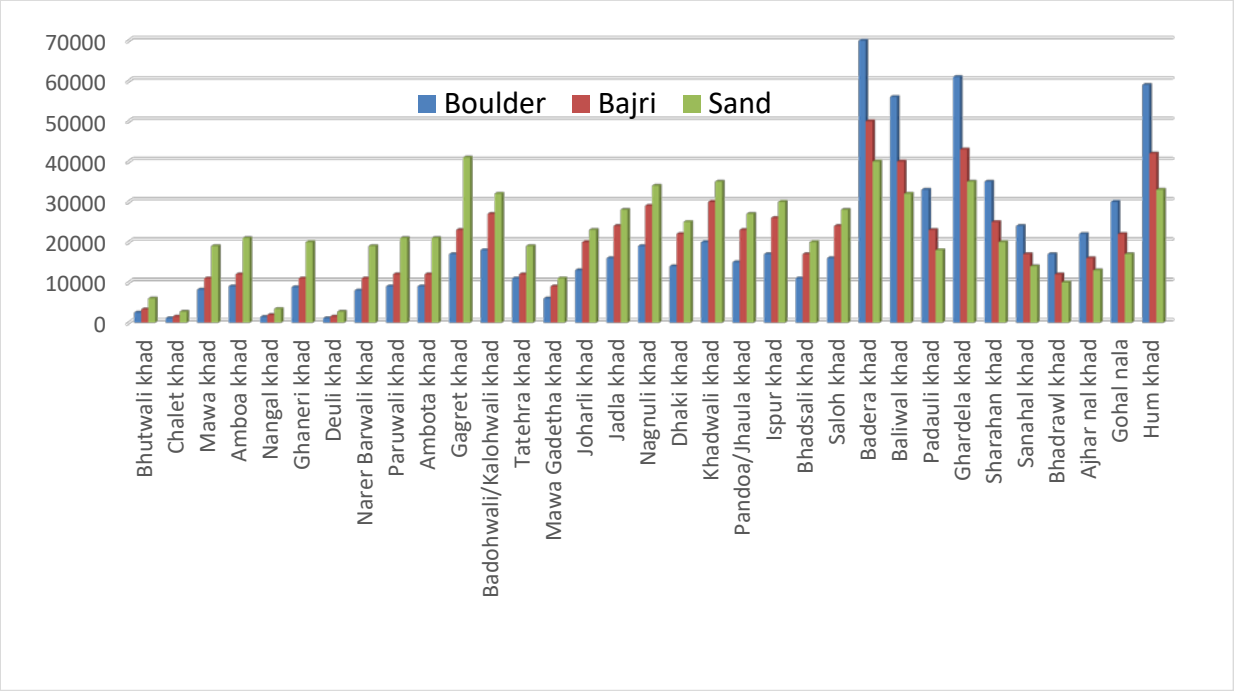
Annual Mineral Deposition in the river Bed of Satluj River Tributaries
Annual Mineral Deposition in Swan (Soan) river and its Tributaries

Table Showing River bed area and Annual deposition in river bed of satluj river tributaries

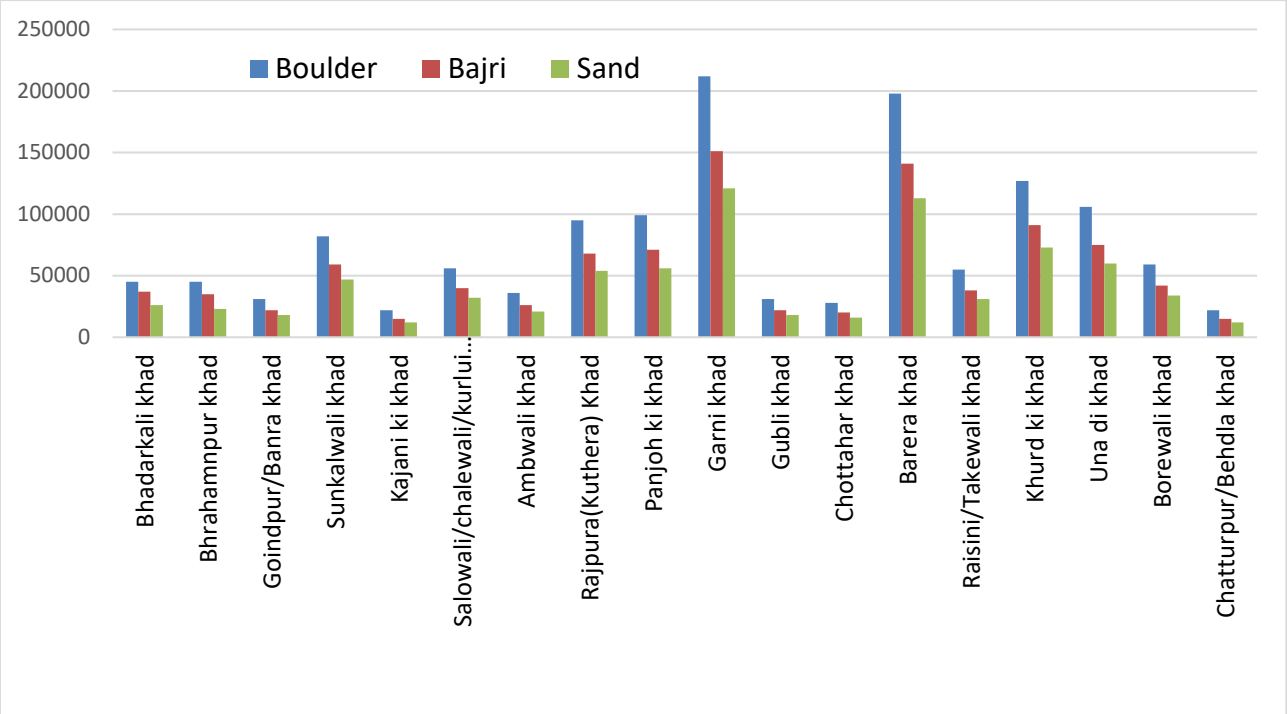
S.n o	Name of River	Total area (in hectare)	Annual Mineral Deposition in metric tonnes			
	Right Bank		Boulder	Bajri	Sand	Total
1	Bhutwali khad	15-00-00	2500	3300	6000	11800
2	Chalet khad	7-00-00	1100	1500	2700	5300
3	Mawa khad	49-00-00	8200	11000	19000	38200
4	Amboa khad	53-75-00	9000	12000	21000	42000
5	Nangal khad	8-75-00	1400	1900	3400	6700
6	Ghaneri khad	52-50-00	8800	11000	20000	39800
7	Deuli khad	7-00-00	1100	1500	2700	5300
8	Narer Barwali khad	50-00-00	8000	11000	19000	38000
9	Paruwali khad	55-00-00	9000	12000	21000	42000
10	Ambota khad	60-00-00	9000	12000	21000	42000
11	Gagret khad	104-00-00	17000	23000	41000	81000
12	Badohwali/Kalohwa li khad	82-50-00	18000	27000	32000	77000
13	Tatehra khad	50-00-00	11000	12000	19000	42000
14	Mawa Gadetha khad	28-00-00	6000	9000	11000	26000
15	Joharli khad	60-00-00	13000	20000	23000	56000
16	Jadla khad	72-00-00	16000	24000	28000	68000

17	Nagnuli khad	87-50-00	19000	29000	34000	82000
18	Dhaki khad	65-00-00	14000	22000	25000	61000
19	Khadwali khad	90-00-00	20000	30000	35000	85000
20	Pandoa/Jhaula khad	69-00-00	15000	23000	27000	65000
21	Ispur khad	78-00-00	17000	26000	30000	73000
22	Bhadsali khad	52-50-00	11000	17000	20000	48000
23	Saloh khad	71-50-00	16000	24000	28000	68000
24	Badera khad	180-00-00	70000	50000	40000	160000
25	Baliwal khad	143-00-00	56000	40000	32000	128000
26	Padauli khad	84-00-00	33000	23000	18000	74000
27	Ghardela khad	156-00-00	61000	43000	35000	139000
28	Sharahan khad	90-00-00	35000	25000	20000	80000
29	Sanahal khad	63-00-00	24000	17000	14000	55000
30	Bhadrawl khad	44-00-00	17000	12000	10000	39000
31	Ajhar nal khad	58-00-00	22000	16000	13000	51000
32	Gohal nala	78-50-00	30000	22000	17000	69000
33	Hum khad	150-00-00	59000	42000	33000	134000
	Total	2314-50-00	658100	653200	720300	2032100
	Left Bank					
34	Bhadarkali khad	96-00-00	45000	37000	26000	108000
35	Bhrahamnpur khad	95-00-00	45000	35000	23000	103000
36	Goindpur/Banra khad	66-00-00	31000	22000	18000	71000
37	Sunkalwali khad	175-00-00	82000	59000	47000	188000
38	Kajani ki khad	46-00-00	22000	15000	12000	49000
39	Salowali/chalewali/kurlui khad	120-00-00	56000	40000	32000	128000
40	Ambwali khad	77-00-00	36000	26000	21000	83000
41	Rajpura (Kuthera) khad	202-50-00	95000	68000	54000	217000
42	Panjoh ki khad	210-00-00	99000	71000	56000	226000
43	Garni khad	450-00-00	212000	151000	121000	484000
44	Gubli khad	66-00-00	31000	22000	18000	71000
45	Chottahar khad	60-00-00	28000	20000	16000	64000
46	Barera khad	420-00-00	198000	141000	113000	452000
47	Raisini/Takewali khad	117-00-00	55000	38000	31000	124000
48	Khurd ki khad	270-00-00	127000	91000	73000	291000
49	Una di khad	225-00-00	106000	75000	60000	241000
50	Borewali khad	126-00-00	59000	42000	34000	135000
51	Chatturpur/Behdla khad	46-00-00	22000	15000	12000	49000
52	Swan River khad	3700-00-00	996000	1494000	1746000	4236000

	Total	6567-00-00	2345000	2462000	2513000	7325000



Graph Showing Annual Mineral Deposition (in metric tonnes) in River Bed of right Bank tributaries of Swan river

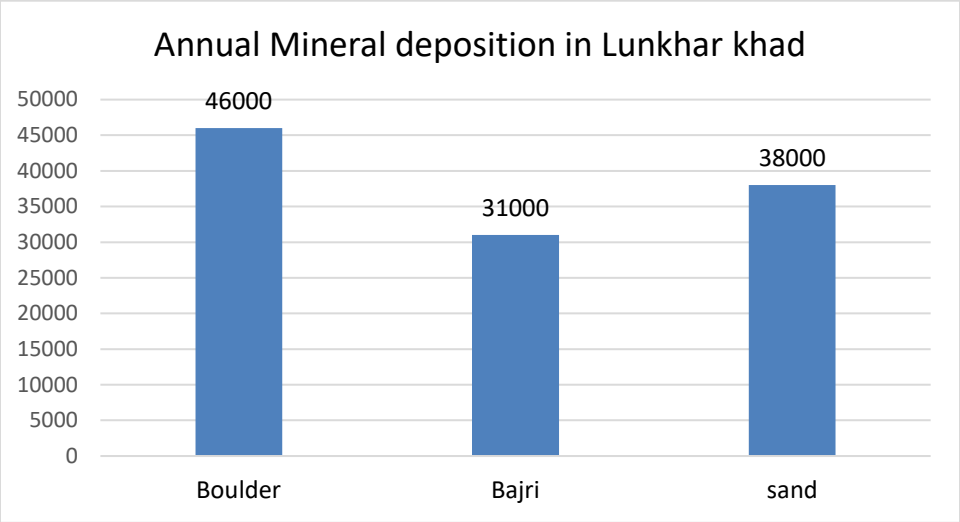


Graph Showing Annual Mineral Deposition (in metric tonnes) in Swan River and its Left Bank tributaries.

Annual Deposition in Lunkhar khad

Table Showing River bed area and Annual deposition in Lunkhar khad

Sr No,	Name of tributary	River bed area in hectares	Annual mineral deposition in metric tonnes			
			Boulder	Bajri	sand	Total
1	Lunkhar khad	136-50-00	46000	31000	38000	115000



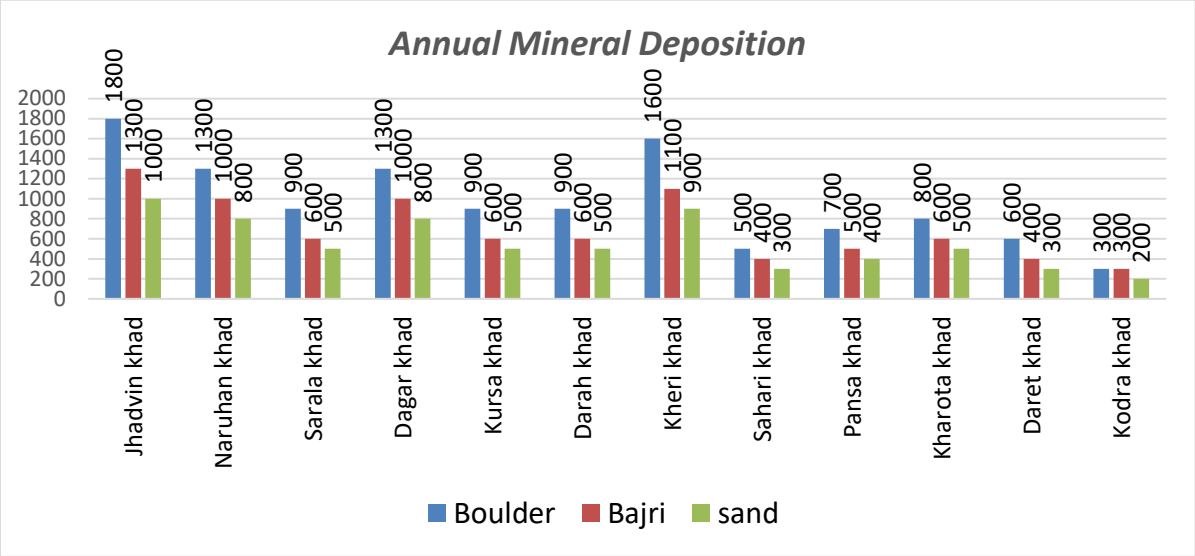
Graph Showing Annual Mineral Deposition (in metric tonnes) in River Bed of Lunkhar Khad

Annual Deposition in streams Draining into Govindsagar

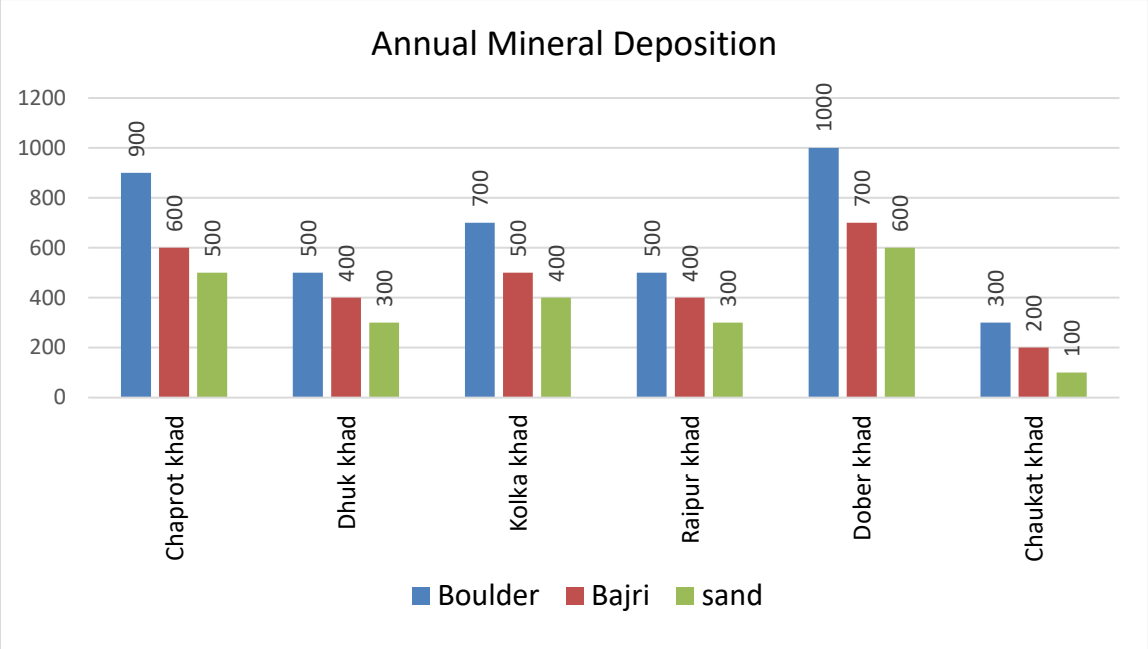
Table Showing River bed area and Annual deposition in streams draining into GovindSagar

Sr No,	Name of tributary	River bed area in hectares	Annual mineral deposition in metric tonnes			
			Boulder	Bajri	Sand	Total
Left Bank						
1	Jhadvin khad	6-00-00	1800	1300	1000	4100
2	Naruhan khad	4-50-00	1300	1000	800	3100
3	Sarala khad	3-00-00	900	600	500	2000
4	Dagar khad	4-50-00	1300	1000	800	3100
5	Kursa khad	3-00-00	900	600	500	2000
6	Darah khad	3-00-00	900	600	500	2000
7	Kheri khad	5-25-00	1600	1100	900	3600
8	Sahari khad	1-75-00	500	400	300	1200
9	Pansa khad	2-50-00	700	500	400	1600
10	Kharota khad	2-70-00	800	600	500	1900
11	Daret khad	2-00-00	600	400	300	1300
12	Kodra khad	1--25--00	300	300	200	800
Right Bank						

13	Chaprot khad	3-00-00	900	600	500	2000
14	Dhuk khad	1-75-00	500	400	300	1200
15	Kolka khad	2-50-00	700	500	400	1600
16	Raipur khad	1-75-00	500	400	300	1200
17	Dober khad	3-50-00	1000	700	600	2300
18	Chaukat khad	1-00-00	300	200	100	600
	Total	54-95-00	15500	11200	8900	35600



Graph Showing Annual Mineral Deposition (in metric tonnes) in River Bed of streams Draining into Govindsagar on Left Bank

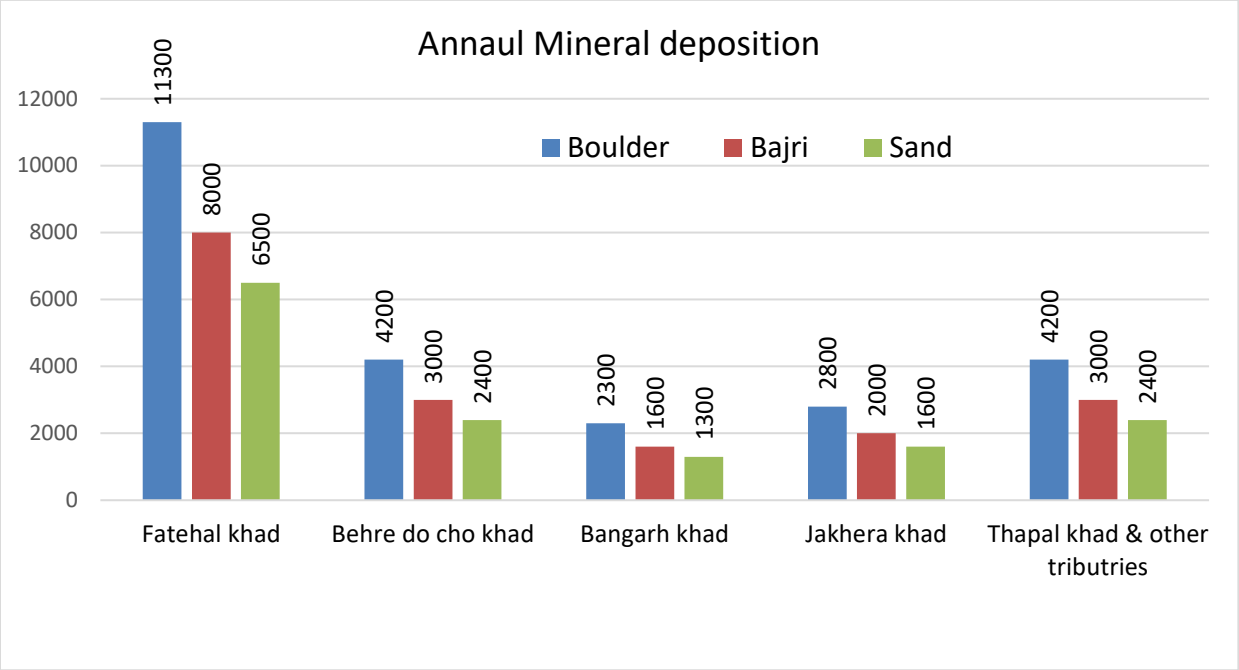


Graph Showing Annual Mineral Deposition (in metric tonnes) in River Bed of streams Draining into Govindsagar on Right bank

Annual Deposition in Streams Flowing into Satluj Between Bhakra Dam and Nangal

Table Showing River bed area and Annual deposition in streams flowing into Satluj between Bhakra Dam and Nangal

S.no	Name of River	River bed area (in hectares)	Annual Mineral Deposition in metric tonnes			
			Boulder	Bajri	Sand	Total
1	Fatehal khad	28-75-00	11300	8000	6500	25800
2	Behre do cho khad	9-00-00	4200	3000	2400	9600
3	Bangarh khad	5-00-00	2300	1600	1300	5200
4	Jakhera khad	6-00-00	2800	2000	1600	6400
5	Thapal khad & other tributries	9-00-00	4200	3000	2400	9600
	Total	57-75-00	24800	17600	14200	56600

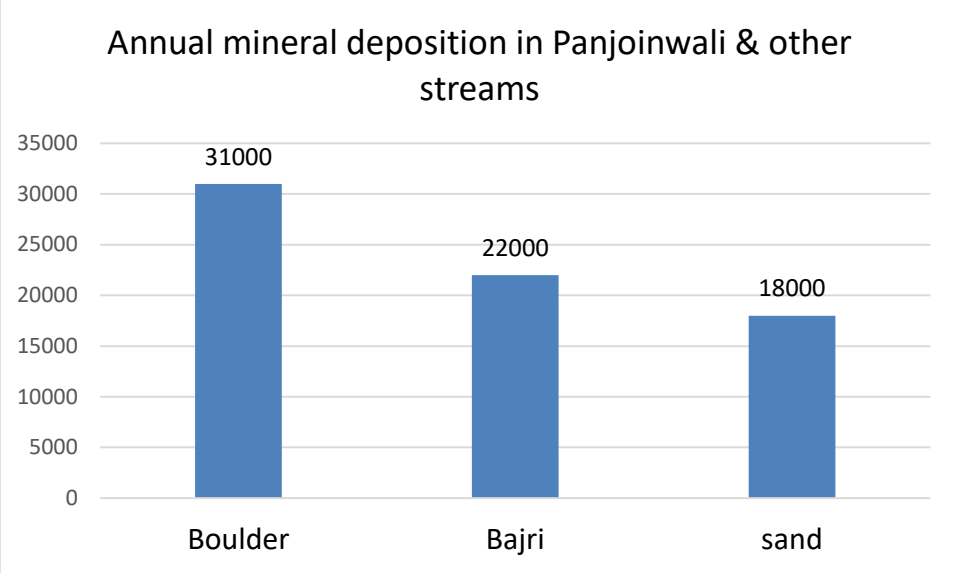


Graph Showing Annual Mineral Deposition (in metric Tonnes) in River Bed of streams Flowing into Satluj between Bhakra Dam and Nangal

Annual Deposition in Panjoiwala Khad

Table Showing River bed area and Annual deposition in Panjoiwala khad

Sr No,	Name of tributary	River bed area in hectares	Annual Mineral deposition in metric tonnes			
			Boulder	Bajri	sand	Total
1	Panjoinwali &other streams	80-00-00	31000	22000	18000	71000

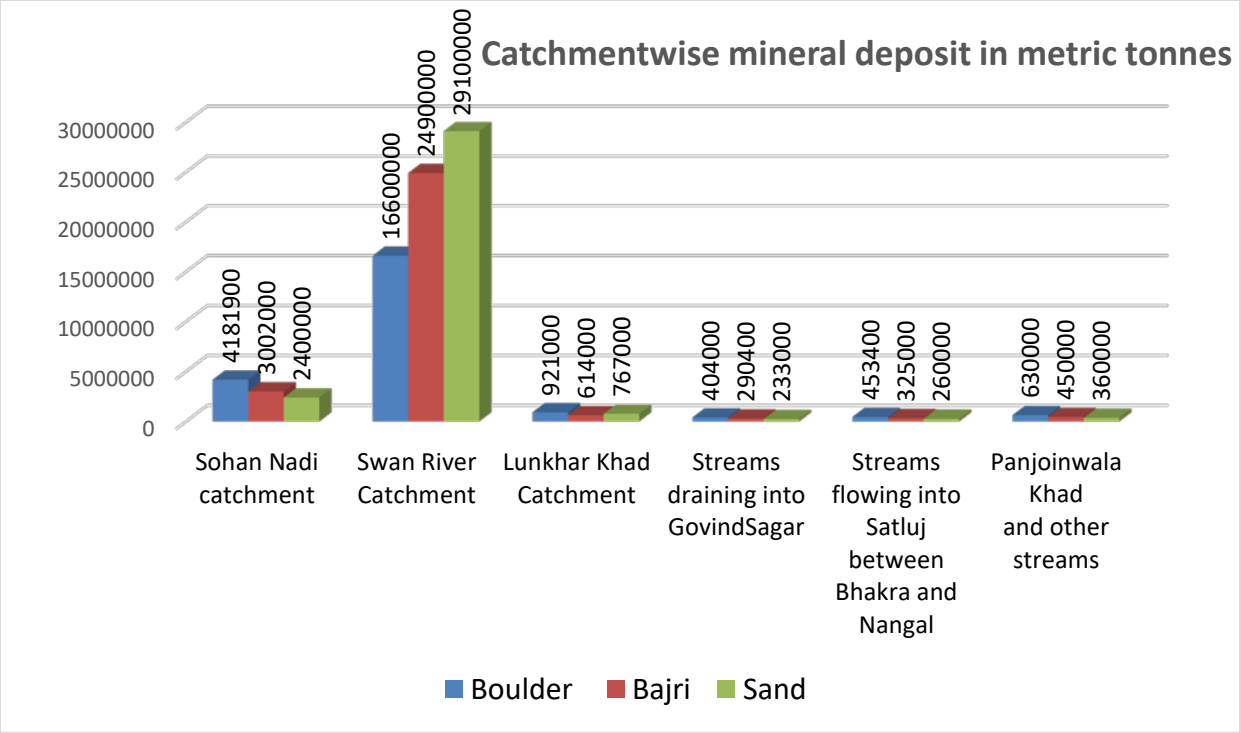


Graph Showing Annual Mineral Deposition (in metric Tonnes) in River Bed of streams Flowing Into Satluj Between Bhakra Dam and Nangal

Catchmentwise Mineral Potential

Table showing Catchmentwise mineral deposit.

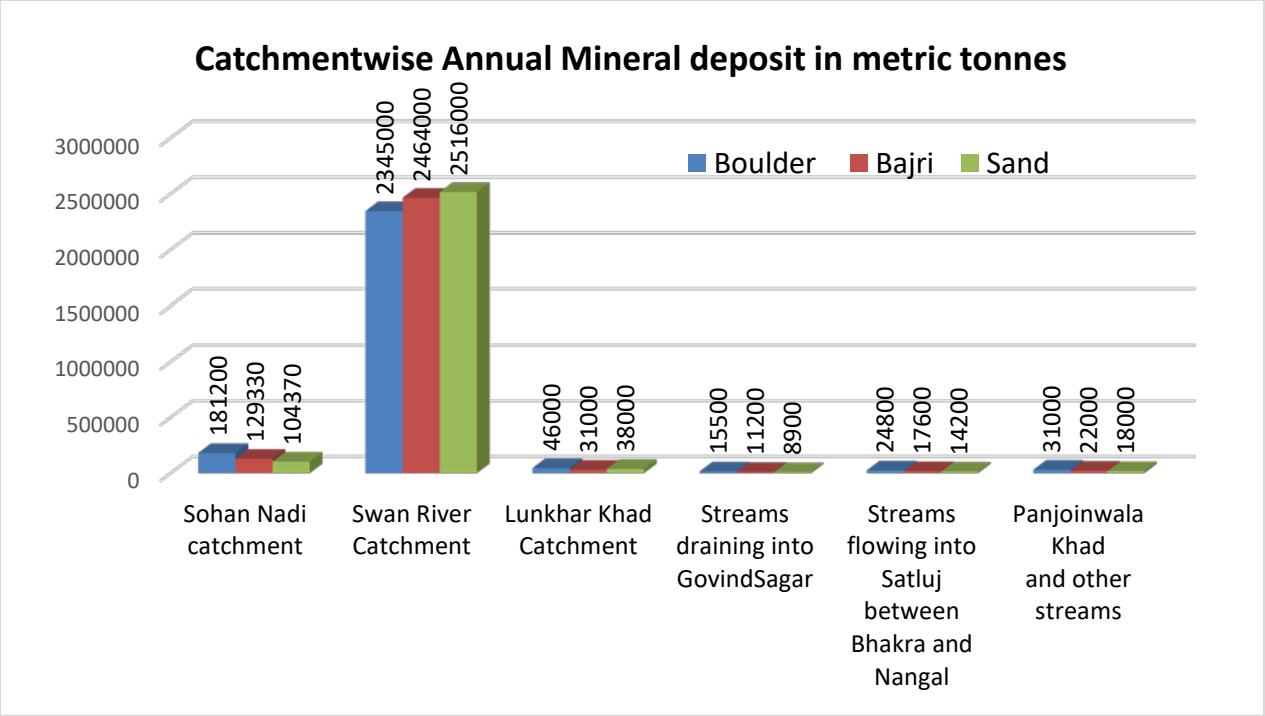
Sr No,	Name of tributary	Boulder (In metric Tonnes)	Bajri (In metric Tonnes)	Sand (In metric Tonnes)	Total mineral potential (in metric tonnes)
1	Sohan Nadi catchment	3473580	3017885	2163985	8655450
2	Swan River Catchment	15885000	22239000	25416000	63540000
3	Lunkhar Khad Catchment	773200	483250	676550	1933000
4	Streams draining into GovindSagar	404000	290400	233000	927400
5	Streams flowing into Satluj between	453400	325000	260000	1038400
	Bhakra and Nangal				
6	Panjoinwala Khad and other streams	630000	450000	360000	1440000
	Total	23190300	29581400	33120000	85891700



Graph showing Catcmentwise mineral deposits (in metric tonnes)

Table Showing Catchmentwise Annual Mineral deposit.

Sr No,	Name of river/stream	Boulder (in metric Tonnes)	Bajri (In metric Tonnes)	Sand (In metric Tonnes)	Total mineral potential (in metric tonnes)
1	Sohan nadi	181200	129330	104370	414900
2	Swan River Catchment	2345000	2464000	2516000	7325000
3	Lunkhar Khad Catchment	46000	31000	38000	115000
4	Streams draining into GovindSagar	15500	11200	8900	35600
5	Streams flowing into Satluj between Bhakra and Nangal	24800	17600	14200	56600
6	Panjoinwala Khad and other streams	31000	22000	18000	71000
	Total	2643500	2675130	2699470	8018100



Graph showing Catchmentwise Annual Mineral deposits (in metric tonnes)

Recommendations

Based on Geo-Morphological factor such as length of stream, catchment area, River bed area, lithology of catchment, mineral potential, annual deposition, present production pattern, in each stream, the streams have either been recommended for mineral concession or prohibited for mineral concession. The streamwise recommendations are as under: -

Beas Catchment

Table Showing recommendations for Sohan nadi and its Tributaries.

Sr No,	Name of tributary	From – To	Recommendation
Sohan Nadi			
Right Bank			
1	Pirthipur khad	From origin to village Pirthipur From Pirthipur village to confluence with Sohan nadi	No mineral concession Recommended for mineral concession
2	Joh khad	From origin to Joh village From Joh village to confluence with Sohan nadi	No mineral concession Recommended for mineral concession

3	Katteka khad	From origin to confluence with Sohan nadi	No mineral concession
4	Bankalika khad	From origin to confluence with Sohan nadi	No mineral concession
5	Barowlai khad	From origin to confluence with Sohan nadi	No mineral concession
6	Saloh ki khad	From origin to confluence with Soan river	No mineral concession
7	Roli khad	From origin to confluence with Sohan nadi	No mineral concession
8	Gangret khad	From origin to confluence with Sohan nadi	No mineral concession
Left bank			
9	Daulatpur/Babel khad	From origin to confluence with Sohan nadi	No mineral concession
10	Nand Ka Lahr khad	From origin to confluence with Soan nadi	No mineral concession
11	Marwari khad	From origin to confluence with Sohan nadi	No mineral concession
12	Lahranwali khad	From origin to confluence with Soan nadi	No mineral concession
13	Bhati khad	From origin to confluence with Sohan nadi	No mineral concession
14	Sohan nadi	From origin to confluence with Joh Khad From Joh khad confluence to Punjab border	No mineral concession Recommended for mineral concession

Satluj Catchment

Recommendations for Swan (Soan) river and its Tributaries

Table showing recommendations for Swan River and its Tributaries.

Sr.no.	Name of River	From--To	Recommendations
	Swan River		
	Right Bank		
1	Bhutwali khad	From origin to confluence with Swan river.	No mineral concession.

2	Chalet khad	From origin to Daulatpur –Gagret road. From Daulatpur –Gagret road to confluence with Swan River.	No mineral concession Recommended for mineral concession.
3	Mawa khad	From origin to Daulatpur –Gagret road From Daulatpur –Gagret road to confluence with Swan River.	No Mineral concession Recommended for mineral concession
4	Amboa khad	From origin to confluence with Swan river	Recommended for mineral concession
5	Nangal khad (Jariala)	From origin to confluence with Swan river	Recommended for mineral concession
6	Ghaneri khad	From origin to confluence with Swan river	No Mineral concession
7	Deuli khad	From origin to confluence with Swan river	No Mineral concession
8	Narer Barwali khad	From origin to confluence with Swan river	No Mineral concession
9	Paruwali khad	From origin to Daulatpur –Gagret road From Daulatpur –Gagret road to confluence with Swan river	No Mineral concession Recommended for mineral concession
10	Ambota khad	From origin to Ambota village From Ambota village to confluence with Swan river	No Mineral concession Recommended for mineral concession
11	Gagret khad	From origin to confluence with Swan river	No Mineral concession
12	Badohwali/ Kalohwali khad	From origin to Ratti Khan	No Mineral concession
		From Ratti Khan to confluence with Swan river	Recommended for mineral concession
13	Tatehra khad	From origin to confluence with Swan river	No Mineral concession
14	Mawa Gadetha khad	From origin to confluence with Swan river	No Mineral concession.

15	Loharli khad	From origin to confluence with Swan river	Recommended for mineral.Concession.
16	Jadla khad	From origin to confluence with Swan river	No Mineral concession
17	Nagnuli khad	From origin to confluence with Swan river	No Mineral concession
18	Dhaki khad	From origin to confluence with Swan river	No Mineral concession
19	Khadwali khad	From origin to confluence with Swan river	Recommended for Mineral concession
20	Pandoa/Jhaula khad	From origin to confluence with Swan river	Recommended for Mineral concession
21	Ispur khad	From origin to Ispur village From Ispur village to confluence with Swan river	No mineral concession Recommended for Mineral concession
22	Bhadsali khad	From origin to confluence with Swan river	No Mineral concession
23	Saloh khad	From origin to confluence with Swan river	No Mineral concession
24	Badehra khad	From origin to confluence with Swan river	Recommended for Mineral concession
25	Baliwal khad	From origin to confluence with Swan river	No mineral concession
26	Padauri khad	From origin to confluence with Swan river	No Mineral concession
27	Ghardala khad (Palkwah Khad)	From origin to Pubowal From Pubowal to confluence with Swan river	No Mineral concession Recommended for Mineral concession
28	Sharahan khad	From origin to confluence with Swan river	Recommended for Mineral concession
29	Sanahal khad	From origin to confluence with Swan river	Recommended for Mineral concession
30	Bidorwal khad	From origin to confluence with Swan river	No Mineral concession
31	Ajhar nal khad	From origin to confluence with Swan river	No Mineral concession
32	Gohar and Seri nala	From origin to confluence with Swan river	Recommended for Mineral concession

33	Hum khad	From origin to Dolehar village From Dolehar village to confluence with Swan river including Gondpur and Bathu khad	No Mineral concession Recommended for Mineral concession
	Left Bank		
34	Bhadarkali khad	From origin to Bhadarkali From Bhadarkali to confluence with Swan river	No mineral concession Recommended for mineral concession
35	Bhrahamnpur khad	From origin to Fatehpur village From Fatehpur village to confluence with Swan river	No mineral concession Recommended for mineral concession
36	Goindpur/Banra khad	From origin to Kuthera Rampur From Kuthera Rampur to confluence with Swan river	No mineral concession Recommended for mineral concession
37	Sunkalwali khad	From origin to Nakro village From Nakro village to confluence with Swan river	No mineral concession Recommended for mineral concession
38	Kajani ki khad	From origin to Panjal vllage From Panjal village to confluence with Swan river	No mineral concession Recommended for mineral concession
39	Salowali/Chalerwali/Kalruhi khad	From origin to confluence with Chalerwali and Salohwali khad From confluence with Chalerwali and Salohwali khad to confluence with Swan river	No mineral concession Recommended for mineral concession
40	Ambwali khad	From origin to Amb From Amb to confluence with Swan river	No mineral concession Recommended for mineral concession

41	Rajpura (Kuthera) khad	From origin to Kuthera Khairla From Kuthera Khairla to confluence with Swan river	No mineral concession Recommended for mineral concession
42	Panjoa ki khad	From origin to confluence with Swan river	Recommended for mineral concession
43	Garni khad	From origin to confluence with Barian di Khad From Barian di Khad to confluence with Swan river	No Mineral concession Recommended for Mineral concession
44	Gubri khad (Dussara Khad)	From origin to Satothar village From Satothar village to confluence with Swan river	No Mineral concession Recommended for Mineral concession
45	Chotta har khad	From origin to Batuhi village From Batuhi village confluence with Soan river	No Mineral concession Recommended for Mineral concession
46	Barera khad (Basal Khad)	From origin to Sajhot village From Sajhot village to confluence with Swan river	No Mineral concession Recommended for Mineral concession
47	Raisiri/Takewali khad	From origin to Jhamber village From Jhamber village to confluence with Swan river	No Mineral concession Recommended for Mineral concession
48	Khurd ki khad	From origin to Sammur village From Sammur village to confluence with Swan river	No Mineral concession Recommended for Mineral concession
49	Una di khad	From origin to Madanpur From Madanpur to confluence with Swan river	No Mineral concession Recommended for Mineral concession
50	Borewali khad	From origin to Una Santokhgarh Road (Tabba, JalGraun) From Una Santokhgarh Road to cconfluence with Swan river	No Mineral concession Recommended for Mineral concession

51	Chattarpur/Behdala khad	From origin to Fatehpur From Fatehpur to confluence with Swan river	No Mineral concession Recommended for Mineral concession
52	Swan River khad	From origin to Mawa Kahloon From Mawa Kahloon to Punjab border (Batu Bathri)	No mineral concession Recommended for mineral concession

Lunkhar khad

Table Showing recommendations for Lunkhar khad

Sr No,	Name of tributary	From--To	Recommendations
1	Lunkhar khad	From origin to Tamlet village From Tamlet village to confluence with Govind Sagar	No mineral oncession Recommended for mineral concession

Streams draining into Govindsagar

Table Showing recommendations for streams draining into Govindsagar

Sr No,	Name of tributary	From---To	Recommendations
Streams draining into Govindsagar			
Left Bank			
1	Jhadvin khad	From origin to confluence with Govindsagar	No Mineral concession
2	Naruhan khad	From origin to confluence with Govindsagar	No Mineral concession
3	Sarala khad	From origin to confluence with Govindsagar	No Mineral concession
4	Daghar khad	From origin to confluence with Govindsagar	No Mineral concession
5	Kursa khad	From origin to confluence with Govindsagar	No Mineral concession
6	Darah khad	From origin to confluence with Govindsagar	No Mineral concession
7	Kheri khad	From origin to confluence with Govindsagar	No Mineral concession
8	Sahari khad	From origin to confluence with Govindsagar	No Mineral concession

9	Pansa khad	From origin to confluence with Govindsagar	No Mineral concession
10	Kharota khad	From origin to confluence with Govindsagar	No Mineral concession
11	Daret khad	From origin to confluence with Govindsagar	No Mineral concession
12	Kodra khad	From origin to confluence with Govindsagar	No Mineral concession
Right Bank.			
13	Chaprot khad	From origin to confluence with Govindsagar	No Mineral concession
14	Dhuk khad	From origin to confluence with Govindsagar	No Mineral concession
15	Kolka khad	From origin to confluence with Govindsagar	No Mineral concession
16	Raipur khad	From origin to confluence with Govindsagar	No Mineral concession
17	Dober khad	From origin to confluence with Govindsagar	No Mineral concession
18	Chaukat khad	From origin to confluence with Govindsagar	No Mineral concession

Streams Flowing into Satluj Between Bhakra Dam and Nangal

Table Showing recommendations for streams flowing into Satluj between Bhakra dam and Nangal.

Sr. No.	Name of tributary	From--To	Recommendations
1	Fatehal khad	From origin to 500 m upstream of Fatehal village From 500m upstream of Fatehal village to Punjab border	No mineral concession Recommended for mineral concession
2	Behre do cho khad	From origin to Punjab Border	No mineral concession
3	Bangarh khad	From origin to Punjab Border	No mineral concession
4	Jakhera khad	From origin to Punjab Border	No mineral concession
5	Thapal khad & other tributries	From origin to Punjab Border	No mineral concession

Panjoinwala Khad

Table Showing recommendations for Panjoiwala khad

Sr No,	Name of tributary	From-To	Recommendations
1	Panjaonwali & other streams	From origin to Kuthar village From Kuthar village to Punjab border.	No mineral concession Recommended for mineral concession

14 GENERAL RECOMMENDATIONS

The part of river/stream beds recommended for grant of mineral concessions in this report are based on reconnaissaince survey conducted for whole of District Una, however before grant of any mineral concession in a particular river/stream bed, the guidelines contained in River/Stream bed mining policy are to be followed in addition to site specific conditions as specified by the Joint Inspection Committee and recommendation thereof. In the ibid Policy Guidelines, the following general conditions are mentioned.

- No River/Stream bed mining shall be allowed without the recommendations of the Sub-Divisional Level Committee.
- No River/Stream bed mining shall be allowed without getting clearance under Forest
- Conservation Act, 1980 if the area attracts the provisions of FCA,1980.
- No River/Stream bed mining shall be allowed within 75 meters from the periphery of soil conservation works, nursery plantation, check dams or within the distance as recommended by the Sub-Divisional Committee, which ever is more.
- No River/Stream bed mining shall be allowed within 1/5th of its span or 5 meters from the bank or as specified by the Sub-Divisional Committee which ever is more.
- No River/Stream bed mining shall be allowed within 200 meters U/S and D/S of Water Supply Scheme or the distance as specified by the Sub- Divisional Committee which ever is more.
- No River/Stream bed mining shall be allowed within 200 meters U/S and 200 to 500 mts D/S of bridges depending upon the site-specific conditions.
- No approach road from PWD road shall be allowed to River/Stream beds mining unless lessee/contractor obtains written permission from XEN PWD for making road leading to all intake places from the PWD Roads.
- Mechanical mining through mechanical excavator including any other earth moving machines like JCB, Bouldozer, Pocklain, Loders etc. shall be carried out in river or stream Bed by the lease holder or permit holder or contractor after obtaining permission from competent authority.
- No boulder/cobbles/hand broken road ballast shall be allowed to be transported outside the State from River/Stream beds, to reduce pressure on the River/Stream beds.
- Depth of mining in river bed will be undertaken as per the provisions of mineral policy 2024. Presently mineral has been calculated up to a depth of one meter only , however if the extraction of mineral is allowed up to depth of three meters or more the production of mineral calculated in the DSR shall also be increased twice or thrice depending upon the mining depth allowed.
- Every leaseholder shall supply in advance the Registration Nos of vehicles engaged in transportation of mineral from mining area to his industrial unit. This would ensure the checking of illegal vehicles carrying minerals.

- Every lessee/contractor shall ensure that his labour does not involve fish poaching.
- No blasting shall be allowed in river/stream beds.

Presently the mineral reserves have been calculated only upto a depth of 1.00 metre. Since, there are so many portions in the river beds such as channel bars, point bars and central islands, where the annual deposition is raising the level of river bed thus causing catastrophic conditions especially during the rainy seasons by shifting the rivers towards banks resuting in to cutting of banks. Therefore, removal of material at such locations upto the bed level or up to 3.00 metre depth as per the provisions of mining rules, is essential to control the river flow in its central part and to check the bank cutting. In such a manner, the mineral potential presently calculated only up to one meter depth will certainly be increased twice or thrice as per the depth allowed for mining in the area. While, calculating the mineral potentials, the mineral deposits lying in the sub-tributaries, of that particular stream/river has not been taken into consideration. Since, these tributaries are also adding the mineral deposits annually and especially during the rainy season in to the main river, as such, the mineral deposits and annual replenishment which has been calculated presently will be much more. Further the Survey of India Topo-Sheets has been used as base map to know the extent of river courses.

PART B:
MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING:

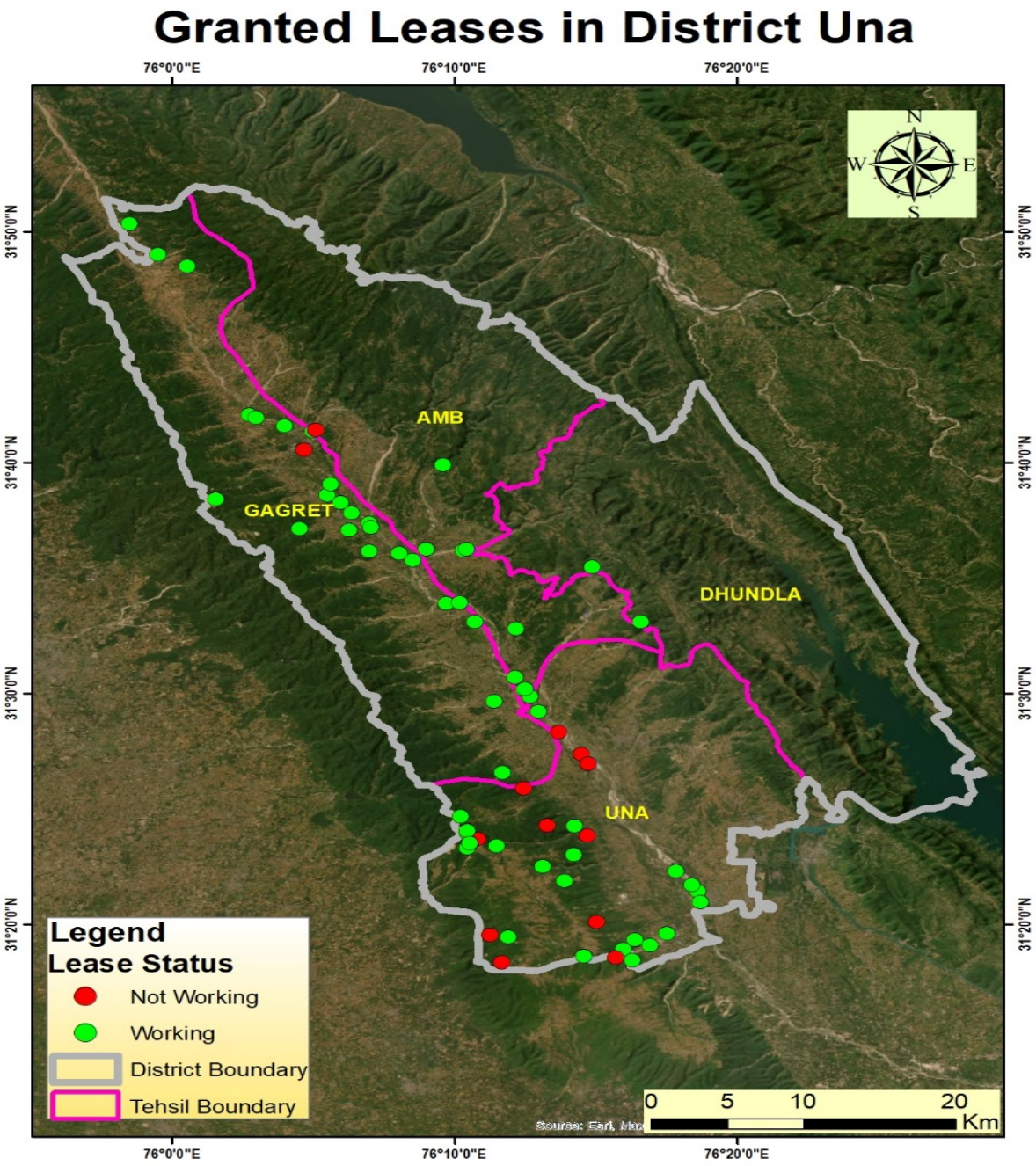
15 INTRODUCTION:

It is important to mention here that, whenever, any of the area is applied by any of the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Disisional Officer(C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations as per the provisions of Mining Rules. Accordingly, as per the recommendations of the joint inspection committees, letter of Intents are issued to the applicants by the Competent Authorites for completion of other codal formalities required under law. After the issuance of the Letter of Intent the mineral concession holder has to prepare the detailed "Mining Plan" for the allotted area through Registered Qualified Person which is further required to be approved from authorized officer of Geological Wing of the State Government. The comprehensive mining plan are prepared by RQP wherein, details of mineral reserves, method of mining, progressive mine closure plan, extent of proposed mining, impact of Environment due to mining and its remedial mitigation and other related details with respect to use of the mineral are required to be furnished. As such, the microlevel, site specific study of the area comprising the probable and provable mineral reserve deposition at the particular site is conducted before the grant of mining lease.

Overview of Mining Activity in District Una:

As stated earlier, occurrence of a number of economic rocks are found in the district but except minor minerals like Sand, Stone, sillca sand and Bajri none have commercial significance in the district. In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds. The demand of sand is mainly met through by river borne sand whereas the demand of bajri/grit is either met through river borne collection or through manufactured grit by stone crushers. The demand of dressed or undressed stone is met from the hill slopes. Almost all of the mineral concessions which have been granted for the extraction of sand, stone, Bajri are type of an open cast of mining and are limited in aerial extent.

16 MINING LEASES MARKED ON THE MAP OF THE DISTRICT



17 DRAINAGE AND IRRIGATION PATTERN

As mentioned earlier the district is located in the sub-mountanious Shiwalik Hill Zone. The area displays a highly dissected topography carved by the numerous seasonal streams flowing from the hills to the main river Soan and Lunkhar Khad (now part of Govind Sagar). The general slope of the district is from Northwest to Southeast that is the direction of flow of river Soan and Lunkhar Khad. But at the sub-regional level the district can be divided into four slope facets on the basis of slope aspect, which are at right angle

to the regional slope of the area. Two of these slope facets on either side of river Soan dips towards the river and the other two similarly dips towards Lunkhar Khad from either side. The slope gradient in most of the district is less than 10 metres per km. it is between 10-20 metres in the hilly areas with elevation more than 600 metres. rrigation is the most important element of infrastructure for the development of agriculture. It is estimated that the irrigation potential of the state is only 3.35 lakh hectares which is 57.5 per cent of the total cultivable area. Out of the total irrigated area of 3.35 lakh hectares, 0.50 lakh hectares (14.9 per cent) can 35 be irrigated through major and medium irrigation projects and rest 2.85 lakh hectares (85.1 per cent) through minor irrigation schemes. The total irrigated area in Una district is 8556 hects which accounts for about 23.2 per cent of the net area sown against the state average of around 21 per cent as irrigated. The major sources of irrigation in the district include tanks, tubewells, and wells, lift irrigation, flow irrigation etc. Out of these sources, the highest area is irrigated by tubewells followed by lift irrigation.

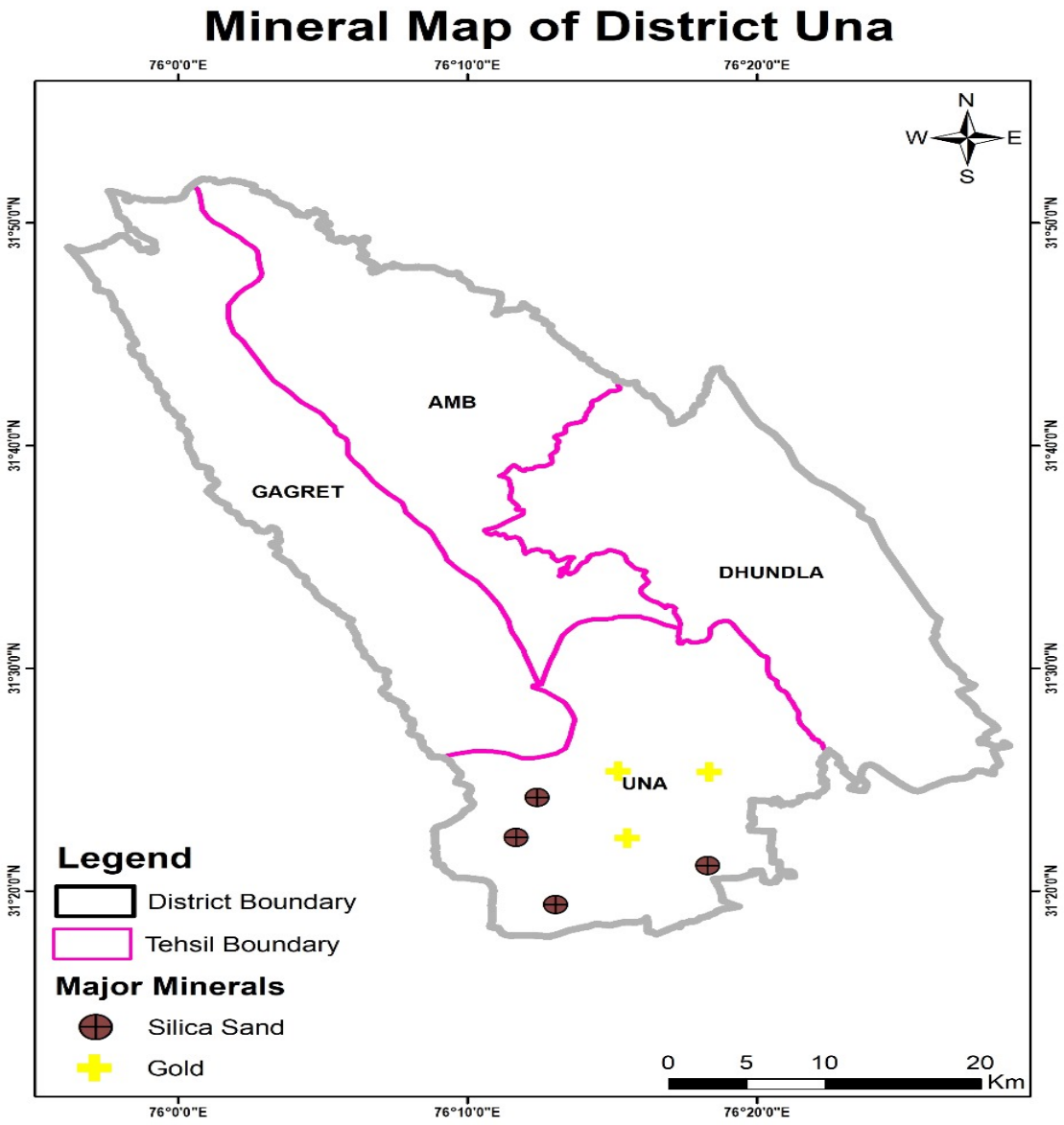
Use of mineral

As stated earlier, occurrence a number of economic rocks are found in the district but except minor minerals like Sand, Stone, Bajri and to some extent, silica Sand, none have commercial significance in the district. Sand, stone and bajri are being used as constructin material.

18 QUALITY /GRADE OF MINERAL AVAILABLE IN DISTRICT.

The rock types commonly seen in the district are shale, clay and sandstones, of Shivalik formations. Glass sand deposits in the form of quartzite pebbles and cobbles in the gravel bed occur along the upper stretch of Jaijo- *Khad*. The pebbles and cobbles of the size of 5-15cm are predominate in the area. The analytical results have indicated that the pure white quartzite pebbles and boulders (Grade 'A') contain on an average 97.44% SiO2 and 0.22% Fe2O3 and those with greenish and greyish tinge (Grade 'B') contains 95.7% SiO2 and 0.59% Fe2O3. In Bathri village (31°18'30": 76°17'30"), a gravel bed containing glass sand yielding quartzite pebbles, cobbles and boulders of Grade 'A', 'B' and 'C' is exposed along the Garhshankar-Nangal road. The glass sand of the above deposits can be used for the manufacture of ordinary glass. However, minor mineral like sand stone and bajri all of the mineral concessions which have been granted for the extraction of sand, stone, Bajri are type of an open cast of mining and are limited in aerial extent.

19 MINERAL MAP OF THE DISTRICT.



20 DEMAND AND SUPPLY OF THE MINERAL IN THE LAST THREE YEARS:

Mainly three types of minor mineral constituents such as sand stone and bajri are the main constituents required for the moderen construction/developmental activities apart from other material like cement and steel. With the increase in the developmental activities in the State as well as in the district the demand of minor mineral in the district started an increasing trend. The The production of mineral since 2020-21 onwards is tabulated in the following table.

Sr No.	Year	Production of mineral (Approx.) (in Metric tonnes)	Demand of mineral
3.	2020-21	29,40,696	Most of the mining leases granted in District Una are situated in the Private lands and the demand of mineral depends upon the
4.	2021-22	20,23,662	
5.	2022-2023	37,84,834	

			development activities which varies from time to time.

Impact on the Environment due to Mining Activity

Mining in District Una is restricted only to the extraction/collection of minor minerals such as sand, stone, bajri and Sillica sand to some extent. This type of mining is done by adopting the open cast scheme of mining in the sanctioned lease areas as per the perception of the mining plan. The mining lease areas are predominantly barren and no any type of blasting material is required for such type of mining. The major contributors of pollution in such type of open cast mining are excavation, loading, transportation, and generation of dust which leads only to momentary rise in the suspended particulate matter (SPM). Though there is no large-scale impact of opencast mining on the Environment, however, obtaining Environment Clearance for grant of any type of mining lease has been made mandatory in the Rules.

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

As stated earlier, the mining activities in the district are predominantly carried out in barren areas and no any type of blasting material is required for such type of mining. As such there is hardly any impact on Environment other than dust emissions to a smaller extent. Such types of dust emmissions can be controlled by sprinkling water on the working face of mine so that the dust is suppressed. Moreover, to mitigate the impact of mining on the Environment, if any, the mining lease holder has to get approved the Environment clearece as well as mining plan of the area prior to mining wherein adequate procedure for prevention of Environment degradation is prescrived.

22 RECLAMATION OF MINED OUT AREA AND DISASTER MANAGEMENT PLAN.

For the development and conservation of minerals in the State, it has been provided under Rule 35(1) of Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining Transportation and Storage) Rules, 2015 that “No mining lease or contract shall be granted in the State of Himachal Pradesh, unless there is a mining plan approved from the Competent Authority. As such, prior to mining, the mining lease holder has to get approved the mining plan of the area. The said mining plan is required to be prepared in accordance with Form “M” appended with the said Rules wherein sufficient provisions for the reclamation of mined out area as well as management planning is prescribed as per the site-specific conditions.

23 DETAIL OF LETTER OF INTENT ISSUED IN DISTRICT UNA.

Following no. of Letter of intens has been issued in the district, however all of them may not get matured due the bindings of various conditions imposed in the LOI.

Sr. No.	Name & address of mining lease.	Area	River bed/ hill slope	Purpose of lease free sale/ stone crusher
1	Smt Nidhi Kuthiala Prop. M/s Maan Naina Devi Stone Crusher, VPO Palkwah Tehsil Haroli Distt. Una.	04-04-04	River Bed	Stone Crusher
2	M/s Rudra Stone Crusher Prop.Sh Raman Kumar S/o Dharam Pal V P O Ispur Tehsil Haroli Distt. Una.	04-81-31	River Bed	Stone Crusher
3	Smt. Ambika D/o Sh Prem Chand Prop. M/s Sarswati Stone Crusher & Screening Unit, Vivek Nagar, Pirnigah Road, Tehsil & Distt.	04-08-53	River Bed	Stone Crusher

	Una.			
4	M/s Him Stone Crusher V P O Maidangarh Tehsil Amb Distt. Una	14-61-59	River Bd	Stone Crusher
5	M/s Mahavir Sto Crusher V P O Takarla Tehsil Amb Distt. Una	3-02-42	River Bed	Stone Crusher
6	M/s Vipasha Stone Crusher Partner. Sh Amit Kumar and Surinder Sharma V P O Ambota Tehsil Amb Disst. Una	3-28-21	River Bed	Stone Crusher
7	M/s Jagdambay Stone Crusher & Screening Plant V P O Gondpur Jai chand Tehsil Haroli Disst Una	2-75-53	Hill Slope	Stone Crusher
8	M/s Nav Durga Stone Crusher .Prop. Sh Manjit Singh V. Bangarh P O Jakhera Tehsil & Disst Una	01-99-88	Hill Slope	Stone Crusher
9	Smt. Vinita Prop. M/s Sai Stone Crusher V Bhadiaran P O Dulehar Tesil Haroli Disst. Una	04-93-37	Hill Slope	Stone Crusher
10	M/s AAR-ESS Stone Crusher V P O Kutharbeet Tehsil Haroli Disst Una	04-45-08	Hill Slope	Stone Crusher
11	M/s Him Stoe Crusher V P O Maidangarh Tehsil Amb Disst. Una	04-82-67	River Bed	Stone Crusher
12	M/s Matri Stone Crusher V Batoli Tehsil & Disst. Una	04-75-67	River Bed	Stone Crusher
13	M/s Himachal Crushing Co. Partner. Sh Rajinder Gupta V P O Gondpur Jaichand Tehsil Haroli Disst Una	01-46-20	Hill Slope	Stone Crusher
14	Sh Nand Kishore S/o Late Sh Ved Brat V P O Guglehar Tehsil Amb Disst. Una	00-81-31	River Bed	Open Sale
15	Sh Raman Kumar S/o Sh Dharm Pal V P O Isour Tehsil & disst. Una	03-31-57	River Bed	Open Sale
16	Sh Ran Vijay S/o Sh Des Raj V P O Nangran Tesil & Disst. Una	02-84-13	River Bed	Open Sale
17	Sh Sanjeev Thakur S/o Sh Kaman Singh R/O Mohalla Gopal Nagar Rampur Road, Tehsil & Disst. Una	03-38-90	River Bed	Open Sale
18	Sh Tajinder Singh S/o Sh Ghanda Singh	03-10-01	River Bed	Open Sale
19	Sh Mohan Lal S/o Gurbachan Lal V P O bathu Tehsil h Haroli Disst Una	01-98-97	River Bed	Open Sale
20	Sh Dalbir Singh S/o Rulia Ram V P O Bathri Tehsil Haroli Disst una	01-81-91	River Bed	Open Sale
21	Sh Som Nath S/o Sh Yog Raj V P O upper Basal Tehsil & Disst Una	03-47-69	River Bed	Open Sale
22	Sh Vijay Kumar S/o Sh magat Ram V P O Charatgarh Tehsil & Disst Una	03-99-79	River Bed	Open Sale
23	Sh Kapil Sharma Partner. M/s Shree Rudra Stone Crusher & Screening Plant V P O Oel Tehsil Amb Disst. Una	02-95-63	River Bed	Stone Crusher
24	Sh Malkiat Singh and Rajan Raizada S/o Late Sh Joginder Singh V Lal Singi P O Rainsri Tehsil & Disst Una	114 Kanal	River Bed	Open Sale
25	M/s Luxmi Stone Crusher V P O Thathal (Ram Nagar) Tehsil Amb Disst Una	18-11-31	River Bed	Stone Crusher
26	Smt Vinita Kumar Prop. M/s Building Stretch Crushing Zone V P O Pubowal Tehsil Haroli Disst. Una	03-66-46	Hill Slope	Stone Crusher
27	Sh Rajender Singh S/o Late Sh Kashmir Singh	02-43-18	River Bed	Stone Crusher

	H . No. 118 Phese-IV ,Himuda Colony Rakker Una			
28	Sh Rajender Singh S/o Late Sh Kashmir Singh H . No. 118 Phese-IV ,Himuda Colony Rakker Una	02-53-25	River Bed	Stone Crusher
29	Sh Kashmiri Lal S/o Dasu Ram V P O Palkwah Tehsil Haroli Disst. Una	03-50-01	River Bed	Open Sale
30	Sh Rajan Kumar S/o Sh Ved Parkash V P O Saloh Tehsil Haroli Disst. Una	03-36-41	River Bed	Open Sale
31	Sh Ajay Sharma S/o Sh Prem Chand V Kalehra P O Kungrat Tehsil Haroli Disst. Una	03-12-51	River Bed	Open Sale
32	M/s Bharat Stone Crusher V P O Mawa Sindhian Tehsil Amb Disst. Una	04-49-31	River Bed	Stone Crusher
33	Himachal Crushing Co. Partner. Sh Rajender Gupta & Sh Yashpal Goel V P O Gondpur Jaichand Tehsil Haroli Disst. Una	04-95-70	River Bed	Stone Crusher
34	Sh Ajender Singh Bharti S/o Sh Ram Pal Singh V P O Oel Tehsil Amb Disst Una	03-55-11	River Bed	Stone Crusher
35	Sh Anil Kumar S/o SH Mohan Lal Prop. Jagdambey Stone Crusher & Screening Plant V P O Badsala Tehsil & Disst Una	04-83-50	River Bed	Stone Crusher
36	Sh Kapil Sharma S/o Sh Sansar Chand Partner. M/s Shree Rudra Stone Crusher V P O Oel Tehsil Amb Disst. Una	01-39-45	River Bed	Open Sale
37	Sh Kapil Sharma Prop. M/s Shree Shree Rudra Stone Crusher & Screening Plat V P O Basal Tehsil & Disst. Una	02-99-25	River Bed	Stone Crusher
38	Sh Pink Raj S/o ShKamal Dev V P O Santoshgarh Tehsil & Disst. Una	03-93-44	River Bed	Open Sale
39	Sh Raj Kumar S/o Sh Sansar Chand V P O Bathu Tehsil Haroli Disst Una	01-15-93	River Bed	Open sale
40	Sh Rajiv Kumar S/o Dhayan Singh V P O Basal Tehsil & Disst Una	03-81-48	River Bed	Open sale
41	Sh Rajender Singh Prop. M/s Thakur Enterprises Unit II V P O Kuthiari Tehsil Amb Disst. Una	04-54-70	River Bed	Stone Crusher
42	Sh Ram Pal S/o Sh Balbeer Singh V P O Bathri Tehsil Haroli Disst. Una	02-86-62	River Bed	Open Sale
43	M/s J B B Stone Crusher & Screening Plant Prop.Sh Madan Jaswal V P O Jadla Koeri Tesil Amb Disst Una	04-61-12	River Bed	Stone Crusher
44	M/s Bala ji Stone Crusher & Screening Plant . Partner. Sh Sanjeev Saini & Yogesh Aeri V P O basal Tehsil & Disst. Una	13-49-47	River Bed	Stoe Crusher
45	Sh Sumit Kumar Sharma S/o Sh Harish Kumar Sharma V P O Basal Tehsil & Disst. Una	02-98-59	River Bed	Open Sale
46	Sh Durjodhan Singh S/o Sh Gian Chand V P O Nagnoli Tehsil & Disst. Una	02-03-21	River Bed	Opan Sale
47	Sh Ashwani Kumar S/o Nand Kishore R/o V Nurpur Tehsil Anandpur Sahib Disst. Roper .Punjab	02-17-83	River Bed	Open Sale
48	M/s RSB Project Ltd. Sh Dinesh Gupta, Genral manager /SPA of the Company, A-34 Okhla Industrial Area Phese-1 New Dehli Working Site IOCL Petroleum Storege Depot V	00-92-58	Hill Slope	Ordinary Clay

	Pekhubela Tehsil & Disst, Una			
49	Sh Udham Singh S/o Sh Kirpa Ram V Salah P O Dangehar Tehsil Baroh Disst. Una	01-98-98	River Bed	Open Sale
50	Sh Susheel Kumar S/o Sh Purshotam Lal V P O Bathri Tehsil Haroli Disst. Una	01-27-89	River Bed	Open Sale
51	M/S Nanika Stone Crusher Prop.Sh Vishwajeet Singh,VPO Kadh ,Teh Ghanari,Distt.Una HP.	02-37-70	River Bed	Sand,sto ne bajri
52	M/S GVG Minng through its partner Sh .Gurdial Singh VPO Kangar ,Teh Haroli Distt.UNA ,HP	04-81-22 Hects (Private Land)	River Bed	Open Sale sand , stone & bajri
53	Sh. Lakhwinder Singh S/o .Jagmail Singh, HIG-824,Phase-11, Mohali (Punjab)	03-89-94 hectares (Hill Slope,Private Land)	Hill Slope	Sand,Stone & Bajri
54	Sh. Lakhwinder Singh S/o .Jagmail Singh, HIG-824,Phase-11, Mohali (Punjab)	5-05-47	Hill Slope	Stone Crusher
55	M/s RSB Project Ltd. Sh Dinesh Gupta, Genral manager /SPA of the Company, A-34 Okhla Industrial Area Phese-1 New Dehli Working Site IOCL Petroleum Storege Depot V Pekhubela Tehsil & Disst, Una	02-38-00	Hill Slope	Ordinary Clay
56	Sh Sandan Sharma Prop. Mahadev Stone crusher V P O Bathri Tehsil Haroli Disst. Una	04-61-11	Hill Slope	Stone Crusher
57	Sh Satish Kumar Sharma S/o Sh Parkash Chand Prop. H S D Stone Crusher V P O Charuru Tehsil Amb Disst. Una	03-08-2011	River Bed	Stone Crusher
58	Sh Udham Singh S/o Kirpa Ram V Salah P O Dangehar Tehsil Baroh Disst. Kangra.	04-83-90	River Bed	Open Sale
59	Smt Suman Khanna W/o Sh Rajesh Khanna H. No. B6/225 , Satgur Nagar Nawashahar (Punjab)	01-28-04	Hill Slope	Stone Crusher
60	Sh Rajiv Kumar S/o Sh Nardev Singh V P O Jalgran Tabba Tehsil & Disst Una	70-04, Kanal	River Bed	Open Sale
61	M/s Shiva Stone Crusher, Prop. Sh. Rakesh Goel V P O Dhamandri Tehsil & Disst. Una	02-94-14	River Bed / Hill Slope	Stone Crusher
62	Sh Ravinder Kumar S/o Sh Parmeshwar Nand V P O Santoshgarh Tehsil & Disst. Una	02-10-65	River Bed	Open Sale
63	Sh. Anuj Chhabra Bhakra Stone Crusher ,Vill. Gondpur Bulla .Teh & Distt Una ,H.P.	03-96-45 Hects (Private Land)	Hill Slope	Sand Stone& Bajri
64	Sh. Umesh Kumar S/O Sh. Ravinder Kumar VPO Santoshgrah. Teh & Distt. Una H.P.	3-35-15 Hects	River Bed	Sand,& B ajri
65	Sh. Anuj Chhabra S/o Sh. S.K. Chhabra , 152-153 Phase-1 B, Shivalik Avenue Naya Nangal, Distt.Roper (Panjab)	65-14 kanal (Private Land)	River Bed	Sand,& Bajri
66	Sh. Suraj Parkash s/o Smt. Gayatri Devi ,Village Nelha , Teh Naina Devi, Distric Bilaspur ,H,P,	02-66-72 Hects (Private Land , Hill Slope)	Hill Slope	Sand,& Stone Bajri
67	Sh Rajiv Kumar S/o h Dhyan Singh Prop. M/s Shree Rudra Stone Crusher & Screening Plant, V P O Upper Basal Tehsil &Disst. Una	02-67-50	River Bed	Stone crusher
68	M/s Katyani Stone Crusher Partner. Sh Balraj Singh V P O bhadauri Tehsil Haroli Disst. Una	11-91-16	Hill Slope	Stone Crusher

69	Sh. Sarvan Singh S/o Late Sh Nathu Ram V P O Sainsowal Tehsil Haroli Disst Una	02-62-50	River Bed	Open Sale
70	Sh. Rakesh Kumar S/o Sh Piare lal	01-40-62	River Bed	Open Sale
71	Sh. Manav Khanna S/o Late Sh Kapil Mohan	01-39-00	River Bed	Open Sale
72	Sh. Kushal Singh S/o Sh Basanta Singh	4-88-02	Hill Slope	Stone Crusher
73	Sh Rakesh Chander Gupta M/s Balaji Brick Kiln Traders V P O Badsala	1-03-98	Hill Slope	Brick Kiln
74	Harjinder Singh M/s Vinod & Sons Brick Udyog Lower Bhanjhal Tehsil Amb Disst. Una	0-69-05	Hill Slope	Brick Kiln
75	M/s Lakhwinder Singh Stone Crusher V P O Gondpur Bulla Tehsil Haroli Disst Una	4-80-63	Hill Slope	Stone Crusher
76	M/s Lakhwinder Singh Stone Crusher V P O Kungrat	13-57-15	Hill Slope	Stone Crusher
77	Smt. Ranjana Devi Prop. M/s jai Bhawani Brick Industry V P O dangoh Tehsil Amb Disst. Una	00-89-20	Hill Slope	Brick Kiln
78	Smt. Rakha Joshi Prop. M/s Kiran brick Kiln V P O badehra Tehsil Haroli Disst Una	33-03 , Kanal	Hill Slope	Brick Earth
79	Sh Rakesh Chander Gupta Prop. M/s Ganpati Brick Kiln Traders V P O Barnoh Tehsil & Disst. Una	01-29-38	Hill Slope	Brick Earth
80	M/s mahavir Stone crusher Sh Satish Kumar & Sh Kamal Kumar V P O Takarla Tehsil Amb Disst. Una	03-72-96	River Bed	Stone Crusher
81	M/s S S Stone Crusher & Screening plant Prop. Manjit Singh V Halehra P O Heeran Tehsil Haroli Disst. Una	3-28-21	Hill Slope	Stone Crusher
82	M/s Sri Shakti Stone Crusher Partner. Sh Ashoke Kumar V Nanowal P O Malewal Tehsil Balachor Disst. SBS Nagar (Punjab)	1-30-79	Hill Slope	Stone Crusher
83	Sh Sunil Kumar V P O Lower Badehra Tehsil Haroli Disst. Una	37-02 Kanal	River Bed	Open Sale
84	Sh Parveen Kumar V P O Charatgarh Tehsil & Disst. Una	1-79-70	River Bed	Open Sale
85	Smt Surinder kaur D/o Sh Kartar Singh V P O Rora Baliwal Tehsil Haroli Disst. Una	1-24-79	River Bed	Open Sale
86	Sh Rubby Kumar S/o Sh Avtar Singh V P O Deoli Tehsil Ghanari Disst. Una	4-12-91	River Bed	Stone Crusher
87	M/s Krishana Stone Crusher Partner. Sh. Arun Kumar & Naresh Kumar V Tatehra P O Oel Tehsil Ghanari Disst. Una	1-69-23	Hill Slope	Stone Crusher
88	Kanwar Sandeep Singh C/O Sh Narinder Kumar Jaswal V Dangoh Khas Tehsil Ghanari Disst. Una	4-12-99	River Bed	Stone Crusher
89	Smt Aradhna Devi W/o Sh Surinder Pal V P O Agampur Tesil Aandpur Sahib Disst. Ropar (PUNJAB)	4-34-63	Hill Slope	Stone Crusher
90	Sh Deepak Kumar S/o Sh Chet Ram, H. NO. ews 174 Rakkar Colony Una Tehsil & Disst. Una	01-29-51	River Bed	Open Sale
91	M/s Krishana Stone Crusher Partner. Arun Kumar & Naresh Kumar V Tatehra P O Oel Tehsil Ghanari Disst. Una	02-94-70	River Bed	Stone Crusher
92	Subhash Chand Gautam M/s Jagtambay Brick Kiln TCS Company Operative Industrial	02-07-90	Brick Earth	Brick Kiln

	Society LTD Jatpur Santoshgarh			
93	Sh. Naresh Kumar M/s Vashishth Industry VPO Behdala Distt. Una	01-04-57	Brick Earth	Brick Kiln
94	Sh Kulbhushan rana S/o Sh Kuldeep Rana V P O Nangal Khurd Tehsil Haroli District Una	1-86-78	River bed	Opan Sale
95	Sh Rajesh Kumar S/o Avtar Nath V P O Santoshgarh Tehsil & District Una	1-89-04	River bed	Opan Sale
96	Sh Kapil Sharma S/o Sansar Chand Partner M/S Shree Rudra Stone Crusher & screening Plant V P O Oel Tehsil Amb District Una	4-87-72	River bed	Stone Crusher
97	Sh Vinod Kumar S/o Sh Bijai Singh V P O Kadh Tehsil Ghanari District Una	2-00-03	River bed	Open Sale
98	Sh Ravinder Kumar M/s Sarswati Stone Crusher & Screening Plant VPO Basal	02-93-51	River Bed	Stone Crusher
99	Raman Kapoor M/s Jai Shankar Stone Crusher VPO Chandpur	02-76-30	Hill Slope	Stone Crusher
100	Naresh Kumar M/s NKV Brick Kiln VPO Jankaur	01-50-00	Hill Slope	Brick Kiln
101	Ravinder Kumar Prop. M/s Jagdambay Stone Crusher & Screening Plant VPO Ghaluwal	02-89-02	River Bed	Stone Crusher
102	Sh Satveer Singh S/o Sh Bikram Singh V P O Bhadauri Tehsil Haroli District Una	3-52-37	River bed	Open sale
103	Sh Dev Raj Sharma S/o Sh Shaligram Village Badwal P O Booni Tehsil Nadaun Distict Hamirpur	2-16-18	River bed	Open Sale
104	Sh Ashok Thakur S/o Sh Kaman Singh Ward No 10 Gopal Nagar Una Rampur Road Una	1-95-21	River bed	Open Sale
105	Sh Bahadur Singh S/o Sh Didar Singh Prop: M/S A& N Stone Crusher & Secreening Plant V P O Mohalla Galua Tehsil & District Una	2-25-47 Hact.	River Bed	Stone Crusher
106	Sh Rajinder Singh S/oSh Kashmir Singh Prop:M/s Thakur Enterprises Unit- IV ,H .No.118, Phase-4 , Himuda Colony Rakkar,Tehsil & District Una	2-95-10 Hact	River Bed	Stone Crusher
107	Sh Lakhwinder Singh S/o Jagmail Singh, HIG-824, Phase –II,Mohali Punjab	07-21-35 Hact	Hil Slope	Stone Crusher
108	M/s JMB Associates ,Prop:Sh Yogesh Aeri ,V PO Ghaluwal Tehsil Haroli District Una	2-50-18 Hact	River Bed	Stone Crusher
109	Ram Parkash S/o Amar Nath Prop: M/s Mahesh Stone Crusher V P O Karluhi Tehsil Amb District Una	6-52-21 Hact	River Bed	Stone Crusher
110	Sh Manjeet Singh S/o Punjab Singh Prop: M/s. S S Stone Crusher V Haleran P O Heeran Tehsil Haroli District Una	04-26-01 Hect.	Hil Slope	Stone Crusher
111	Sh Manjeet Singh S/o Punjab Singh Prop: M/s. S S Stone Crusher V Haleran P O Heeran Tehsil Haroli District Una	3-52-62 Hect.	Hill Slope	Stone Crusher
112	Ashok Kumar S/o Husan Lal Prop: M/s Shekhari Stone Crusher VPO Gondpur Iaichand Nichla Tehsil Haroli District Una	03-77-15 Hect.	River Bed	Stone Crusher
113	Sh Bhadur Singh S/o Didar Singh Prop: M/S Mahadev Stone Crusher V P O Nangal Khurad Tehsil Haroli District Una	1-36-30 Hact	Hill Slope	Stone Crusher
114	Smt. Ambika Prashar W/o Sh. Abhey Parashar	01-48-21 Hect.	Hill Slope	Stone Crusher

	Prop. M/s Sarswati Stone Crusher & Screening Plant VPO Basal Tehsil & Distt. Una HP			
115	Sh. Kapil Sharma Prop. M/s Shree Shree Rudra Stone Crusher VPO Dharampur Tehsil Haroli Distt. Una HP	02-93-58 Hect.	Hill Slope	Stone Crusher
116	Sh. Bahadur Singh S/o sh. Didar Singh Prop. M/s Mahadev Stone Crusher VPO Nangal Khurd Tehsil Haroli District Una HP	02-90-78 Hect.	Hill Slope	Stone Crusher
117	Sh. Hitesh Kumar Prop. M/s AAR ESS Stone Crusher VPO Gondpur Bulla Tehsil Haroli Distt. Una HP	04-10-69 Hect.	Hill Slope	Stone Crusher
118	M/s Om Stone Crusher Prop. Smt. Sudershana Rani Sharma H. No.249, Giani zail Singh Nagar Roper (Punjab)	04-27-75 Hect.	Hill Slope	Stone Crusher
119	M/s Matri Stone Crusher V P O Basal Tehsil & District Una	00-39-16Hact	Hill Slope	Stone Crusher
120	M/s Luxmi Stone Crusher Partner Sh Kamal Dev Sharma & Smt Tripta Sharma V P O Thathal Tehsil Amb District Una	5-93-07 Hact	River Bed	Stone Crusher
121	Sh Kapil Sharma S/o Sansar Chand (GPA) Partner M/s Shree Rudra Stone Crusher V P O Oel Tehsil Ghanari Distrct Una	2-20-22 Hact	River Bed	Stone Crusher
122	Sh Lakhwinder Singh R/o Flat No 824 HIG Phase-2 Mohali Punjab Prop: M/s Lakhwinder Singh Stone Crusher Unit I	5-18-46 Hact	Hill Slope	Stone Crusher
123	Sh. Ravinder Kumar S/o Sh Karam Singh Prop. M/s Sarswati Stone Crusher and Screening Unit VPO Haroli	01-90-71 Hect.	Hill Slope	Stone Crusher
124	Sh Anuj Chhabra Prop: M/s Bhakhra Stone Crusher V Gondpur Bulla P O Dulehar Tehsil Haroli District Una	4-42-38 hact	Hill slope	Stone Crusher
125	Sh Vishal Sharma S/o Shehdev Sharma Partner M/s Him Stone Crusher Village Maidangarh P O Pirthipur Tehsil Ghanari District Una	2-30-41 Hact	Hill slope	Stone Crusher
126	Sh Raman Kumar S/o Dharam Pal Prop: M/s Rudra Stone Crusher V PO Basal Tehsil & District Una	1-77-80 Hact	Hill slope	Stone Crusher
127	Sh Raman Kumar S/o Dharam Pal Prop: Rudra Stone Crusher V P O Basal Tehsil & District Una	2-85-69 Hact	River Bed	Stone Crusher
128	Sh Ajender Singh Bharti Prop: M/s Ganpati Stone Crusher V P O Oel Tehsil Ghanari District Una	2-77-82 Hact	River bed	Stone Crusher
129	Sh Rajan Sharma Prop: Sultan Stone Crusher (old name GPA M/s AAR ESS Grit V P O Kutharbeet Tehsil Haroli District Una	7-34-16 Hact	Hill Slope	Stone Crusher
130	Sh Ruby Kumar S/o Sh Avtar Singh Prop:M/s Maa Chintpurni Stone Crusher &Screening Plant V P O Deoli Tehsil Ghanari District Una	2-71-96 Hact	River Bed	Stone Crusher
131	Sh Ravinder Kumar S/o Sh Karam Singh Prop: M?s Jagdambey Stone Crusher & Screening Unit V P O Ghaluwal Tehsil Haroli District Una	2-82-77 Hact	Hill Slope	Stone Crusher
132	Sh Tarun Sharma S/o Ashok Kumar Prop: M/s	2-10-07 Hact	River Bed	Stone Crusher

	Shree Ganga Stone Crusher & Screening Unit V P O Upper Basal Tehsil & district Una			
133	Lakhwinder Singh Stone Crusher & Screening Plant Unit :III V P O Gondpur Bulla Tehsil Haroli District Una	3-84-11 Hact	Hill Slope	Stone Crusher
134	Lakhwinder Singh Stone Crusher & Screeming Plant Unit III V P O Gondpur Bulla Tehsil Haroli District Una	3-96-22 Hact	Hill Slope	Stone Crusher
135	M/s AAR ESS Stone Crusher V P O Gondpur Bulla Tehsil Haroli District Una	5-40-55 Hact	Hill Slope	Stone Crusher
136	Sh Tarun Sharma S/o Ashok Kumar Prop: M/S Shree Ganga Stone Crusher & Screening Unit V P O Upper Basal Tehsil & District Una	2-91-57 Hact	Hill Slope	Stone Crusher
137	Himachal Chemical & Silicate Works V P O Bathu Tehsil Haroli District Una	12-96-91 Hact	Hill Slope	Stone Crusher
138	Himachal Chemical & Silicate Works V P O Bathu Tehsil Haroli District Una	24-43-55 Hact	Hill Slope	Stone Crusher
139	Sudarshana Rani Prop: M/s Om Stone Crusher V P O Kutharbeet Tehsil Haroli District Una	8-15-68 Hact	Hill Slope	Stone Crusher
140	Pawan Kumar S/O Chint Ram Prop: M/S New Mahadev Stone Crusher V P O mawa Sindhian Tehsil Ghanari District Una	2-02-21 Hact	Hill Slope	Stone Crusher
141	Lakhwinder Singh Prop: Lakhwinder Singh Stone Crusher & Screening Plant Unit-I V P O Pollian Tehsil Haroli District Una	3-86-14 Hact	Hill Slope	Stone Crusher
142	Madan Jaswal Prop: M/S JBB Stone Crusher V P O Jadla Koeri Tehsil Ghanari District Una	3-16-01 Hact	River Bed	Stone Crusher
143	Lakhwinder Singh Prop: Lakhwinder Singh Stone Crusher & Screening Plant Unit III V P O Gondpur Bulla Tehsil Haroli District Una	1-93-45 Hact	Hill Slope	Stone Crusher
144	Lakhwinder Singh Prop: Lakhwinder Singh Stone Crusher & Screening Plant Unit I V P O Polian Beet Tehsil Haroli District Una	2-27-36 Hact	Hill Slope	Stone Crusher
145	Lakhwinder Singh Prop: Lakhwinder Singh Stone Crusher & Screening Plant Unit I V P O Polian Beet Tehsil Haroli District Una	1-18-94 Hact.	Hill Slope	Stone Crusher
146	Himachal Chemical & Silicate Works Partners Sh. Jasjit Singh Sidhu & Sh. Manmeet Singh Sidhu VPO Bathu Tehsil Haroli District Una HP	06-85-65 Hect.	River Bed	Stone Crusher

24 PLANTATION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT.

Specific conditions are being imposed by the state pollution control board during grant of consent to operate to the mines to develope adequate no. of plantation as per the recommendation made in the approved mining plan during operation period and closure of mining activity. Most of the mines of the district are situated in the riverbed areas and reclamation measures are been undertaken by the lease holders including plantation of local species in the peripheral safety zones of the quarries/clusters and along the the haul roads.

25 RECOMMENDATIONS

The District Survey Report of District Una has been updated by covering the mineral bearing areas after taking in to consideration all the relevant features pertaining to geology and mineral wealth in replenish-able and non-replenish-able (paleo- channels) areas of rivers/terraces, stream and other sources related with hill slopes as stated earlier. It is worthwhile to mention here that District Una is not known for large-scale minerals/ mining activities unlike other parts of the State and Country. Mostly the minor mineral such as, sand, stone, bajri are well available in various parts of the district, including private and Govt Lands. However, whenever, any of the abovesaid mineral bearing area is applied by any of the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Divisional Officer (C) comprising members from Public Works Department, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations. Thereafter, only as per the site-specific recommendations of the committee, and approval of the detailed "Mining Plan" comprising details of mineral reserves, method of mining, progressive mine closure plan, extent of proposed mining and other related details of the allotted area, the mineral concessions are granted by the Competent authorities after completion of all the codal formalites required under law.

26 MONITORING & EVALUATION

The Ministry of Environment, Forest & Climate Change has published "Enforcement & Monitoring Guidelines for Sand Mining" in the year 2020 wherein Monitoring Mechanism has been defined very specifically and recommended that a uniform monitoring mechanism is required to assess the regulatory provision in quantitative terms, with robust institutional and legal framework. Based on past experience and suggestions available, the following requirements are suggested for defining a mechanism for monitoring of mining activities which will help in identification of mining which is operating either illegally or are violating the regulatory provisions. Some suggestion will facilitate direct or indirect information to help in such an assessment.

1. All precaution shall be taken to ensure that the water stream flows unhindered and process of Natural river meandering doesn't get affected due to mining activity.
2. River mining from outside shall not affect rivers, no mining shall be permitted in an area up to a width of 100 meters from the active edge of embankments or distance prescribed by the Irrigation department.
3. The mining from the area outside river bed shall be permitted subject to the condition that a safety margin of two meters (2 m) shall be maintained above the groundwater table while undertaking mining and no mining operation shall be permissible below this level unless specific permission is obtained from the Competent Authority. Further, the mining should not exceed nine-meter (9 m) at any point in time.
4. Survey shall be carried out for identifying the stretches having habitation of freshwater turtles or turtle nesting zones. Similarly, stretches shall be identified for other species of significant importance to the river eco-system. Such stretch with adequate buffer distance shall be declared as no-mining zone and no mining shall be permitted. The regulatory authority as defined for granting Environmental Clearance, while considering the application of issuance of ToR and/or EC for the adjacent block (to non-mining zone) of mining shall take due precaution and impose requisite conditions to safeguard the interest of such species of importance.
5. District administration shall provide detailed information on its website about the sand mines in its district for public information, with an objective to extend all information in public domain so that the citizens are aware of the mining activities and can also report to the district administration on any deviation observed. Appropriate feedback and its redressal mechanism shall also be made operational. The details shall include, but not limited to, lease area, geo-coordinates of lease area and mineable area, transport routes, permitted capacity, regulatory conditions for operation including mining, environmental and social commitments etc.
6. A website needs to be maintain to track the movement of centralised sand mining and a Centralised server system should be made to manage the data related to sand mining across India.
7. The mineral concession holders shall maintain electronic weighbridges at the appropriate location identified by the district mining officer, in order to ensure that all mined minerals from that particular mine are accounted for before the material is dispatched from the mine. The weighing bridge shall have the provision of CCTV camera and all dispatch from the mine shall be accounted for.
8. The mineral movement shall be monitored and controlled through the use of transit permit with security features like printing on IBA approved MICR papers, Unique bar/QR, fugitive ink background, invisible ink mark, void pantographs and watermarks papers or through use of RFID tagged transit permits and IT /IT-enabled services. Such monitoring system shall be created and made operationalised by State Mining department and district level mining officer shall be

responsible for ensuring that all legal and operational mines are connected and providing the requisite information on the system.

9. State Government shall constitute a District Level Task Force (DLTF) under the Chairmanship of Deputy Commissioner/District Magistrate/Collector with Superintendents of Police and other related senior functionaries (District Forest Officer, District transport officer, Regional officer- SPCBs, Senior Officer of Irrigation Department, District Mining Officer) with one/two independent member nominated by the Commissioner concerned. The independent member shall be retired government officials/teacher or ex-serviceman or ex-judiciary member. The DLTF shall keep regular watch over the mining activities and movement of minerals in the district. The DLTF shall have its regular meeting, preferably every month to reconcile the information from the mining activity, and other observations made during the month and take appropriate corrective and remedial action, which may include a recommendation for revoking mining lease or environmental clearance. The DLTF may constitute an independent committee of the expert to assess the environmental or ecological damage caused due to illegal mining and recommend recovery of environmental compensation from the miner's concern. The recommendation may also include action under the provision of E(P) Act, 1986.

10. The area not identified for mining due to restriction or otherwise are also to be monitored on a regular basis by the DLTF. Any observations of mining activity from the restricted area shall be reported and corrective measures shall be initiated on an urgent basis by the DLTF.

11. The dispatch routes shall be defined in the Environmental Clearance and shall be avoided through densely habituated area and the increase in the number of vehicle movement on the road shall be in agreement with the IRC guidelines / carrying capacity of the road. The alternate and dedicated route shall be explored and preferred for movement of mining to avoid inconvenience to the local habitat. The mining production capacity, by volume/weight, shall be governed by total permissible dispatch calculated based on the carrying capacity of dispatch link roads and accordingly, the production should be regulated.

12. The movement of minerals shall be reconciled with the data collected from the mines and various Naka/check posts. Other measures may also include a general survey of the potential mineable area in the district which has not been leased/auctioned or permitted for mining due to regulatory or other reasons.

13. The location and number of check post requirement shall be reviewed by DLTF on a regular basis so that appropriate changes in location/number could be made as per the requirement. Such review shall be carried out on a regular basis for the district on inter-state boundary or district providing multiple passages between two districts of different states.

14. The district administration shall compile the information from their district of the permitted and legal mined out minerals and other details and share such information and intelligence with the officials of the adjoining district (Inter or/and Intra State) for reconciliation. The information shall include the area of operation, permissible quantity, mined out minerals (production) the permitted route etc., and other observations, especially where the mine lease boundary is congruent with the district boundary. Such coordination meeting shall be held on a quarterly basis, alternatively in two district headquarters or any other site in two districts decided mutually by the District Magistrate.

15. The in-situ and ex-situ environmental mitigative measures stipulated as EMP, CER, CSR and other environmental and safety conditions in mines including the welfare of labours shall properly reflect in the audit report.