

CENTRAL GROUND WATER BOARD

Ministry of Water Resources

Government of India

GROUND WATER INFORMATION BOOKLET

HOSHIARPUR DISTRICT, PUNJAB

North Western Region

CHANDIGARH

2013

Contributors

M. L. Angurala  
Scientist-“C”

Prepared under supervision of

Regional Director

GROUND WATER INFORMATION BOOKLET  
HOSHIARPUR DISTRICT, PUNJAB

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HOSHIARPUR DISTRICT AT A GLANCE	
ITEMS	Statistics
GENERAL INFORMATION	
i) Geographical area (sq.km)	3365
ii)Administrative Divisions	
Number of Tehsil/Block	04/10
Number of Panchayat/Villages	
iii)Population (as on 2001 Census)	1480736
iv) Normal Annual Rainfall (mm)	938
GEOMORPHOLOGY	
Major Physiographic units	Alluvial Plain
Major Drainages	Beas and Satluj Rivers
LANDUSE (Sq.Km)	
a) Forest area	1000
b)Net area shown	2180
c) cultivable area	3410
MAJOR SOIL TYPES	
Calcerous sand to fine sandy loam to silt	
AREA UNDER PRINCIPAL CROPS	
2920	
IRRIGATION BY DIFFERENT SOURCES(Areas and Numbers of Structures)	
Tube Wells/Boreholes and Dugwells	1350
Tanks/Ponds	-
Canals	200
Other Sources	20
Net Irrigated area	1570
Gross irrigated area	2820
NUMBERS OF GROUND WATER	
MONITORING WELLS OF CGWB	
14	
No. of Dug Wells	03
No. of Piezometers	9
PREDOMINANT GEOLOGICAL FORMATIONS	
Quaternary Alluvium	
HYDROGEOLOGY	
Major Water bearing formations	Sand layers

Pre-monsoon depth to Water Level	4-11.52mbgl
Post-monsoon depth to water level	2.65-17.05mbgl
Long term water level trend in 10 yrs (1997-2006)in m/yr	0.68m/yr to 0.07m/yr
<b>GROUND WATER EXPLORATION BY CGWB</b>	
No of Total wells drilled	48
EW	39
PZ	09
Depth Range (m)	55-459
Discharge (litres per min.)	708-2900
Storativity (S)	$58 \times 10^{-2}$ - $1.8 \times 10^{-3}$
Transmissivity (m <sup>2</sup> /day)	634 m <sup>2</sup> /day-4120 m <sup>2</sup> /day
<b>GROUND WATER QUALITY</b>	
chemical constituents more than permissible limit	Fe and As
Type of Water	Calcium- Bicarbonate type
<b>DYNAMIC GROUND WATER RESOURCES(2011) in MCM</b>	
Annual Replenishable Ground Water Resources	<b>881.58</b>
Net Annual Ground water Draft	<b>912.97</b>
Provision for Domestic and Industrial Uses upto 2025	<b>61.21</b>
Stage of ground Water Development	104%
<b>AWARENESS AND TRAINING ACTIVITY</b>	
<b>EFFORTS OF ARTIFICIAL RECHARGE &amp; RAINWATER HARVESTING</b>	
<b>GROUND WATER CONTROL AND REGULATION</b>	
OE Blocks	5. Mukerian, Hazipur, Dasuya, Tanda, Garhshankar
Critical Blocks	-
Notified Blocks	-
<b>MAJOR GROUND WATER PROBLEMS AND ISSUES.</b>	Over exploitation and declining water level

GROUND WATER INFORMATION BOOKLET  
HOSHIARPUR DISTRICT, PUNJAB

INTRODUCTION

Hoshiarpur district falls in the eastern part of the Punjab State and is bounded by North latitudes 30°58'30" and 32°08'00" and East longitudes 75°28'00" and 76°30'00". It falls in parts of Survey of India Toposheets nos. 43P, 44M and 53A and covering an area of 3365 sq.km. The district is drained by the river Beas in the north and northwest and Satluj in the south. The district is well connected by roads and railways. It shares common boundaries with Kangra and Una districts of Himachal Pardesh in the north east, Jalandhar and Kapurthala districts (interspersed) in south-west and Gurdaspur district in the north-west. The main townships are Hoshiarpur, Dasuya, Garh Shankar and Mukerian and Tanda-Urmur. The towns are well connected by roads. Administratively the district has four tahsils, five sub-tehsils and ten blocks. The tehsils are Hoshiarpur, Dasuya, Garh Shankar and Mukerian. The blocks are Hoshiarpur-I, Hoshiarpur-II, Bhunga, Tanda, Dasuya, Garh Shankar, Mahipur, Mukerian, Talwara, Hazipur. The district is one of the second lowest densely populated districts of the state. The area of present Hoshiarpur District was also part of Indus Valley Civilization. Recent excavations at various sites in the district have revealed that the entire area near the Shivalik foothills was selected for habitation not only by the early Paleolithic man but also by those in the protohistoric and historic periods. In the explorations, seven early Stone Age sites at Atbarapur, Rehmanpur and Takhni, 30-40 km north of Hoshiarpur District in the foothills of Shivalik, have been discovered where the stone artifacts have been found. Besides these excavations, among the archaeological remains in the Hoshiarpur District, the remains of temples at Dholbaha, 24 km north of Hoshiarpur, and especially the local legends throw valuable light on the ancient history of the district. At present, it has an area of 3386 Sq. Kms. and a population, as per 2011 Census is 15, 82,793 persons. Area wise Population as per 2011 Census

Tehsil	Rural			Urban			Total population
	Male	Female	Total	Male	Female	Total	
Hoshiarpur	1,88,136	1,80,544	3,68,680	99,322	89,786	1,89,108	55,77,88
Dasuya	1,52,076	1,49,368	3,01,444	28,983	27,198	56,181	3,57,625
Garhshankar	1,53,456	1,48,840	3,02,296	14,677	13,632	28,309	3,30,605
Mukerian	1,38,583	1,36,966	2,75,549	31,688	29,538	61,226	3,36,775
Total	6,32,251	6,15,718	12,47,969	1,74,670	1,60,154	3,34,824	15,82,793

## RAINFALL & CLIMATE

The climate of Hoshiarpur district is classified as tropical steppee, hot and semi-arid which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. There are four seasons in a year. The hot season starts from mid March to last week of the June followed by the south west monsoon which lasts upto September. The transition period from September to November forms the post monsoon season. The winter season starts late in November and remains upto first week of March.

**Rainfall:** The normal annual rainfall of the district is 938 mm which is unevenly distributed over the area in 38 days. The south west monsoon , sets in from first week of July and withdraws in end of September, contributes about 77% of annual rainfall. July and August are the wettest months. Rest 23% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast .

### Rainfall:

Normal Annual Rainfall:	938 mm
Normal monsoon Rainfall:	720 mm

### Temperature

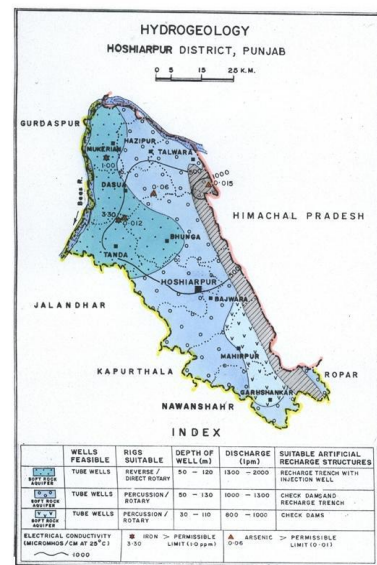
Mean Maximum:	39 <sup>o</sup> C (May- June)
Mean Minimum:	5 <sup>o</sup> C(January)
Normal Rainy days:	38

## GEOMORPHOLOGY

Total area of Hoshiarpur district is 339000 hectares, out of which forest area is 109000 hectares (32.15 per cent). Nearly 60 percent is the net sown area out of which 81 percent is irrigated and the cropping intensity is 170 percent, 18 percent points less than the state average. For 90 percent of irrigated area, source of irrigation is tubewells (electric operated) and wells. Based on topography, soil-crop-climate complex, the district can be divided into three broad regions.

**First region** is constituted by flood plains comprising Dasuya, Tanda and Mukerian blocks. This is the most fertile area of the district covering one-fourth of the geographical area. It has wide spread irrigational facilities. Paddy, wheat, maize and sugarcane are the main crops of

this region. **Second region** the Kandi area located at the foot of Shivalik Hills and covers the sub-mountainous undulating plain with a slope of 16 metres per kilometer which progressively decreases towards the west side of the district. This belt Comprise of Hazipur, Talwara, Bhunga Hoshiarpur-II Blocks and parts of some other blocks. There is acute shortage of water in this area and this area faces high incidence of soil erosion which is caused by the rivulets (choes) passing through this region and are flooded during the rainy season. Soil of this region is poor and it constitutes about more than one-half of the total geographical area of the district of which two-third area is sown under rain fed conditions. Maize and wheat are the major crops of this region. A lot of soil and water conservation activities like rain water harvesting structures, harvesting of base flow and micro lift systems for irrigation, rain water recharging structures have been done and have shown very good results. **Third region** comprises Hoshiarpur-I, Mahilpur and Garhshankar blocks located on the beds of lower Shivalik, these are undulating plains with relatively low slope decreasing up to 4 meters per kilometer. There is acute scarcity of water supply in the belt. This area is suitable for maize, Sugarcane and paddy crops. Of late, potato sunflower/maize cropping pattern has emerged in a vast area of this region. The major horticulture crops in the district are Kinnow & other citrus fruits, Mango, Guava, Peach and Grapes etc. The predominant economic activities include agricultural farming, dairying, poultry farming, horticulture, mushroom cultivation, bee keeping, ban making and other village and cottage industries, handicrafts production and export thereof, transport, service activities and trade and business. There is increasing demand for new activities such as Vermiculture, beekeeping, Turmeric cultivation, Amla cultivation etc. The district is emerging as a honey bowl. Overall 70 percent of the total area is irrigated. In the Kandi block the situation is bad as in Talwara as only one fourth of its area is irrigated and only 36 percent is area net sown. In Bhunga block the only 42 percent of the area is net sown, In many other blocks (Hoshiarpur-11, Hazipur, Garhshankar and Mahilpur) nearly 60 percent of the area is under cultivation.



### HYDROGEOLOGY:

Unconsolidated alluvial sediments lying south of Siwalik foothills mainly occupy the district. The alluvial sediments are classified as piedmont and fluvial deposits. The piedmont deposits lie along Siwalik Hills, which comprises boulders, pebbles, gravel, sand and clay. It is further divided into Kandi and Sirowal, which are



contemporaneous, and merge imperceptibly with each other. The fluvial comprise of silt, sand, gravel and clay in association with Kankar. Ground water is generally fresh at all levels. Ground water exploration was carried out at 48 sites which includes 5 piezometers . The boreholes at Patti Khas, Naloian, Jian, Hariana and Niala were abandoned due to insufficient thickness of aquifers. In the rest of the area, as well the ground water occurs under unconfined conditions in shallow aquifers and under semi-confined to confined condition in deeper aquifers. The drilling depth range from 126 to 460m bgl and constructed in the depth range of 103 to 374m. The yield of these wells ranges from 708 lpm to 2900 lpm with draw down of 5 to 12m. The wells constructed in the northwestern part of the district were high yielding wells than those constructed along the Siwalik foothills zone. Transmissivity of aquifers ranges from 634 to 4120 m<sup>2</sup>/day. The hydraulic conductivity value in the district varies from 2 to 29m/day. The value of storage coefficient worked out to be 58x10<sup>-2</sup> to 1.8 x 10<sup>-3</sup>

Block	SNO	LOCATION	Type Of Well
Bhunga	1.	Hariana	Ew
	2.	Janauri	Ew
	3.	Bhunga	Ew
	4.	Raghowal	Ew
	5.	Bhikhowal	Ew
	6.	Kapahat	Ew
	7.	Gardhi Wala	Pz
	8.	ADHOWAL GARHI	Pz
Dasuya	9.	Khuddar	E W
	10.	Dasuya	Pz (Deep)
	11.	Dasuya	Pz (Shallow)
	12.	Janauri-I	Ew
	13.	Janauri-II	Ew
	14.	Koulpur	Ew
Garh Shankar	15.	Garh Shankar	Pz
	16.	Achalpur	Ew
	17.	Malkowal	Ew
	18.	Binewal	Ew
	19.	Shahpur	Ew
	20.	Hajipur	Ew
	21.	Simbli	Ew
	22.	Simbli	Pz (Shallow)
Hazipur	23.	Hazipur	Ew
Hoshiarpur-I	24.	Fateh Garh Nigra	Ew
	25.	Naloian	Ew
Hoshiarpur-II	26.	Jian	Ew
	27.	Mahalam Wali	Ew
	28.	Patti Khas	Ew

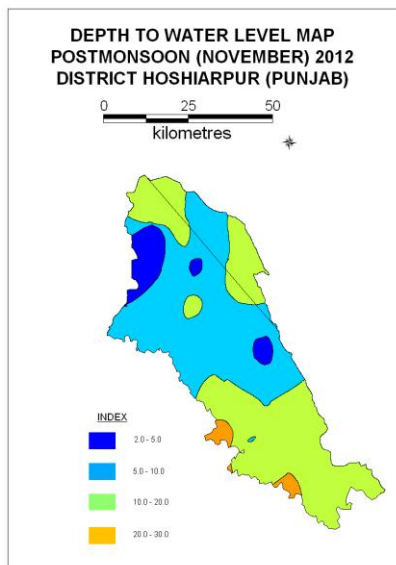
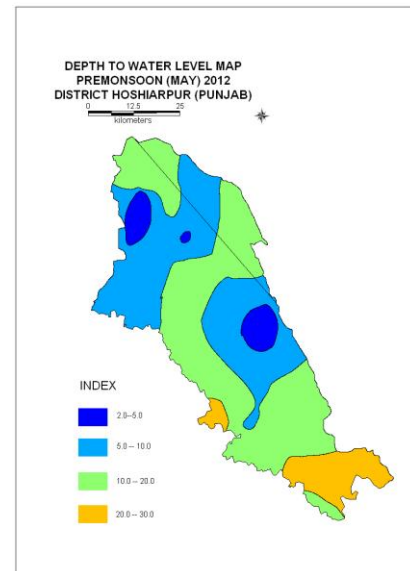
	29.	Rampur Colony(HSP)	Pz (Deep)
	30.	Rampur Colony(HSP)	Pz (Shallow)
	31.	Rampur Colony(HSP)	Pz V. Shallow)
	32.	Phuglana	Pz
Mahilpur	33.	Helron	Ew
	34.	Nayiala	Ew
	35.	MAHILPUR	Pz
Mukerian@	36.	-	-
Talwara	37.	Bamboo Tar	Ew
	38.	Talwara	Ew
	39.	Beh Jogan	Ew
	40.	Nangal Khanaura	Ew
	41.	Beh Kittu	Ew
	42.	Sansarpur	Ew
	43.	Rajwal	Ew
	44.	Labbar	Ew
	45.	Bhandarian	Ew
	46.	Palahara	Ew
	47.	Bringli	Ew
Tanda	48.	Jalalpur	Ew

Aquifer Group	Depth Range ( m bgl)	General Nature
I	0 to 55	Unconfined consisting of individual sand & clay layers
II	160 to 225	Semi-confined/ confined consisting of individual sand and clay layers.
III	380 to 425	Confined, consisting of thin sand layers alternating with thicker clay layer

## Water level behavior

### PRE-MONSOON

During the pre-monsoon period depth to water in the district varies from 3.63 m bgl at Dumriwal (Kandi belt) to 27.22m bgl at Phuglana (Alluvial plains). Depth to water level less than 10m is of Hazipur, Mukerian, Tanda and Dasuya in northern, Hoshiarpur-I&II in central parts of district. Depth to water level in range of 10 to 20m in parts of Hazipur, Talwara Dasuya, Bhunga, Hoshiarpur-I&II Mahilpur and Garhshankar blocks of the district. water levels still become deeper (>20m) in the south eastern parts of the district falling in garhshankar



block.

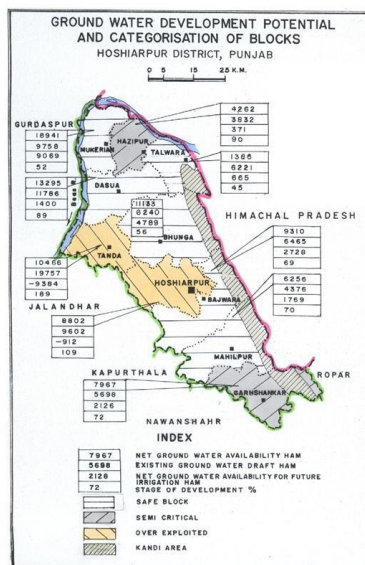
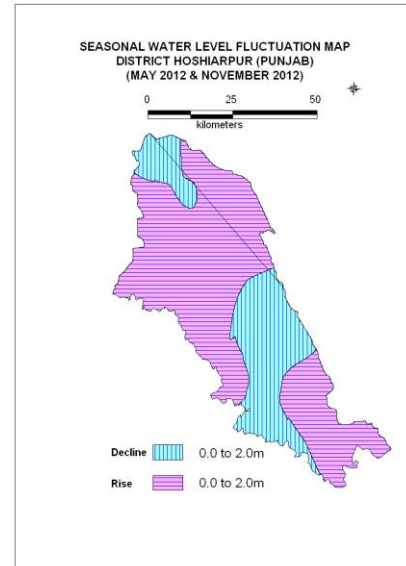
**POST-MONSOON** During the pre-monsoon period depth to water in the district varies from 3.03 m bgl at Chohal (Kandi belt) to 28.88m bgl at Phuglana (Alluvial plains). Depth to water level less than 10m is of Hazipur, Mukerian, Dasuya, Tanda and Bhunga in northern, Hoshiarpur-I&II in central parts of district. Depth to water level in range of 10 to 20m in parts of Hazipur, Talwara, Hoshiarpur-II, Mahilpur and Garhshankar blocks of the district. Deeper water levels (>20m) is found in isolated patches in falling in garhshankar block.

## Seasonal water level fluctuation

Water level rise upto 2m has been recorded in all blocks in the district, whereas decline has been recorded parts of Hazipur, Hoshiarpur-II and Mahilpur blocks.

## Ground water flow

The elevation of the water table in the district varies from 221.34 to 229.34 m above mean sea level. The water table elevation map shows the general slope of the water table towards South SE from North. The average gradient of the water table is of the order of 1.5 m/km. The overall flow of



ground water is from north to southeast direction.

## Ground Water Resources

Ground Water Resources estimation of the district was done in 2004 for each individual block. Perusal of the Estimates reveals overall stage of ground water development in the district is of the order of 84%. The ground water development in two blocks viz Tanda (189%) and Hoshiarpur-I (109%) of the district has exceeded the available recharge and thus the blocks have been categorized as over exploited. Talwara block has least development of ground water among all blocks i.e. 45%. Net annual ground water availability of the district is 91817 ham and existing gross ground water draft for all users is 78139 ham.

The block wise ground water resource potentials in the district are given below:-

GROUND WATER RESOURCE AND DEVELOPMENT POTENTIAL OF HOSHIARPUR DISTRICT, PUNJAB AS ON 31<sup>ST</sup> MARCH, 2011 in ha m

S. No.	Assessment Unit	Annual Ground Water Availability	Existing Ground Water Draft for irrigation	Existing Ground Water Draft for domestic and industrial USES	Existing Gross Ground Water Draft for all uses	Provision for domestic, and industrial requirement supply to 2025 years	Net Ground Water Availability for future irrigation development	Stage of Ground Water Development (%)
1	BHUNGA	9510	6239	344	6583	465	2805	69
2	DASUYA	12704	14112	323	14435	434	-1842	114
3	GARHSAHNKAR	12472	14072	964	15035	1114	-2714	121
4	HAZIPUR	5701	5677	331	6008	447	-423	105
5	HOSHIARPUR-1	8405	5135	1089	6224	1339	1930	74
6	HOSHIARPUR-II	8752	5243	533	5776	659	2850	66
7	MAHILPUR	6818	5084	331	5415	447	1287	79
8	MUKERIAN	12736	13695	353	14048	469	-1428	110
9	TALWARA	1724	1217	224	1441	303	204	84
10	TANDA	9336	16001	329	16330	444	-7109	175
	<b>TOTAL</b>	<b>88158</b>	<b>86475</b>	<b>4822</b>	<b>91297</b>	<b>6121</b>	<b>-4438</b>	<b>104</b>

## **Ground Water Quality**

Data of chemical analysis of water samples from shallow aquifers indicates that ground water is slightly alkaline in nature ( pH varies between 7.45 to 8.20). Salinity is low to medium ( E.C. value ranges between 280 to 1050 ). All chemical parameters are well within the permissible limits for safe drinking waters set by Bureau of Indian Standards (BIS 1991, revised in 2007) except Iron which is high at two locations with a value of greater than 1.0 mg/l which is permissible limit and As greater than the permissible value of 0.01 mg/l also at two locations. Among anions, bicarbonate is the dominant ion and among cations Ca ion is dominant one. Hence ground water is calcium bicarbonate type. By and large, quality of ground water is suitable for drinking purposes. The suitability of ground water for irrigational uses is generally ascertained by considering salinity (EC), Sodium Adsorption Ratio (SAR) and Residual Sodium Carbonate (RSC). These parameters range from 280 to 1050 micromhos/cm. At 25°C 0.27 to 5.95 and - 1.2 to 1.68 milliequivalents respectively. Thus it can be concluded that ground water is suitable for irrigation on all types of soils. The US Salinity Laboratory classification of irrigation waters indicates that all ground waters fall under C<sub>2</sub>S<sub>1</sub> class except for one sample each which fall under C1S1 and C3S2 class. These waters will cause neither salinity nor sodium hazards when used for irrigation purposes.

## **Status of Ground Water Development**

Net area sown in the district is 2,01,000 ha. Area sown more than once is 1,58,000 ha bringing the total cropped area (Gross sown area) to 3,59,000 ha. 83.9% of the total area is sown annually. The entire net area sown is irrigated through tubewells and canals. Paddy and Maize constitutes the main kharif crop whereas wheat and oil seeds (sunflower and mustard) is the main Rabi crop. Hoshiarpur has 301,200 ha as gross irrigated area and 1,62,000 ha as net irrigated area. Out of 1,62,000 ha, canals irrigate approximately 14,000 ha, which is 8.64% of net irrigated area of the district, whereas 91.36 % of net irrigated area is irrigated by tubewells. Entire drinking water supply to all rural as well as urban parts of the district is based on ground water or by canal. The tubewell for water supply constructed by Public Health Department, Punjab for drinking water supply are generally between 40 to 100 m deep or on the basis of local hydrogeological conditions and available fresh water bearing zone. The area where drinking water supply is not present through PHD Punjab, the supply is dependent on hand pumps /dug wells shallow jet pumps which are constructed by Panchayat or by user. The depth of hand pumps varies from 10 to 25 m (in phreatic zone) on the basis of prevailing local conditions.

## **GROUND WATER MANAGEMENT STRATEGY**

### **Ground Water Development**

The stage of ground water development for the district is 84 % and two blocks fall in over-exploited categories. That means that the ground water is available in plenty amount. There is further scope for further ground water development.

### **Water Conservation & Artificial Recharge**

The stage of ground water development for the district is 84% that means the net annual withdrawal is less than the net annual recharge. During the last 10 years the ground water level has declined in most of the area of the district and the rate of decline is in the range of .073m/yr to 0.68 m/yr. So there is a need to take measures to arrest the decline of ground water level and artificial recharge to ground water is one of such measures. Whole of the district except the area in the north-west parts of the Mukerian block is suitable for artificial recharge to ground water. Excess rain water in agricultural field, surplus canal water and rooftop rain water can be injected to ground water system. Recharging shafts and injection wells are recharging structures suitable for the district.

### **GROUND WATER RELATED PROBLEMS AND ISSUES**

In the district, the main issues of concern related to ground water is the depleting ground water resources especially in two blocks viz. Tanda and Hoshiarpur-I. Water levels are declining in some areas on a long term basis especially in Dasuya block. Rising water level up to shallower level is observed. Quality of ground water is fresh but in some areas Iron and Arsenic contents have been detected more than the permissible limit.

### **RECOMMENDATIONS**

1. The stage of ground water development for the district at present is 84% and except for two blocks viz Tanda and Hoshiarpur-I further ground water development is recommended on sustainable basis.
2. The construction of roof top rainwater harvesting and artificial recharge to ground Water structures should be made mandatory in building bye-laws especially in overexploited blocks.
3. The water level monitoring network needs to be increased in the central and Southern parts of the district.
4. The Tanda block of the district needs to be notified for the registration and
5. Regulation of ground water structures.
6. Local populace to be educate regarding consequences of mining of ground water and need for its effective and economic use.