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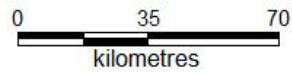
**Government of India
Ministry of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Board**

PLAN ON

**ARTIFICIAL RECHARGE TO GROUND WATER AND WATER CONSERVATION IN
OVEREXPLOITED BLOCKS OF JALANDHAR DISTRICT, PUNJAB**

**Central Ground Water Board
North Western Region
Chandigarh**

PLAN OF ARTIFICIAL RECHARGE TO GROUND WATER IN OVER EXPLOITED BLOCKS DISTRICT JALANDHAR, PUNJAB



-  OVER EXPLOITED BLOCKS
-  NOTIFIED BLOCKS

PLAN OF ARTIFICIAL RECHARGE TO GROUND WATER IN OVER EXPLOITED BLOCKS, DISTRICT JALANDHAR PUNJAB

The district is named after Jalandhar, a demon king, who finds a mention in the Puranas. According to another version Jalandhar is said to have derived its name from the vernacular term 'Jalandhar' means area inside the water, i.e. tract laying between the two rivers Satluj and Beas, another name of Jalandhar had been Trigartta, as it was waters by three rivers, Satluj, Beas and Ravi. Jalandhar is located on the intensively irrigated plain between Beas and Sutlej rivers. The city, with has major road and rail connections, is a market for agricultural products. Manufacturing units include textiles, leather goods, wood products, and sporting goods. Jalandhar was the capital of Punjab from India's independence (1947) until Chandigarh was built in 1953. Jalandhar is situated at 71° 31' East and 30° 33' North at a distance of 146 kms from state capital Chandigarh. It is at a distance of 350 Kms from Delhi on Delhi-Amritsar Highway. It is surrounded by Ludhiana district in East, Kapurthala in West, Hoshiarpur in North and Ferozpur in South. It is well connected by road and train.

The Jalandhar District consists of 5 tehsils 1). Jalandhar-I, 2. Jalandhar II, 3. Nakodar 4. Phillaur and 5. Shahkot , further sub-divided into 10 development blocks, as Jalandhar East, Jalandhar West, Bhogpur, Adampur, Nakodar, Shahkot, Phillaur, Nurmahal, Lohian and Rurka Kalan. According to District Statistical Office, the district has 956 inhabited villages.

CLIMATE AND RAINFALL

The climate of this district is on the whole dry except during the brief south-west monsoon season..The average annual rainfall in the district is 703.0 mm. The rainfall in the district in general increases from the south-west towards the north-east and varies from 551.3 mm at Nakodar to 892.3 mm at Adampur (Aera-obsy). About 70 per cent of the annual normal rainfall in the district is received during the period July to September. The variation in the rainfall from year to year in the district is appreciable. In the 80 year, 1901 to 1980, the highest annual rainfall amounting to 181 per cent of the normal occurred in 1917. The lowest annual rainfall which was 55 per cent of the normal occurred in the year 1905. In the same period, the annual rainfall in the district was less than 80 per cent of the normal in 22 years. On an average, there are 36 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The

heaviest rainfall in 24 hours recorded at any station in the district was 304.8 mm at Jalandhar on 18 August 1878. January is generally the coldest month with the mean daily maximum temperature at about 19⁰C and the mean daily minimum at about 6⁰C during the winter season.

GEOMORPHOLOGY

The district is part of Bist Doab Tract, which is inter alluvial plain between Beas and Satluj River. Physiographically, the district is characterised by two distinct features i.e. vast upland plain and Satluj flood plain. The width of the flood plain varies according to the amount of shift experienced by the river. It is widest in the Nakodar tehsil. The district is mainly drained by the river Satluj and its tributaries –East (White) Bein and West (Black) Bein.

SOILS

Jalandhar district is occupied by two types of soils a) tropical arid brown and b) arid brown soils. Tropical brown soils are found in major parts of the district whereas arid brown soils are found in south western part of the district especially in Lohian and part of Shahkot block. Along the river Satluj, fluvial type of soil is found.

HYDROLOGY

The Bist Doab Canal System is the major source of canal irrigation. The network of Jalandhar branch (irrigate northern and central parts) and Phillaur distributary of Nawashahar branch ((irrigate southern parts of the district). In all there are 41 canals having total length of 604.40 km. of which Best Doab canal is 43 km long. Out of 2,27,423 ha net irrigated area, 26,755 ha is irrigated by canal and rest by ground water. With ‘Remodeling of Phillaur distributaries system in Nakodar area and Construction of super passage over Nasrala choe near Adampur will increase the capacity of the channel by 20% and to avoid the damages to the crops and adjoining abadies during flood season.

HYDROGEOLOGY

The area is underlain by Sub- recent to Quaternary alluvium comprising sand, gravel, pebbles, Kankar and clay. Older alluvium occupies the uplands all over the district except along the river Sutlej. It is also found underlying the younger alluvium in the flood plains of Sutlej. The older alluvium belongs to lower to middle Pleistocene age, while younger alluvium belongs to upper Pleistocene to recent age. Blown sands of recent age also occur as isolated patches in Western part of the district. Ground water is fresh at all levels in the district. Central Ground Water Board has drilled 11 exploratory boreholes along with equal no of observation wells

besides 20 Piezometers to delineate and determine potential aquifer zones, evaluation of aquifer characteristics etc. Ground water exploration undertaken by CGWB has revealed the presence of 3 aquifer groups down to a depth of 350m. These aquifer groups comprise of fine to medium grained sand. The first granular zone forms the water table aquifer and occurs upto 115 m below ground level. The second aquifer occurs between 130 and 195 m depth, the third exist between 215 and 333 m depth down wards. Total thickness of the alluvium is more because bedrock has not been encountered up to 350 m depth in the district. Further, in order to understand sub surface disposition and nature of aquifer system Jalandhar district geological sections have been drawn within and across the boundaries of the district.

GROUND WATER RESOURCES

Block wise ground water resource potential of the district has been assessed as per GEC-97. The ground water development in all the blocks has exceeded the available recharge, thus all the blocks have been categorized as over exploited. Stage of ground water development ranges from 162 %(Adampur -block) to 345 %(Nakodar Block). Net replenishable ground water availability in the district has been assessed as 1174.76 mcm. Gross ground water draft for all uses in the district is 2717.31mcm, thus leaving short-fall (over draft) of 1563.39 mcm. Stage of ground water development in the Jalandhar district has been assessed to be 231%. Due to the rampant ground water exploitation in the district, the Central Ground Water Authority had notified all ten blocks of the district for registration of tube wells from ground water management point of view.

GROUND WATER QUALITY

Data of chemical quality of water from shallow (Phreatic) and deep aquifers indicates that all the chemical parameters i.e. major cations (Ca, Mg, Na & K) and major anions (CO₃, HCO₃, Cl & SO₄) are well within the permissible limits set by the BIS, 1991 except fluoride and nitrate concentrations which has been found in shallow ground water at some places to be higher than permissible limits. The fluoride point values of some of the places are Kittan Sadan (2.98), Alhawalpur (2.24), Mawai (2.84), Rurki (2.90), Phillaur (2.40) etc. By and large, the quality of ground water is suitable for domestic /irrigation purposes.

Distribution of Shallow Tubewells According to Owner's Holding Size

No. of shallow tube wells by size class of individual owner							
Sr.no	district	Marginal (0-1 ha)	Small (1-2 ha)	Semi-Medium (2-4 ha)	Medium (4-10ha)	Big (>=10 ha)	Total
1	Jalandhar	1229	4886	15560	20483	5762	47920

Distribution of Deep Tubewells According to Owner's Holding Size

No. of deep tube wells by size class of individual owner							
Sr.no	district	Marginal (0-1 ha)	Small (1-2 ha)	Semi-Medium (2-4 ha)	Medium (4-10ha)	Big (>=10 ha)	Total
1	Jalandhar	1096	3888	11157	10264	3907	30312

Distribution of Shallow Tubewells According to Depth of tube well

No. by the depth of shallow Tube well							
Sr.no	district	(0-20 mts)	(20-40 mts)	(40-60 mts)	(60-70 mts)	(>70 mts)	Total
1	Jalandhar	712	6095	10229	30957	0	47993

Number of Ground Water Schemes and Potential Utilized by water distribution device

Ground Water Schemes according to water Distribution System				
Open Water Channel				
Sr.no	District	Lined/pucca	Unlined/kutcha	Under ground pipe
1	Jalandhar	2280	63818	12154

PLAN OF THIS REPORT

In this plan 2 types of the recharge structures are proposed such as Roof Top Rain water harvesting in rural & urban areas and Recharge pits in agriculture lands of 5mt x5mt x3mt size. The pit will be surrounded by angle irons and barbed fencing. The size and depth depend on the availability of the land. The extra water available on the field will be stored in the pit and that will also be recharged to the ground water.

A summery outline of the artificial recharge plan for the entire district of each block is given at the beginning in tabular forms. This is followed by the salient features of each block along with the detailed structure-wise recharge plan and cost estimates.

Details of the block wise type of suitable recharge structures and volume of water assured for annual recharge for each block, schematic design of recharge structures are annexed at annexure I & II.

This plan is focusing on the technical aspects of the ground water recharge through various means so that various implementing agencies may get the appropriate technical guidelines. The existing/ongoing schemes of the central or state govt. like MANERGA, IWSP, PMKVY, NABARD funded schemes, Urban Development schemes, departmentally funded projects etc. may be benefitted from the recharge plan by incorporating the input in the operational guidelines/ design and for locating the specific sites.

Agriculture University, engineering Collages, Academic and Research Institution, NGO may also take up the pilot or demonstrative projects in the blocks suitable to them to plan at local level as per local conditions.

Sr.no.	Type of Structure	No. of structures	Unit cost Rs. in Lakhs	Total cost of structure Rs. in Crores	Annual Recharge (MCM)
ROOF TOP RAIN WATER HARVESTING IN RURAL AND URBEN AREAS					
1	Artificial Recharge Plan For Urban Areas.	15978	0.25	39.94	1.843
2	Roof Top Rain Water Harvesting in Rural Areas	21367	0.25	53.41	1.719
	Total	37345	0.25	93.35	3.562
ARTIFICIAL RECHARGE IN FARMS					
1	Artificial Recharge Plan Through Recharge Pits.	24251	0.35	84.87	24.98
	Total			84.87	24.98

By the implementation of the proposed recharge structures there will be a reduction of 2.13% in stage of ground water development as tabulated below.

Sr. no.	Total Draft (present) (mcm)	Overdraft (mcm)	Additional Recharge through proposed structures (mcm)	Draft Reduced due to Recharge (mcm)	Stage of development (present)	Stage of development after recharge	Reduction in stage of development after recharge
1	2717.31	-1563.39	28.542	2688.768	231%	228.87	2.13%

ARTIFICIAL RECHARGE PLAN THROUGH RECHARGE PITS IN OVER EXPLOITED BLOCKS OF JALANDHAR DISTRICT

Block Name	Total area of the village (in hectares)	10% of village area taken for farm recharge (in hectares)	Total number of recharge pits	recharge (MCM) = (Area * Runoff 15% * Rainfall)	Cost of Pit @ Rs.0.35 lakh (Crores)
BHOGPUR	16907.30	1691	1691	2.095	5.66
ADAMPUR	18900.80	1890	1890	2.228	6.61
JALANDHAR WEST	29124	2912	2912	3.237	10.19
LOHIAN KHAS	19651.20	1965	1965	1.657	6.87
SHAHKOT	23045.70	2305	2305	1.998	8.06
NAKODAR	43763.60	4376	4376	4.090	15.31
JALANDHAR EAST	19684.40	1968	1968	2.026	6.88
NURMAHAL	25640.30	2564	2564	2.427	8.97
RURKA KALAN	17243.70	1724	1724	1.611	6.03
PHILLAUR	28556.20	2856	2856	1.611	9.99
			24251	24.98	84.62

Number of Recharge pits are based on following factors:

Availability of Irrigation wells In the farmer land

Area of sandy strata at shallow depth identified

Type of structure will be recharge pit/ Recharge well(where top three meters is clay)

**ROOF TOP RAINWATER HARVESTING IN RURAL AREAS OF JALANDHAR
DISTRICT OF PUNJAB**

Name of District	Sr. no	Name of CD Block	Total area of the village (in hectares)	Number of households (2011 census)	No of Houses taken for Artificial Recharge (10% of total households)	Total No of AR Structures	Total recharge in MCM	Cost @ 0.25 Lacs/ structure
JALANDHAR	1	BHOGPUR	16907.30	14650	1465	1465	0.145	3.66
	2	ADAMPUR	18900.80	20937	2094	2094	0.197	5.23
	3	JALANDHAR WEST	29124	26245	2625	2625	0.233	6.56
	4	LOHIAN KHAS	19651.20	11573	1157	1157	0.078	2.89
	5	SHAHKOT	23045.70	17044	1704	1704	0.118	4.26
	6	NAKODAR	43763.60	33626	3363	3363	0.251	8.40
	7	JALANDHAR EAST	19684.40	24514	2451	2451	0.202	6.12
	8	NURMAHAL	25640.30	18896	1890	1890	0.143	4.72
	9	RURKA KALAN	17243.70	17224	1722	1722	0.132	4.30
	10	PHILLAUR	28556.20	28958	2896	2896	0.22	7.24
		Total	242517.20	76732	21367	21367	1.719	53.41

ARTIFICIAL RECHARGE PLAN FOR URBAN AREAS OF DISTRICT JALANDHAR PUNJAB

District	Block	Town Name	Total Households	Total Population of Town	Households taken for Artificial Recharge (10%)	Total Roof Top Area (sq m)	Vol of water available for recharge (MC M)	Cost @Rs.0.25 lakh (Crores)
JALANDHAR	LOHIAN KHAS	LOHIAN KHAS (NP)	2001	10362	200	40020	0.019	0.5
	SHAHKOT	SHAHKOT (NP)	2957	14488	296	59140	0.027	0.74
	NAKODAR	NAKODAR (MCL)	7814	36973	781	156280	0.078	1.95
	PHILLAUR	GORAYA (NP)	3590	16462	359	71800	0.036	0.89
	PHILLAUR	PHILLAUR (MCL)	5153	24688	515	103060	0.052	1.28
	NURMAHAL	NURMAHAL (MCL)	3117	14560	312	62340	0.031	0.78
	NURMAHAL	APRA (CT)	1262	6258	126	25240	0.013	0.31
	NURMAHAL	JANDIALA (CT)	1857	8487	186	37140	0.019	0.46
	JALANDHAR-1	JALANDHAR-CANTT 9(CB)	9699	47845	970	193980	0.106	2.42
	JALANDHAR-1*	JALANDHAR- (M.CORP+OG) PART	186174	862886	5000	100000	0.549	12.5
	ADAMPUR	ALAWALPUR (MCL)	1715	7815	172	34300	0.022	0.43
	ADAMPUR	ADAMPUR (MCL)	4859	20922	486	97180	0.061	1.21
	ADAMPUR	SUFIPIND (CT)	2066	9406	207	41320	0.026	0.51
	ADAMPUR	DHIN (CT)	1259	5961	126	25180	0.016	0.31
	ADAMPUR	KHAMBRA (CT)	1132	5483	113	22640	0.014	0.28
	ADAMPUR	SANSARPUR (CT)	1033	4657	103	20660	0.013	0.02
	ADAMPUR	CHOMON (CT)	826	3704	83	16520	0.010	0.02
	ADAMPUR	KARTARPUR (MCL)	53332	25662	5333	106664	0.671	1.33
	BHOGPUR	BHOGPUR (NP)	3802	17549	380	76040	0.050	0.09
	BHOGPUR	RAIPUR RASULPUR (CT)	794	3916	79	15880	0.010	0.19
	BHOGPUR	SARAI KHAS (CT)	1511	7044	151	30220	0.020	0.37
	TOTAL		295953	1155128	15978	3195580	1.843	26.59

B. POTENTIAL FOR REDUCTION IN OVERDRAFT BY ENHANCING THE GROUND WATER USE EFFICIENCY OF IRRIGATION TUBE WELLS

The micro level transformation in the ground water management have vast impact potential to counter extensive ground water depletion faced by the state of Punjab, particularly in overexploited blocks. There are around 78305 tube wells operated by farmers for irrigation through unlined/Katcha (81.49%) open channel system in Jalandhar district where water from the tube-well is discharge to the agricultural field. In this process huge quantity of ground water is wasted in soil moisture and evaporation losses.

Dynamic ground water resources (2011) indicate that Gross ground water draft for irrigation in Jalandhar district is estimated at 2645 MCM. It is expected that around 50% of over draft can be brought down by switching over to underground/surface pipeline based distribution from the prevailing unlined open channels. Thereby gross draft will be reduced to the tune of 2072.67 MCM assuming there is no crop diversification by the farmers.

The benefit will lead to saving of precious ground water resources in overexploited blocks Jalandhar Districts. The measure if implemented will bring down the ground water overdraft from 209% to 159 %. The category of the blocks will also improve drastically resulting in boosting of agriculture and industrial development otherwise not sustainable in majority of the blocks in the state.

The tube wells also consume enormous electricity which is subsidized and government incurs significant revenue on this account. The measures therefore will result in saving of energy and money. Pollution impact will be reduced whenever diesel engines are used by the farmers. The environmental and ecological condition in the irrigated land will improve. Unwanted weed growth will also be controlled inside the farm land. This will also be useful in the waterlogged/ shallow water table areas as the seepage losses in these areas also aggravate the water logging. **Government should make/launch a mission mode program for installing the underground pipe lines instead of having *katcha* channel in the entire Punjab.** Heavy ground water overdraft can be reduced by these efforts. This will ensure **more crops per drop**.

POTENTIAL FOR REDUCTION IN OVERDRAFT BY ENHANCING THE GROUND WATER USE EFFICIENCY IN IRRIGATION TUBEWELLS, JALANDHAR DISTRICT













Net Annual Ground Water Availability (mcm)	Total Draft (present) (mcm)	Gross Irrigation Draft (present) (mcm)	Gross Ground Water Draft for Domestic and industrial supply (mcm)	Percentage of unlined channel	Wastage through unlined channel, (mcm) (Col 3 X Col5 X 0.30 [#])	Potential of Reduced irrigation overdraft (Col3-col6) (mcm)	Gross draft after saving of water (mcm) (Col 7+Col4)	Present Stage of development (%)	Stage of development afterwards((Col 8/Col1)X100) (%)	Reduction in stage of development after constructing pucca canal (Col9-Col10) (%)
1	2	3	4	5	6	7	8	9	10	11
1304.1	2719.3	2645	74.3	81.49	646.63	1998.41	2072.67	209	159	50

losses from open kuchha channel are around 30%.

COST ESTIMATE OF UNDERGROUND PIPE LINE

District	Block	Irrigated area by ground water scheme (ha)	Percentage of Unlined Channel (%)	Area under unlined Channels	Total cost @Rs.0.50 lack per hecter(in cr) =Total irrigated area (by ground water scheme) of the block *0.5 *Col4	Total Cost in Rs. Crores. District wise
1	2	3	4	5	6	7
JALANDHAR	Bhogpur	15079.4	81.49	12288	61.44	825.87
	Adampur	13808.2	81.49	11252	56.26	
	Jalandhar-West	23906.6	81.49	19481	97.41	
	Lohian Khas	16906.2	81.49	13777	68.88	
	Shahkot	20666.9	81.49	16841	84.21	
	Nakodar	36392.3	81.49	29656	148.28	
	Jalandhar-East	16676.5	81.49	13590	67.95	
	Nurmahal	21504.5	81.49	17524	87.62	
	Rurka Kalan	14210.4	81.49	11580	57.90	
	Phillaur	23540.2	81.49	19183	95.91	

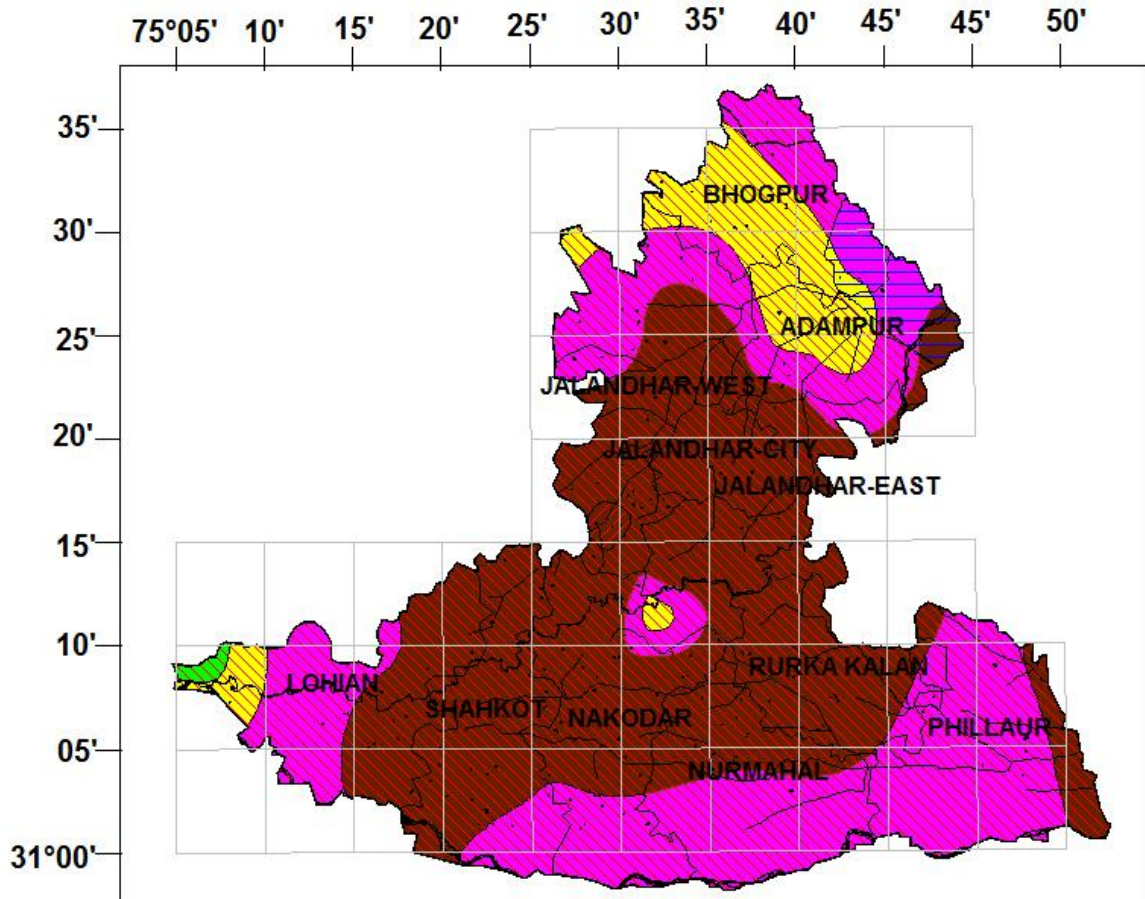
SALIENT FEATURES OF HYDROGEOLOGY OF DISTRICT JALANDHAR

Wells Feasible	Rigs Suitable	Depth of Well (m)	Discharge (lpm)	Suitable Artificial Recharge Structures
Tube Wells	Direct and Reverse Rotary	40 - 130	2000 - 3500	Recharge trench with Injection Wells
Tube Wells	Direct and Reverse Rotary	50 - 130	1000 2000	Recharge trench with Injection Wells
Tube Wells	Direct and Reverse Rotary	50 - 100	700 - 1000	Recharge trench with Injection Wells
DEPTH TO WATER LEVEL NOVEMBER 2014				
	0.00 - 5.00 mbgl	 National Highway	 International Boundary	
	5.00 - 10.00 mbgl	 Canals	 State Boundary	
	10.00 - 20.00 mbgl	 Water Bodies	 Block Boundary	
	20.00 - 40.00 mbgl	 Major Drainage	 Block Headquarters	

OTHER INFORMATION

Name of State	Punjab
Name of District	Jalandhar
Geographical Area	2662 sq.km
Major Geological Formation	Alluvium
Major Drainage System	Sutlej and Beas
Population (as on 2011)	21,81,753
Total Number of Blocks	10
Existing Major/Medium Irrigation Projects	Bist Doab Canal
Utilizable Ground Water Resources 2011	1174.76 (mcm)
Net Ground Water Draft	2717.31 (mcm)
Stage of Ground Water Development	231 %
Average Annual Rainfall	701 mm
Range of Mean Daily Temperature	6° - 42° C
Over Exploited Blocks	BHOGPUR, ADAMPUR JALANDHAR - WEST, LOHIAN KHAS SHAHKOT, NAKODAR JALANDHAR - EAST, NURMAHAL RURKA KALAN, PHILLAUR

PLAN OF ARTIFICIAL RECHARGE TO GROUND WATER DISTRICT JALANDHAR, PUNJAB



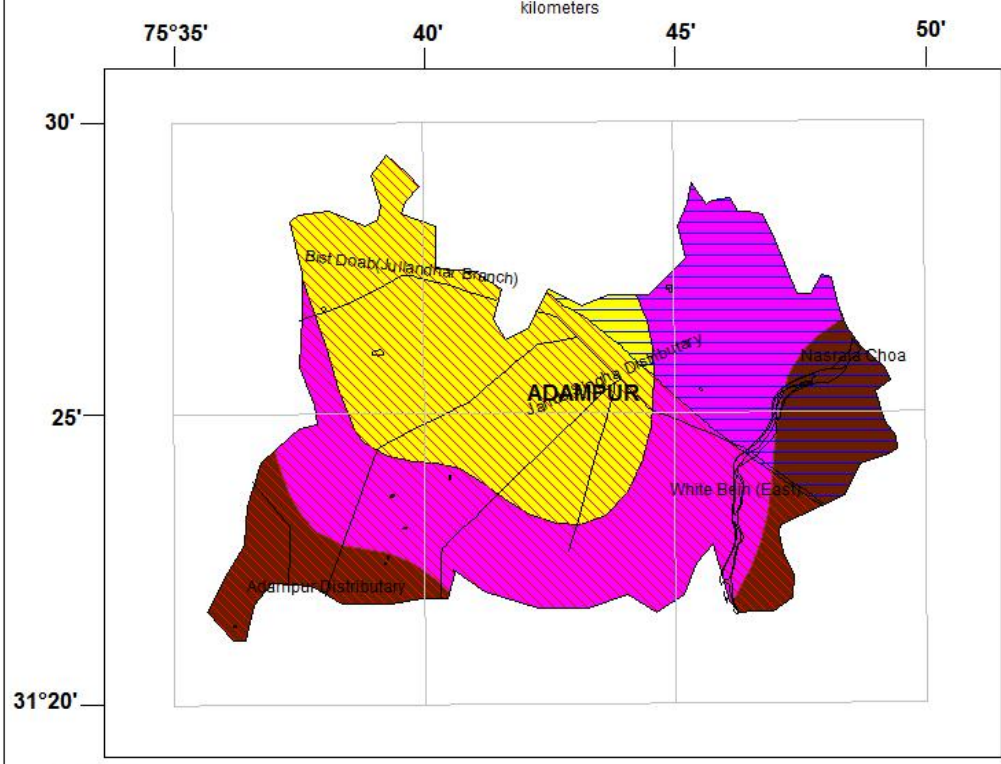
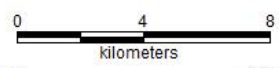
Legend

Refer Salient Features of Hydrogeology

***BLOCK
WISE PLAN OF
DISTRICT
JALANDHAR
PUNJAB***

(10 OE BLOCKS)

**BLOCK ADAMPUR DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend

Decadal mean water level (post monsoon)

- 5.00 - 10.00 mbgl
- 10.00 - 20.00 mbgl
- 20.00 - 40.00 mbgl

Decadal mean water level trend (m)

- 0.00 - 0.1114
- 0.1 - 0.00

2094

No. of Recharge Structures in Rural Villages

6623

No. of Recharge Structures in Urban Towns

1890

Recharge Pits in Agricultural Land

15.50

Thickness of Sand



Canal Network



Water Bodies

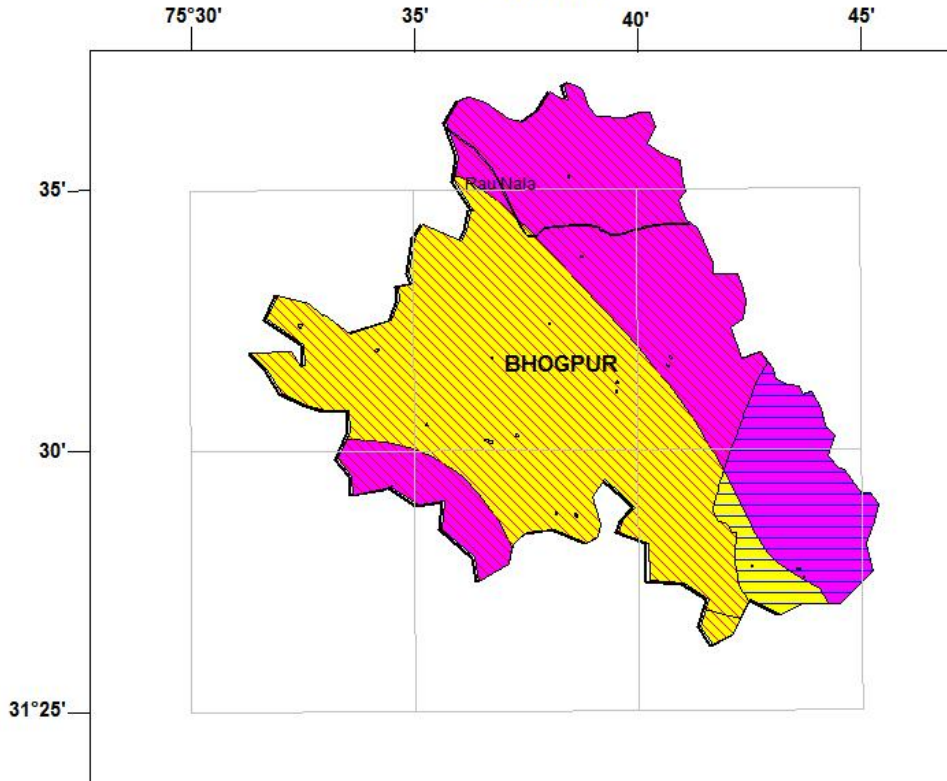
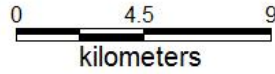
Ground Water Scenario of Block

Block Name:- Adampur		State:- PUNJAB	
District:- Jalandhar			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	204.2	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	70 0	
	ii) Average Annual Rainfall (mm)	790	
	iii) Area feasible for Artificial Recharge	204.2	
	iv) Village identified under scarcity of Water	71	
	v) Village covered under water supply	52	
	vi) Water Tank exists in the village	22	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Satluj 100%</i>	
3.	LAND USE		
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	203.31 176.49 92.00 268.49 152 --	
	4.	PREDOMINANT GEOLOGICAL FORMATIONS	<i>Recent alluvium</i>
	5.	HYDROGEOLOGY	
		Major Water bearing Formation (Aquifer)	Fine to coarse Sand

	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 6.95-8.18 (mbgl) 	5.00 – 20.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 7.15-7.43(mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	3	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in $\mu\text{S}/\text{cm}$ at 25⁰c 	394	805
	<ul style="list-style-type: none"> • NO₃ (mg/l) 	--	50
	<ul style="list-style-type: none"> • F (mg/l) 	0.27	0.54
	<ul style="list-style-type: none"> • As (mg/l) 	0.0027	0.0027
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	126.66	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	201.88	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	3.13	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	205.01	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	4.47	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-79.70	
	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	162	
	<ul style="list-style-type: none"> • Category of Block 	OE	

	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	<i>Extensive Irrigation</i>	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 15.5	Percentage % 31	
10	Volume of unsaturated zone available for recharge (MCM)	308.16		
11.	Volume of water required for recharge (MCM)	409.87		
12.	Volume of surplus water available for recharge(MCM)	4.71		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	1890	6.62	2.228
14	RWH Rural @ Rs. 25000/-	2094	5.24	0.197
15	RWH Urban@ Rs. 25000/-	6623	16.56	0.833
16	Underground pipe line (area in hectares) @ Rs. 50000/-	11252	56.26	48.83
	TOTAL		84.67	52.088

**BLOCK BHOGPUR DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend

Decadal mean water level (post monsoon)

- 5.00 - 10.00 mbgl
- 10.00 - 20.00 mbgl

Decadal mean water level trend (m)

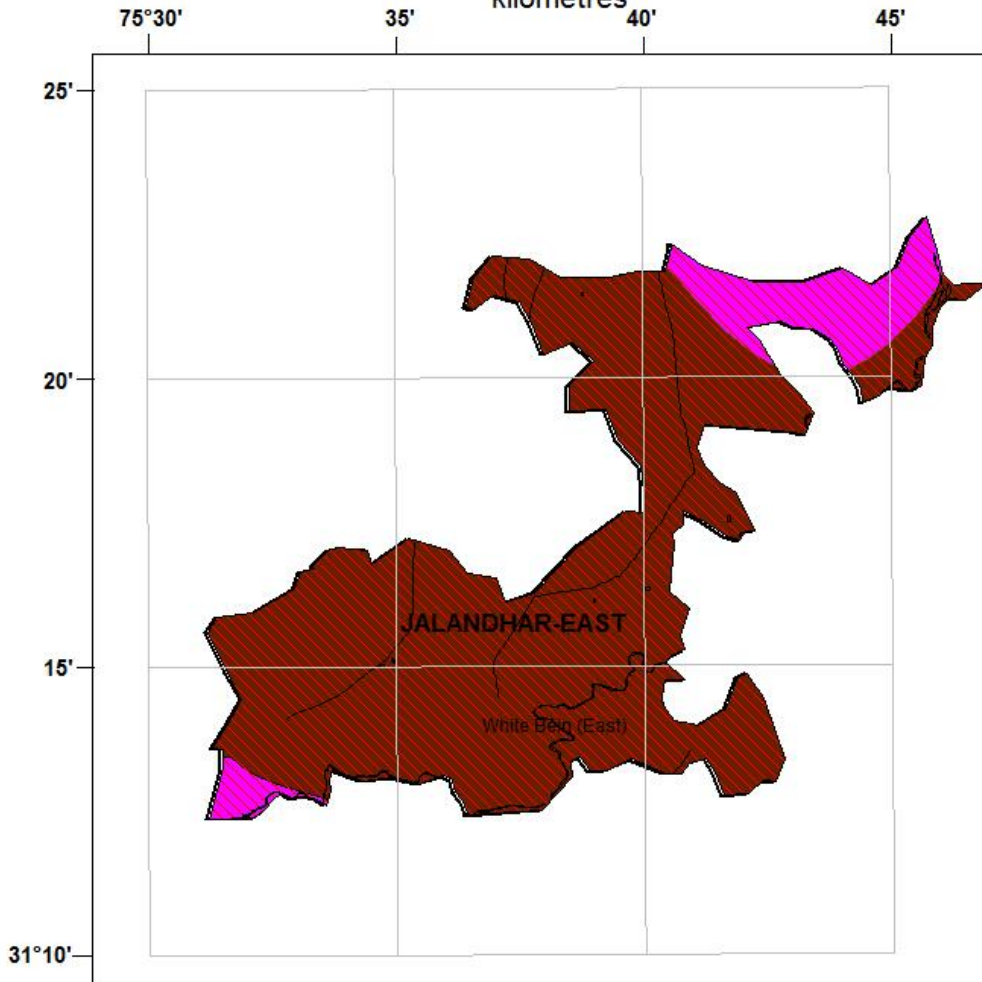
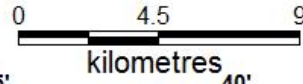
- 0.00 - 0.1114
- 0.1 - 0.00

- 1465** **No. of Recharge Structures in Rural Villages**
- 610** **No. of Recharge Structures in Urban Towns**
- 1691** **Recharge Pits in Agricultural Land**
- 25** **Thickness of Sand**
- Canal Network**
- Water Bodies**

As the Bhogpur Block has been formed recently, remaining data is not available.



RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
1	Farm Recharge @Rs. 35000/-	1465	5.13	0.145
2	RWH Rural @ Rs. 25000/-	1691	4.23	2.095
3	RWH Urban@ Rs. 25000/-	610	1.53	0.08
4	Underground pipe line (area in hectares) @ Rs. 50000/-	12288	61.44	63.75
	TOTAL		72.32	66.07

**BLOCK JALANDHAR (EAST) DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**










Legend

Decadal mean water level (post monsoon)

-  10.00 - 20.00 mbgl
-  20.00 - 40.00 mbgl

Decadal mean water level trend (m)

-  - 0.1 - 0.00

-  **No. of Recharge Structures in Rural Villages**
-  **No. of Recharge Structures in Urban Towns**
-  **Recharge Pits in Agricultural Land**
-  **Thickness of Sand**
-  **Canal Network**
-  **Water Bodies**

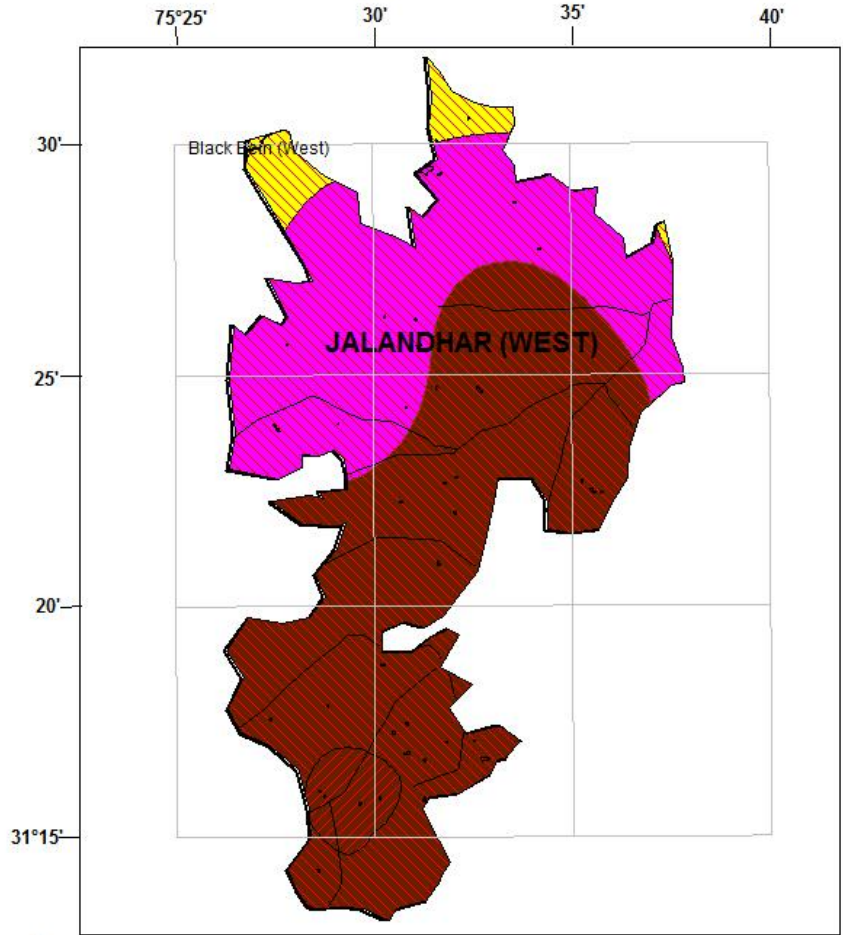
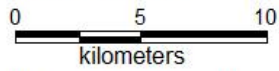
Ground Water Scenario of Block












Block Name:- Jalandhar (East)		State:- PUNJAB	
District:- Jalandhar			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	256.2	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	89 2	
	ii) Average Annual Rainfall (mm)	684	
	iii) Area feasible for Artificial Recharge	256.2	
	iv) Village identified under scarcity of Water	90	
	v) Village covered under water supply	54	
	vi) Water Tank exists in the village	31	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Satluj 100%</i>	
3.	LAND USE		
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	210.39 184.56 124.29 308.85 167 --	
	4.	PREDOMINANT GEOLOGICAL FORMATIONS	<i>Recent alluvium</i>
	5.	HYDROGEOLOGY	
		Major Water bearing Formation (Aquifer)	Fine to coarse Sand

	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 23.00-32.70 (mbgl) 	20.00-40.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 23.50-33.85 (mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	3	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in µS/cm at 25⁰c 	447	644
	<ul style="list-style-type: none"> • NO3 (mg/l) 	--	36
	<ul style="list-style-type: none"> • F (mg/l) 	0.11	0.37
	<ul style="list-style-type: none"> • As (mg/l) 	0.0074	0.0074
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	72.50	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	206.16	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	23.39	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	229.54	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	34.19	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-167.85	
	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	317	
	<ul style="list-style-type: none"> • Category of Block 	OE	

	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 28	Percentage % 56	
10	Volume of unsaturated zone available for recharge (MCM)	386.63		
11.	Volume of water required for recharge (MCM)	514.25		
12.	Volume of surplus water available for recharge(MCM)	5.91		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	1968	6.89	2.026
14	RWH Rural @ Rs. 25000/-	2451	6.13	0.202
15	RWH Urban@ Rs. 25000/-	970	2.43	0.106
16	Underground pipe line (area in hectares) @ Rs. 50000/-	13590	67.95	49.86
	TOTAL		83.39	52.194

**BLOCK JALANDHAR (WEST) JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend			
Decadal mean water level (post monsoon)			
	5.00 - 10.00 mbgl		No. of Recharge Structures in Rural Villages
	10.00 - 20.00 mbgl		No. of Recharge Structures in Urban Towns
	20.00 - 40.00 mbgl		Recharge Pits in Agricultural Land
Decadal mean water level trend (m)			Thickness of Sand
	-0.20 .. -0.10		Canal Network
	- 0.1 - 0.00		Water Bodies

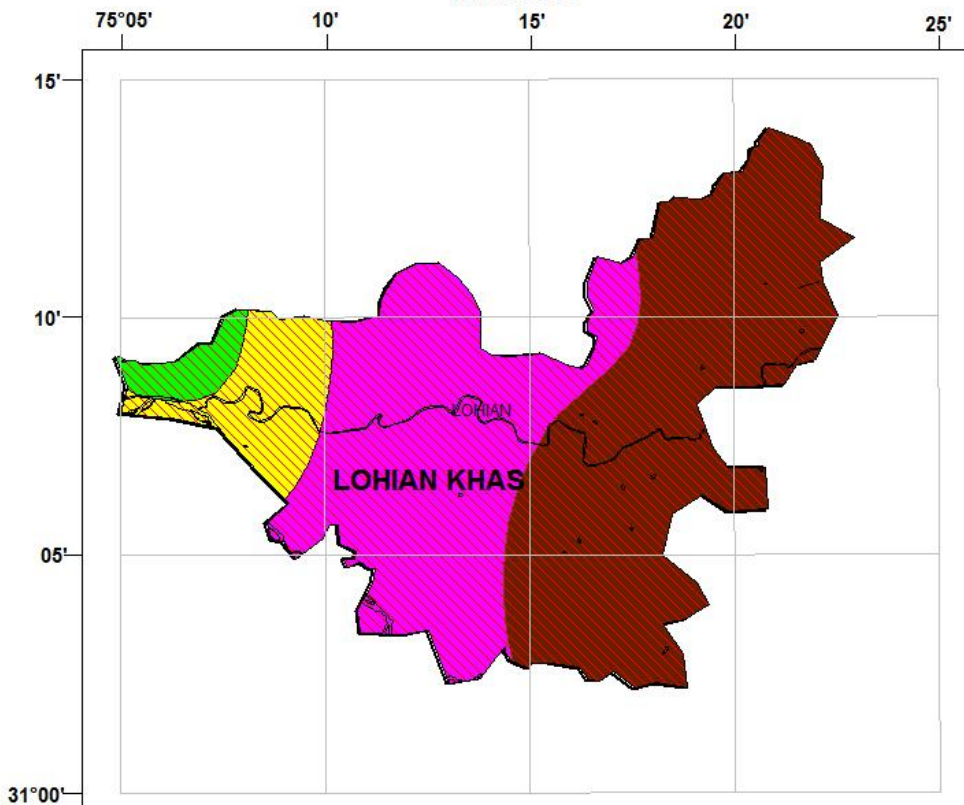
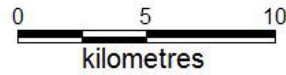
Ground Water Scenario of Block








Block Name:- Jalandhar (West)		State:- PUNJAB
District:- Jalandhar		
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	338.9
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	112 4
	ii) Average Annual Rainfall (mm)	741
	iii) Area feasible for Artificial Recharge	338.9
	iv) Village identified under scarcity of Water	136
	v) Village covered under water supply	114
	vi) Water Tank exists in the village	34
2.	GEOMORPHOLOGY	
	Major Physiographic	Alluvium Plain
	Major drainages	
	Basin Sub-Basin	Satluj 100%
3.	LAND USE	
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	300.54 279.58 148.72 410.23 147 --
4.	PREDOMINANT GEOLOGICAL FORMATIONS	Recent alluvium
5.	HYDROGEOLOGY	

	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 17.13-33.20 (mbgl) 	20.00- 40.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	2	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in $\mu\text{S/cm t}^{250\text{c}}$ 	447	644
	<ul style="list-style-type: none"> • NO₃ (mg/l) 	--	36
	<ul style="list-style-type: none"> • F (mg/l) 	0.11	0.37
	<ul style="list-style-type: none"> • As (mg/l) 	0.0074	0.0074
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	177.50	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	315.81	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	.25	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	316.06	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	.25	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-138.56	
	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft(%) 	178	

	<ul style="list-style-type: none"> Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 20.5	Percentage % 41	
10	Volume of unsaturated zone available for recharge (MCM)	511.44		
11.	Volume of water required for recharge (MCM)	680.24		
12.	Volume of surplus water available for recharge(MCM)	7.82		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	2912	10.19	3.24
14	RWH Rural @ Rs. 25000/-	2625	6.56	0.23
15	RWH Urban@ Rs. 25000/-	5000	12.50	0.55
16	Underground pipe line (area in hectares) @ Rs. 50000/-	19481	97.41	76.89
	TOTAL		126.66	80.91

**BLOCK LOHIAN KHAS DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**

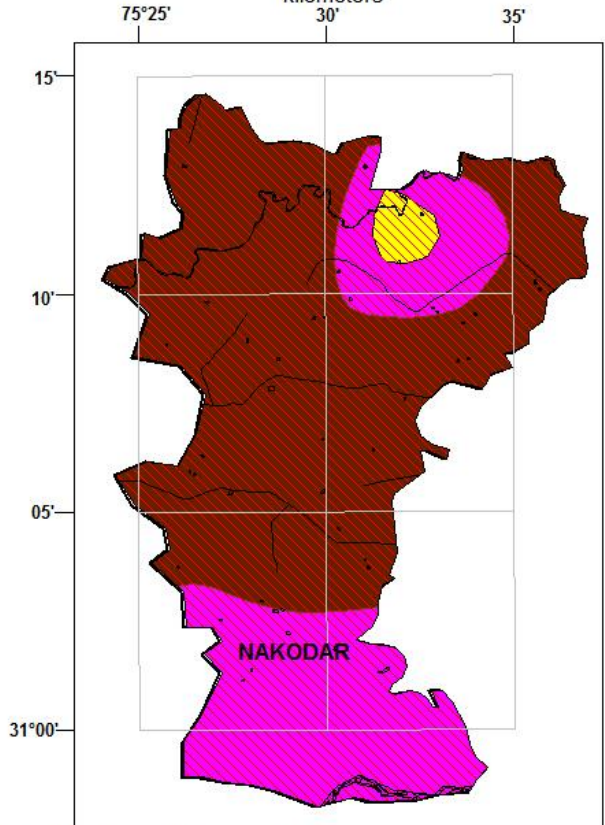
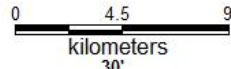


Legend		1157	No. of Recharge Structures in Rural Villages
Decadal mean water level (post monsoon)		200	No. of Recharge Structures in Urban Towns
	0.00 - 5.00 mbgl	1965	Recharge Pits in Agricultural Land
	5.00 - 10.00 mbgl	13	Thickness of Sand
	10.00 - 20.00 mbgl		Canal Network
	20.00 - 40.00 mbgl		Water Bodies
	Decadal mean water level trend (m) - 0.1 - 0.00		

As the Lohian Khas Block has been formed recently, remaining data is not available.

RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
1	Farm Recharge @Rs. 35000/-	1965	6.88	1.66
2	RWH Rural @ Rs. 25000/-	1157	2.89	0.08
3	RWH Urban@ Rs. 25000/-	200	0.50	0.02
4	Underground pipe line (area in hectares) @ Rs. 50000/-	13777	68.89	52.56
	TOTAL		79.16	54.31

**BLOCK NAKODAR DISTRICT JALANDHAR, PUNJAB
DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
VS
DECADAL MEAN TREND POST MONSOON
(2004-2013)**



Legend

Decadal mean water level (post monsoon)

- 5.00 - 10.00 mbgl
- 10.00 - 20.00 mbgl
- 20.00 - 40.00 mbgl

Decadal mean water level trend (m)

- 0.1 - 0.00

3363

**No. of Recharge Structures
in Rural Villages**

781

**No. of Recharge Structures
in Urban Towns**

4376

**Recharge Pits in
Agricultural Land**

17

Thickness of Sand



Canal Network

Water Bodies

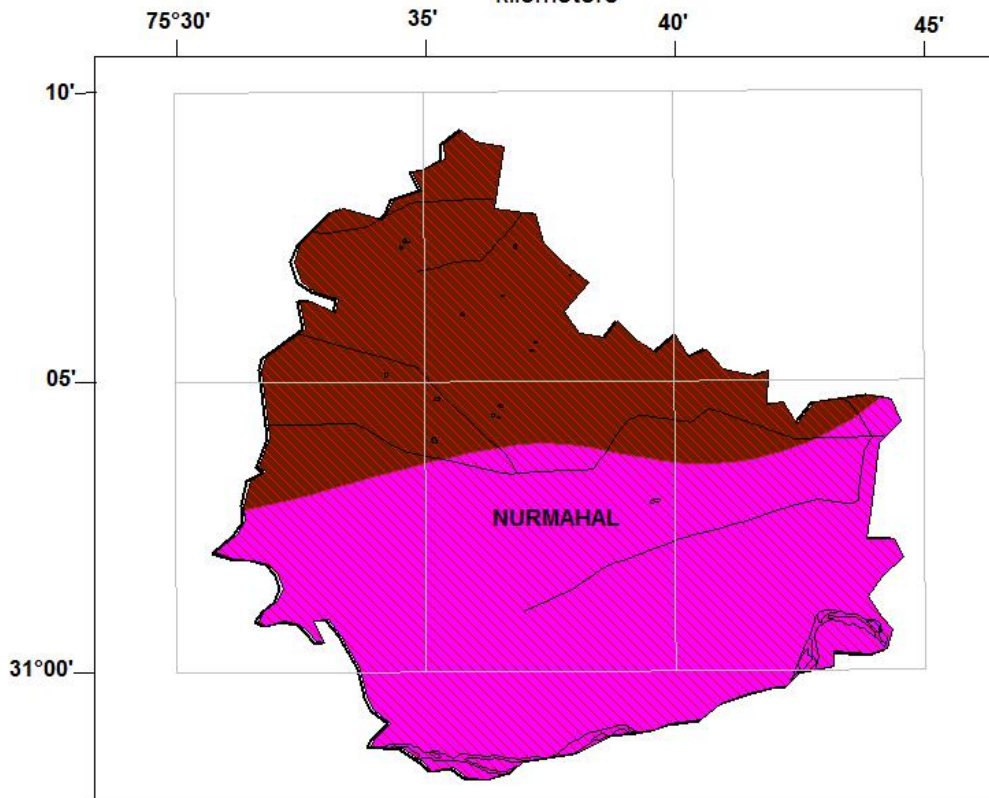
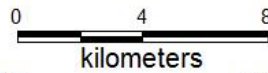
Ground Water Scenario of Block

Block Name:- Nakodar		State:- PUNJAB
District:- Jalandhar		
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	353.3
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	136 0
	ii) Average Annual Rainfall (mm)	625
	iii) Area feasible for Artificial Recharge	353.3
	iv) Village identified under scarcity of Water	87
	v) Village covered under water supply	85
	vi) Water Tank exists in the village	34
2.	GEOMORPHOLOGY	
	Major Physiographic	Alluvium Plain
	Major drainages	
	Basin Sub-Basin	Satluj 100%
3.	LAND USE	
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	293.79 275.23 153.67 428.90 156 --
4.	PREDOMINANT GEOLOGICAL FORMATIONS	Recent alluvium

5.	HYDROGEOLOGY		
	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> Pre- monsoon: (May 2015) 9.20-30.31 (mbgl) 	10.00-40.00 (mbgl)	
	<ul style="list-style-type: none"> Post –monsoon: (Nov2014) 7.68-31.73 (mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> No of wells drilled 	7	
	<ul style="list-style-type: none"> Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> Storativity 	6.0*10 ⁻³	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> EC in μS/cm at 25⁰c 	459	1118
	<ul style="list-style-type: none"> NO₃ (mg/l) 	--	40
	<ul style="list-style-type: none"> F (mg/l) 	0.35	0.95
	<ul style="list-style-type: none"> As (mg/l) 	0.0039	0.0039
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> Net Ground Water Availability (Mcm) 	133.69	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Irrigation (Mcm) 	456.26	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	4.46	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for all Uses (Mcm) 	460.72	
	<ul style="list-style-type: none"> Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	6.39	
	<ul style="list-style-type: none"> Net Ground Water Availability for Future Irrigation Development (Mcm) 	-328.95	

	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	345		
	<ul style="list-style-type: none"> • Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 17	Percentage % 34	
10	Volume of unsaturated zone available for recharge (MCM)	533.17		
11.	Volume of water required for recharge (MCM)	709.15		
12.	Volume of surplus water available for recharge(MCM)	8.15		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	4376	15.32	4.09
14	RWH Rural @ Rs. 25000/-	3363	8.41	0.251
15	RWH Urban@ Rs. 25000/-	781	1.95	0.078
16	Underground pipe line (area in hectares) @ Rs. 50000/-	29656	148.28	110.35
	TOTAL		173.96	114.77

**BLOCK NURMAHAL DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend

Decadal mean water level (post monsoon)

- 10.00 - 20.00 mbgl
- 20.00 - 40.00 mbgl

Decadal mean water level trend (m)

- 0.1 - 0.00

- 1890 **No. of Recharge Structures in Rural Villages**
- 624 **No. of Recharge Structures in Urban Towns**
- 2564 **Recharge Pits in Agricultural Land**
- 18 **Thickness of Sand**
- Canal Network**
- Water Bodies**

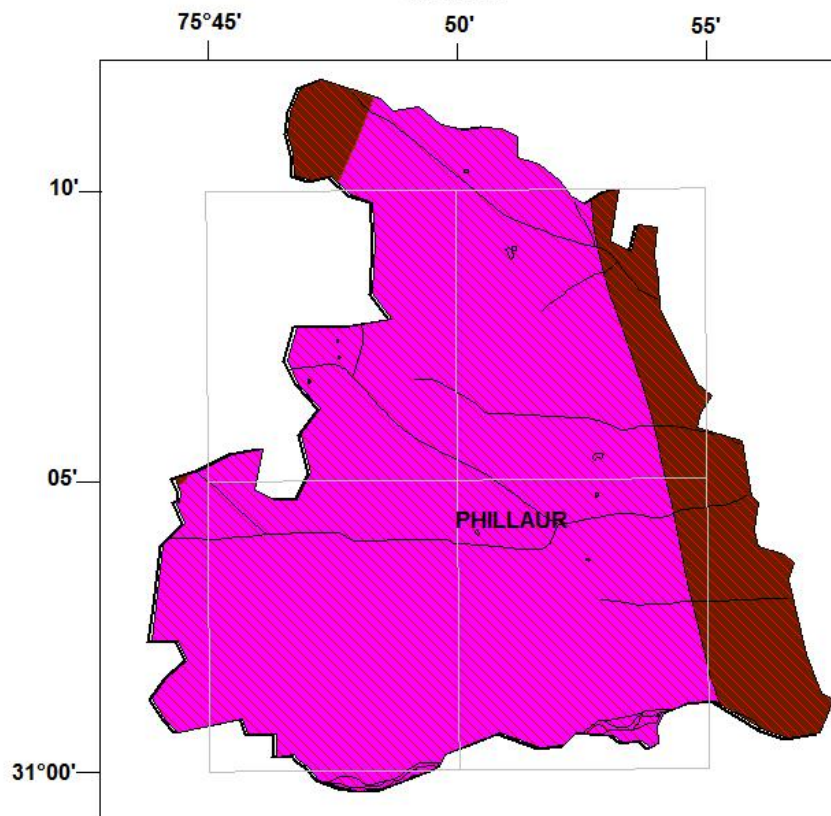
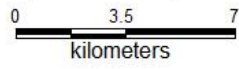
Ground Water Scenario of Block






Block Name:- Nurmahal		State:- PUNJAB	
District:- Jalandhar			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	319.8	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	76 5	
	ii) Average Annual Rainfall (mm)	637	
	iii) Area feasible for Artificial Recharge	319.8	
	iv) Village identified under scarcity of Water	71	
	v) Village covered under water supply	54	
	vi) Water Tank exists in the village	25	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Satluj 100%</i>	
3.	LAND USE		
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	227.37 202.55 136.31 338.86 167 --	
	4.	PREDOMINANT GEOLOGICAL FORMATIONS	<i>Recent alluvium</i>
	5.	HYDROGEOLOGY	

	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 18.50-28.10 (mbgl) 	20.00-40.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 18.80-28.50 (mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	--	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in µS/cm at 25⁰c 	--	--
	<ul style="list-style-type: none"> • NO₃ (mg/l) 	--	--
	<ul style="list-style-type: none"> • F (mg/l) 	--	--
	<ul style="list-style-type: none"> • As (mg/l) 	--	--
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	144.11	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	291.82	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	2.75	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	294.57	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	3.98	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-151.69	

	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	204		
	<ul style="list-style-type: none"> • Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 18	Percentage % 36	
10	Volume of unsaturated zone available for recharge (MCM)	482.61		
11.	Volume of water required for recharge (MCM)	641.91		
12.	Volume of surplus water available for recharge(MCM)	7.38		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	2564	8.97	2.427
14	RWH Rural @ Rs. 25000/-	1890	4.73	0.143
15	RWH Urban@ Rs. 25000/-	624	1.56	0.063
16	Underground pipe line (area in hectares) @ Rs. 50000/-	17524	87.62	70.59
	TOTAL		102.88	73.22

**BLOCK PHILLAUR DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend		2896	No. of Recharge Structures in Rural Villages
Decadal mean water level (post monsoon)		874	No. of Recharge Structures in Urban Towns
	10.00 - 20.00 mbgl	2856	Recharge Pits in Agricultural Land
	20.00 - 40.00 mbgl	15	Thickness of Sand
Decadal mean water level trend (m)			- 0.1 - 0.00
			Canal Network
			Water Bodies

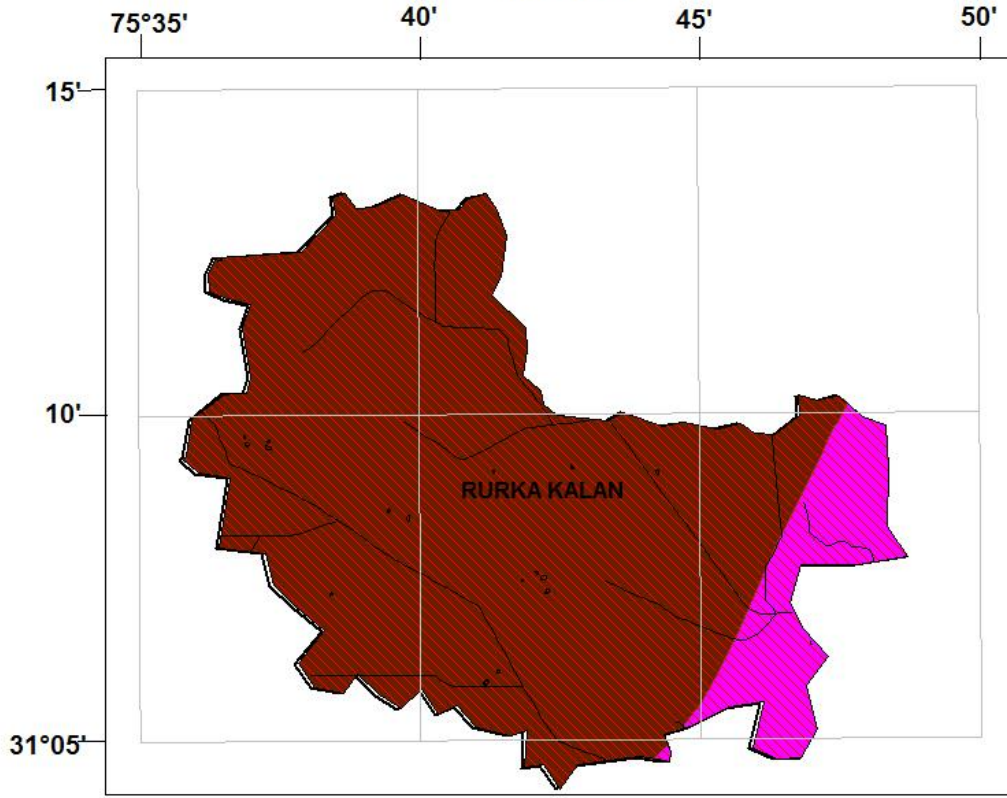
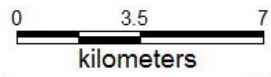
Ground Water Scenario of Block

Block Name:- Phillaur		State:- PUNJAB
District:- Jalandhar		
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	270.3
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	92 4
	ii) Average Annual Rainfall (mm)	635
	iii) Area feasible for Artificial Recharge	270.3
	iv) Village identified under scarcity of Water	100
	v) Village covered under water supply	96
	vi) Water Tank exists in the village	39
2.	GEOMORPHOLOGY	
	Major Physiographic	Alluvium Plain
	Major drainages	
	Basin Sub-Basin	Satluj 100%
3.	LAND USE	
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	326.79 283.20 142.89 426.09 150 --
4.	PREDOMINANT GEOLOGICAL FORMATIONS	Recent alluvium
5.	HYDROGEOLOGY	

	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 15.59-21.70 (mbgl) 	10.00 – 20.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 15.72-21.80(mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	3	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in $\mu\text{S/cm}$ at 25⁰c 	892	892
	<ul style="list-style-type: none"> • NO₃ (mg/l) 	22	22
	<ul style="list-style-type: none"> • F (mg/l) 	0.43	0.43
	<ul style="list-style-type: none"> • As (mg/l) 	0.0018	0.0019
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	156.35	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	309.50	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	5.07	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	314.57	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	7.04	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-160.19	

	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	201		
	<ul style="list-style-type: none"> • Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 15	Percentage % 30	
10	Volume of unsaturated zone available for recharge (MCM)	407.91		
11.	Volume of water required for recharge (MCM)	542.55		
12.	Volume of surplus water available for recharge(MCM)	6.24		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	2856	10.00	1.611
14	RWH Rural @ Rs. 25000/-	2896	7.24	0.22
15	RWH Urban@ Rs. 25000/-	874	2.19	0.088
16	Underground pipe line (area in hectares) @ Rs. 50000/-	19183	95.92	74.86
	TOTAL		115.34	76.78

**BLOCK RURKA KALAN DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
 VS
 DECADAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend

Decadal mean water level (post monsoon)

- 10.00 - 20.00 mbgl
- 20.00 - 40.00 mbgl

Decadal mean water level trend (m)

- 0.1 - 0.00

1722 No. of Recharge Structures in Rural Villages

1724 Recharge Pits in Agricultural Land

8 Thickness of Sand

Canal Network

Water Bodies

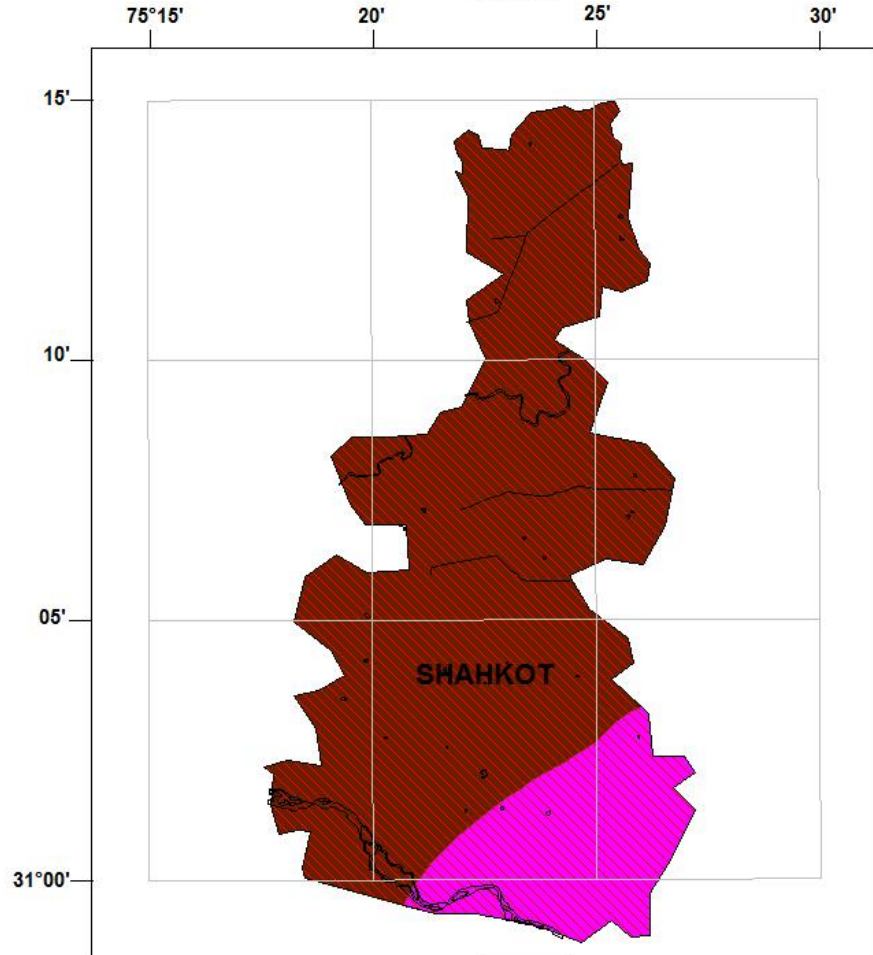
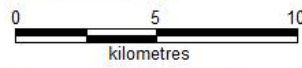
Ground Water Scenario of Block






Block Name:- Rurka Kalan		State:- PUNJAB	
District:- Jalandhar			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	191.8	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	53 2	
	ii) Average Annual Rainfall (mm)	640	
	iii) Area feasible for Artificial Recharge	191.8	
	iv) Village identified under scarcity of Water	45	
	v) Village covered under water supply	33	
	vi) Water Tank exists in the village	24	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Satluj 100%</i>	
3.	LAND USE		
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	181.95 166.40 189.87 356.27 214 --	
	4.	PREDOMINANT GEOLOGICAL FORMATIONS	<i>Recent alluvium</i>
	5.	HYDROGEOLOGY	

	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 19.10-25.52 (mbgl) 	20.00 -40.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 19.70-27.63 (mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	1	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in $\mu\text{S/cm}$ at 25⁰c 	521	620
	<ul style="list-style-type: none"> • NO₃ (mg/l) 	16	52
	<ul style="list-style-type: none"> • F (mg/l) 	0.22	0.34
	<ul style="list-style-type: none"> • As (mg/l) 	---	----
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	104.38	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	210.83	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	.18	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	211.01	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	.18	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-106.62	

	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	202		
	<ul style="list-style-type: none"> • Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 8	Percentage % 16	
10	Volume of unsaturated zone available for recharge (MCM)	289.45		
11.	Volume of water required for recharge (MCM)	384.98		
12.	Volume of surplus water available for recharge(MCM)	4.43		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	1724	6.03	1.611
14	RWH Rural @ Rs. 25000/-	1722	4.31	0.132
15	RWH Urban@ Rs. 25000/-	0	0.00	0
16	Underground pipe line (area in hectares) @ Rs. 50000/-	11580	57.90	51.33
	TOTAL		68.24	53.07

**BLOCK SHAHKOT DISTRICT JALANDHAR, PUNJAB
 DEPTH TO WATER LEVEL - DECADEAL MEAN POST MONSOON
 VS
 DECADEAL MEAN TREND POST MONSOON
 (2004-2013)**



Legend			
Decadal mean water level (post monsoon)		1704	No. of Recharge Structures in Rural Villages
	10.00 - 20.00 mbgl	296	No. of Recharge Structures in Urban Towns
	20.00 - 40.00 mbgl	2305	Recharge Pits in Agricultural Land
Decadal mean water level trend (m)		25	Thickness of Sand
	- 0.1 - 0.00		Canal Network
			Water Bodies

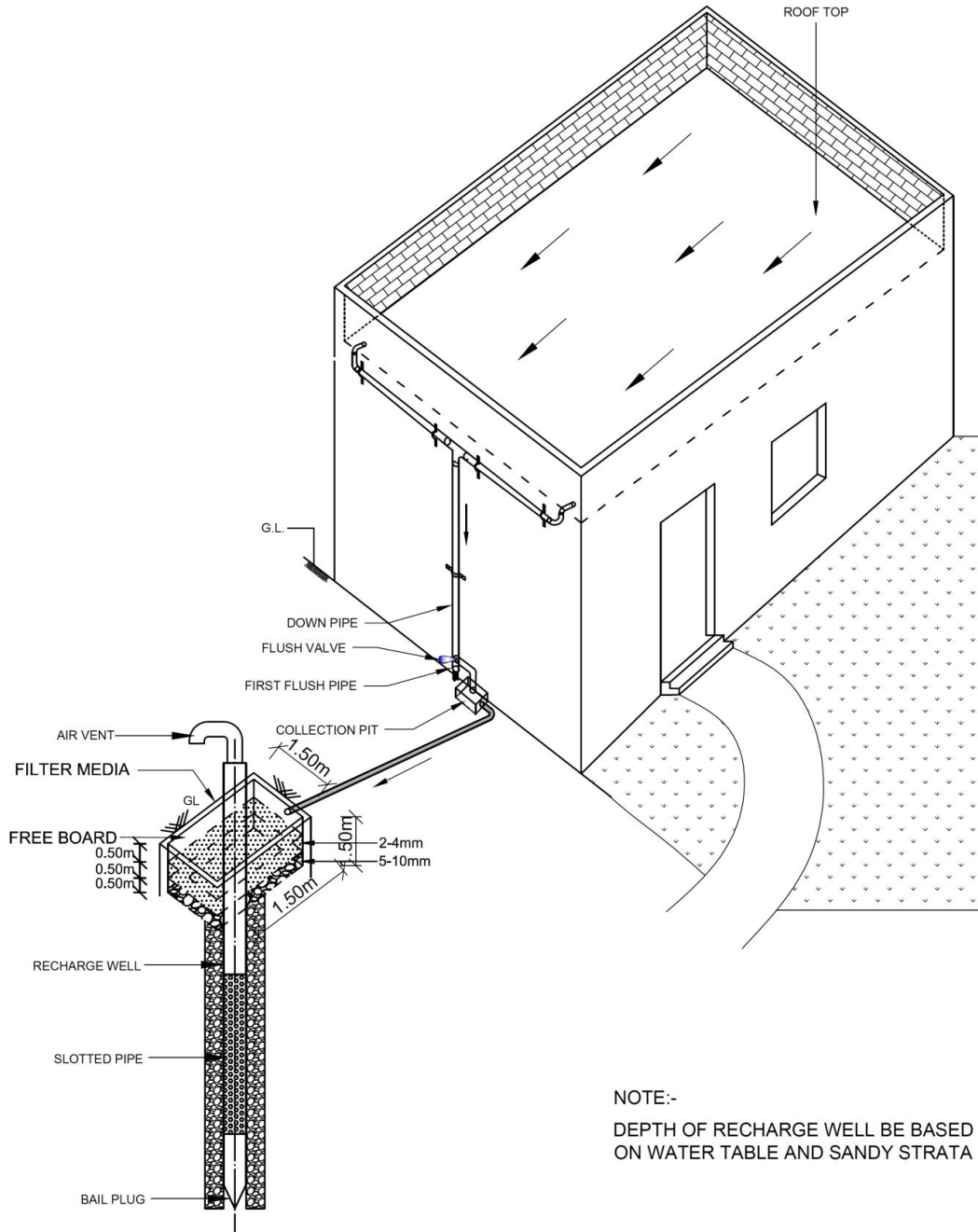
Ground Water Scenario of Block

Block Name:- Shahkot		State:- PUNJAB	
District:- Jalandhar			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	240.7	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	93 1	
	ii) Average Annual Rainfall (mm)	580	
	iii) Area feasible for Artificial Recharge	240.7	
	iv) Village identified under scarcity of Water	82	
	v) Village covered under water supply	78	
	vi) Water Tank exists in the village	20	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Satluj 100%</i>	
3.	LAND USE		
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) • Net Area Sown (Sq.Km) • Area Sown More than Once (Sq.Km) • Total Cropped Area (Sq.Km) • Cropping Intensity • Area under Thur and Sem (Sq.Km) 	216.29 203.67 143.51 347.18 170 --	
	4.	PREDOMINANT GEOLOGICAL FORMATIONS	<i>Recent alluvium</i>
	5.	HYDROGEOLOGY	

	Major Water bearing Formation (Aquifer)	Fine to coarse Sand	
	Avg. Depth to water level (decadal)	Depth to water level May 2015 (mbgl)	
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 15.30-29.80 (mbgl) 	10.00 -40.00 (mbgl)	
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 15.30-31.50 (mbgl) 		
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	<ul style="list-style-type: none"> • No of wells drilled 	11	
	<ul style="list-style-type: none"> • Depth Range (m) 	39.0-304.05	
	<ul style="list-style-type: none"> • Discharge (Ipm) 	5670	
	Aquifer Parameters		
	<ul style="list-style-type: none"> • Transmissivity (m²/day) 	5750	
	<ul style="list-style-type: none"> • Storativity 	6.0*10 ⁻³	
	<ul style="list-style-type: none"> • Specified yield 	0.072	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> • EC in µS/cm at 25⁰c 	439	784
	<ul style="list-style-type: none"> • NO3 (mg/l) 	4.3	95
	<ul style="list-style-type: none"> • F (mg/l) 	0.09	0.32
	<ul style="list-style-type: none"> • As (mg/l) 	---	----
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> • Net Ground Water Availability (Mcm) 	59.27	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Irrigation (Mcm) 	196.84	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (Mcm) 	2.70	
	<ul style="list-style-type: none"> • Existing Gross Ground Water Draft for all Uses (Mcm) 	199.53	
	<ul style="list-style-type: none"> • Allocation for Domestic and Industrial Requirement Supply up to next 25 years (Mcm) 	3.90	
	<ul style="list-style-type: none"> • Net Ground Water Availability for Future Irrigation Development (Mcm) 	-141.47	
	<ul style="list-style-type: none"> • Stage of Ground Water Development / Over Draft (%) 	337	

	<ul style="list-style-type: none"> Category of Block 	OE		
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	<i>Extensive Irrigation</i>	Extensive Irrigation	
9.	Percentage of sand thickness up to 50 m depth (Average)	<i>Thickness(m)</i> 25	Percentage % 50	
10	Volume of unsaturated zone available for recharge (MCM)	363.24		
11.	Volume of water required for recharge (MCM)	483.14		
12.	Volume of surplus water available for recharge(MCM)	5.55		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge/ Water saving in MCM
13	Farm Recharge @Rs. 35000/-	2305	8.07	1.998
14	RWH Rural @ Rs. 25000/-	1704	4.26	0.118
15	RWH Urban@ Rs. 25000/-	296	0.74	0.027
16	Underground pipe line (area in hectares) @ Rs. 50000/-	16841	84.21	47.61
	TOTAL		97.27	49.75

RECHARGE FROM ROOF TOP RAIN WATER HARVESTING (URBAN & RURAL HOUSEHOLDS)



NOTE:-
DEPTH OF RECHARGE WELL BE BASED
ON WATER TABLE AND SANDY STRATA

3-D VIEW

CGWB/NWR/Chandigarh

TYPICAL DESIGN FOR RECHARGE PIT IN FARM

