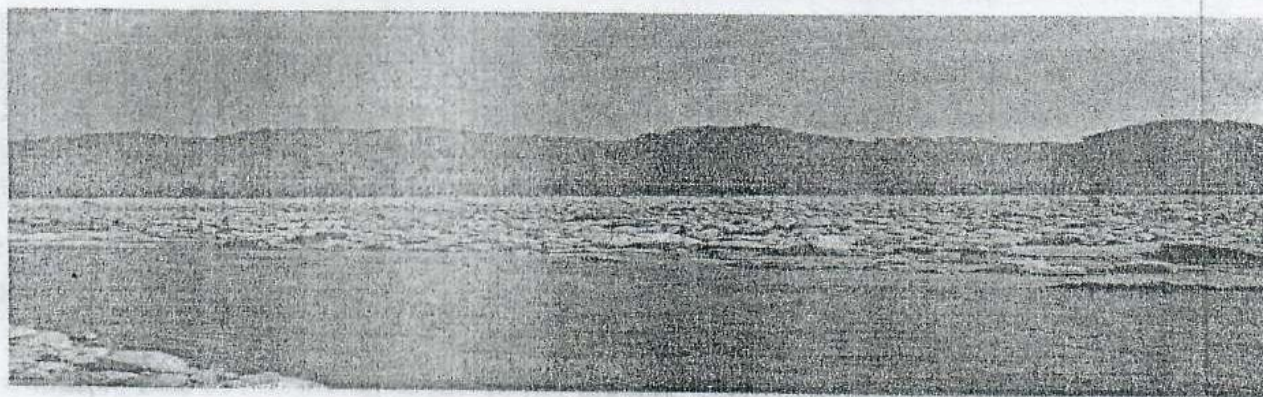
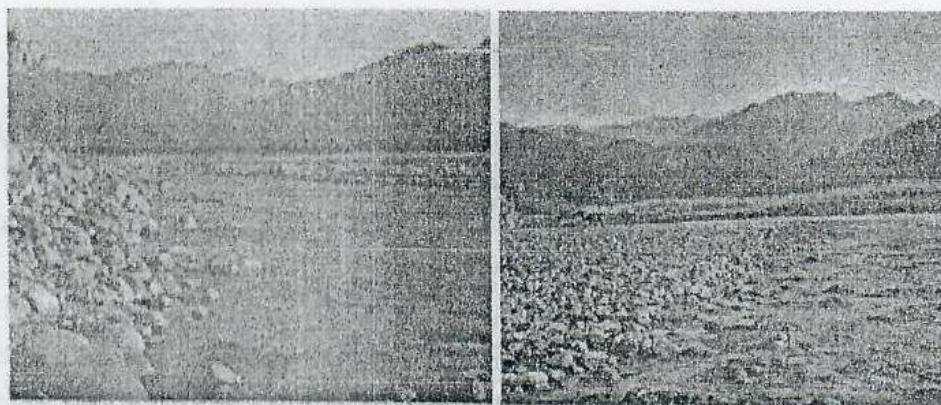


DISTRICT SURVEY REPORT

DISTRICT UDHAM SINGH NAGAR



In Compliance of Ministry of Environment, Forest and Climate Notification

dated: 25.07.2018

1. Introduction

Udham Singh Nagar District was carved out of Nainital District in October 1955 and was named after Saheed Udham Singh, a great freedom fighter, who killed General Dyer and took revenge for the Jalianwala Bagh massacre. The District is also called as the 'Gateway to Kumaon hills. There are eight Tehsils - Rudrapur, Kashipur, Khatima, Kichha, Sitarganj, Bajpur, Jaspur, Gadarpur.

There are many old monuments surviving in towns and far villages. District is fully surrounded by hills, excellent scenery and outdoor activities are also available to do. The prosperous district is endowed with a very fertile land. Agriculture is the mainstay and there are several agriculture related activities and industries located here. Udham Singh Nagar District is also noted for communal harmony and brotherhood. The District is a melting pot of different cultures, religious and life styles.

Brief History of the District

District Udham Singh Nagar was created on 29th September 1997 by carving out tarai belt of district Nainital. It is named after the famous martyr Udham Singh. The extensive archaeological remains discovered in the vicinity of the village of Ujhain, about 1.6 km to the east of the town of Kashipur, indicate that this locality must have been an important and flourishing cultural as well as political centre during the first millennium prior to the Christian era. From the archaeological remains in Ujhain, it is evident that this place represents the site of an important city which was probably the capital of the country called Govishana visited by the Chinese pilgrim Hiuen Tsang, in the 7th century A.D.

In Kashipur region, it is said on the basis of a tradition recorded in Chand Bardai's 'Prithviraj-raso', that about 714 A.D. Ram Parmar, the paramount sovereign and lord of Ujhain (near Kashipur) gave lands to the members of thirty six Rajput clans and Katechr (modern Rohilkhand) to one Kehar. It appears that during the confusion that prevailed after the death of Harsha, the Parmar ruler of Ujhain became independent and gradually acquired considerable power.

Until 1948, this region remained neglected due to dense forest and adverse climatic condition. Due to marshy land, severe hot climate, excessive rainfall, natural habitat of wild and ferocious animals, prevalence of diseases and lack of communication, this part had negligible human habitation by then. Historians believe that centuries ago, a devotee of lord Rudra or some chieftain of a Hindu tribe established Rudrapur village, which with the passage of time has developed into a thriving town.

During the reign of Mughal Emperor Akbar in 1588 this part of tarai was gifted as jaghir (hereditary assignment of land) to the Raja Rudra Chand of Chand dynasty. To bring in stability in the tarai region from regular attacks being perpetrated from plain area, Raja Rudra Chand established a permanent army camp at Rudrapur. This was the beginning of the rise of Rudrapur and prompted human habitation around Rudrapur. It is also said Rudrapur is named after Raja Rudra Chand. The early history of the district is little known.

The ruined fort of Ujhain near the town of Kashipur is well known. A tank in the neighbourhood, known as Drona-Sagar, is popularly believed to have been made by the five Pandava brothers for their teacher, Drona. The tarai tract including the present tahsils of Kichha and Khatima of the district had sometimes been claimed by the rulers of the Kumaon hills in the north and some times by those of Rohilkhand in the south. The ancient sub-montane trade highway is also said to have passed through a part of the tarai in the district. Politically, this area has always, except for a couple of centuries in the later mediaeval period, formed part of the region known variously as North Panchala, Kalehar and Rohilkhand.

Tarai belt remained in the domain of Chand rajas of Kumaon. At the reign of Garur Gyan Chand (1374-1419), the plains including the tarai passed out of the possession of the Chand rajas. Garur Gyan Chand is said to have, proceeded to Delhi and petitioned the Sultan for the grant of the tract laying along the foot of the hills, that is, the bhabar and tarai areas. The Sultan was pleased with the skill of him shooting down a flying vulture on a hunting expedition and he bestowed upon the raja, the title of Garur and granted his prayer to hold and possess the land lying along the foot of the hills as far as Ganga, which thus included the entire bhabar and tarai tract. This Sultan may have been Mahmud Tughlaq who is known to have come to the tarai on a hunting expedition in 1410 or 1412 A.D. During the reign of Rudra Chand who is traditionally assigned to 1565-1597 A.D., a contemporary of the great Mughal emperor Akbar (1556-1605 A.D.), the eastern parts of the bhabar and tarai tracts are said to have been temporarily occupied by the Muslims, probably under Husain Khan Tukariya. It is said that after the death of Husain Khan Tukariya, the raja himself marched to the tarai and expelled the Muslims from that region. The Mughal emperor gave tarai parganas to the raja at a grant. The portion of the tarai that came into the raja's direct and legal possession was called the Chaurasi Mal. The period thereafter is the history of upheaval, which saw the ownership of the tarai region changing from one hand to another.

In the year 1815, this region along with Kumaon came under the British rule. After the creation of district Naini Tal in 1861, during 1864-65, entire tarai and bhabar areas were declared under the British Crown through the 'Tarai and Bhabar Government Act.' During the following decades of the 19th century the history of the area covered by the district is almost uneventful. With the beginning of the 20th century the people of the district began to be gradually conscious of their civic rights and of their exploitation by the colonial government. The growing dissatisfaction of the public began to find expression in different ways. The people of this district took active part in the freedom struggle. The sacrifice of freedom fighters did not go in vain. The country ultimately became independent in 1947. The development of tarai region began after 1948. After the partition of the country, grave problem of refugee settlement came before the government of India. Large number of displaced persons, from northwestern and eastern side was rehabilitated in the vast area of this district under colonization plan. Individual were distributed land. Thus group of people from Kashmir, Punjab, Bengal, Kerala, Garhwal,

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Kumaon, Haryana, Rajasthan and Nepal were settled in this district with different languages, religions, occupations and cultures making it a 'mini Hindustan'.

Brief Industrial profile of Udham Singh Nagar District

In the vicinity of the spectacular Kumaon lies the district of UDHAM SINGH NAGAR which was a part of district NAINITAL before it gained the identity of a separate district in October 1995. Udham Singh Nagar is 'basically an industrial district and many industry related professions are prevalent here, it is perfect example of 'Unity in Diversity' for which India is so widely known, on the other hand different cultures, religions and life styles are blended in absolute harmony.

The fertile land lends itself to different forms of agriculture giving rise to agriculture related activities and industries making this land a green place which has resulted into prosperity all around. Pantnagar University is a leading temple of learning in the fields of agriculture and technology with one of the finest built university all around the world. This place has rare sight seeing as it is surrounded by Kumaon Himalayas on one side and Nepal on the other (Tanakpur touches the Khatima border which is in Champawat district).

2. Overview of Mining Activity in the District

The knowledge regarding occurrences of minerals in the district is scanty. The geological studies so far carried out in the vicinity of the district, do not indicate significant occurrence of any mineral resource. Though devoid of any major mineral resource, the district is blessed with ample deposits of the river borne material which is mined throughout the district and gets annually replenished. The district is one of the major contributors to the royalty received by Uttarakhand state from the mining of RBM. The RBM mining industry supports a number of the stone crushers and screening plants in and around the district. The mining activity in the region is one of the major means of livelihood in the district, after agriculture.

3. The List of Mining Leases in the District with location, area and period of validity

क्र० सं०	पट्टाधारक नाम/पता	नदी का नाम	ग्राम/तहसील	खसरा एवं रकबा	अवधि
01.	श्री मोहब्बे अली पुत्र श्री अब्दुल लतीफ नि० ग्राम सुल्तानपुर, तहसील बाजपुर	कोसी	सुल्तानपुर/ बाजपुर	1.860 है०	04.12.2013 से 03.12.2018 तक
02.	श्री सतीश कुमार पुत्र श्री आनन्द सिंह नि० मोहल्ला आर्यनगर, सुल्तानपुर तह० बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	1.266 है०	21.11.2013 से 20.11.2018 तक
03.	श्रीमती पूनम पत्नी श्री सतीश कुमार नि० मोहल्ला आर्यनगर, सुल्तानपुर तह०	कोसी	मडैयागुलजारी / बाजपुर	1.414 है०	21.11.2013 से 20.11.2018 तक

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04.	श्री मनमोहन सिंह पुत्र श्री त्रिलोक सिंह नि० ग्राम शान्तिपुरी, खमियां नं० 4 /किच्छा	गौला	शान्तिपुरी, खमियां नं० 4/ किच्छा	0.5280है०	19.11.2013 से 18.11.2018
05.	श्री जगदीश खुल्ये पुत्र श्री मोला दत्त नि० ग्राम बिठोरिया पो०आ० कठघरिया तहसील हल्द्वानी जिला नैनीताल।	कैलाश/नन्धौर	उकरौली/ सितारगंज	0.614है०	12.12.2013 से 11.12.2018.
06.	श्री जसवन्त सिंह पुत्र श्री चेताराम नि० ग्राम टांडाबन्जारा, सुल्तानपुर तह० बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	1.126है०	30.11.2013 से 29.11.2018
07.	श्री योगेश तिवारी पुत्र श्री गिरीश चन्द्र तिवारी नि० 2/58 सिविल लाईन, मोटिया पड़ाव, हल्द्वानी जिला नैनीताल।	गौला	खमियां नं० 3/ किच्छा	2.392है०	06.02.2014 से 05.02.2019 तक
08.	श्री आनन्द सिंह पुत्र श्री पूरन सिंह नि० मोहल्ला आर्यनगर, सुल्तानपुर तह० बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	0.869 है०	30.11.2013 से 29.11.2018
09.	श्री अजय गुप्ता पुत्र श्री जगदीश गुप्ता ब्रज बिहार, हल्द्वानी जिला नैनीताल।	दाबका	गोबरा/ बाजपुर	1.442है०	12.02.2014 से 11.02.2019
10.	कु०म०वि०नि० नैनीताल	कैलाश/नन्धौर	उकरौली/ सितारगंज	6.622है०	08.01.2014 से 07.01.2019
11.	कु०म०वि०नि० नैनीताल	कैलाश/नन्धौर	साधुनगर/ सितारगंज	7.442है०	08.01.2014 से 07.01.2019
12.	इन्दर सिंह मेहता पुत्र श्री प्रेम सिंह नि० ग्राम शान्तिपुरी नं०-2 तहसील किच्छा	गौला	शान्तिपुरी/ किच्छा	1.07 है०	21.02.2014 से 21.02.2019 तक
13.	श्रीमती रमनीक पत्नी श्री विशाल शर्मा ग्राम पिपलिया, तहसील बाजपुर।	कोसी	पटौटी/ बाजपुर	2.242है०	07.03.2014 से 06.03.2019 तक
14.	श्रीमती शीला देवी पत्नी बुद्या सिंह नि० मडैयया गुलजारी तह०-बाजपुर	कोसी	मडैयया गुलजारी/ बाजपुर	0.662है०	11.03.2014 से 10.03.2019 तक
15.	श्री सुशील कुमार वर्मा पुत्र श्री लखपत वर्मा नि० मोहल्ला आदर्शनगर, बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	0.703है०	11.03.2014 से 10.03.2019 तक
16.	श्री दिवान सिंह पपोला नि० त्रिलोक नगर, हल्द्वानी जिला नैनीताल।	गौला	खमिया 4/ किच्छा	1.345है०	22.01.214 से 21.01.2019 तक
17.	श्रीमती रामकली पत्नी स्व० खुशीराम नि० ग्राम सुल्तानपुर तह०-बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	0.562है०	05.03.214 से 04.03.2019 तक
18.	श्री राजपाल सिंह पुत्र श्री चरन सिंह ग्राम मेहतावन तह० बाजपुर।	कोसी	पटौटी/ बाजपुर	1.544है०	13.03.214 से 12.03.2019 तक
19.	श्री आन सिंह पुत्र श्री नानक सिंह नि० ग्राम शक्तिफार्म वार्ड नं०-3, सितारगंज।	नन्धौर	साधुनगर/ सितारगंज	1.212है०	13.03.214 से 12.03.2019 तक
20.	श्री देवेन्द्र सिंह पुत्र श्री किशन सिंह नि० ग्राम नलई तह० सितारगंज।	नन्धौर	उकरौली/ सितारगंज	1.504है०	13.03.214 से 12.03.2019 तक
21.	श्री संदीप सिंह पुत्र श्री जगत सिंह नि० ग्राम खमिया न 3 तह०-किच्छा।	गौला	खमिया न 4/ किच्छा	0.600है०	19.03.2014 से 18.03.2019 तक

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22.	श्री राजीव गायल पुत्र श्री बच्चन लाल गोयल, नि० ग्राम पटौटी तह० बाजपुर।	कोसी	पटौटी/ बाजपुर	2.330 है०	13.03.2014 से 12.03.2019 तक
23.	श्री रविन्द्र सिंह पुत्र श्री तेजपाल सिंह नि० ग्राम पटौटी तह० बाजपुर।	कोसी	पटौटी/ बाजपुर	1.477 है०	18.03.2014 से 17.03.2019 तक
24.	श्री रामऔतार पुत्र श्री भीका नि० ग्राम रतनपुर, तहसील बाजपुर।	कोसी	पटौटी/ बाजपुर	0.7590 है०	20.02.2014 से 19.02.2019 तक
25.	श्री गिरीश चौधरी एवं राजवीर सिंह नि० ग्राम उकरौली तह० सितारगंज।	कैलाश	उकरौली/ सितारगंज	0.5632 है०	18.03.2014 से 17.03.2019 तक
26.	सहदेव शर्मा पुत्र श्री राम कुमार नि० गन्ना समिति बाजपुर।	कोसी	पटौटी/ बाजपुर	0.424 है०	14.03.2014 से 13.03.2019 तक
27.	श्री दीपक कुमार शर्मा पुत्र श्री सहदेव नि० गन्ना समिति बाजपुर।	कोसी	मडैयया गुलजारी/ बाजपुर	1.010 है०	14.03.2014 से 13.03.2019 तक
28.	श्री ध्रुव के. सरना पुत्र कश्मीर सिंह, नि० गांधीनगर, तह० बाजपुर।	कोसी	पटौटी/ बाजपुर	0.379 है०	20.02.2014 से 19.02.2019 तक
29.	श्री मलकीत सिंह पुत्र श्री तरसेम सिंह नि० उकरौली, तह० सितारगंज।	नन्धौर	साधुनगर/ सितारगंज	4.26 है०	04.01.2014 से 03.01.2019 तक
30.	श्री सोमपाल पुत्र श्री शांभाराम नि० मोहल्ला नेतानगर, सुल्तानपुर, तह० बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	1.637 है०	18.03.2014 से 17.03.2019 तक
31.	श्री गुलाम मुस्तफा पुत्र श्री लियाकत नि० ग्राम सुल्तानपुर, तह० बाजपुर।	कोसी	सुल्तानपुर/ बाजपुर	0.443 है०	31.03.2014 से 30.03.2019 तक
32.	श्री राम सिंह पुत्र श्री दिवान सिंह नि० ग्राम चकलुवा तह० कालाढुंगी, जिला-नैनीताल।	गौला	खमिया न 4/ किच्छा	0.747 है०	22.03.2014 से 21.03.2019 तक
33.	श्री अशोक शर्मा पुत्र रौशन लाल नि० इलाहाबाद बैंक रोड, काशीपुर।	कोसी	दभौरा एहतमाली/ काशीपुर	1.936 है०	07.04.14 से 06.04.19 तक
34.	श्री परमिन्दर सिंह पुत्र श्री सुखपाल सिंह, नि० भौना इस्लामनगर, बाजपुर।	कोसी	पटौटी/ बाजपुर	1.743 है०	15.04.2014 से 14.04.2019 तक
35.	कु०म०वि० नि० लि० नैनीताल।	कोसी	मडैयया गुलजारी/ बाजपुर	4.08 है०	26.03.2014 से 25.03.2019 तक
36.	चन्दन सिंह बिष्ट पुत्र श्री रूप सिंह ग्राम सिसई बडिया, तह० किच्छा।	गौला	खमिया न० 4 तह० किच्छा	0.672 है०	04.05.14 से 03.05.2019 तक
37.	अशोक कुमार पुत्र श्री देवकी नन्दन निवासी आवास विकास काशीपुर	कोसी	सुल्तानपुर तहसील बाजपुर	0.798 है०	21.11.2014 से 20.11.2019 तक
38.	सेवा सिंह पुत्र श्री दलीप सिंह निवासी ग्राम गोबरा तहसील बाजपुर	कोसी	गोबरा तहसील बाजपुर	0.126 है०	28.11.14 से 27.11.2019 तक
39.	जयप्रकाश पुत्र श्री रामचरन निवासी मोहल्ला आदर्शनगर सुल्तानपुर	कोसी	सुल्तानपुर तहसील बाजपुर	1.492 है०	29.08.14 से 28.08.2019 तक

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40.	ओमप्रकाश पुत्र श्री रामचन्द्र निवासी टाडा बाजार सुल्तानपुर	कोसी	सुल्तानपुर तहसील बाजपुर	1.008है0	29.08.14 से 28.08.2019 तक
41.	अजयपाल यादव पुत्र श्री कान सिंह किच्छा उधम सिंह नगर	गौला	खमिया न0 4/ किच्छा	1.00है0	23.12.14 से 22.12.2019 तक
42.	हिमांशु रावत पुत्र श्री मनवर सिंह निवासी लैंसडाउन पौडी गढवाल	कोसी	पटौटी/ बाजपुर	0.2592है0	22.12.2014 से 21.12.2019 तक
43.	जगजीत सिंह पुत्र श्री परमजीत सिंह ग्राम दभौरा एहतमाली	कोसी	दभौरा एहतमाली/ काशीपुर	1.458है0	06.02.2015 से 05.02.2020 तक
44.	चरनजीत सिंह पुत्र श्री हरमजन सिंह ग्राम दभौरा एहतमाली	कोसी	दभौरा एहतमाली/ काशीपुर	0.866है0	06.02.2015 से 05.02.2020 तक
45.	संजय कुमार पुत्र श्री ओमप्रकाश ग्राम दभौरा एहतमाली	कोसी	दभौरा एहतमाली/ काशीपुर	0.561है0	27.01.2015 से 26.01.2020 तक
46.	कु0म0विकास निगम नैनीताल।	गौला	खमिया न0 3/ किच्छा	2.289है0	10.02.2015 से 04.02.2020 तक
47.	शिव कुमार गुप्ता पुत्र ओमप्रकाश गुप्ता शिव मन्दिर वार्ड न0 4 गदरपुर	कोसी	सुल्तानपुर/ बाजपुर	1.051है0	06.02.2015 से 05.02.2020 तक
48.	मलकीत सिंह पुत्र गुरमेज सिंह ग्राम दभौरा एहतमाली तहसी काशीपुर	कोसी	दभौरा एहतमाली/ काशीपुर	1.520है0	05.02.2015 से 04.02.2020 तक
49.	प्यारा सिंह श्री सावन सिंह ग्राम पटौटी बाजपुर	कोसी	पटौटी / बाजपुर	0.660है0	05.02.2015 से 04.02.2020 तक
50.	फरीद खान पुत्र रसीद खान ग्राम साधुनगर सितारगंज	नन्धौर	साधुनगर/ सितारगंज	2.514	21.02.2015 से 20.02.2020 तक
51.	विजेन्द्र सिंह डोगरा पुत्र रूलिया सिंह ग्राम पटौटी तहसील बाजपुर	कोसी	पटौटी/ बाजपुर	0.6528है0	06.02.2015 से 05.02.2020तक
52.	लक्ष्मी नारायण पुत्र जीराज ग्राम सुल्तानपुर बाजपुर	कोसी	सुल्तानपुर/ बाजपुर	0.829है0	12.02.2015 से 11.02.2020 तक
53.	कृष्णा पुत्र श्री झण्डू ग्राम सुल्तानपुर बाजपुर	कोसी	सुल्तानपुर/ बाजपुर	0.971है0	10.02.2015 से 09.03.2020 तक
54.	शम्मी कुमार पुत्र श्री कश्मीर सिंह शिव मन्दिर निवासी वार्ड न04 गदरपुर	कोसी	दभौरा एहतमाली/ काशीपुर	2.025है0	25.03.2015 से 24.03.2020 तक
55.	लक्ष्मी देवी पपोला पत्नी श्री पूरन सिंह पपोला निवासी उत्तरांचल विहार मल्ली बमोरी हल्द्वानी नैनीताल	गौला	खमिया न0 4/ किच्छा	1.386है0	25.03.2015 से 24.03.2020 तक
56.	निशथ शर्मा पुत्र श्री सुरेश चन्द्र निवासी रेलवे बाजार हल्द्वानी जिला नैनीताल	कोसी	सरकडी / बाजपुर	0.502है0	26.03.2015 से 25.03.2020 तक
57.	श्री संदीप कुमार जिन्दल पुत्र श्री यादराम गुप्ता निवासी तहसील सितारगंज	नन्धौर	साधुनगर/ सितारगंज	0.404है0	30.05.2015 से 29.05.2020 तक

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58	गुरदीप सिंह पुत्र श्री मेजर सिंह निवासी ग्राम पहाडपुर तहसील बाजपुर	कोसी	दमौरा एहतमाली/ काशीपुर	1.00है0	07.07.2015 से 06.07.2020 तक
59	रामवीर सिंह पुत्र श्री शिवचरन सिंह ग्राम फिरोजपुर तहसील काशीपुर	कोसी	पटौटी/ बाजपुर	0.600है0	20.10.2015 से 19.10.2020 तक
60	समीर चतुर्वेदी पुत्र श्री बालकृष्ण ग्राम लाहोरियान तहसील काशीपुर	कोसी	दमौरा एहतमाली/ काशीपुर	2.00है0	15.12.2015 से 14.12.2020 तक
61	सचिन जलाल पुत्र श्री प्रताप जलाल निवासी चीनपुर उंचापुर तहसील हल्द्वानी जिला नैनीताल	कोसी	सुल्तानपुर/ बाजपुर	0.1910है0	27.01.2016 से 26.01.2021 तक
62	सूरेश चन्द्र जोशी पुत्र श्री रामदत्त जोशी निवासी ग्राम लाखतोली गंगोलीहाट जिला पिथौरागढ़	नन्धौर	साधुनगर/ बाजपुर	0.549है0	03.02.2016 से 02.02.2021 तक
63	साजिद नदीम पुत्र श्री काले खाँ निवासी कटोराताल काशीपुर	कोसी	दमौरा एहतमाली/ काशीपुर	0.720है0	10.03.2016 से 09.03.2021 तक
64	श्री आशिष सहगल पुत्र श्री ओमकार सहगल निवासी ए-441 आवास विकास किच्छा उधम सिंह नगर	गौला	सिरौली कला/ किच्छा	0.2840है0	31.05.2016 से 30.05.2021 तक
65	श्री शरीफ अहमद पुत्र श्री खलील अहमद साधुनगर तहसील सितारजंगज जिला उधम सिंह नगर	नन्धौर	साधुनगर/ सितारगंज	0.790है0	15.06.2016 से 14.06.2021 तक
66	आदर्शपाल बसन्त सामूहिक समिति लि0 बाजपुर	कोसी	पटौटी/ बाजपुर	2.03है0	20.01.2016 से 19.01.2021 तक
67	दिग्विजय सिंह ग्राम सुलतनपुर तहसील बाजपुर	कोसी	सुलतानपुर/ बाजपुर	1.597है0	03.01.2017 से 02.01.2022 तक
68	कुँ0म0वि0नि0लि0 खमिया न0 4 तहसील किच्छा जनपद उधम सिंह नगर	गौला	खमिया न0 4/ किच्छा	1.006है0	14.01.2014 से 15.01.2019 तक
69	जगदीश कुमार पुत्र ललता निवासी ग्राम मालधन तहसील रामनगर नैनीताल	कोसी	पटौटी/ बाजपुर	0.600है0	06.02.2017 से 05.02.2022 तक

40 not working as on 28 August, 2019
Remaining 29, 04 expiring in Dec, 2019

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4. Details of Royalty or Revenue received in last three years

Cumulative Revenue (Royalty from Mining Leases, Govt. Agency, illegal mining, Stone Crusher, Bhandaran, Application Fee. etc. are included)

S.No.	Year	Cumulative Revenue (Rs. crore)
1.	2016-17	34.34
2.	2017-18	67.79
3.	2018-19	70.61
4.	TOTAL	172.74

5. DETAIL OF PRODUCTION OF RIVER BED MATERIAL (RBM) IN LAST THREE YEARS (EXISTING RBM LOTS ONLY).

S.No.	Year	Production of RBM (Ton)
1.	2016-17	1166418.56
2.	2017-18	2712289.0
3.	2018-19	1940633.0
4.	TOTAL	5809340.56

6. Process of Deposition of Sediments in the rivers of the District

In the earth system, water may be thought of as the water flowing downhill after a splash of rain, which carries with it some amount of soil that has been eroded by the action of flowing water. The flowing water of river moving down to the ocean also carries huge amounts of sediment which have been accumulated from other smaller streams joining the river.

In general, the water moving over the land surface is the dominant agent of land space alteration. Near surface weathering provide sediment load for the flowing streams. Some of the load gets deposited along the path of the river and only a fraction of the total material waste from the lands is carried by the rivers to the sea. In fact, the land space evolves essentially due to the water flowing over it in small rills and gullies, joining to form small streams, which combine to form rivers. The process of these watercourses eroding and conveying water is a continuous process and has been going on since the formation of this planet and the elements surrounding it. Hence rivers are ever changing but in a man's lifetime it may not be much depending on the land space through which it passes. The general adjective fluvial (from Latin fluvial meaning river) is applied for the work done by river and fluvial system applies to all the area draining a particular river extending from the drainage divides in the source areas of water and sediment, through the channels and valleys of the drainage basin, to depositional area such as the coasts.

District Udham Singh Nagar has a dense network of the drainage pattern. The rivers of the district belong to the Ganges drainage system, Of these, Sarada, Kosi, Gola and Phikka river and

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their tributaries are Sawal deh, Bour, Nandhour, Bhak, Kailash etc. drain the district. The unique feature of the area is debouching of major rivers into the plains from Lower Himalayas. The overall flow direction of these rivers generally north-south trend or northeast-southwest and flows to south till its confluences with the Ganga River. The major rivers are perennial, whereas their tributaries originating from sub-Himalayan zone are ephemeral and remain dry during the non-monsoon season; Overall drainage pattern in the district is sub dendritic to sub parallel.

The river fluvial systems in the district:

Conceptually the fluvial system of the river valley can be divided into three main zones and described as under:

1. An erosional zone of runoff production and sediment source
2. A transport zone of water and sediment conveyance, and
3. A depositional zone of runoff delivery and sedimentation

Sediment erosion, transport and deposition by any river in the district, It is amply clear that since rivers lay a decisive role in land form evolution, the force of water is intricately connected to the dislodging of soil and rock particles or sediment and their conveyance. Where the power of water becomes less, it is forced to deposit the particles on its way, in the district there are few type of depositional system may occurs.

- 1- **Channel aggradation** may also occur in the many rivers of the district where river reach if due to geological reasons (say, increase of erosion of the catchment) the sediment load being conveyed to the river increases than that can be carried by the river in equilibrium. As a result the riverbed rises and forces the channel to carve out its path in a braided fashion.
- 2- **Braided rivers**, there is a tendency for stream to widen and become very shallow with bars subjected to rapid changes in morphology. At high flows braided streams have a low sinuosity and often appear to be straight at low flows, numerous small channels weave through the exposed bars.

Aggradation also occurs in a channel when there is a decrease of bed slope for example as the river emerges from the hills and enters relatively flat land. This has occurred markedly in the river Kosi, which has forced the river to change its course by more than a hundred kilometer westward in the last 200 years, but in the frame of district it can be found in the Bhabar region also.

- 3- **Bars** refer to large bed forms on the bed of a river that are often exposed during low flows in the river system, these deposited segment mounds are not static and often get transported

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under high flows. They may again appear when the flow subsided but may not necessarily at the same location as the earlier ones.

Alternate bars form in straight channels with deposits alternation from right bank to left bank. Point bars form due to the presence of secondary flow of river bends, there is a perceptible flow in a plane perpendicular to the river flow direction. At the outer bank the secondary flow causes erosion and at the inner bank it causes deposition, thus giving rise to point bar formation. The locus of the deepest points of the river along the length is called the thalweg. Most thalwegs pass through a succession of pools in the channel bed that are separated by riffles which might be sedimentary bed forms or bed rock ledges. The pools and riffles of the streambed cause the thalweg to have an irregular slope, rising and falling in the downstream direction.

- 4- **Meandering**, A river that winds a course not in a straight line but in a sinusoidal pattern is called a meandering river. It is the continued action of the secondary flow developed on the river bends that cause further erosion on the outer bank and deposition on the inner bank. The meandering action increases the length of the stream or river and tends to reduce the slope.

A river tends to build a steeper slope by depositing the sediment on the bed when the sediment load is in excess of that required for equilibrium. This increase in slope reduces the depth and increases the width of the river channel if the banks do not resist erosion. Only a slight deviation from uniform axial flow is then required to cause more flow towards one bank than the other. Additional flow is immediately attracted towards the former bank, leading to shoaling along the latter ascending the curvature of the flow and finally producing meanders in its wake.

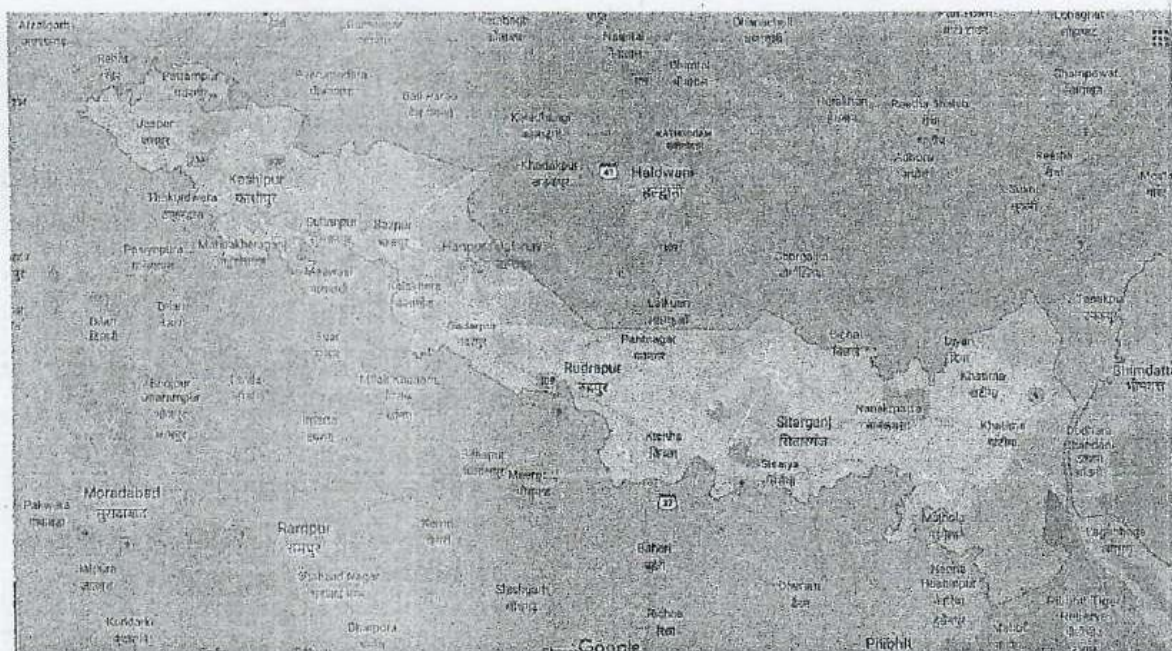
Channel meandering is a result of an ongoing bed and bank deformation by the flow in a self-formed alluvial channel thus the meander sinuosity increases with the passage of time, Bank erosion consists of the detachment of grains or assemblages of grains from the bank, followed by fluvial entrainment. Though the riverbed may be composed of non-cohesive alluvial material the banks, on the other hand, may be composed of cohesive or non-cohesive soils. Cohesive, fine-grained bank material is easily eroded by the entrainment of the aggregates or the crumbs of the soil rather than individual particles, which are bound tightly together by electro-mechanical cohesive forces. Non-cohesive bank material is usually detached grain by grain and may leave a pronounced notch marking peak stage achieved.

7. General Profile of the District

S. No.	Features of the District	Number	Description
1.	Neighbouring Country	01	Nepal
2.	Neighbouring Districts of Udham Singh Nagar		Bijnour, Moradabad, Rampur, Bareilly, Pilibhit, Champawat, Nainital
3.	Region type		Tarai

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4.	Subdivisions	07	Jaspur, Kashipur, Bajpur, Rudrapur, Kichha, Sitarganj, Khatima
5.	Blocks	07	Jaspur, Kashipur, Bajpur, Gadarpur, Rudrapur, Sitarganj, Khatima
6.	Parliamentary Constituency Of District	01	Nainital
7.	Assembly Constituencies Of District	09	62-Jaspur, 63-Kashipur, 64-Bajpur, 65-Gadarpur, 66-Rudrapur, 67-Kichha, 68-Sitarganj, 69-Nanakmatta, 70-Khatima
8.	Nyaya Panchayats	27	
9.	Number of villages	658	
10.	Nagar Nigam	02	Kashipur and Rudrapur
11.	Nagar Palika Parishad	06	Jaspur, Bajpur, Gadarpur, Kichha, Sitarganj, Khatima
12.	Nagar Panchayats(6)	06	Mahua Dabra, Mahuakheraganj, Kelakhera, Dineshpur, Sultanpur Patti, Shakti Garh
13.	Water Availability	-	At 10 m
14.	Population	-	More than 12 lakhs
15.	Tourist Season	-	Whole year
16.	Language of District	-	Hindi, Punjabi, English
17.	District Magistrate Office, Udham Singh Nagar	-	Collectorate Compound, Rudrapur Udham Singh Nagar, Uttarakhand Contact Numbers : – 05944-242344 (office) 242345, 250404 (Residence) Email Id: – dm-usn-ua@nic[dot]in



Map of District Udham Singh Nagar

8. Land Utilization Pattern in the district: Forest, Agriculture, Horticulture, Mining etc.

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In the past this land which was full of forest land and was neglected till 1948 due to difficult climatic conditions. Marshy lands, extreme heat, rains which lasted months, a place full of wild animals, diseases and no means of transportation prevented the human race to form a colony here. Now due to the efforts of Government and people this land is the modern agricultural, educational and industrial hub of Uttarakhand.

The district of Udham Singh Nagar, as of now, is an agro-industrial district. The Major Crops in the District are Rice, Wheat, Barley, Maize, Mandua, sugarcane, etc. The major land was covered under agricultural activities spread throughout the district in all blocks and tehsils.

With the upcoming of SIDCUL and different industries, change in the land use pattern is noticed not only in Pantnagar and Sitarganj but also in other blocks. The mining of RBM has supported the setting up of stone crusher and screening plants. Apart from the above industries can be found spread in all blocks and tehsils.

Uttarakhand is known for its horticultural crops, which include fruits, vegetables, off-season vegetables, floricultural crops, medicinal and aromatic plants. Horticulture is one of critical sectors in the economy of the hill state of Uttarakhand. It provides much needed opportunity for diversification and increased employment in the state where the scope of high rate of growth in conventional agriculture is rather limited due to peculiar topography and majority of scattered and marginal holdings.

9. Physiography of the District

Udham Singh Nagar was a portion of district Nainital before the Tarai belt was separated to form the present Udham Singh Nagar on 30/09/1995. Udham Singh Nagar district falls in the Tarai region of Kumaon Division, it was separated from district Nainital on the basis its physiographical conditions i.e. Tarai. It is also well known for the industries as the geographical location is conducive. The geographical area of the district is 3055 Km² and aerially it ranks 9th in Uttarakhand state. It is located between latitude 28° 53' N and 29° 23' N and laterally extends between longitudes 78° 45' E and 80° 08' E. The district is bounded by Nainital and Champawat districts of Uttarakhand on the north, Moradabad, Rampur, Bareilly and Philibhit districts of Uttar Pradesh on the south, Bijnor district of Uttar Pradesh on west and Nepal on the east. The Sarada River forms the international boundary between India and Nepal.

Udham Singh Nagar district may be broadly divided into two physiographic units from north to south viz., Bhabar and Tarai respectively. Since the area is located in the Himalayan foothills, a very thick column of alluvium is deposited, which further is classified into two distinct divisions:

(A) *The Piedmont fan deposits known as Bhabar*

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These zones spread in northeast – southwest direction all along the foothills of the Siwalik formation having a maximum width of less than 30 km. The general gradient towards south varies from 9 to 17 m/km. The slope gradually decreases towards south in the Tarai region and becomes almost flat close to the boundary between Tarai and Central Ganga plains, which exists few km south of the southern boundary of the study area. The geomorphology of an area plays a very significant role in the groundwater movement and its occurrences.

The soil types are controlled by the topography and rock types, the Bhabar soils lay at the northern extremity of Khatima and Bazpur blocks, part of the alluvial fan deposits. Soils are shallow with sandy to loamy texture, poorly sorted, comprising mainly of gravel, sand, silt, clay with pebbles etc, rather than this the Tarai soils run all along the northern extremity of the district, form continuous fringe with the Bhabar Zone.

(B) The Tarai Alluvium

Bhabar formation is found in extreme northern parts of the Khatima and Bazpur blocks, boundary demarcated by the contact of Tarai and Bhabar. The Tarai belt is 8–25 km in width, and the general slope is <1% towards south. Soil is calcareous, moderately productive and suitable for extensive cultivation of high yielding variety of crops like rice and sugar cane.

10. Rainfall: month-wise

YEAR		2014	2015	2016	2017	2018
JAN	R/F	95.4	32.8	0.1	24.4	10.1
	%DEP	218	9	-99	-19	-66
FEB	R/F	116.9	11.2	1.9	0.7	2.8
	%DEP	515	-41	-90	-96	-85
MAR	R/F	56.9	91	4.6	3.4	0.5
	%DEP	262	480	-71	-78	-97
APR	R/F	8.8	12.8	7.9	1.9	18
	%DEP	-2	42	-13	-79	100
MAY	R/F	22.5	17.6	76.2	12.7	9.9
	%DEP	-32	-47	132	-61	-70
JUN	R/F	70.1	169.8	97.7	68.3	47.3
	%DEP	-52	15	-34	-54	-68
JUL	R/F	349.9	253.8	346.3	360.3	271.9
	%DEP	-13	-37	-14	-11	-33
AUG	R/F	109.8	247.5	116.8	302.1	335
	%DEP	-70	-32	-68	-17	-8
SEPT	R/F	55.1	59.3	82.5	216	115.8
	%DEP	-73	-71	-60	6	-43
OCT	R/F	48.9	2.5	0.4	0	1.7
	%DEP	-33	-97	-99	-100	-98
NOV	R/F	0	1.3	0	0	1.4
	%DEP	-100	-71	-100	-100	-70
DEC	R/F	46.4	0.4	2.6	1.8	0.2
	%DEP	394	-96	-72	-81	-98

11. Geology and Mineral Wealth

On the basis of previous Geological studies along the foothill Himalaya region, Geomorphology and Geology of the district plays an important role in shaping of groundwater resources and river born material deposits, basically those piedmont alluvial deposits represent the geology of the district which can be broadly divided into two formations viz. Bhabar and Tarai. These are characterized by distinct lithology, grain size distribution, variation of degree of sorting etc. a generalized geological succession of district is shown in the following table.

Geological details of district Udham Singh Nagar, Uttarakhand.

Age	Morpho-tectonic Unit	Divisions	Lithology
Recent to Quaternary	Piedmont	Bhabar	Boulder sand and clay
	Alluvial plain	Tarai	Sand, clay and slit.

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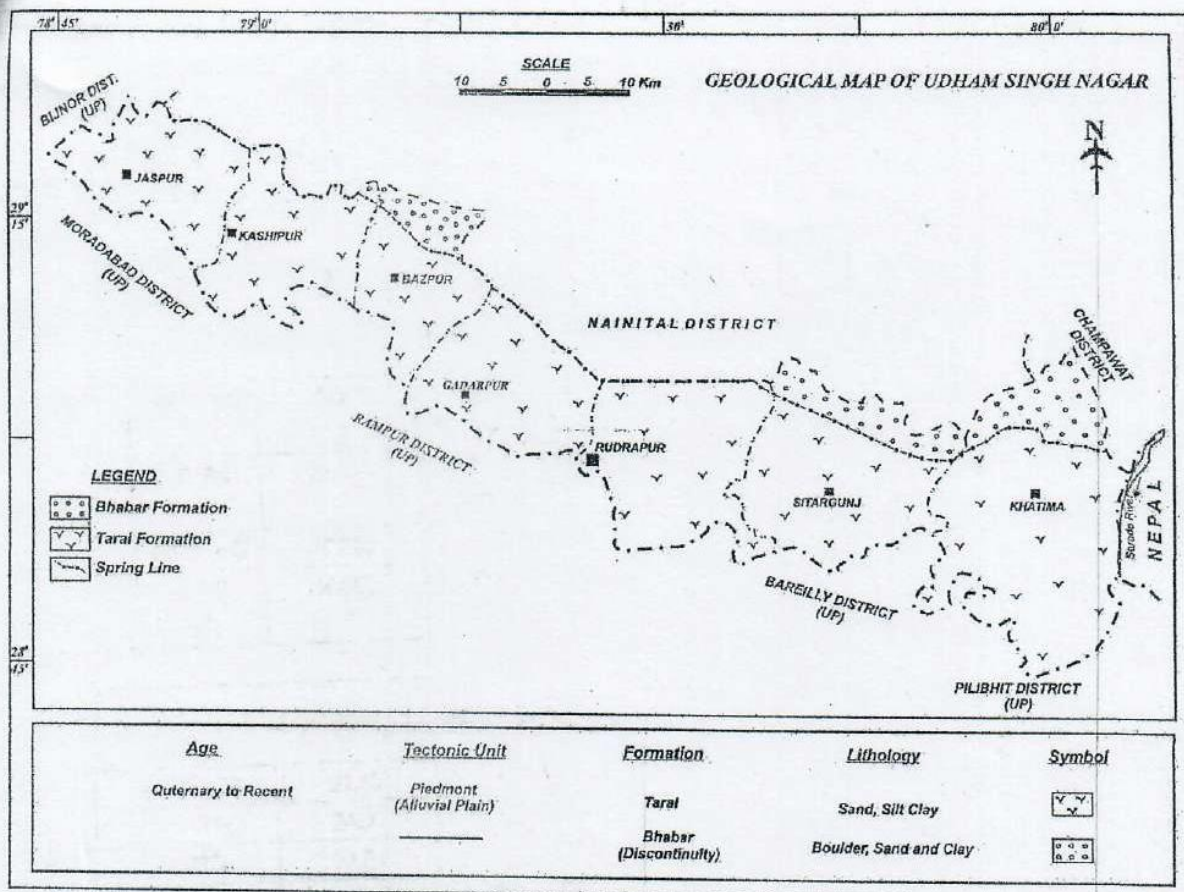
(i) Bhabar Formation:

Bhabar formation is essentially constituted of alluvial deposits lying on the sloping plains in the Himalayan foothills. It is primarily constituted of unconsolidated sediments like sand, gravel, boulder and clays. The grain size varies from material of sand grade (2 mm) through granules, pebbles, cobbles to boulders size i.e. >256 mm, sometimes the boulders have dimensions in feet. The clays are generally brown in color and clay bed sequences tend to pinch and for the same reason have short lateral continuity. The Bhabar formation is exposed immediately south of the Siwaliks of the Himalayan foothills, observed at northern parts of the Bazpur, Siatargunj and Khatima blocks. The exact trend and disposition of Bhabar formation depends largely upon the disposition of the Siwaliks. The extreme northern portion of the Bhabar zone is marked by the contact with Siwalik Ranges, whereas the southern limit is defined by the contact between Bhabar and Tarai, which forms the spring line or marshy conditions. The width of the bhabar formation is quite variable, the maximum being 21 kms.

(ii) Tarai Formation:

The Tarai formation is exposed immediately south of the Bhabar formation, and the name itself being derived from marshy conditions. Tarai formation consists of clays, sandy clays, fine to medium sand and occasional gravels. In this formation there is a dominance of clayey successions over sandy horizons. The granular zones mostly occur as lenses and have inter-tonguing relationships with clastic and non-clastic units. The northern limits of the zone is demarcated by the spring line, i.e. the contact between Bhabar and Tarai, whereas the southern limit of this zone is taken to be the region where auto flow conditions cease to exist in the tube wells. The Tarai sediments representing the finer portion of the channel bed load and the load in suspension and solution, which are brought by the streams and evenly sorted out by the river action. Tarai formation is better sorted as compared to the Bhabar.

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Geological map of District Udham Singh Nagar

Mineral Wealth

Bhabar Zone: Bhabar is highly porous and permeable alluvial tract lying in an elongated form along the Siwalik foothills. It has northwest-southeast elongation and forms a highly potential hydro-geologic unit. Bhabar's deposits are poorly sorted, unconsolidated sediments viz., boulders, cobbles, pebbles, and granules, coarse to fine sand, silt and clay. The Bhabar merges gradually with the Tarai occurring in the south. The contact between these two hydrogeomorphic units is characterized by the change in slope and groundwater effluents, which form the spring line. These channels debouch the sediments at the downhill, over the foothills of the sub-Himalayan zone.

The sediments are deposited in the form of triangular alluvial fans and cones, by the braided streams. The alluvial cones join together to form an extensive piedmont plain. This Bhabar zone is highly productive on account of these sediments deposits which can be used as good building material which has high demand at the present time. The Bhabar zone acts as a recharge front for the Tarai belt while in Tarai belt fine alluvium deposits are found, where mostly sand, fine silt and clay is found to expose. The vast ground water stored below the Tarai region of Udham Singh Nagar also contributes to the natural asset of the district.

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

क्र०स०	नदी का नाम	जिले से कुल दूरी (किमी०)	उद्गम स्थल	उद्गम स्थान पर ऊँचाई	निकासी क्षेत्र (वर्ग किमी०)	अभ्युक्ति
1	2	3	4	5	6	7
सिंचाई खण्ड, काशीपुर						
1	फीका नदी	20.000	फीका बैराज जसपुर (उ०सि०न०)	859 फीट	1.02	मिट्टी युक्त रेत
2	ढेला नदी	23.000	ढेला गांव (कार्वेट नेशनल पार्क)	1102 फीट	1.26	तदैव
3	कोसी नदी	12.000	गोबरा घाट	858 फीट	1.20	तदैव
4	लेवड़ा नदी	16.000	खम्बारी गांव चनकपुर	701 फीट	0.096	तदैव
सिंचाई खण्ड, रुद्रपुर						
5	निहाल	22.50	गूलरभोज	228.29	0.450	खनन सामग्री-मिट्टी
6	भाखड़ा	24.50	गूलरभोज	234.09	0.490तदैव...
7	खजिया	23.50	गूलरभोज	234.39	0.470तदैव...
8	गौला	22.50	पहाड़ पानी जिला-नैनीताल	1865.00	0.700	सैण्ड, सिल्ट एवं मिट्टी
सिंचाई खण्ड, सितारगंज						
9	जगबूढ़ा	18.50	कठोर वन क्षेत्र चम्पावत	1245	0.925	आर०बी०एम०, सिल्ट/ मिट्टी आरक्षित वन क्षेत्र
10	परवीन	49.00	झनकट उधमसिंह नगर	213	0.900	सिल्ट/मिट्टी राजस्व क्षेत्र
11	कामन	13.70	दोगड़ी रेंज नैनीताल	1240	0.320	आर०बी०एम०, सिल्ट/ मिट्टी आरक्षित वन क्षेत्र
12	निहाई	8.70	जोलासाल वन क्षेत्र उधमसिंह नगर	227	0.240	सिल्ट/ मिट्टी आरक्षित वन क्षेत्र व नानक सागर जलाशय डूब क्षेत्र
13	देवहा	40.00	नन्धौर वन क्षेत्र नैनीताल	321	1.5	आर०बी०एम०, सिल्ट/ मिट्टी आरक्षित वन क्षेत्र एवं राजस्व क्षेत्र

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14	कैलाश	32.00	चोरगलिया वन क्षेत्र नैनीताल	316	3.2	आर०बी०एम०, सिल्ट/ मिट्टी आरक्षित वन क्षेत्र एवं राजस्व क्षेत्र
15	सूखी/बैगु ल	21.00	पसौली वन रेंज नैनीताल	447	0.8	आर०बी०एम०, सिल्ट/ मिट्टी आरक्षित वन क्षेत्र एवं राजस्व क्षेत्र

b) District wise availability of sand or gravel or aggregate resources (other than existing RBM Mining leases)

ई-निविदा सह ई-नीलामी के अन्तर्गत शासन द्वारा जारी आशय पत्र						
क्र० सं०	आशय पत्र धारक का नाम	उपखनिज क्षेत्र का नाम	नदी का नाम	क्षेत्रफल (है०)	उपखनिज की अपेक्षित मात्रा (टन में)	आशय पत्र संख्या
1	श्री गोपाल सिंह बिष्ट	जनपद उधमसिंहनगर तहसील बाजपुर के ग्राम लक्ष्मीपुर, क्षेत्रफल 2.800 है०	—	2.800	92400	1353/2018
2	श्रीमती प्रिया अग्रवाल	जनपद उधमसिंहनगर तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 1.959 है०	कैलाश	1.959	23385	1616/2018
3	श्री कवलजीत सिंह कॉन्ट्रेक्टर	जनपद उधमसिंहनगर तहसील किच्छा के लॉट नं० 02 कोटखर्वा शान्तिपुरी नं० 4 गौला नदी, क्षेत्रफल 5.00 है०	गौला	5.00	165000	1647/2018
4	श्री सुखवन्त कौर	जनपद उधमसिंहनगर तहसील बाजपुर के ग्राम बैतखेड़ी, दाबका नदी, क्षेत्रफल 1.849 है०	दाबका	1.849	61017	1648/2018
5	श्रीमती प्रिया अग्रवाल	जनपद उधमसिंहनगर तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 3.183 है०	कैलाश	3.183	47745	1649/2018
6	श्री सुखवन्त कौर	जनपद उधमसिंहनगर तहसील किच्छा के ग्राम नया प्लाट शान्तिपुरी नं० 4, लॉट नं० 01/गौला नदी, क्षेत्रफल 5.00 है०	गौला नदी	5.00	165000	1651/2018
7	श्रीमती प्रिया अग्रवाल	जनपद उधमसिंहनगर तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 4.390 है०	कैलाश	4.390	65850	1620/2018
8	श्रीमती सुखवन्त कौर	जनपद उधमसिंहनगर तहसील बाजपुर के ग्राम गोबरा, दाबका नदी, क्षेत्रफल 20.223 है०	दाबका	20.223	667359	1621/2018
9	श्री पुनीत कुमार गोयल	जनपद उधमसिंहनगर तहसील सितारगंज के ग्राम साधुनगर, कैलाश नदी, क्षेत्रफल 5.926 है०	कैलाश	5.926	88890	1617/2018
10	मै० गंगा इन्टरप्राइजेज	जनपद उधमसिंहनगर तहसील किच्छा के ग्राम लॉट नं० 04 भगवानपुर रुद्रपुर	साहनी/ गौला	7.00	231000	1650/2018

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		साहनी/गौला नदी, क्षेत्रफल 7.00 है०				
11	मै० गंगा इन्टरप्राइजेज	जनपद उधमसिंहनगर तहसील किच्छा के ग्राम लॉट नं० 03- कनमन/गौला नदी, क्षेत्रफल 10.00 है०	कनमन/गौला	10.00	330000	1653/2018
12	श्री जितेन्द्र सिंह	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 6.00 है०	कैलाश	6.00	90000	1926/2018
13	श्री पुनीत कुमार गोयल	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 12.344 है०	कैलाश	12.344	185160	2455/2018
14	श्री अब्दुल अलीम	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 12.894 है०	कैलाश	12.894	193410	2458/2018
15	श्री राजेश शर्मा	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम उकरौली, कैलाश नदी, क्षेत्रफल 29.805 है०	कैलाश	29.805	447075	2457/2018
16	गुरुनानक इन्टरप्राइजेज	जनपद उधमसिंहनगर की तहसील बाजपुर के ग्राम गुलडिया, क्षेत्रफल 13.911 है०	-	13.911	459063	39/2019
17	मै० रामा कन्स्ट्रक्शन	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम मेरावाराना, क्षेत्रफल 15.00 है०	नधौर/कैलाश	15.00	495000	38/2019
18	गुरुनानक इन्टरप्राइजेज	जनपद उधमसिंहनगर की तहसील सितारगंज के ग्राम उकरौली, क्षेत्रफल 40.50 है०	कैलाश	40.50	1336500	40/2019
		समतलीकरण अनुज्ञा पत्र				
19	तृप्त कौर पत्नी स्व० अमरजीत सिंह निवासी ग्राम रतनपुरी तहसील बाजपुर	जनपद उधमसिंह नगर ग्राम रतनपुरी तहसील बाजपुर क्षेत्रफल 0.470 है०	-	0-470	-	1497/2019
20	मनमीत सिंह पुत्र श्री कुलवीर सिंह निवासी ग्रीन सिटी बाजपुर	जनपद उधम सिंह नगर ग्राम गोबरा तहसील बाजपुर क्षेत्रफल 1.5520 है०	-	1-5520	-	125/2019
21	अर्जुन सिंह, अजय कुमार, अतुल कुमार पत्रगण ओमप्रकाश निवासी निझाडा सैनीक कालोनी काशीपुर	जनपद उधमसिंह नगर ग्राम ढकीया कला तहसील काशीपुर	-	0.607	-	120/2019
		खनन पट्टा निजी भूमि				
22	काशीराम पुत्र श्री कपूर सिंह निवासी ढकीयाकलौ तहसील, काशीपुर	जनपद उधम सिंह नगर ग्राम पटौटी तहसील बाजपुर क्षेत्रफल 0.295 है०	कोसी नदी	0.295	-	726/2013

उत्तराखण्ड वन विकास निगम को जनपद उधमसिंहनगर में आशय पत्र पर स्वीकृत लॉटों का विवरण				
क्र० सं०	लॉट का नाम	नदी का नाम	कुल क्षेत्रफल (है०)	उपखनिज की अपेक्षित मात्रा (लाख टन में)
1.	दाबका नदी -3	दाबका	65.00 है०	7.15

शासन द्वारा उत्तराखण्ड वन विकास निगम को जनपद उधमसिंहनगर में आवंटित नए लॉटों का विवरण				
क्र० सं०	लॉट का नाम	नदी का नाम	कुल क्षेत्रफल है० में	अपेक्षित मात्रा (लाख टन में)
1.	बनगढ़, महुआ ढाली रतनपुरी लोअर, कोसी नदी (5-3ख जंगलात)	कोसी	218.366	72.06
2.	गोबरा, दाबका नदी (5-3ख जंगलात)	दाबका	62.327	20.56

जनपद स्तर पर ई-टेण्डर के माध्यम से आवंटित किये जाने वाले नदी तल उपखनिज के खनन पट्टे (पूर्व में ई-नीलामी प्रक्रिया से आवंटन ना हो पाने तथा निगमों के द्वारा समर्पित उपखनिज के खनन पट्टे)					
जनपद उधमसिंहनगर					
क्र० सं०	उपखनिज क्षेत्र का नाम	क्षेत्रफल (है०)	नदी का नाम	उपखनिज मात्रा	
1	खमियां नं०-4, तहसील किच्छा	4.35	गौला	-	KMVN submitted
2	खमियां नं०-3, तह० किच्छा	1.156	गौला	-	KMVN submitted
3	शारदा नदी-2	186.00	शारदा नदी	-	Forest submitted
4	ग्राम जोगीपुरा लोअर कोसी नदी 5(3) वन भूमि	20.832	कोसी	687456	-
5	ग्राम बैतखेडी, दाबका नदी 5(3) वन भूमि	6.715	दाबका नदी	221595	-
6	ग्राम बनूसी, परवीन नदी	2.834	परवीन नदी	93522	-
7	ग्राम झनकट, परवीन नदी	13.470	परवीन नदी	444510	-
8	ग्राम नौसर, परवीन नदी	4.607	परवीन नदी	152031	-
9	ग्राम जरासु- प्रतापपुर	7.069	परवीन नदी	233277	-
10.	खमियां नं०-3, तह० किच्छा	0.22	गौला	7200	KMVN submitted
11.	खमियां नं०-4, तहसील किच्छा	1.006	गौला	33198	KMVN submitted
12.	उकरौली	5.291	कैलाश	150793	KMVN submitted
13.	मडैया गुल्जारी	2.69	कोसी	88770	KMVN submitted
14.	साधूनगर	5.166	कैलाश नदी	170478	KMVN submitted
15.	दमौरा एहतमाली	1.403	कोसी	46299	

11 (c) Details of Existing Mining Leases of sand and aggregates, District Udham Singh Nagar

S. No.	Name of lessee	Lot Location	Area (in ha.)	Sanctioned Capacity (in tons)	Type of mineral	Period
River Dabka						
River Kosi						
1	अशोक कुमार पुत्र श्री देवकी नन्दन निवासी आवास विकास काशीपुर	सुल्तानपुर तहसील बाजपुर	0.798है०	22743	आर०बी०एम०	21.11.2014 से 20.11.2019 तक
2	सेवा सिंह पुत्र श्री दलीप सिंह निवासी ग्राम गोबरा तहसील बाजपुर	गोबरा तहसील बाजपुर	0.126है०	3591	आर०बी०एम०	28.11.14 से 27.11.2019 तक
3	जयप्रकाश पुत्र श्री रामचरण निवासी मोहल्ला आदर्शनगर सुल्तानपुर	सुल्तानपुर तहसील बाजपुर	1.492है०	42522	आर०बी०एम०	29.08.14 से 28.08.2019 तक
4	ओमप्रकाश पुत्र श्री रामचन्द्र निवासी टाडा बाजार सुल्तानपुर	सुल्तानपुर तहसील बाजपुर	1.008है०	28728	आर०बी०एम०	29.08.14 से 28.08.2019 तक
5	हिमांशु रावत पुत्र श्री मनवर सिंह निवासी लैसडाउन पौडी गढ़वाल	पटौटी / बाजपुर	0.2592है०	7387	आर०बी०एम०	22.12.2014 से 21.12.2019 तक
6	जगजीत सिंह पुत्र श्री परमजीत सिंह ग्राम दमौरा एहतमाली	दमौरा एहतमाली / काशीपुर	1.458है०	41553	आर०बी०एम०	06.02.2015 से 05.02.2020 तक
7	चरनजीत सिंह पुत्र श्री हरमजन सिंह ग्राम दमौरा एहतमाली	दमौरा एहतमाली / काशीपुर	0.866है०	24681	आर०बी०एम०	06.02.2015 से 05.02.2020 तक
8	संजय कुमार पुत्र श्री ओमप्रकाश ग्राम दमौरा एहतमाली	दमौरा एहतमाली / काशीपुर	0.561है०	15988	आर०बी०एम०	27.01.2015 से 26.01.2020 तक
9	शिव कुमार गुप्ता पुत्र ओमप्रकाश गुप्ता शिव मन्दिर वार्ड न० 4 गदरपुर	सुल्तानपुर / बाजपुर	1.051है०	25108	आर०बी०एम०	06.02.2015 से 05.02.2020 तक
10	मलकीत सिंह पुत्र गुरमेज सिंह ग्राम दमौरा एहतमाली तहसी काशीपुर	दमौरा एहतमाली / काशीपुर	1.520है०	43320	आर०बी०एम०	05.02.2015 से 04.02.2020 तक
11	लाजवन्ती देवी पत्नी प्यारा सिंह ग्राम पटौटी बाजपुर	पटौटी / बाजपुर	0.660है०	18810	आर०बी०एम०	05.02.2015 से 04.02.2020 तक
12	विजेन्द्र सिंह डोगरा पुत्र रूलिया सिंह ग्राम पटौटी तहसील बाजपुर	पटौटी / बाजपुर	0.6528है०	18604	आर०बी०एम०	06.02.2015 से 05.02.2020 तक

13	लक्ष्मी नारायण पुत्र जीराज ग्राम सुल्तानपुर बाजपुर	सुल्तानपुर/ बाजपुर	0.829है०	23626	आर०बी०एम०	12.02.2015 से 11.02.2020 तक
14	कृष्णा पुत्र श्री झण्डू ग्राम सुल्तानपुर बाजपुर	सुल्तानपुर/ बाजपुर	0.971है०	27673	आर०बी०एम०	10.02.2015 से 09.03.2020 तक
15	अजय कुमार पुत्र कश्मीर सिंह शिव मन्दिर निवासी वार्ड न०4 गदरपुर	दमौरा एहतमाली/ काशीपुर	2.025है०	43284	आर०बी०एम०	25.03.2015 से 24.03.2020 तक
16	निशथ शर्मा पुत्र श्री सुरेश चन्द्र निवासी रेलवे बाजार हल्द्वानी जिला नैनीताल	सरकडी / बाजपुर	0.502है०	12425.6	आर०बी०एम०	26.03.2015 से 25.03.2020 तक
17	गुरदीप सिंह पुत्र श्री मेजर सिंह निवासी ग्राम पहाड़पुर तहसील बाजपुर	दमौरा एहतमाली/ काशीपुर	1.00है०	24750	आर०बी०एम०	07.07.2015 से 06.07.2020 तक
18	रामवीर सिंह पुत्र श्री शिवचरन सिंह ग्राम फिरोजपुर तहसील काशीपुर	पटौटी/ बाजपुर	0.600है०	11700	आर०बी०एम०	20.10.2015 से 19.10.2020 तक
19	समीर चतुर्वेदी पुत्र श्री बालकृष्ण ग्राम लाहोरियान तहसील काशीपुर	दमौरा एहतमाली/ काशीपुर	2.00है०	42750	आर०बी०एम०	15.12.2015 से 14.12.2020 तक
20	सयिन जलाल पुत्र श्री प्रताप जलाल निवासी चीनपुर उँचापुल तहसील हल्द्वानी जिला नैनीताल	सुल्तानपुर/ बाजपुर	0.1910है०	4512.9	आर०बी०एम०	27.01.2016 से 26.01.2021 तक
21	साजिद नदीम पुत्र श्री काले खॉं निवासी कटोराताल काशीपुर	दमौरा एहतमाली/ काशीपुर	0.720है०	17820	आर०बी०एम०	10.03.2016 से 09.03.2021 तक
22	आदर्शपाल बसन्त सामूहिक समिति लि० बाजपुर	पटौटी/ बाजपुर	2.03है०	53033.2	आर०बी०एम०	20.01.2016 से 19.01.2021 तक
23	दिग्विजय सिंह ग्राम सुलतनपुर तहसील बाजपुर	सुल्तानपुर/ बाजपुर	1.597है०	45514	आर०बी०एम०	03.01.2017 से 02.01.2022 तक
24	जगदीश कुमार पुत्र ललता निवासी ग्राम मालधन तहसील रामनगर नैनीताल	पटौटी/ बाजपुर	0.600है०	14850	आर०बी०एम०	06.02.2017 से 05.02.2022 तक
25	अजय कुमार तिवारी पुत्र श्री सुधाकर तिवारी ग्राम पटौती तहसील बाजपुर	पटौटी/ बाजपुर	1.47 है०	31433.6	आर०बी०एम०	06.02.2017 से 05.02.2022 तक
26	राम किशोर पुत्र श्री ग्राम पटौटी तहसील बाजपुर जिला उधम सिंह नगर	पटौटी/ बाजपुर	0.964है०	23859	आर०बी०एम०	31.01.2018 से 30.01.2023 तक
27	ललित कुमार पुत्र श्री गुणानन्द ग्राम सुल्तानपुर तहसील बाजपुर जिला उधमसिंह नगर।	सुल्तानपुर/बाजपुर	1.30है०	36936	आर०बी०एम०	25.05.2018 से 24.05.2023 तक
28	मदन लाल पुत्र श्री शिखा निवासी आर्यनगर सुल्तानपुर, बाजपुर	सुल्तानपुर/	0.813है०	26829	आर०बी०एम०	22.07.2019 से 21.07.2024 तक

4

River Gaula						
28	लक्ष्मी देवी पपोला पत्नी श्री पूरन सिंह पपोला निवासी उत्तरांचल विहार मल्ली बमोरी हल्द्वानी नैनीताल	खमिया न० 4 / किच्छा	1.386 है०	39501	आर०बी०एम०	25.03.2015 से 24.03.2020 तक
29	श्री आशिष सहगल पुत्र श्री ओमकार सहगल निवासी ए-441 आवास विकास किच्छा उधम सिंह नगर	सिरोली कला / किच्छा	0.2840 है०	7029	आर०बी०एम०	31.05.2016 से 30.05.2021 तक
30	अजयपाल यादव पुत्र श्री कान सिंह किच्छा उधम सिंह नगर	खमिया न० 4 / किच्छा	1.00 है०	28500	आर०बी०एम०	23.12.14 से 22.12.2019 तक
31	सुजान सिंह ग्राम खमिया न 3 तहसील किच्छा जिला उधमसिंह नगर	खमिया न० 3 तहसील किच्छा	2.22 है०	73128	आर०बी०एम०	20.03.18 से 19.03.2023 तक
32	सुरेन्द्र कौर पुत्री सतनाम	बखपुर / किच्छा	0.512 है०	39996	आर०बी०एम०	20.03.18 से 19.03.2023 तक
River Parveen						
Add other rivers						
33	श्री संदीप कुमार जिन्दल पुत्र श्री यादराम गुप्ता निवासी तहसील सितारगंज	साधुनगर / सितारगंज	0.404 है०	11514	आर०बी०एम०	30.05.2015 से 29.05.2020 तक
34	सूरेश चन्द्र जोशी पुत्र श्री रामदत्त जोशी निवासी ग्राम लाखतोली गंगोलीहाट जिला पिथौरागढ़	साधुनगर / बाजपुर	0.549 है०	14341.8	आर०बी०एम०	03.02.2016 से 02.02.2021 तक
35	फरीद खान पुत्र रसीद खान ग्राम साधुनगर सितारगंज	साधुनगर / सितारगंज	2.514	71649	आर०बी०एम०	21.02.2015 से 20.02.2020 तक
36	श्री शरीफ अहमद पुत्र श्री खलील अहमद साधुनगर तहसील सितारगंज जिला उधम सिंह नगर	साधुनगर / सितारगंज	0.790 है०	26070	आर०बी०एम०	15.06.2016 से 14.06.2021 तक
37	वन विकास निगम ग्राम उकरौली तहसील सितारगंज जिला उधमसिंह नगर	उकरौली / सितारगंज	90.00 है०	659780	आर०बी०एम०	01.10.2018 से 31.05.2019 तक

A

Mineable Potential with respect of drainage

Portion of the River or Stream Recommended for Mineral Concession	Length of area recommended for mineral concession (in Km)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in sq. meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
Kailash River	-	-	1274580	1679572
Gola River	-	-	221340	410392.8
Dabka River	-	-	1561140	2232583
Kosi	-	-	2716460	5551146
Sharda	-	-	1860000	0
Parveen	-	-	1222370	1337359
Other	-	-	487110	964477.8
Total	-	-	9343000	12175530

Mineral Potential

Boulder (MT)	Bajri (MT)	Sand (MT)	Total Mineral (MT)	Mineable Potential
Existing Mining				
-	-	-	1705540	
Other Newly indentified/ to be auction/Sanctioned (LoI) Lots				
-	-	-	10469990	
Total Potential			12175530	

Annual Deposition

Boulder (MT)	Bajri (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
-	-	-	More than 12175530.00

Grand Total of mineable mineral potential (Existing and Identified RBM deposits)

S. No.	River or Stream	Portion of the river stream recommended for mineral concession (in Km)	Length of area recommended for mineral concession (in Km)	Average width of area recommended for mineral concession (in meter)	Area recommended for mineral concession (in sq. meter)	Mineable mineral potential (in MT) (60% of total mineral potential)
1	Kailash River	-	-	-	1274580	1679572
2	Gola River	-	-	-	221340	410392.8
3	Dabka River	-	-	-	1561140	2232583
4	Kosi	-	-	-	2716460	5551146
5	Sharda	-	-	-	1860000	0
6	Parveen	-	-	-	1222370	1337359
7	Other	-	-	-	487110	964477.8
Total for the District		-	-	-	9343000	12175530


GENERAL RECOMMENDATIONS/CONCLUSIONS

During the preparation of the present report prominent rivers/ streams has been studied in detail, as the rest of the streams/ rivers either have very insignificant annual replenishment/ approachability problem or are very narrow at most of the places and as such are not fit for grant of mineral concession for mineral based industries, however it is also important to mention here that because of the regular demand of sand, stone and bajri for the developmental activities in the respective areas, such streams are prone to illegal mining. It is suggested that the auctions of quarries be done regularly to meet out the local demand subject to the approval from the joint Inspection Committee as Uttarakhand Minor Mineral Concession Rule, 2001. These mineral concessions shall also reduce demand load and will be helpful to minimize illegal extraction of minerals, failure of which may result in to illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology. Irrespective of it, following geo-scientific consideration should also be taken into account during the river bed mining in a particular area:

1. Abandoned stream channels or terrace and inactive floodplains may be preferred rather than active channels and their deltas and floodplains.
2. Stream should not be diverted to form inactive channel.
3. Mining below sub-terranean water level should be avoided as a safeguard against environmental contamination and over exploitation of resources.



4. Large rivers and streams whose periodic sediment replenishment capacities are larger, may be preferred than smaller rivers.
5. Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
6. Mining at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.
7. Continued riverbed material mining in a given segment of the river will induce seasonal scouring and intensify the erosion activity within the channel. This will have an adverse effect not only within the mining area but also both in upstream and downstream of the river course. Hazardous effects of such scouring and enhanced erosion due to riverbed mining should be evaluated periodically and avoided for sustainable mining activities.
8. Mining area should be demarcated on the ground with Pucca pillars so as to avoid illegal unscientific mining.
9. It is recommended that Sub Divisional Level Committee may take into consideration all its relevant aspects / data while scrutinizing and recommending the application for EC to the concerned Authority.


उप निदेशक/भूतत्व
भूतत्व एवं खनिकन इकाई
उद्योग निदेशालय
उधमसिंह नगर

DISTRICT UDHAM SINGH NAGAR AT A GLANCE

S.No	Items	Statistics
1	GENERAL INFORMATION	
	(i) Geographical Area (Sq. km)	3055
	(ii) Number of Tehsils / Blocks	Tehsils-7 / Blocks-7
	(iii) Number of Villages	669
	(iv) Population (As on 2001 census)	12,35,614
	(v) Average Annual Rainfall (mm)	1296.85
2	GEOMORPHOLOGY	
	(i) Major Physiographic Units	Bhabar and Tarai
	(ii) Major Drainages	Sarada, Kosi, Gola and Phikka and their tributaries are Sawaldeo, Bour, Nandhour, Bhak, Kailash etc.
3	LAND USE (ha)	53256.0
	(i) Forest	84717
	(ii) Net Sown Area	149523
	(iii) Cultivable Area	150024
4	MAJOR SOIL TYPES	Udifluventic Ustochrepts, Typic Ustipsammments, Udic Ustochrepts, Udic Haplustolls, Typic Ustochrepts
5	AREA UNDER PRINCIPAL CROPS (ha)	
	(i) Paddy	108017
	(ii) Wheat	83029
	(iii) Sugarcane	38098
	(iv) Maize	704
	(v) Pulses	3771
6	IRRIGATION BY DIFFERENT SOURCES	
	(i) Dug wells (ha)	12099
	(ii) Tube wells/bore wells (Govt./Private) (ha)	10899/85602
	(iii) Tanks/Ponds (ha)	20
	(iv) Canals (ha)/length (km)	30224/924.3
	(v) Other sources (ha)	6582
	(vi) Net Irrigated area (ha)	145426
	(vii) Gross Irrigated area (ha)	232912
7	NUMBER OF GROUND WATER MONITORING WELLS OF CGWB	31
	(i) Number of Dug wells	18
	(ii) Number of Piezometers	Nil
	(iii) Number of Hand Pumps	13
	(iv) Number Observation wells	Nil
8	PREDOMINANT GEOLOGICAL FORMATION	Varanasi /Older Alluvium
9	HYDROGEOLOGY	

	(i) Major water bearing formations	Bhabar and Tarai (Varanasi /Older Alluvium)
	(ii) Pre-monsoon depth to water level range (Period: 2006)	2.09 to 7.08 m bgl
	(iii) Post-monsoon depth to water level range (Period: 2006)	1.73 to 6.89 m bgl
	(iv) Long term water level trend in 10 yrs (1997-2006)	
10	GROUNDWATER EXPLORATION BY CGWB (as on 31/03/2008)	
	(i) Number of wells drilled (EW, OW, PZ, SH, Total)	12 Exploratory Wells
	Depth Range (m)	74.98 to 88.39
	Discharge (lpm)	2683 to 3100
	Transmissivity (m ² /day)	7484 to 14140
11	GROUNDWATER QUALITY	Overall Groundwater quality is good for domestic and irrigation purpose.
	Presence of Chemical constituents more than permissible limit	All the parameters well within the permissible limits.
12	DYNAMIC GROUND WATER RESOURCES (2004) in MCM	
	(i) Annual Replenishable Groundwater Resources	665691.8 ha m
	(ii) Net Annual Ground Water Draft	49207.27 ha m
	(iii) Projected demand for domestic and industrial uses up to 2025	12798.0 ha m
	(iv) Stage of Groundwater Development	79.34% (Safe)
13	AWARENESS AND TRAINING ACTIVITY	--
	Mass Awareness Programmes Organized	Not yet organized
	Ground Water Management Training Programmes (GWMTP) Organized	Nearby town in Haldwani 2006 GWMTP was organized
14	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	
	Projects completed by CGWB (No & Amount Spent)	Nil
	Projects under technical guidance of CGWB (Numbers)	Nil
15	GROUNDWATER CONTROL AND REGULATION	
	Number of OE Blocks	Nil
	Number of Critical Blocks	Nil
	Number of Blocks Notified	Nil
16	MAJOR GROUND WATER PROBLEMS AND ISSUES	There is no groundwater problem and issues in district Udham Singh Nagar.

DISTRICT GROUNDWATER BROCHURE

UDHAM SINGH NAGAR DISTRICT, UTTARAKHAND

1.0 INTRODUCTION

Udham Singh Nagar District is the food bowl of Uttarakhand State. Prior to its formation, it was part of District Nainital. It was separated out on the basis of physiographical conditions i.e. Tarai. It is also well known for the industries as the geographical location is conducive. Udham Singh Nagar district is famous for its agriculture and irrigation on synchronized patterns from the past as garner of popularity for its productivity in paddy crops in the whole Uttarakhand state, and it is rightly called “*Chawal ki Nagar*”, thus making it importance in bringing out the district groundwater brochure.

Udham Singh Nagar district falls in the Tarai region of Kumaon Divison. The geographical area of the district is 3055 Km² and in aerially it ranks 9th in Uttarakhand state. It is located between latitude 28° 53' N and 29° 23' N and laterally extends between longitudes 78° 45' E and 80° 08' E. The district is bounded by Nainital and Champawat districts of Uttarakhand on the north, Moradabad, Rampur, Bareilly and Philibhit districts of Uttar Pradesh on the south, Bijnor district of Uttar Pradesh on west and Nepal on the east. The Sarada River forms the international boundary between India and Nepal. The study area falls in Survey of India Toposheet (Quadrangle Maps) Nos. 53K, O, P and 62D.

For the Administrative convenience, the district has been divided into 7 developmental blocks and 7 tehsils, viz. *Japsur, Kashipur, Bazpur, Gadarpur, Rudrapur, Sitargunj* and *Khatima* with the district's headquarters at Rudrapur, shown in **Fig.1**. District Udham Singh Nagar is reported with 669 inhabited villages, block wise villages are depicted in **Table 1**. Area wise Sitargunj block is the largest (325 km²), whereas Kashipur the smallest block (185 km²). Forest covers 5.0% area of the district. The total population of the district is 12,35,614 (Census: 2001), out of which male, female population is 6,49,484 and 5,86,130 respectively. It ranks third in the state in respect of the population. The population density is 405.45 persons/km². The overall literacy rate is 64.86%.

The officers of the Central Ground Water Board (CGWB) carried out Systematic Hydrogeological Surveys (SHS)/ Groundwater Management Studies (GWMS)/Reappraisal Hydrogeological Studies (RHS) and Hydrogeological investigations in Udham Singh Nagar district from time to time since 1959.

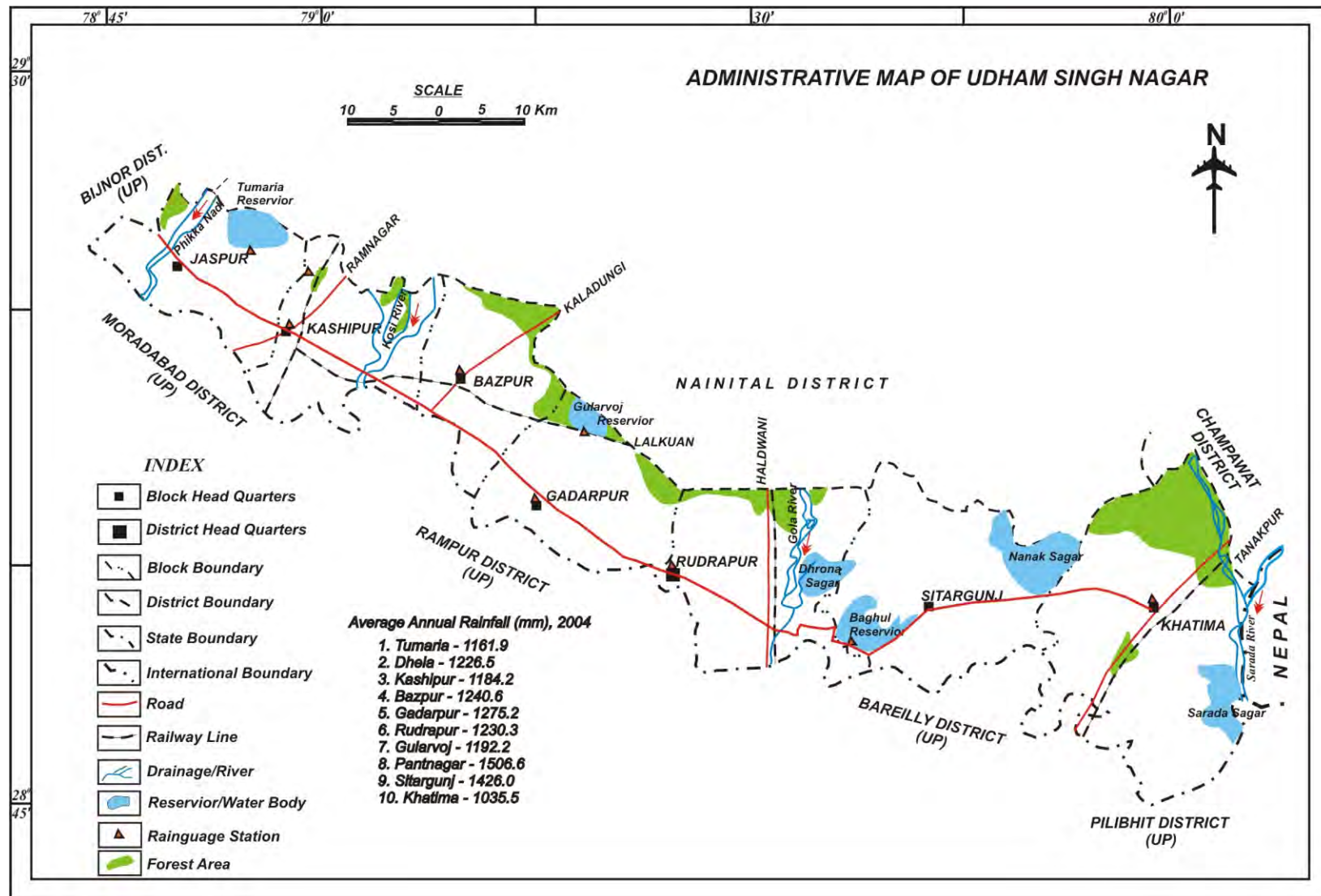


Fig. 1 Administrative map of district Udhham Singh Nagar, Uttarakhand

DRAINAGE: District Udham Singh Nagar has a dense network of the drainage pattern. The rivers of the district belongs to the Ganges drainage system. Of these, Sarada, Kosi, Gola and Phikka river and their tributaries are Sawalده, Bour, Nandhour, Br 1 Kailash etc. drain the district, shown in **Fig. 2**. The unique feature of the area is debouching of major rivers into the plains from Lower Himalayas. The overall flow direction of these rivers generally north–south trend or northeast–southwest and flows to south till its confluences with the Ganga River. The major rivers are perennial, whereas their tributaries originating from sub-Himalayan zone are ephemeral and remain dry during the non-monsoon seasons. The overall drainage pattern in the study area sub dendritic to sub parallel.

Table 1. Details of the Developmental Blocks and tehsils, District Udham Singh Nagar

S. No	Name of the Block	Area (Km ²)	Name of Tehsil	Population Census2001	Villages		
					Inhabited	Uninhabited	Total
1	Jasपुर	232	Jasपुर	98279	100	5	105
2	Kashipur	185	Kashipur	86831	75	2	77
3	Bazपुर	286	Bazपुर	102143	113	3	116
4	Gadarpur	233	Gadarpur	104201	69	-	69
5	Rudrpur	307	Rudrpur	109730	90	-	90
6	Sitargunj	325	Sitargunj	146584	120	2	122
7	Khatima	324	Khatima	161291	89	1	90
	Forests	1103		23541			
	Urban	60		403014			
	Total	3055		1235614	656	13	669

(Source: District statistical Diary, 2005, district Udham Singh Nagar)

CROPPING PATTERN: Agriculture is the primary occupation of the people as it justifies the title of “Chawal ki Nagari”. About 64% of the total work force is engaged in farming the very fertile land (Tarai formation). Khariff and Rabi are two major cropping seasons. The main Khariff crops are rice, soyabean, Urd, Moong and till, and the Rabi crops are wheat, barley, Gram, Masoor, Mustard, Sunflower. It is observed in the study area that the rice crop is grown three times in a year. The total reported area in district is 279455 ha, out of which 84717 ha are occupied by the forests. Net sown area in the district is 149523 ha and gross sown area is 246481 ha. Area had sown more than once in the district is 96561 ha.

Area under *Rabi* and *Khariff* crops are 97973 ha and 139928 ha respectively. 8580 ha is reported under the *Zaid* crop. The sugarcane crop is also grown in very intensively as it is a cash crop.

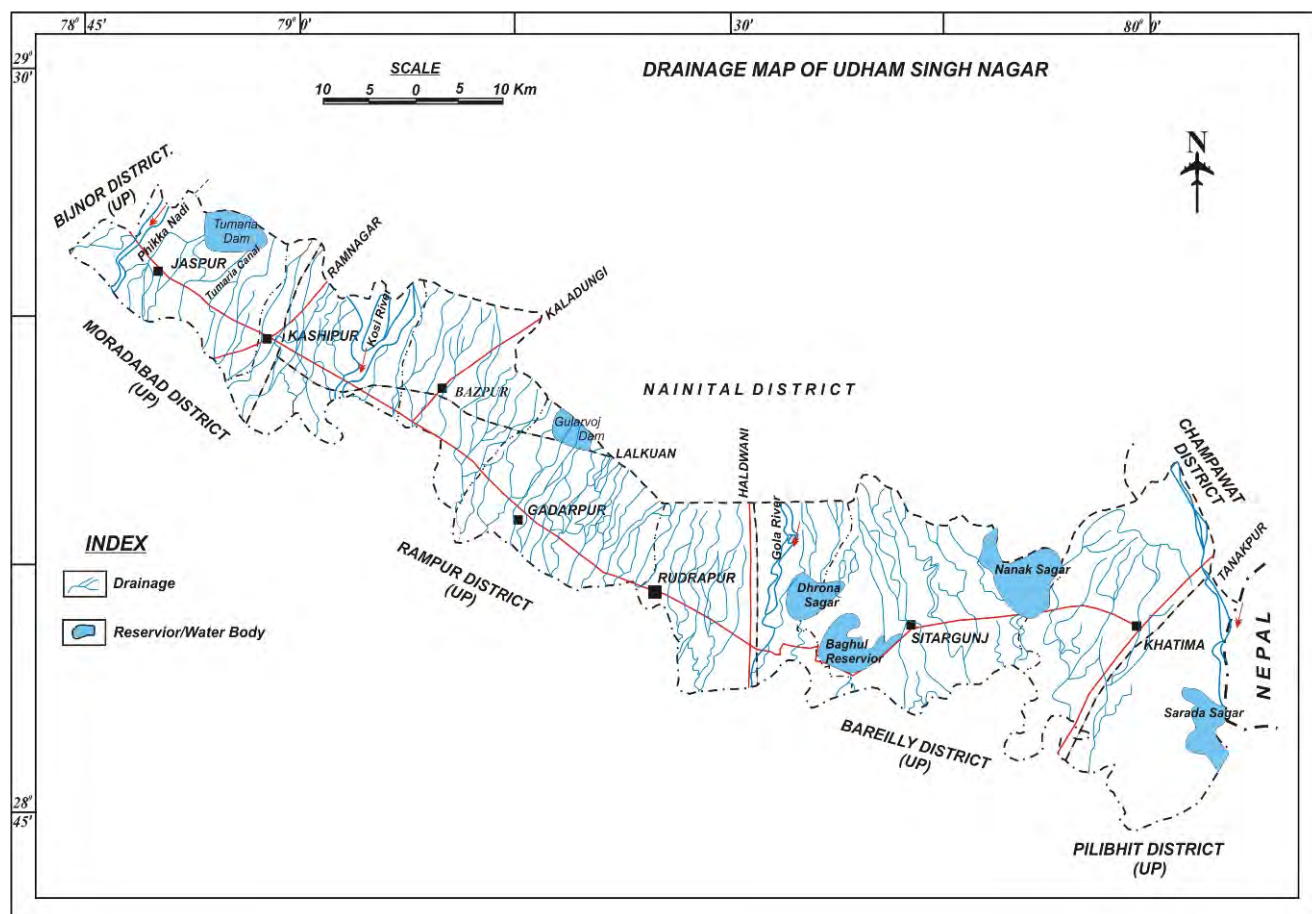


Fig. 2 Drainage map, District Udham Singh Nagar

IRRIGATION: The major rivers Kosi, Gola, and Sarada provide ample water to meet the irrigation demand, besides major reservoirs like Tumaria (Jaspur), Gularboj and Haripura (Gadarpur), Dron, Baghul and Nanak Sagar (Sitargunj) and Sarada Sagar (Khatima) in the study area. The prominent canals like Kosi, Gola and Sarada irrigate a large area of the Tarai belt and the other canals are Tumaria, Nathanpir. The branches of the major canals are the Gandli, Sukhi, Katna, Kailash, Kaman, Sanedi. The length of the canals in the study area is 924.3 km, which caters the needs of irrigation. Gadarpur block owns the maximum length of canals in the district, is of 205.65 km. Drip irrigation and sprinkler irrigations are in practice. The total irrigation potential created/utilized through minor irrigation schemes, through groundwater and surface water scheme is 144.140 and 72.851 mha, respectively.

There are 24703 shallow tubewells and 400 deep tube wells tapping multiple aquifers in the district.

2.0 CLIMATE AND RAINFALL

The climate varies from Sub-tropical and sub-humid with three distinct seasons i.e. summer, monsoon (rainy season) and winter. The rainy season starts from the month of middle June to September end, and followed by the winter season, which starts from the end of October and goes up to February. The winter rains are generally experienced in late December or early January, which brings down the temperature and that's how December and January are the coldest months in the district. The summer season starts from March and it goes up to June. The hottest months of the year are May and June. The maximum temperature in the district goes up to 42°C during the summers and the minimum temperature is between 1 and 4°C, further north of the district, the temperature comes down to 0.4°C in winter season.

Rainfall, spatially, is highly variable depending upon the altitude. The intensity of the rainfall increases from south to north and the amount of rainfall decreases in generally from west to east. About 90% of the rainfall received during the monsoon period, and the remaining 10% of the rainfall in non-monsoon period. The average annual rainfall is 1296.85 mm (Year; 2004). The annual rainfall according to the rainguage station and block-wise depicted in **Table 2** and pictorially shown in **Fig. 1**.

Table 2. Details of Rainfall (mm), District Udham Singh Nagar

S. No	Rainguage Station	Name of Block	Year	Rainfall (mm)
1	Tumaria	Jaspur	2004	1154
2	Kashipur	Kashipur	2004	2122
3	Dhela	Kashipur	2004	1137
4	Bazpur	Bazpur	2004	1317
5	Gadarpur	Gadarpur	2004	1121
6	Gularboj	Gadarpur	2004	1105
7	Rudrapur	Rudrapur	2004	1154
8	Pantnagar	Rudrapur	2003	2035.1
9	Sitargunj	Sitargunj	2004	1122
10	Khatima	Khatima	2004	1035.5

(Source: Irrigation Department, 2005, District Udham Singh Nagar)

3.0 GEOMORPHOLOGY AND SOIL TYPE

Udham Singh Nagar district may be broadly divided into two physiographic units from north to south viz., Bhabar and Tarai respectively. Since the area is located in the Himalayan foothills, a very thick column of alluvium is deposited, which further is classified into two distinct divisions:

(A) *The piedmont fan deposits known as Bhabar*

(B) *The Tarai Alluvium*

These zones spread in northeast – southwest direction all along the foothills of the Siwalik formation having a maximum width of less than 30 km. The general gradient towards south varies from 9 to 17 m/km. The slope gradually decreases towards south in the Tarai region and becomes almost flat close to the boundary between Tarai and Central Ganga plains, which exists few km south of the southern boundary of the study area. The geomorphology of an area plays a very significant role in the groundwater movement and occurrence, pictorially represented in **Fig. 3** and corresponding legend for groundwater prospects tabulated in **Table 3**.

The soil types are controlled by the topography and rock types. Based on the National bureau of soil Survey and Land Use Planning (ICAR) Nagpur, the soils of the district Udham Singh Nagar can be classified into Udifluventic Ustochrepts, Typic Ustipsamments, Udic Ustochrepts, Udic Haplustolls, Typic Ustochrepts as determined by their diagnostic properties. The Bhabar soils lay at the northern extremity of Khatima and Bazpur blocks, part of the alluvial fan deposits. Soils are shallow with sandy to loamy texture, poorly sorted, comprising mainly of gravel, sand, silt, clay with pebbles etc.

The Tarai soils run all along the northern extremity of the district, form continuous fringe with the Bhabar Zone. Bhabar formation is found in extreme northern parts of the Khatima and Bazpur blocks, boundary demarcated by the contact of Tarai and Bhabar. The Tarai belt is 8–25 km in width, and the general slope is <1% towards south. Soil is calcareous, moderately productive and suitable for extensive cultivation of high yielding variety of crops like rice and sugar cane. Soils typify marshy and swampy environment.

4.0 GROUNDWATER SCENARIO

4.1 GEOLOGY

Geology plays an important role in shaping the groundwater scenario of an area. So, it becomes imperative to know the geology of District Udham Singh Nagar. Piedmont alluvial deposits represent the geology of the study area. Broadly, it can be divided into two

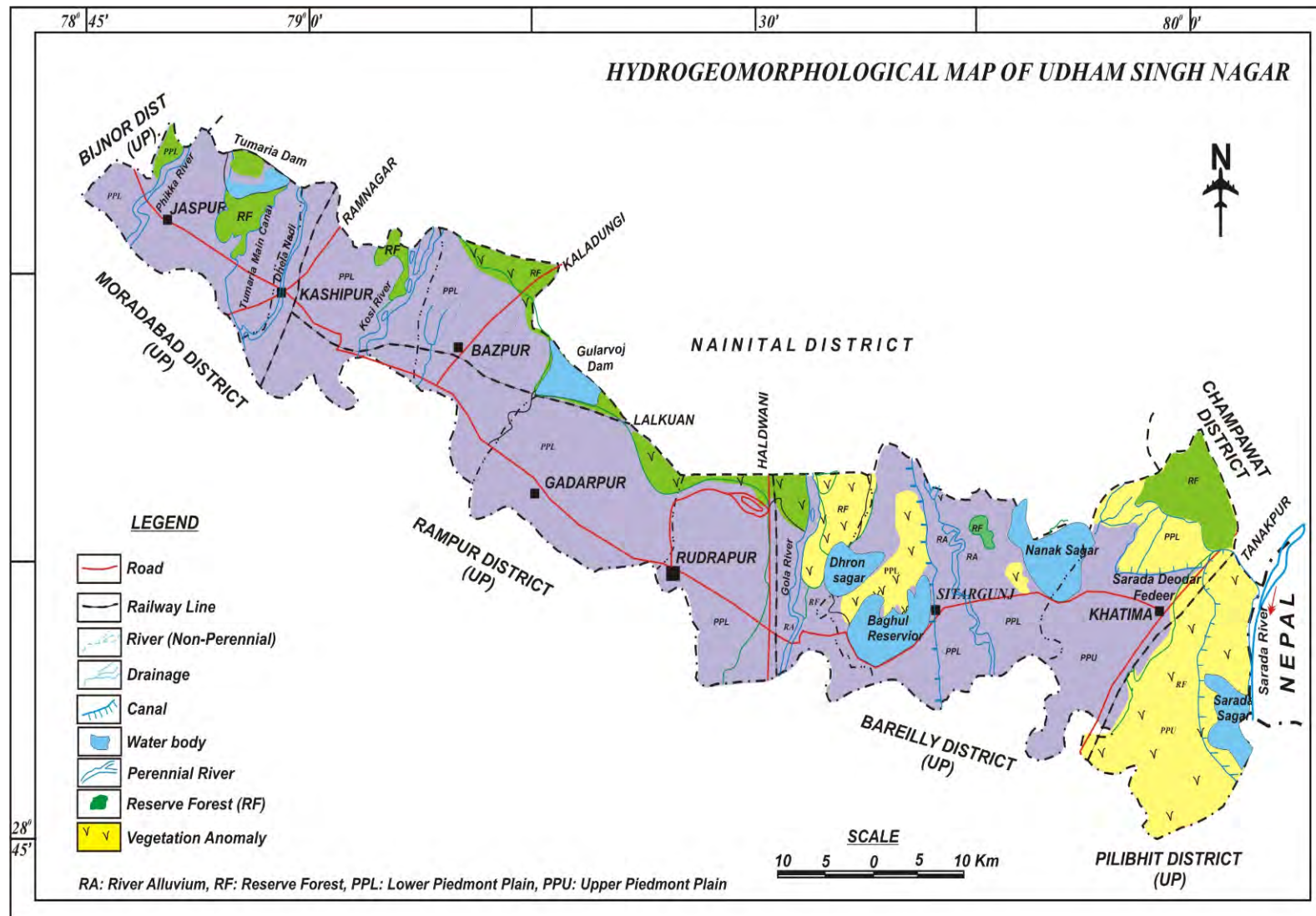


Fig. 3 Hydrogeomorphological Map of District Udhamsingh Nagar, Uttarakhand

formations viz. Bhabar and Tarai. These are characterized by distinct lithology, grain size distribution, variation of degree of sorting etc. a generalized geological succession, of the area, is as follows; Geological map of Udham Singh Nagar is shown in the **Fig. 4**.

Table 4. Geological details of district Udham Singh Nagar, Uttarakhand

Age	Morphotectonic Unit	Divisions	Lithology
Recent to Quaternary	Piedmont	Bhabar	Boulder sand and clay
	Alluvial plain	Tarai	Sand, clay and slit.

(i) BHABAR FORMATION:

Bhabar formation is essentially constituted of alluvial deposits lying on the sloping plains in the Himalayan foothills. It is primarily constituted of unconsolidated sediments like sand, gravel, boulder and clays. The grain size varies from material of sand grade (2 mm) through

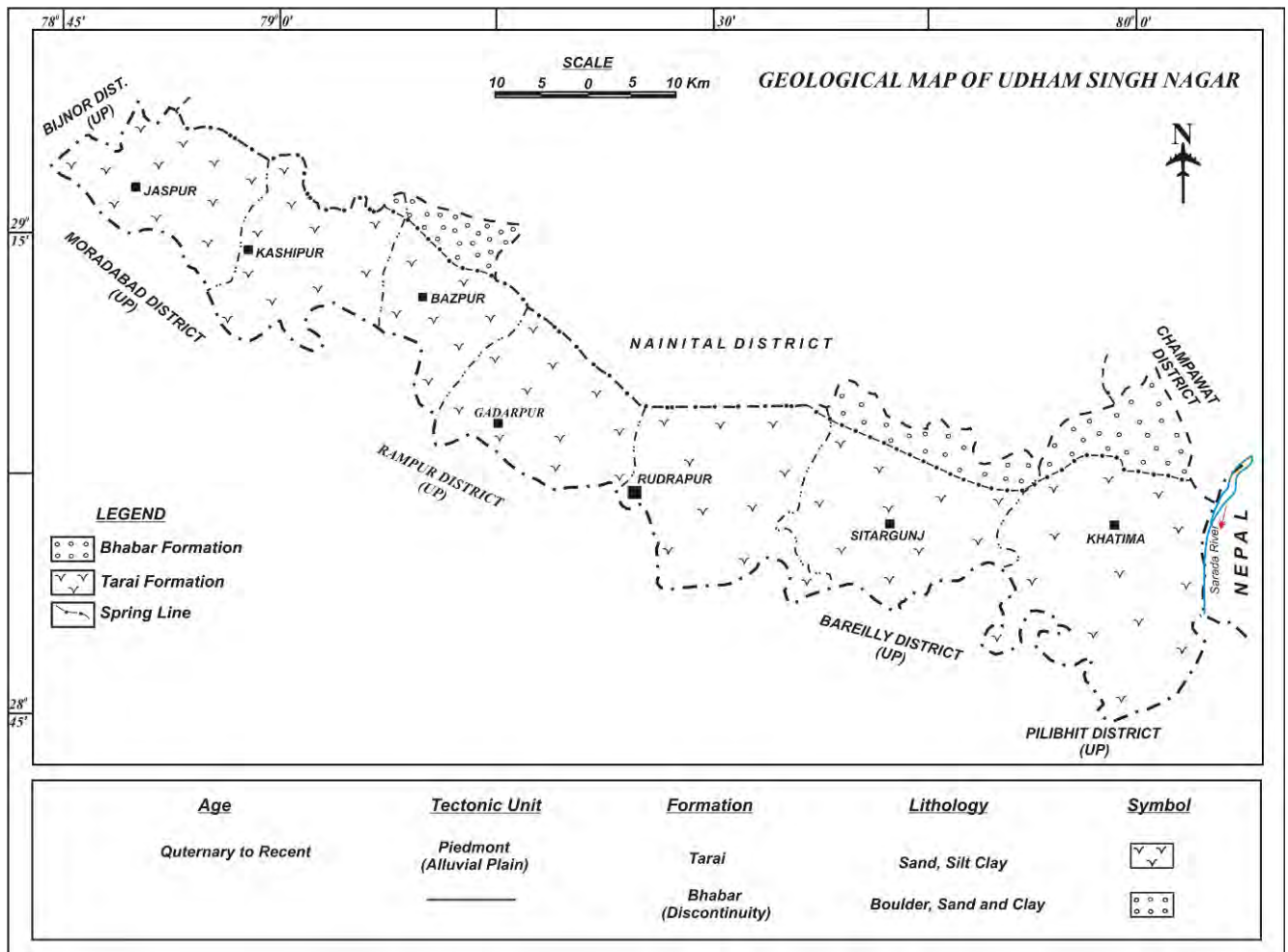


Fig. 4 Geological map of District Udham Singh Nagar

granules, pebbles, cobbles to boulders size i.e. >256 mm, sometimes the boulders have dimensions in feet. The clays are generally brown in color and clay bed sequences tend to pinch and for the same reason have short lateral continuity. The Bhabar formation is exposed immediately south of the Siwaliks of the Himalayan foothills, observed at northern parts of the Bazpur, Siatargunj and Khatima blocks. The exact trend and disposition of Bhabar formation depends largely upon the disposition of the Siwaliks. The extreme northern portion of the Bhabar zone is marked by the contact with Siwalik Ranges, whereas the southern limit is defined by the contact between Bhabar and Tarai, which forms the spring line or marshy conditions. The width of the bhabar formation is quite variable, the maximum being 21 kms.

(ii) TARAI FORMATION:

The Tarai formation is exposed immediately south of the Bhabar formation, and the name itself being derived from marshy conditions. Tarai formation consists of clays, sandy clays, fine to medium sand and occasional gravels. In this formation there is a dominance of clayey successions over sandy horizons. The granular zones mostly occur as lenses and have inter-tonguing relationships with clastic and non-clastic units. The northern limits of the zone is demarcated by the spring line, i.e. the contact between Bhabar and Tarai, whereas the southern limit of this zone is taken to be the region where auto flow conditions cease to exist in the tube wells. The Tarai sediments representing the finer portion of the channel bed load and the load in suspension and solution, which are brought by the streams and evenly sorted out by the river action. Tarai formation is better sorted as compared to the Bhabar.

4.2 HYDROGEOLOGY

Generally the groundwater flows from north to south in the study area. Based on the behavior and occurrence of groundwater, the district can be broadly categorized into two broad hydrogeomorphic units namely (1) Bhabar and (2) Tarai, which have significantly different Hydrogeological attributes. These are briefly described hereunder and the Hydrogeological map of Udham Singh Nagar district is shown in **Fig.5**.

(i) BHABAR ZONE: Bhabar is highly porous and permeable alluvial tract lying in an elongated form along the Siwalik foothills. It has northwest–southeast elongation and forms

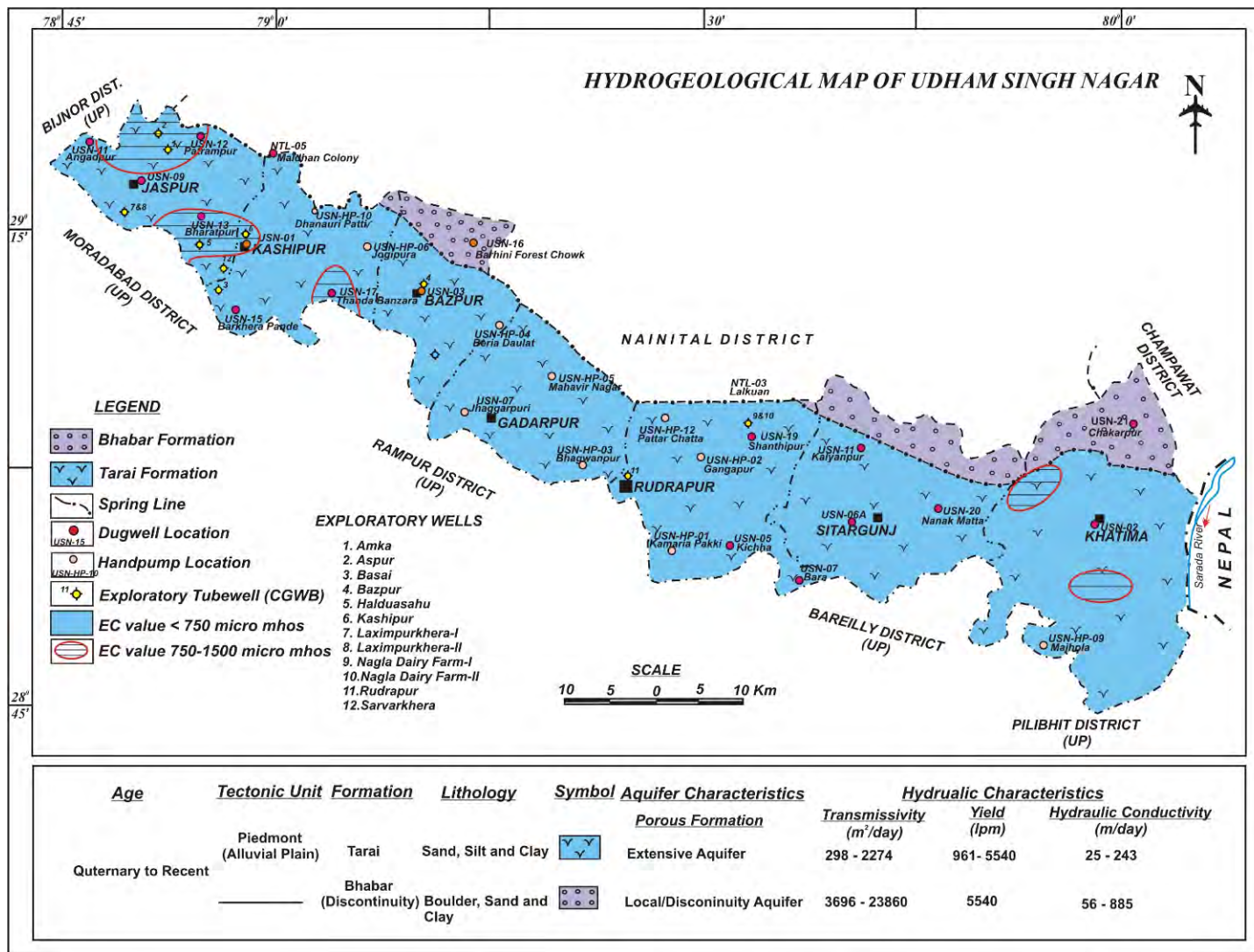


Fig.5 Hydrogeological Map of District Udhampur, Uttarakhand

a highly potential hydrogeologic unit. Bhabars are poorly sorted, unconsolidated sediments viz., boulders, cobbles, pebbles, and granules, coarse to fine sand, silt and clay. The Bhabar merges gradually with the Tarai occurring in the south. The contact between these two hydrogeomorphic units is characterized by the change in slope and groundwater effluents, which form the spring line. These channels debouch the sediments at the downhill, over the foothills of the sub-Himalayan zone.

The sediments are deposited in the form of triangular alluvial fans and cones, by the braided streams. The alluvial cones join together to form an extensive piedmont plain. This Bhabar zone is highly productive. This zone is characterized by high degree of permeability and porosity, allowing major part of the precipitation to infiltrate, within a very short span of time, leading to the formation of excellent groundwater reservoirs. The aquifers in these zones are mostly unconfined. However, there are perched conditions also present in the study area. The Bhabar zone acts as a recharge front for the Tarai belt. Depth to water level progressively decreases towards south and water finally emerges at the surface as a spring line.

Bhabar is the main intake area close to the Himalayan foothills. Generally the water table is as deep as 75 m bgl; the water table also shows higher seasonal fluctuation.

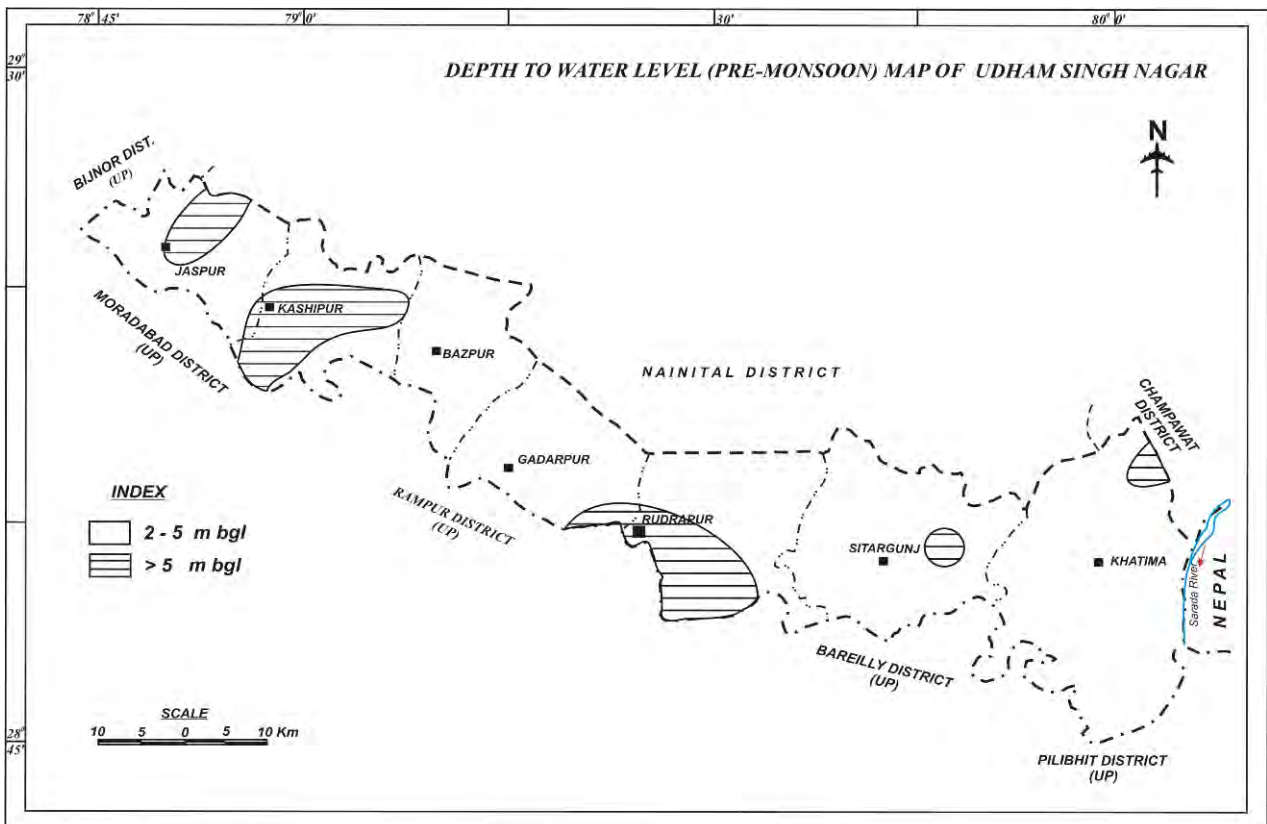


Fig. 6 Depth to water level Map (Pre-monsoon, 2006), District Udham Singh Nagar

The groundwater body appears to be sustained and recharged by (1) direct infiltration from precipitation on the land surface, and (2) infiltration from turbulent streams flowing across the belt. Considerable amount of water is also discharged by perennial springs at the southern limit of Bhabar during in monsoon seasons. The formation is favorable to percolate the water laterally from the Bhabar to Tarai and the Older Alluvium further south. The hydraulic gradient is approximately 2.97 m/km. The pre monsoon and post monsoon depth to water level ranges from 2.01(Barhini) to 5.58 (Chakarpur) m bgl, and 1.73 (Barhini) to 5.20 (Chakarpur) m bgl, respectively. Seasonal fluctuation varies from 0.28 to 0.38 m. The depth to water level of pre monsoon, post monsoon and seasonal fluctuation maps are prepared and shown in **Fig. 6**, **Fig. 7**, and **Fig. 8**, respectively. The yield of the tube well is observed up to 5540 lpm. The transmissivity values range from 3696 to 23860 m²/day. The hydraulic conductivity, as deciphered from pumping tests, range from 56 to 825 m/day.

(ii) **TARAI ZONE:** Tarai formation lies south of the Bhabar, which comprises predominantly of clays and silts with horizons of well-sorted granular material such as sand,

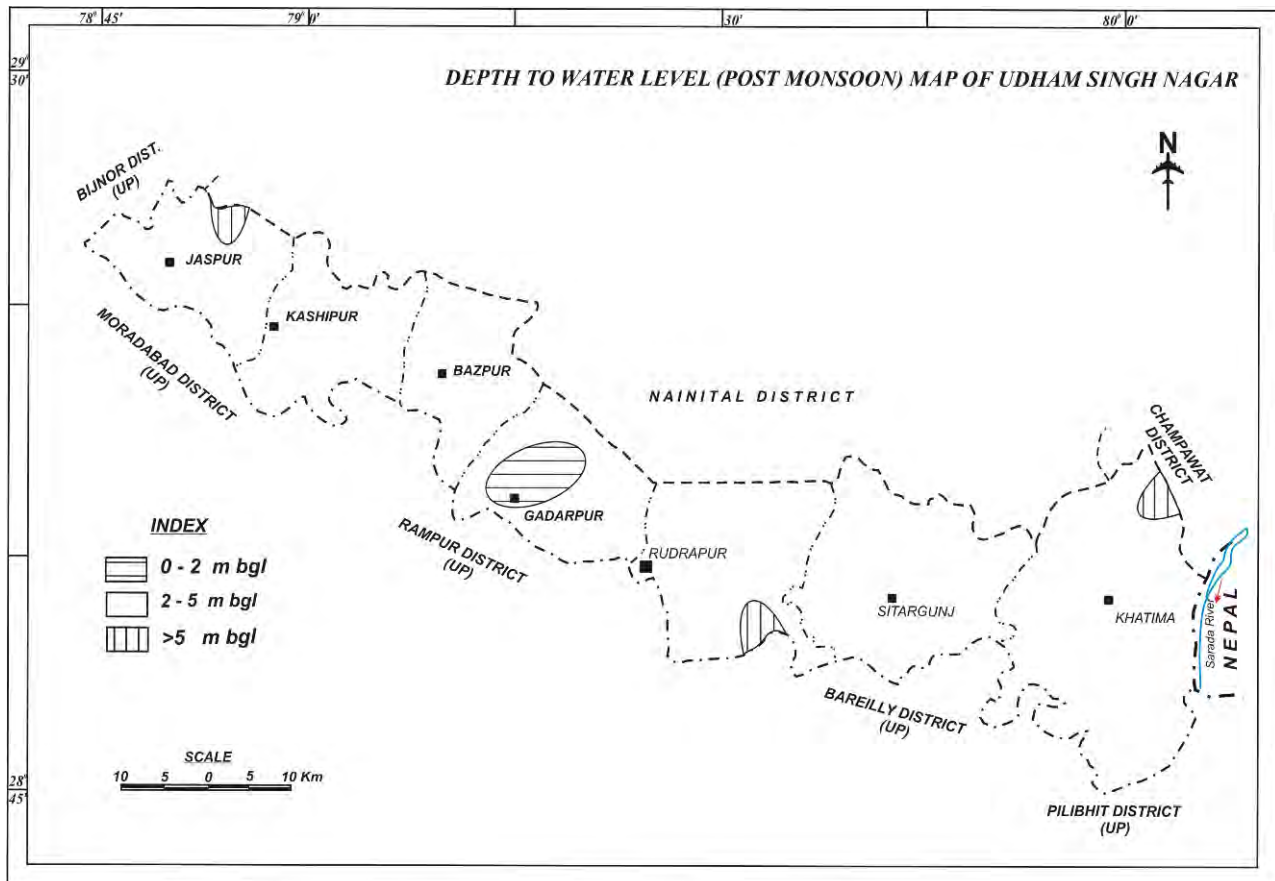


Fig. 7 Depth to water level Map (Post-monsoon, 2006), District Udham Singh Nagar

gravel occasionally boulders and cobbles and pebble beds. The boundary between the Bhabar and the Tarai is defined by a spring line, which is characterized by auto-flow (free-flowing) conditions. There are plenty of moist and waterlogged areas around the spring line particularly during monsoon season. The sand and gravel associated with the finer fractions are the major aquifers in this zone.

Groundwater in shallow aquifer is tapped through dug-wells; the groundwater occurs under unconfined/phreatic conditions. The groundwater in deep aquifers is, under confined and artesian conditions. The deeper aquifers (> 50 m) being generally confined conditions with higher artesian heads, and the tightly cased tubewells constructed in them result in flowing wells. The unconfined shallow groundwater of the Tarai may be recharged by (1) the direct infiltration from rainfall on the land surface, (2) the infiltration from the streams when flooded, (3) return seepage from irrigation (4) lateral percolation from adjacent Bhabar zone. On the contrary, the confined groundwater is probable recharged by downward percolation and lateral flow from Bhabar belt. Bhabar is, therefore, the intake area for Tarai as well.

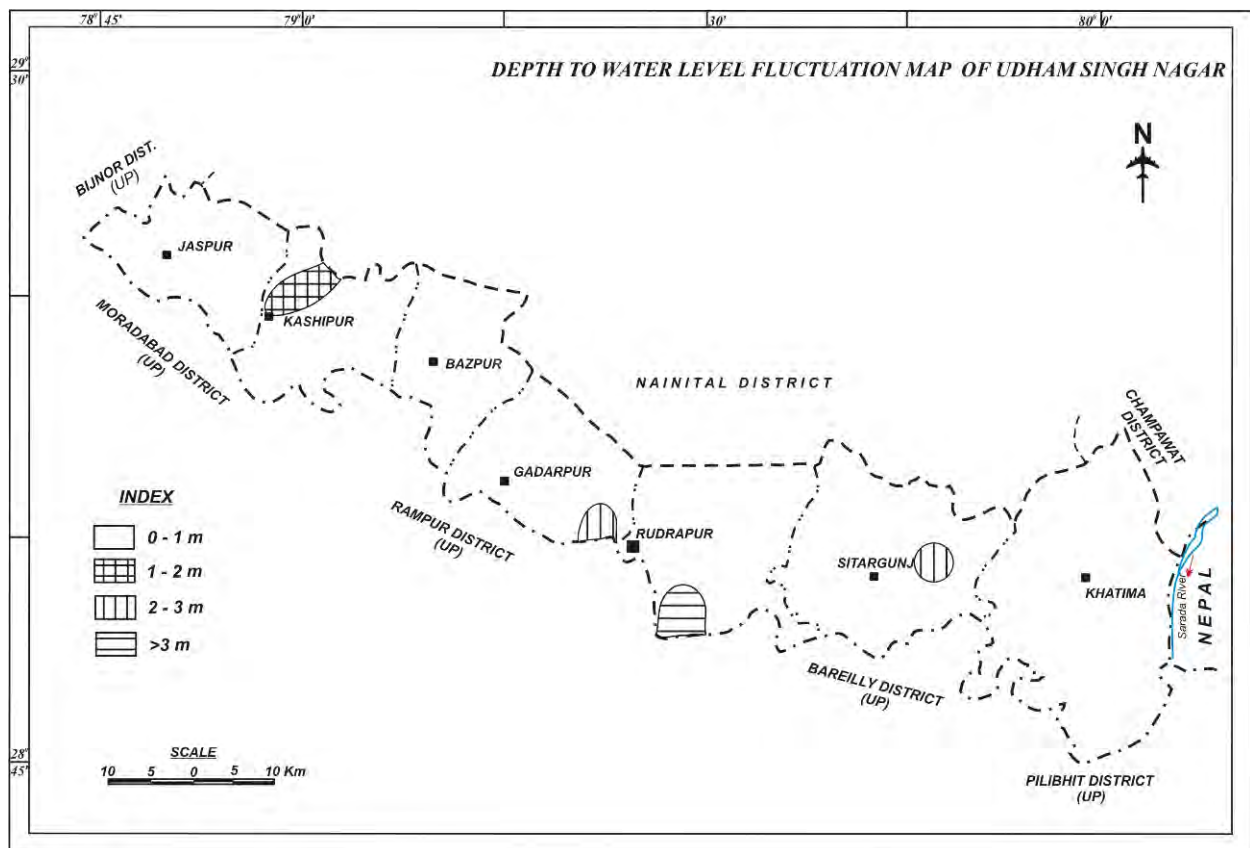


Fig. 8 Fluctuation Map (Period, 2006), District Udham Singh Nagar

The groundwater in Tarai zone occurs both in unconfined and confined conditions. In the unconfined aquifer, the depth to water level in pre monsoon and post monsoon varies

from 2.09 to 7.08 m bgl and from 1.99 to 6.89 m bgl, respectively. The seasonal fluctuation varies from 0.09 to 3.56 m. The general slope of water table is from north to south. The detailed hydrogeological map along with locations of exploratory tube wells are shown in **Fig. 5**. The tube wells tapping deeper confined aquifers with auto-flow conditions yield 25.0 to 55.0 lps of freshwater for a draw down of 2.0 to 8.0 m. In case of tubewells tapping confined aquifers with non flowing conditions the yield varies between 10 and 40 lps for a draw down of 4.0 to 9.0 m. The exploratory wells of CGWB tapping confined aquifer, drilled depth ranges from 74.98 to 88.39 m, yield ranges from 2683 to 3100 lpm, transmissivity values range from 1180 to 2500 m^2/day , and the hydraulic conductivity ranges from 25 to 243 m/day. The hydraulic gradient ranges between 1.35 to 4.0 m/km. the coefficient of permeability ranges between 17 and 108 m/day.

(iii) GROUNDWATER CONDITIONS IN AUTO FLOW ZONES:

Artesian conditions are restricted to the Tarai zone. In a well, penetrating through an aquifer, the water level will rise above the bottom of the confining bed. If the water level rises above the top of the upper confining layer, above the ground surface, free flowing /auto flow conditions result. In this zone confining conditions result due to intercalation of permeable materials like sand and gravel with impervious clay horizons. The difference in elevation of Bhabar and Tarai, together with the regional slope of the strata, appears to build the artesian head in the aquifers. Permeability of the Tarai aquifers is less than that of Bhabar, thereby playing a vital role in developing the pressure, as it impedes ground water flow. The discharge of the tubewells is dependent of aquifer properties, and local ground conditions. There are more than 2000 artesian wells existing in Kashipur, Bazpur, Gadarpur, Rudrapur and Sitargunj blocks. Central Ground Water Board has constructed artesian wells at Basai, Kashipur, Bazpur, Nagla and Rudrapur (**Fig. 5**). The drilled depth ranging from 84.4 to 433.0 m bgl, with free flowing head upto 8.69 m above ground level. The yield of these wells upto 3400 lpm, with the drawdown 5.39 to 10.69 m. The Transmissivity values range from 825 to 12274 m^2/day , and the hydraulic conductivity ranges from 16.17 to 106.6 m/day.

It is observed that the pressure head of the artesian aquifers drastically reduced over the two decades and some of the shallower depth wells lost its artesian conditions. The causes of reduction in discharge of artesian wells may be attributed i. Over exploitation of groundwater due to industrialization ii. Reduction in recharge area due to developmental activities in Bhabar zone iii. Over exploitation of confined artesian aquifer iv. Interlinking of

confined and unconfined aquifers due to increased number of tube wells, v. choking of wells and vi. Continuous free flow of artesian water as there is no efforts to arrest the auto-flow.

(iv) GROUNDWATER MONITORING WELLS (GMMW):

Central Ground Water Board has established 28 nos. groundwater monitoring wells to monitor the groundwater regime periodically and to study the hydrogeological behavior of the aquifers in district Udham Singh Nagar, which are shown in **Fig. 5**. The basin wise groundwater monitoring wells are given in **Table 5**.

Table 5. Details of block wise groundwater monitoring wells, District Udham Singh Nagar

S. No	Name of the Block	GMMW	Type of structure	Basin	Geology
1	Jaspur	1. Jaspur 2. Angadpur 3. Patrampur 4. Bharatpur	DW DW DW DW	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
2	Kashipur	1. Kashipur 2. Barkhera Pande 3. Dhanauri Patti 4. Jogipura 5. Thanda Banzara	DW DW HP HP DW	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
3	Bazpur	1. Bazpur 2. Banna Khera 3. Barhini FC 4. Beria Daulat	DW DW DW HP	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
4	Gadarpur	1. Mahavir Nagar 2. Jhaggarpuri 3. Bhagwanpur	HP HP HP	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
5	Rudrapur	1. Pattar Chatta 2. Gangapur 3. Kamaria Pakki 4. Shanthipur 5. Kichha 6. Bara	HP HP HP DW DW DW	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
6	Sitargunj	1. Sitargunj 2. Kalyanpur 3. Nanak Matta	HP DW DW	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium
7	Kahtima	1. Khatima 2. Chakarpur 3. Majhola	DW DW HP	Ganga Basin Ramganga Sub-basin	Terrace and Channel Alluvium

4.3 GROUNDWATER RESOURCES

Groundwater resource estimation has been carried out for district Udham Singh Nagar. As a part of the Reappraisal Hydrogeological Studies (RHS) in the study area, an attempt has been made to evaluate the available groundwater resources in the district based on the norms laid down in GEC-1997 (Groundwater Resource Estimation Committee) as well as the adhoc norms of the State Groundwater Department (Erstwhile Uttar Pradesh). Resources have been calculated block wise based on the Water Table Fluctuation (WTF) and Rainfall Infiltration Method (RIF). The overall stage of groundwater development in the district is 79.67%, and it is mentioned in the **Table 6**. The summarized results of the resource potential details of each block are depicted in the **Table 7**. The graphical representation of stage of groundwater development (groundwater availability, groundwater draft and balance) had shown block wise in the **Figure .9** given hereunder.

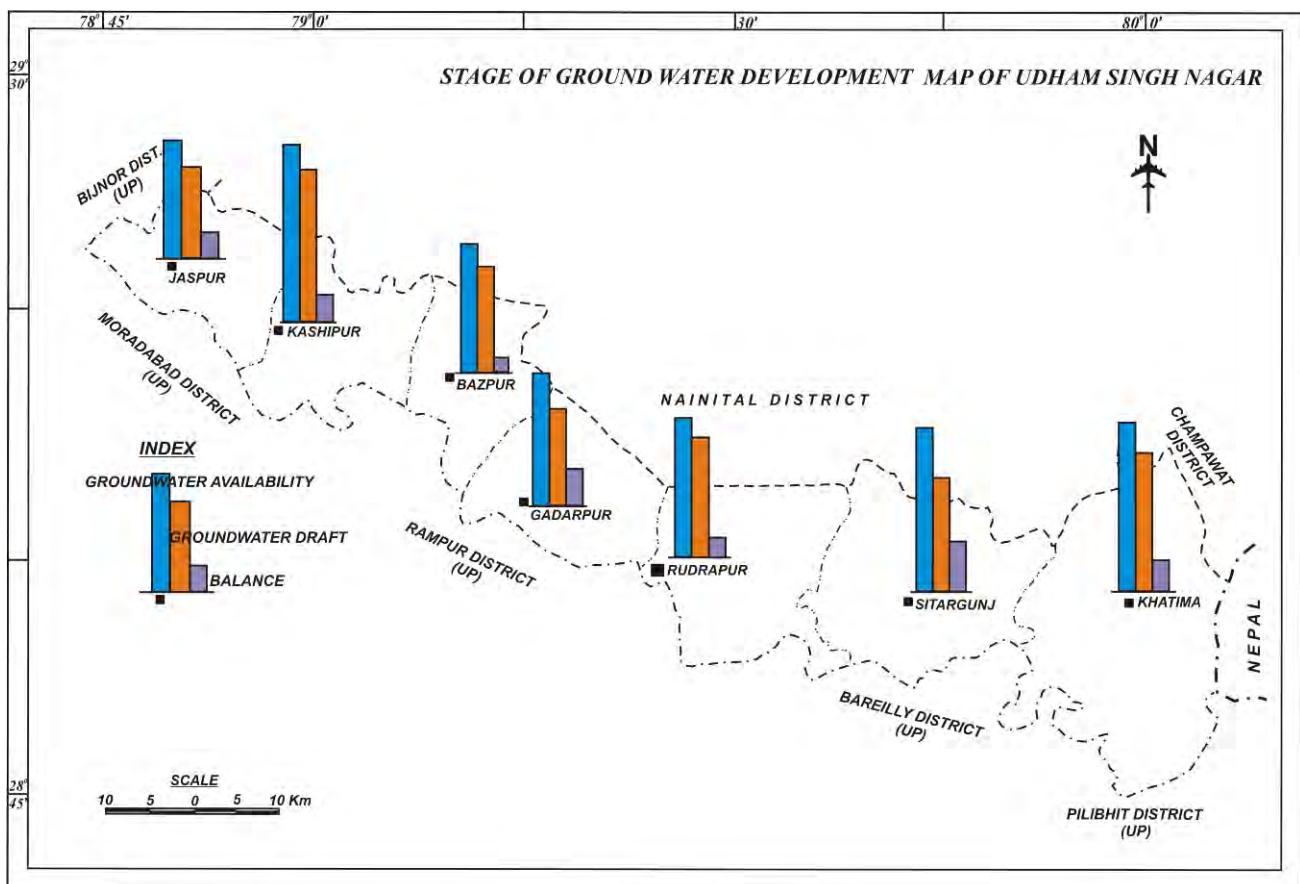


Fig. 9 Bar diagram of Stage of groundwater development, district Udham Singh Nagar

Table 6. Groundwater Resources Potential (in Ha m), District Udham Singh Nagar

S. No	District	Total annual GW Recharge	Net GW Availability	Annual draft for all uses	Net GW Availability for future irrigation	Stage of Development (%)	Remarks
1	Udham Singh Nagar	665691.8	62005.8	49207.27	12798	79.67	For plain area

Table 7. Block-wise Groundwater Resources Potential District, Udham Singh Nagar, Uttarakhand as on 01/04/2004

S. No	Block	GW Availability	GW Draft	Level of Development (%)	Categorization
1	Jasipur	8868.06	6836.73	77.09	Semi-Critical
2	Kashipur	7331.68	6179.41	84.28	Semi-Critical
3	Bazpur	8151.94	6905.15	84.70	Semi-Critical
4	Gadarpur	7226.31	5256.68	72.74	Semi-Critical
5	Rudrapur	7880.80	6838.26	86.77	Semi-Critical
6	Sitargunj	10960.79	7629.64	69.60	Safe
7	Khatima	11586.26	9561.40	82.52	Semi-Critical

Rudrapur block (86.77%) has shown the highest groundwater development, and the lowest groundwater development is shown by the Sitargunj block (69.60%). As per the norms of GEC-1997, all the blocks are under semi-critical situation except Sitargunj block with safe distinction.

4.4 GROUND WATER QUALITY

To assess the chemical quality of groundwater in the study area, 63 numbers of water samples collected from various structures like dug wells, hand pumps, tube wells etc. and got them analyzed for EC, pH, Calcium, Magnesium, Sodium, Potassium, Bicarbonate, Chloride, Nitrate, Copper, Lead, Zinc, Iron, Chromium and Manganese. The ranges of different chemical parameter, in District Udham Singh Nagar, are tabulated in **Table 8**.

Table 8. Variations of different chemical parameter, District Udham Singh Nagar

Parameter	Dug wells/Hand Pumps
Electrical Conductivity (EC)	262 – 1300 μ mhos
pH	7.8 - 8.3
Calcium (Ca)	8 – 40 mg/l
Magnesium (Mg)	10 – 58 mg/l
Sodium (Na)	1.4 – 46 mg/l
Potassium (K)	0.4 – 68 mg/l
Bicarbonate (HCO_3)	18 – 262 mg/l
Chloride (Cl)	7 – 270 mg/l
Nitrate(NO_3)	0.5 – 63 mg/l
Fluoride (F)	0.1 – 0.4 mg/l
Total Hardness as CaCO_3	120 – 300 mg/l
Copper (Cu)	0.02 – 0.03 mg/l
Lead (Pb)	0.01 – 0.03 mg/l
Zinc (Zn)	0.03 – 1.09 mg/l
Iron (Fe)	0.12 – 3.00 mg/l
Chromium (Cr)	0.02 – 0.13 mg/l
Manganese (Mn)	0.10 – 3.20 mg/l

5.0 GROUNDWATER MANAGEMENT STRATEGY

Groundwater in Udham Singh Nagar district has been extensively developed through tubewells. Proper management is required to minimize the over withdrawal of priceless groundwater in the district. The artesian aquifers are required to be protected by putting sluice valves on the wells, which arrests the free flow of water. Most of the shallow artesian aquifer got dried because of the over development of the groundwater in the area. It is observed from the groundwater management studies, the shallow tube wells less than 60 feet are giving very low discharge during summers, for which deeper aquifers are to be tapped for further future groundwater development. Rainwater Harvesting and Artificial Recharge are to be practiced on a larger scale in the Bhabar areas, which is recharging zone for Tarai area, thus maintaining discharge/pressure head of the artesian wells.

5.1 STATUS OF GROUNDWATER DEVELOPMENT

Groundwater in Udham Singh Nagar district has been extensively developed through tubewells. Central Ground Water Board has constructed twelve exploratory wells (**Table 9**), out of them five wells are exhibiting auto-flowing conditions, viz, Basai, Kashipur, Bazpur, Nagla and Rudrapur, The discharge of these wells ranges between 961 and 2300 lpm. State Government (Jal Nigam, Irrigation Department etc) and local populace have drilled maximum tubewells in the alluvial portions with depth ranging from 60 to 150 m bgl. The discharge of these tubewells ranges from 1200 to 2500 lpm.

5.2 WATER CONSERVATION AND ARTIFICIAL RECHARGE

Proper groundwater management is required to minimize the over withdrawal of priceless groundwater in the district. Rainwater Harvesting and Artificial Recharge are to be practiced on a larger scale in the Bhabar areas. The Bhabar zone along the foothills of Siwalik consists of boulders, gravels, sand and clay, which exhibit high porosity and permeability enabling it to form a good recharge zone through direct infiltration of precipitation. The Groundwater Management Studies reveals that the overall groundwater flows in north–south direction. The high altitude areas of Siwalik and Bhabar areas may be used for the construction of check dams by tapping the lower order streams, so that groundwater is recharged in the plain areas (Tarai Zone), which enables/restores the life of some artesian wells. The areas where maximum agricultural activities and industrial withdrawal are taking places may be selected for rainwater harvesting and groundwater recharge through abandoned dugwells or dried bore wells.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS

Hydrogeological investigations reveal that the depth to water level is shallow in Udham Singh Nagar district since last two decades and there is no change in the long term water level trend. The shallow aquifer gets contaminated and gives foul smell as many industries discharges their untreated effluents directly to near by water bodies, which affects the quality of drinking water. Groundwater pollution studies are to be taken up in project mode to bring out clearer picture in realistic manner. However, in hand pumps the quality problem is mainly because of the color (yellowish brown) and bitter taste, indicating that

the water has very high iron content. Putting an iron filter unit with the outlet of the hand pump can solve the problem.

7.0 AWARENESS & TRAINING ACTIVITY

There is no mass awareness and ground water management training activities have been conducted in the district. However, one Groundwater Management Training on “Rainwater Harvesting and Artificial Recharge to Groundwater” has been conducted in nearby town, Haldwani, Nainital district by Central Ground Water Board, Uttaranchal Region, Dehradun. The delegates participated from both the districts Udham Singh Nagar and Nainital. The Industrialist working in the area were advised and requested to save groundwater from various sources of pollution and to adopt Rainwater Harvesting and Artificial Recharge to sustain groundwater resources. The Gram Pradhans, Village Development Officers and NGOs were especially invited so that they could increase the awareness among villagers on important issues like sustainable development of the fast depleting groundwater resource by adopting methods on conservation of groundwater. In order to create awareness in masses, exhibition on different techniques of Rainwater Harvesting in rural and urban areas were exhibited. During the Training Programme, Sh. A. M. Khan, the then Regional Director gave a talk on water conservation and management. Dr. R. P. Singh, Scientist ‘D’, delivered lecture on various techniques of Rainwater Harvesting in rural and urban areas and discussed about the significance of such activities, in context of hilly region. Dr. S. K. Srivastava, Scientist ‘B’ (Chemist) elaborated on the quality of water for drinking and irrigational uses and discussed in detail about pollution hazards of groundwater.

8.0 AREA NOTIFIED BY CGWA

There is no block under over exploited category in district Udham Singh Nagar and hence no notified area by Central Ground Water Authority.


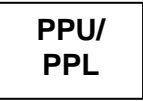






9.0 RECOMMENDATIONS

1. The groundwater is developed mainly through tube wells, hand pumps and dug wells. The overall groundwater scenario in the district is safe to semi-critical. However, the situation is slowly deteriorating due to over exploitation of groundwater

due to rapid urbanization, industrialization besides rapid deforestation. There is an urgent need for intensive monitoring of groundwater scenario in the district.

2. Deforestation must be avoided in Bhabar areas, which is recharge zone for groundwater.
3. In the district, paddy is grown intensively, leading to over exploitation of groundwater. The local farmers should be encouraged to adopt cultivating of other less water consuming crops along with paddy.
4. Due to artesian conditions in 1/3rd area of the district, water is being wasted as there is no mechanism to regulate the free flow of groundwater. There should be proper mechanism to stop such wastage, which facilitate to protect the diminishing pressure heads of the artesian wells.
5. Unmetered domestic water is being supplied in the district, which leads to wastage of water. There should be metered domestic water supply so as to encourage water conservation.
6. Some of the major towns/cities are situated close to perennial rivers like Sarada, Gola, Kosi and Phikka. A battery of shallow tube wells may be constructed along these rives to augment domestic water supply and irrigation. This will help to reduce stress on groundwater.
7. The district receives moderate to high rainfall and most of it goes waste as runoff. There is an urgent need to harvest the rainwater by utilizing it for artificial recharge. On farm rainwater conservation will not only help to reduce depletion of groundwater but will also help to preserve the soil nutrients.
8. Abandoned dug wells can be used for recharging the groundwater instead of filling with garbage.
9. Mass Awareness and Rainwater Harvesting Training programmes should be taken up with the participation of local people for creating awareness.
10. Detailed pollution studies are required in the vicinity of the industrial areas like Kashipur, Rudrapur and Sitargunj blocks to asses the quality of groundwater.
11. In the district, hand pumps and dug wells are being monitored as groundwater monitoring wells, which easily get disturbed by anthropogenic activities, so loosing the valuable water level data. To mitigate this problem, purpose built Piezometers should be constructed, so that long term water level data can be obtained.

Table 3. Hydrogeomorphological aspects and details of geomorphic units, District Udham Singh Nagar, Uttarakhand

Map Symbol	Geomorphic Unit	Lithostratigraphy	Structure	Description	Groundwater Prospects
	Fluvial boulder bed	Boulder, gravel, sand	--	Deposited partly as valley fills and constitutes boulder, cobble, pebble, gravel, sand and silt	Excellent
	Piedmont Plain (Upper/Lower) (PPU/PPL)	Rock Debris and Alluvium	--	Piedmont plain in the area is found as gently sloping plain formed of the foot hill zones by the coalescence of several alluvial fans consisting of fine to coarse alluvium brought by Kosi and Gola rivers and several other streams such as Sawaldeo Nadi, Bour Nadi, Nandhour Nadi etc, debouching from the hills to the plains. Upper/Lower piedmont plains are marked based on slope variation and extension of deposition. Lower piedmont plain contain more silt and clay and is covered with vegetation (Bhabar)	Moderate to Good
	Alluvial Fan (AF)	Alluvium		Streams deposits whose surface approximates segment of a cone that radiates down slope from where the stream leaves a mountainous region. Such alluvial fans are observed along Gola river and in between Bour Nadi and Bhak Nadi.	Good
	Ravines (RA)	Alluvium (AI)		Ravenous lands are identified as small, narrow, deep depressions smaller than gorge. The gullies are covered by surface run-off and are marked by eroded land surfaces along Kailash Nadi and Gola river.	Poor
	Terrace	Alluvium (AI)		Occurs by the sides of Kosi river and its upper reaches and are almost flat terraces. These terraces are separated by steep wall like escarpments and are characterized by thick vegetation.	Moderate to Good
	<u>Landforms</u> Vegetation Anomaly	--	--	Thick dense vegetation indicates the presence of loose material and good quantity of water.	Moderate to Good
	Meander scar			Abandoned meanders in the lower piedmont plain areas are often filled in by alluvial deposits and covered with vegetation.	Good to excellent
	Water logged area			Water logged areas are identified at places where the water table is at or near land surface.	Good for shallow aquifers

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