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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 AMRITSAR DISTRICT, PUNJAB**

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

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



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

Amritsar district is located in the northern part of Punjab state and lies between $31^{\circ} 28' 30''$ to $32^{\circ} 03' 15''$ north latitude & $74^{\circ} 29' 30''$ to $75^{\circ} 24' 15''$ east longitude. Total area of the district is 2647 sq km. Amritsar I, Amritsar II, Baba Bakala and Ajnala are four teshils of the district, whereas Majitha, Attari, Tarsikka, Lopoke and Ramdas are subtehsils in the district. There are eight development blocks namely Ajnala, Chogawan, Harsha Chhina, Jandiala, Majitha, Rayya, Tarsika and Verka. The total population of the district is 24,90,891 as per 2011 census which constitutes 8.99 % of the total population of the state. Amritsar district falls between rivers Ravi and Beas. Major canal in the district is Upper Bari Doab canal which give rise to various branches as Lahore Branch, Kasur branch etc. these canals further feed to their distributaries.

Rainfall & Climate

The climate of the district is classified as tropical, semi arid and hot which is mainly dry with very hot summer and cold winter except during south west monsoon season. The normal annual rainfall of the district is 680 mm unevenly distributed over 31 rainy days. The rainfall increases from southwest to northeastern part of the district.

Geomorphology & Soil Types

Amritsar district falls in between the Ravi River and Beas River. The river Ravi flows in north west of the district and forms international border with Pakistan. The Beas River flows in the eastern part of the district. There are three nalas which drains Amritsar district from north-east to south-west. Kiran Saiki nala flows in the northern part of the district. Hudiara nala and Kasur nala drain the central part of the district where as Patti nala drains south eastern part of the district. Upper Bari Doab canal is the main canal passing through the central part of the district. Lahore branch and Kasur branch lower are the major distributaries of the Upper Bari Doab canal.

Soils in the western part of the district are coarse loamy, calcareous soils, whereas in the central part of the district soils are fine loamy, calcareous and are well drained. The soils are Ustochrepts to Haplustaff type.

Hydrogeology

The district forms part of the Upper Bari Doab and is underlain by formations of Quaternary age comprising of alluvium deposits belonging to vast Indus alluvial plains. Subsurface geological formations comprise of fine to coarse grained sand, silt, clay

and kankar. Gravel associated with sand beds occurs along left bank of Ravi. The beds of thin clay exist alternating with thick sand beds and pinch out at short distances against sand beds.

Central Ground Water Board has carried out ground water exploration up to a depth of 450 meters at village Kohala (Lopoke) in Chogwan block. Total thickness of alluvium is expected to be more than 450 m as bedrock has not been encountered up to that depth. Depth to water level in the district ranges from 11.61 to 24.30 m below ground level (bgl) during premonsoon period and between 12.26 to 24.04 m bgl during postmonsoon period. Water level elevation in the district ranges from 200m above mean sea level (amsl) to 230 m amsl. The ground water flow direction is from northeast to southwest.

Ground Water Resources

The block-wise ground water resource potential of the district has been assessed as per GEC-97. The net replenishable ground water availability in the district has been assessed as 1233.65 mcm. Gross ground water draft for all uses in the district is 2221.58 mcm, leaving a shortfall (over-draft) of 1015.96 mcm. Ground water development in all the blocks has exceeded available recharge; hence all the blocks have been categorized as over exploited. The stage of ground water development ranges from 159 % (block Rayya) to 197 % (block Jandiala). The stage of ground water development in Amritsar district has been assessed as 180 %.

Ground Water Quality

Chemical quality of groundwater of shallow aquifer shows that all parameters are within the permissible limits for drinking purpose set by the BIS, 2012. Electrical conductivity, Chloride, Nitrate and Flouride are the important parameters that are normally considered for evaluating the suitability of ground water for drinking uses. Ground water occurs within desirable levels with respect to EC (less than 1000 micromohos/cm at 25⁰C), Chloride (<250 mg/l), Nitrate (<45mg/l) and Flouride (<1mg/l) in all samples. As per geo-chemical classification, the shallow ground water is Ca-Mg-HCO₃ type with few exception where water is Na-HCO₃ type.

GROUND WATER IRRIGATION SCENARIO

As per the data available from minor irrigation census 2006-07 the detailed number of shallow, deep, tubewells, lined, unlined water distribution system, land holdings of wells are given below for reference

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	Amritsar	1689	14508	39498	23553	3864	83112

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	Amritsar	27	213	864	1040	415	2559

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	Amritsar	14	11137	37252	34709	0	83112

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/kutchra	Under ground pipe
1	Amritsar	309	84999	349

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 x 5mt x 3mt 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 in Lakhs	Total cost of structure in Lakhs	Annual Recharge (MCM)
ROOF TOP RAIN WATER HARVESTING IN RURAL AND URBEN AREAS					
1	Artificial Recharge Plan For Urban Areas.	8483	0.25	2121.50	0.866
2	Roof Top Rain Water Harvesting in Rural Areas	32161	0.25	8040.25	2.522
	Total	40644	0.25	10161.75	3.484
ARTIFICIAL RECHARGE IN FARMS					
1	Artificial Recharge Plan Through Recharge Pits.	25490	0.35	8921.50	25.042
			Total	8921.50	25.042

By the implementation of the proposed recharge structures there will be a reduction of 2.23% in stage of ground water development as tabulated below

Sr. no.	Total Draft (present) (mcm)	Recharge through different 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	2221.58	28.43	2193.15	180%	177.77%	2.23 %

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

Block Name	Total area of the village (in hectares)	10% of village area taken for farm recharge(sq m)	Total number of recharge pits	Annual recharge (MCM)= (Area*Runoff 15%*Rainfall)	Cost of Pit @ Rs. 35000/- (crores)
Tarsika	25849	25849000	2585	2.935	9.0475
Ajnala	44698	44698000	4470	4.009	15.645
Chogawan	71468	71468000	7147	6.593	25.0145
Harsa Chinna	21877	21877000	2188	2.012	7.658
Verka	12876	12876000	1288	1.225	4.508
Jandiala Guru	22818	22818000	2282	2.259	7.987
Majitha	26993	26993000	2699	2.790	9.4465
Rayya	28312	28312000	2831	3.219	9.9085
			25490	25.042	89.215

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)

ARTIFICIAL RECHARGE PLAN FOR RURAL AREAS OF PUNJAB

ROOF TOP RAINWATER HARVESTING IN RURAL AREAS OF PUNJAB								Cost @ Rs.25000/- per structure (crores)
Name of District	Sr.no	Name of CD Block	Total area of the village (in hectares rounded up to one decimal place)	Number of households (2011 census)	No of Houses taken for Artificial Recharge (10% of total households)	Total No of AR Structures (one structure for each house)	Total recharge in MCM	
Amritsar	1	Raya	28312	31596	3160	3160	0.287	7.9
	2	Tarsika	25849.2	24293	2429	2429	0.221	6.0725
	3	Majitha	26993	28016	2802	2802	0.232	7.005
	4	Jandila group	22817.8	25406.7	2541	2541	0.201	6.3525
	5	Verka	24108.60	23154.00	2315	2315	0.191	5.7875
	6	Harsa chinna	21877	17629	1763	1763	0.130	4.4075
	7	Chogawan	71467.60	142493.57	14249	14249	1.052	35.6225
	8	Ajnala	44698	158157	2902	2902	0.208	7.255
		Total	266123	450745	32161	32161	2.522	80.4025

ARTIFICIAL RECHARGE PLAN FOR URBAN AREAS OF PUNJAB

District	Block	Town Name	Total Households	Total Population of Town	HousholdS taken for Atificial Recharge (10%)	Total Roof Top Area (sqm)	Vol of water available for recharge (MCM)	Cost @Rs.25000/- (crores)
1	2	3	4	5	5	6	7	
Amritsar	Ajnala	Ramdass (M CI)	1249	6398	125	24980	0.012	0.3125
	Ajnala	Ajnala(NP)	4060	21107	406	81200	0.039	1.015
	Ajnala	Raja Sansi(NP)	2898	14298	290	57960	0.028	0.725
	Chogwan	Chogwan(CT)	1100	5416	110	22000	0.012	0.275
	Majitha	Majitha	2695	14503	270	53900	0.030	0.675
	Verka	Amritsar Cant	2240	10410	224	44800	0.023	0.56
	Verka	Amritsar(M Corp.)*	239078	1183549	5000	1000000	0.507	12.5
	Verka	Kathnian(CT)	2232	10679	223	44640	0.023	0.5575
	Verka	Nagli(CT)	4232	20440	423	84640	0.043	1.0575
	Verka	Mudal (CT)	706	3882	71	14120	0.007	0.1775
	Jandila	Jandila (MCI)	5651	29232	565	113020	0.060	1.4125
	Raya	Raya (NP)	2910	14506	291	58200	0.031	0.7275
	Raya	Khilchian (CT)	921	4588	92	18420	0.010	0.23
	Raya	Baba Bakala	1834	8946	183	36680	0.019	0.4575
	Raya	Budha Theh (CT)	2099	10979	210	41980	0.022	0.525
		Total	273909	1358938	8483	1696540	0.866	21.2075
	*	DUE TO OLD CITY TOTAL HOUSEHOLDS TAKEN AS 5000						

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 83112 operated by farmers for irrigation through unlined/Katcha (99.21%) open channel system in Amritsar district where water from the tubewell 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 Amritsar district is estimated at 2171.50 MCM. It is expected that around 43.93% 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 542.89 MCM assuming there is no crop diversification by the farmers.

The benefit will lead to saving of precious ground water resources in overexploited blocks of Amritsar Districts. The measure if implemented will bring down the ground water overdraft from 180% to 136.07 %. 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 tubewells 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 crop per drop**.













POTENTIAL FOR REDUCTION IN OVERDRAFT BY ENHANCING THE GROUND WATER USE EFFICIENCY IN IRRIGATION TUBEWELLS, AMRITSAR 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 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
1233.65	2221.58	2171.50	50.08	99.21	542.89	1628.61	1678.69	180	136.07	43.93

Losses from open kuchha channel are around 30%.

COST ESTIMATE OF UNDERGROUND PIPE LINE

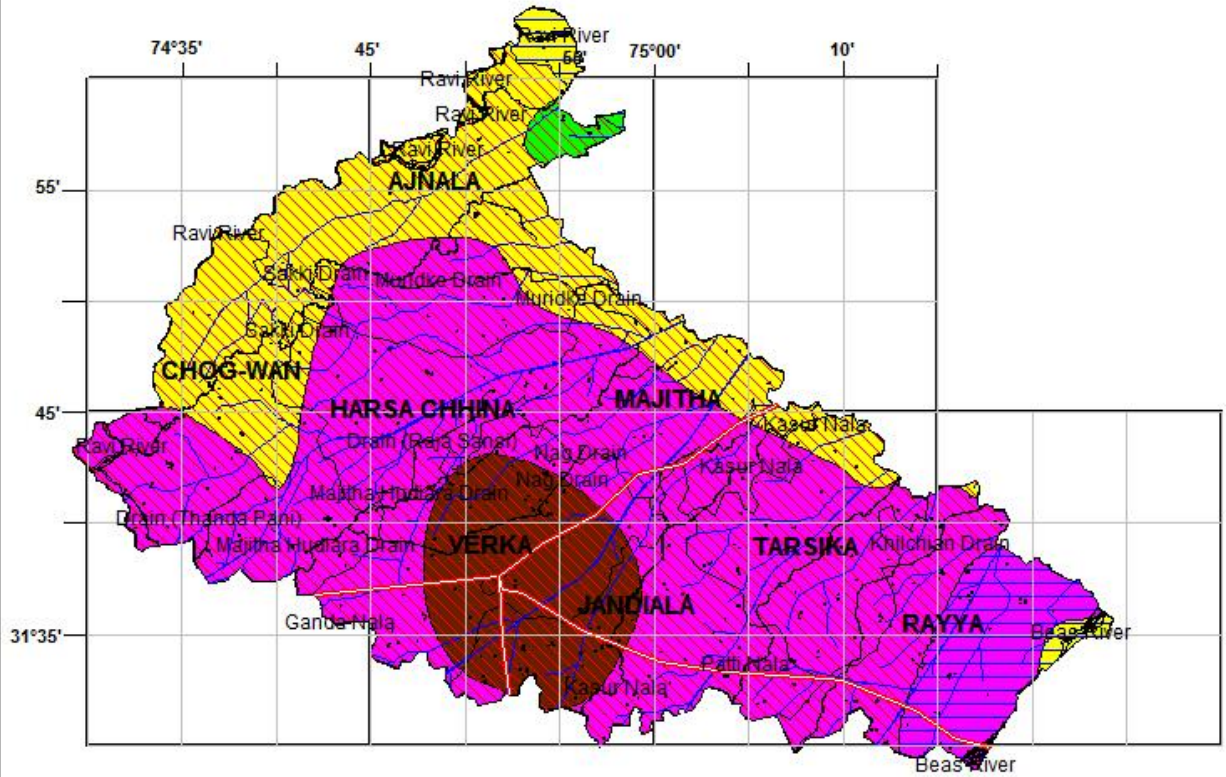
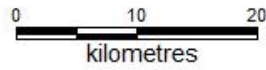
District	Block	Irrigated area by ground water scheme (ha)	Percentage of Unlined Channel (%)	Area under unlined Channels	Total cost @Rs.0.50 lack per hector(in cr) Area *0.50/100 = Crores	Total Cost in Rs.Cr. District wise
AMRITSAR	Ajnala	31298	99.21	31051	155.25	652.73
	Chogawan	20648.8	99.21	20486	102.43	
	Harsa Chinna	7483	99.21	7424	37.12	
	Attari	12339.6	99.21	12242	61.21	
	Verka	5355.2	99.21	5313	26.56	
	Jandiala Guru	12993	99.21	12890	64.45	
	Majitha	11135.6	99.21	11048	55.24	
	Tarsika	17522.1	99.21	17384	86.92	
Rayya	12810	99.21	12709	63.54		

Wells Feasible	Rigs Suitable	Depth of Well (m)	Discharge (lpm)	Suitable Artificial Recharge Structures
Tube Wells	Direct and Reverse Rotary	80 - 210	2000 - 4000	Recharge Shaft And Recharge Trench
Tube Wells	Direct and Reverse Rotary	30 - 105	1000 - 2000	Recharge Shaft And Recharge Trench
Tube Wells	Direct and Reverse Rotary	30 - 90	800 - 1000	Recharge Shaft And Recharge Trench
DEPTH TO WATER LEVEL NOVEMBER 2014				
	2.00 - 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	Amritsar
Geographical Area	2403 sq.km.
Major Geological Formation	Alluvium
Major Drainage System	Ravi and Beas
Population (as on 2011)	24,90,891
Total Number of Blocks	8
Existing Major/Medium Irrigation Projects	Upper Bari Doab Canal
Utilizable Ground Water Resources 2011	1233.65 (mcm)
Net Ground Water Draft	2221.58 (mcm)
Stage of Ground Water Development	180 %
Average Annual Rainfall	691 mm
Range of Mean Daily Temperature	6 - 40°C
Over Exploited Blocks	AJNALA CHOGWAN TARSIKKA RAYYA MAJITHA JANDIALA GURU HARSHA CHHINA VERKA

PLAN OF ARTIFICIAL RECHARGE TO GROUND WATER DISTRICT AMRITSAR, PUNJAB



Legend

Refer Salient Features of Hydrogeology

Decadal mean water level trend (m)



0.00 -- 0.1114

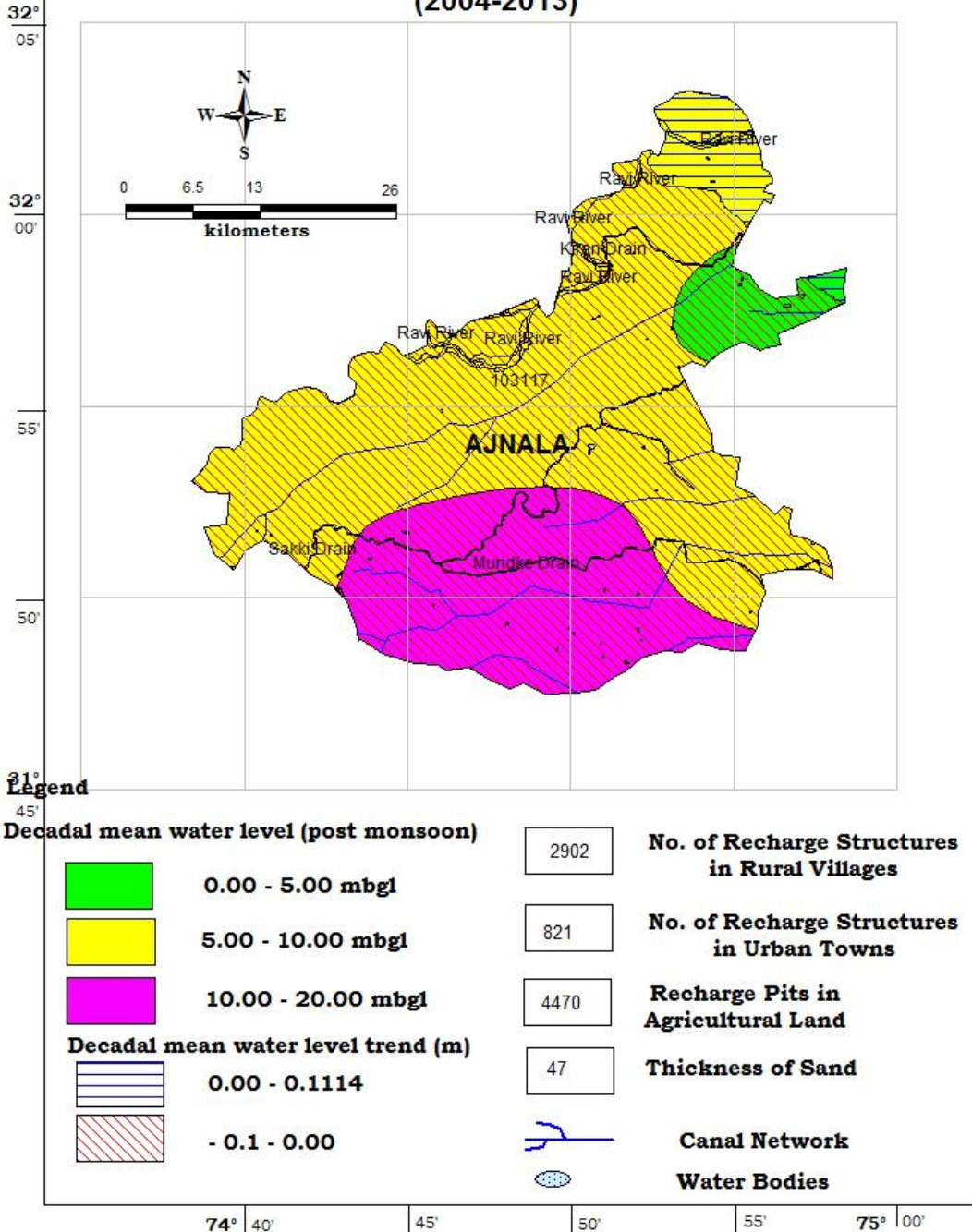


-0.10 -- -0.00

***BLOCK
WISE PLAN OF
DISTRICT
AMRITSAR
PUNJAB***

(8 OE BLOCKS)

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



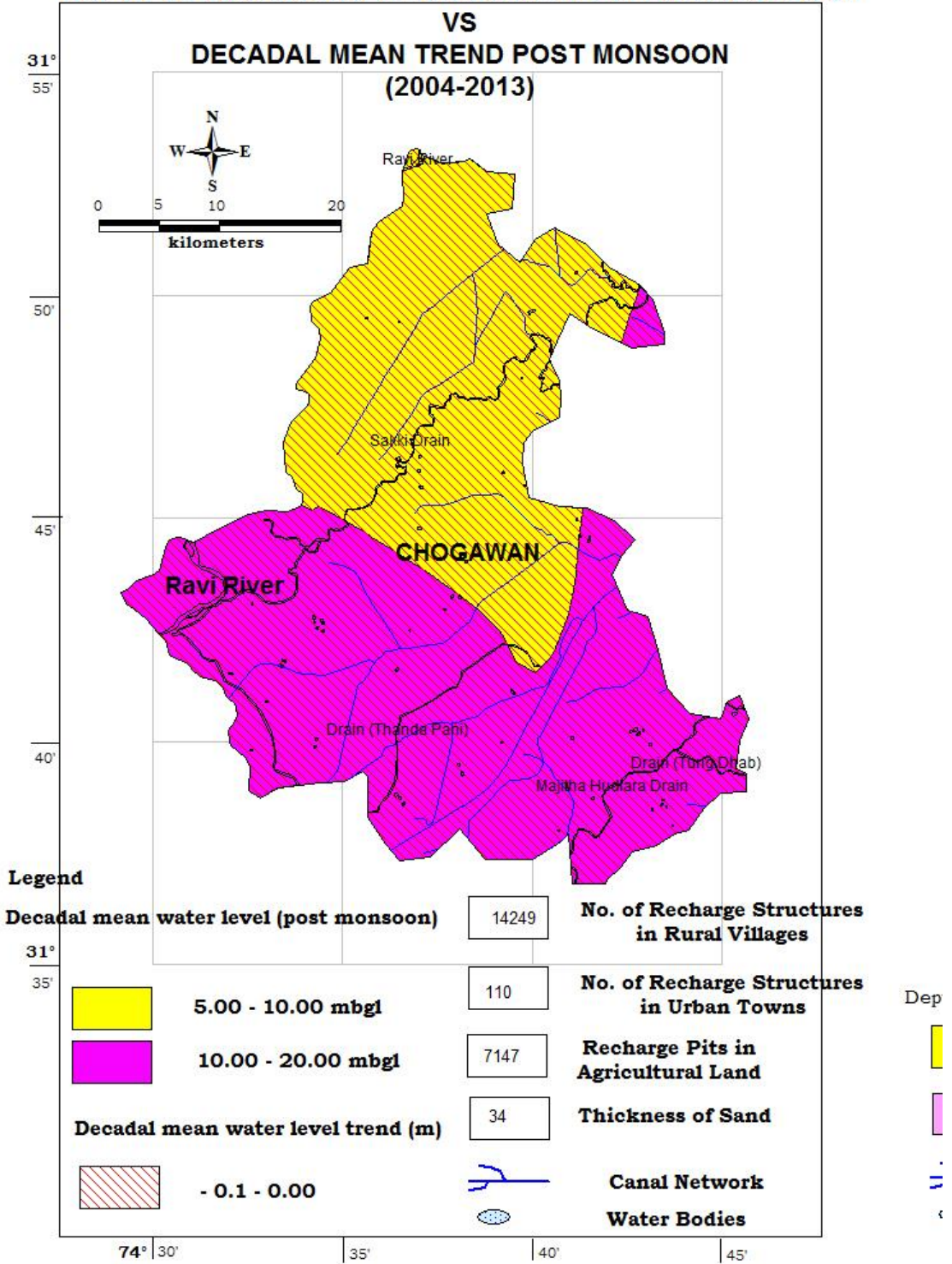
Ground Water Scenario of Block

Block Name:- AJNALA		State:- PUNJAB
District:- AMRITSAR		
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	375.5
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	140 25
	ii) Average Annual Rainfall (mm)	608
	iii) Area feasible for Artificial Recharge	375.5
	iv) Village identified under scarcity of Water	136
	v) Village covered under water supply	130
	vi) Water Tank exists in the village	27
2.	GEOMORPHOLOGY	
	Major Physiographic	Alluvium Plain
	Major drainages Basin Sub-Basin	Ravi 100%
3.	LAND USE	
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) 	449.20
	<ul style="list-style-type: none"> • Net Area Sown (Sq.Km) 	381.63
	<ul style="list-style-type: none"> • Area Sown More than Once (Sq.Km) 	763.27
	<ul style="list-style-type: none"> • Total Cropped Area (Sq.Km) 	1144.90
	<ul style="list-style-type: none"> • Cropping Intensity 	300
	<ul style="list-style-type: none"> • Area under Thur and Sem (Sq.Km) 	0
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)
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) 5.20—12.80(mbgl) 	5.00- 20.00 (mbgl)
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) 4.20—12.90(mbgl) 	
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)	
	<ul style="list-style-type: none"> • No of wells drilled 	2

	• Depth Range (m)	302.32-375.0	
	• Discharge (Ipm)	2750-4845	
	• Transmissivity (m ² /day)	1450-7190	
	• Stortivity	2.00*10 ⁻²	
	• Specified yield	0.072	
7.	GROUND WATER QUALITY	Min	Max
	• EC in $\mu\text{S}/\text{cm}$ at 25 ⁰ c	980	980
	• NO ₃ (mg/l)	2.2	2.2
	• F (mg/l)	0.16	0.16
	• As (mg/l)	0.0045	0.0168
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	• Net Ground Water Availability (MCM)	198.82	
	• Existing Gross Ground Water Draft for Irrigation (MCM)	365.34	
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	4.19	
	• Existing Gross Ground Water Draft for all Uses (MCM)	369.53	
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	6.62	
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-173.14	
	• Stage of Ground Water Development / Over draft (%)	186	
	• 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> 47	Percentage % 94
10	Volume of unsaturated zone available for recharge (MCM)	382.38	
11.	Volume of water required for recharge (MCM)	508.64	
12.	Volume of surplus water available for recharge(MCM)	18.42	

RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge @Rs. 35000/-	4470	15.645	4.009
14	RWH Rural @ Rs. 25000/-	2902	7.255	0.208
15	RWH Urban @ Rs. 25000/-	821	2.05	0.079
16	Underground pipe line (area in hectares) @ Rs. 50000/-	31051	155.25	91.34
	TOTAL		180.20	95.636

**BLOCK CHOGAWAN DISTRICT AMRITSAR, PUNJAB
DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON**



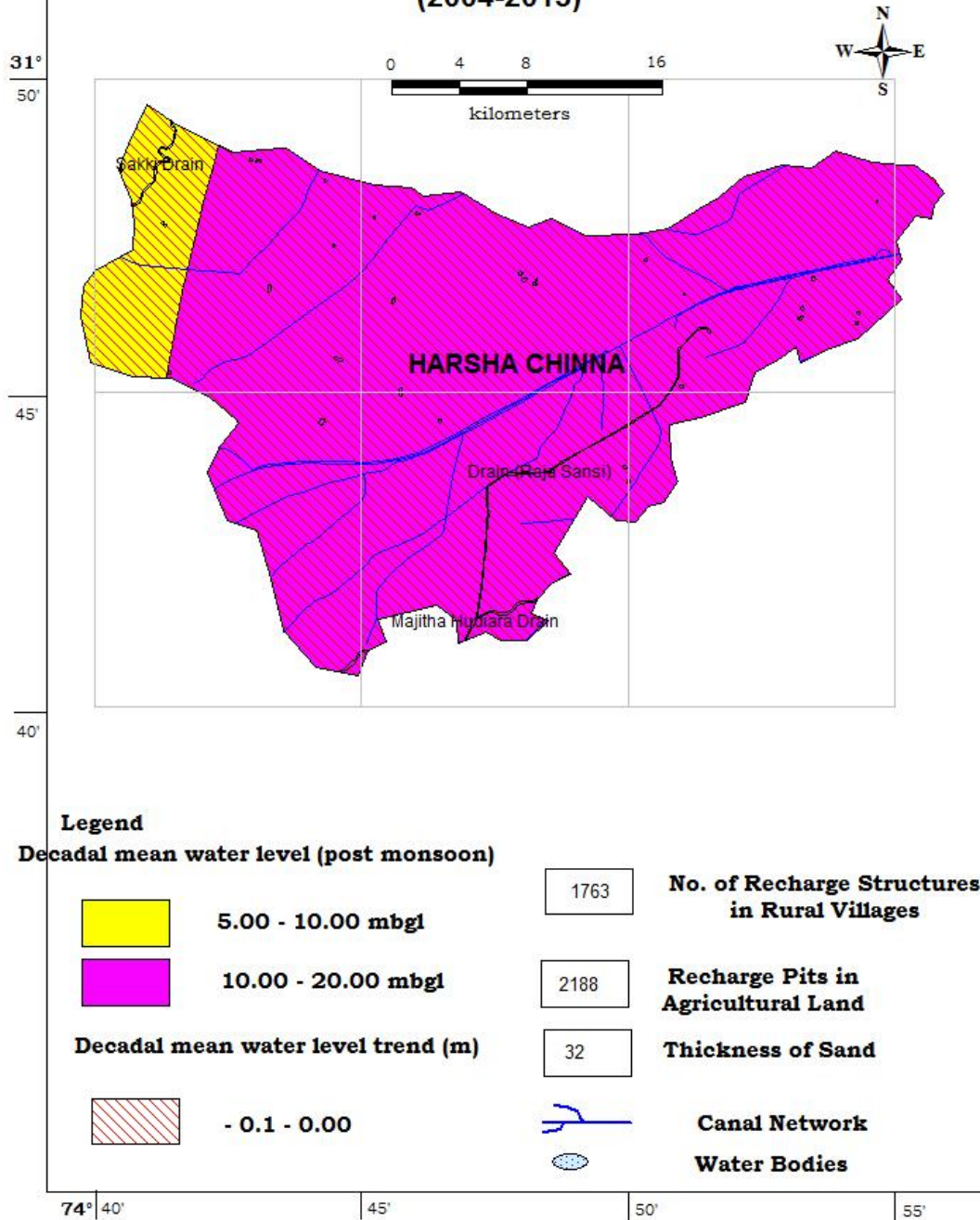
Ground Water Scenario of Block

Block Name:- CHOGAWAN		State:- PUNJAB	
District:- AMRITSAR			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	396	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	110 6	
	ii) Average Annual Rainfall (mm)	627	
	iii) Area feasible for Artificial Recharge	396	
	iv) Village identified under scarcity of Water	111	
	v) Village covered under water supply	103	
	vi) Water Tank exists in the village	116	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	Ravi 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) 	397.67 350.75 696.80 1047.55 299 0	
	4.	PREDOMINAT 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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) 6.90—15.80(mbgl) • Post –monsoon: (Nov2014) 6.70—15.10(mbgl) 	5.00 -20.00 (mbgl)

6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	• No of wells drilled	2	
	• Depth Range (m)	302.32—375.0	
	• Discharge (Ipm)	2750-4845	
	• Transmissivity (m ² /day)		
	• Stortivity	2.00*10 ⁻²	
	• Specified yield	0.072	
7.	GROUND WATER QUALITY	Min	Max
	• EC in µS/cm at 25 ⁰ c	370	992
	• NO3 (mg/l)	0	65
	• F (mg/l)	0.09	0.41
	• As (mg/l)	0.001	0.079
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	• Net Ground Water Availability (MCM)	184.93	
	• Existing Gross Ground Water Draft for Irrigation (MCM)	336.82	
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	3.44	
	• Existing Gross Ground Water Draft for all Uses (MCM)	340.26	
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	5.47	
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-157.37	
	• Stage of Ground Water Development/ Over dreft (%)	184	
	• 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> 34	Percentage % 68
10	Volume of unsaturated zone available for recharge (MCM)	403.25	

11.	Volume of water required for recharge (MCM)	536.40		
12.	Volume of surplus water available for recharge(MCM)	19.43		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	7147	25.01	6.593
14	RWH Rural @ Rs. 25000/-	14249	35.62	1.052
15	RWH Urban@ Rs. 25000/-	110	0.27	0.012
16	Underground pipe line (area in hectares) @ Rs. 50000/-	20486	102.43	84.21
TOTAL			163.33	95.636

BLOCK HARSHA CHINNA DISTRICT AMRITSAR, PUNJAB
DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
VS
DECADAL MEAN TREND POST MONSOON
(2004-2013)



Ground Water Scenario of Block

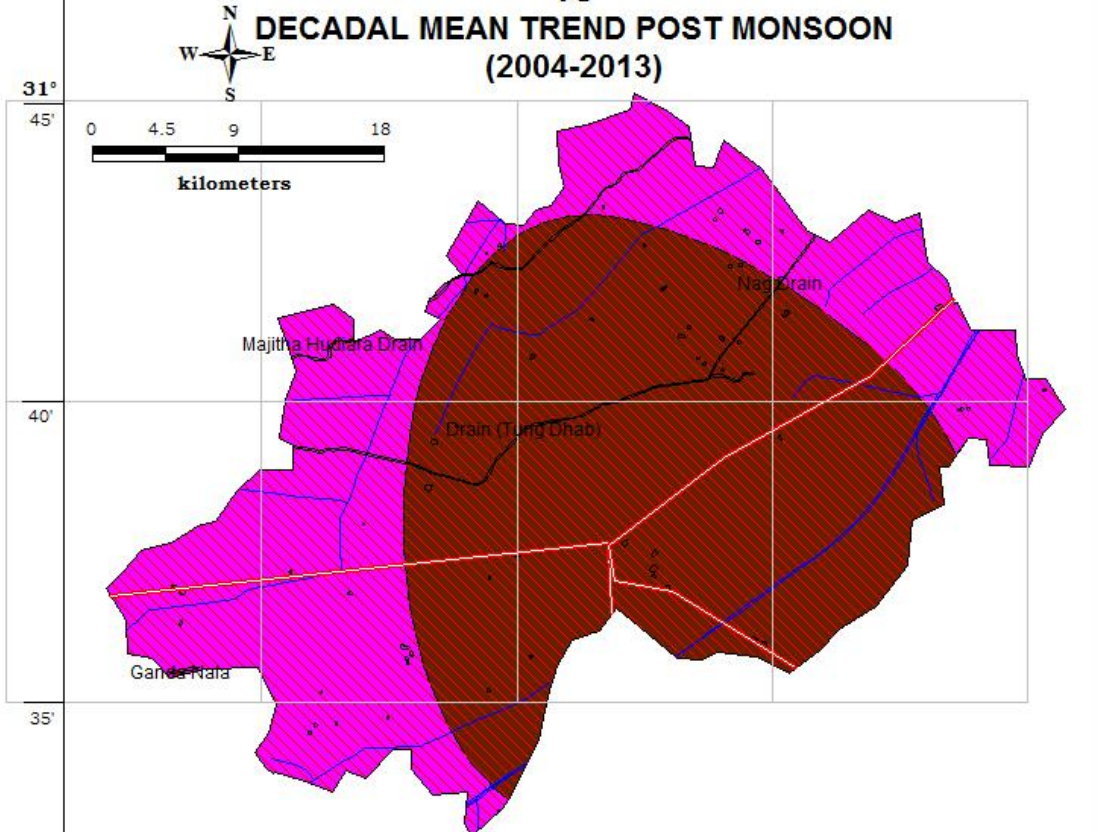
Block Name:- HARASHA CHINA		State:- PUNJAB	
District:- AMRITSAR			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	257.4	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	62 1	
	ii) Average Annual Rainfall (mm)	624	
	iii) Area feasible for Artificial Recharge	188	
	iv) Village identified under scarcity of Water	17	
	v) Village covered under water supply	57	
	vi) Water Tank exists in the village	17	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	Ravi 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) 	217.82 202.59 402.48 605.07 2.99 0	
	4.	PREDOMINAT 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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) 8.90—14.70(mbgl) • Post –monsoon: (Nov2014) 8.80—14.10(mbgl) 	5.00 – 20.00 (mbgl)
6.		GROUND WATER EXPLORATION BY CGWB	










	(As on 31.03.2015)		
	• No of wells drilled	0	
	• Depth Range (m)	302.32—375.0	
	• Discharge (Ipm)	2750-4845	
	Aquifer Parameters		
	• Transmissivity (m ² /day)	1450-7190	
	• Stortivity	2.00*10 ⁻²	
	• Specified yield	0.072	
7.	GROUND WATER QUALITY	Min	Max
	• EC in µS/cm at 25 ⁰ c	0	0
	• NO3 (mg/l)	16	0
	• F (mg/l)	0	0
	• As (mg/l)	0.001	0.001
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	• Net Ground Water Availability (MCM)	114.08	
	• Existing Gross Ground Water Draft for Irrigation (MCM)	212.38	
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	2.32	
	• Existing Gross Ground Water Draft for all Uses (MCM)	214.70	
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	3.69	
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-101.99	
	• Stage of Ground Water Development (%)	188	
	• 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> --	Percentage % --
10	Volume of unsaturated zone available for recharge (MCM)	262.11	

11.	Volume of water required for recharge (MCM)	348.66
12.	Volume of surplus water available for recharge(MCM)	12.63

RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	2188	7.658	2.012
14	RWH Rural @ Rs. 25000/-	1763	4.407	0.130
15	RWH Urban@ Rs. 25000/-	NA	NA	NA
16	Underground pipe line (area in hectares) @ Rs. 50000/-	7424	37.12	53.10
	TOTAL		49.19	55.242

**BLOCK VERKA DISTRICT AMRITSAR, 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		No. of Recharge Structures in Rural Villages
	20.00 - 40.00 mbgl		No. of Recharge Structures in Urban Towns
Decadal mean water level trend (m)			Recharge Pits in Agricultural Land
	- 0.1 - 0.00		Thickness of Sand
			Canal Network
			Water Bodies
74° 45'	50'	55'	75° 00'

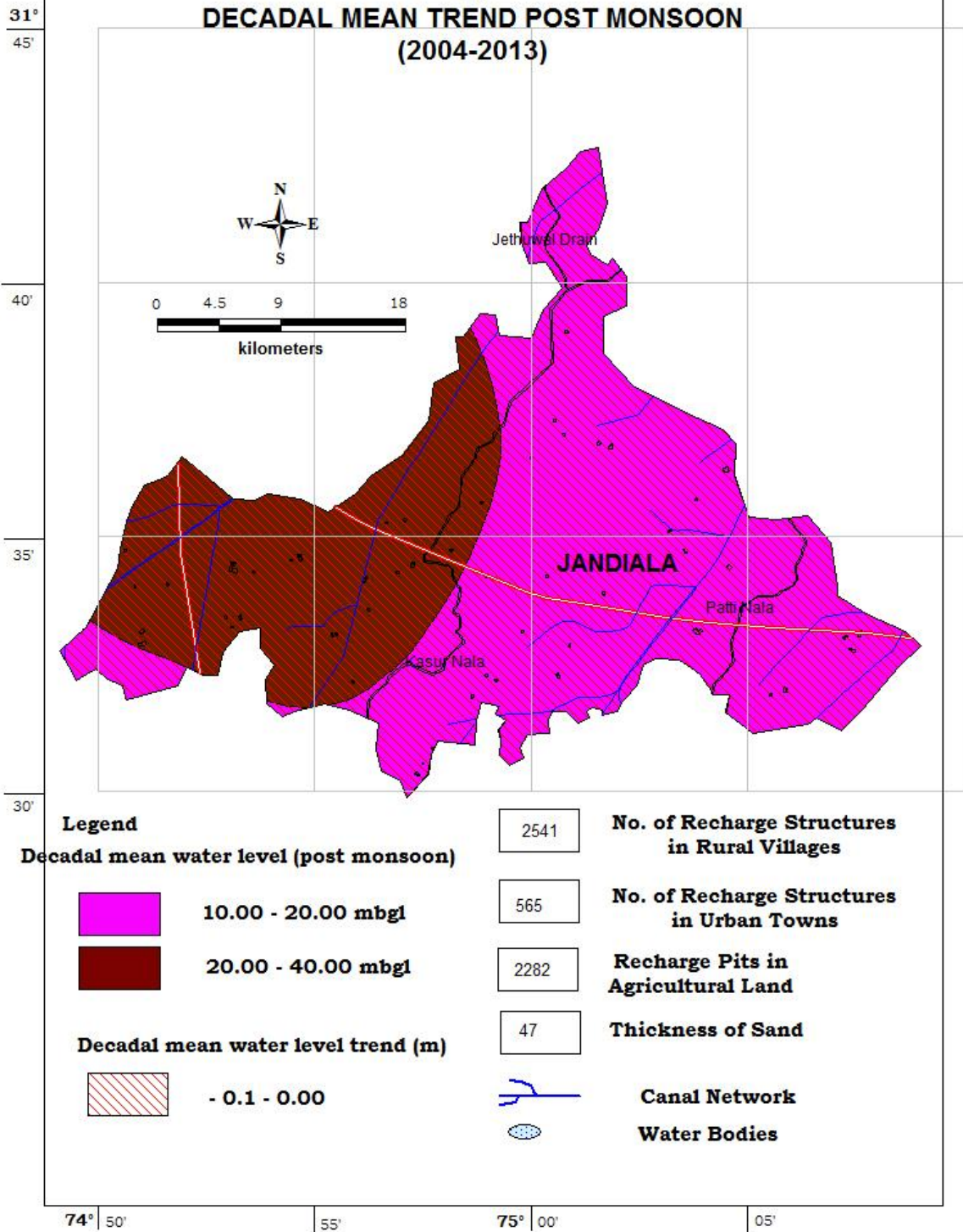
Ground Water Scenario of Block

Block Name:- Verka		State:- PUNJAB	
District:- AMRITSAR			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	333.4	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	69 0	
	ii) Average Annual Rainfall (mm)	644	
	iii) Area feasible for Artificial Recharge	0	
	iv) Village identified under scarcity of Water	42	
	v) Village covered under water supply	42	
	vi) Water Tank exists in the village	12	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	Ravi 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) 	173.23 147.62 294.08 441.70 2.99 0	
	4.	PREDOMINAT 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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) 12.80-24.84(mbgl) • Post –monsoon: (Nov2014) 12.80-23.86(mbgl) 	10.00-40.00 (mbgl)

6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)			
	• No of wells drilled	1		
	• Depth Range (m)	302.32—375.0		
	• Discharge (Ipm)	2750-4845		
	Aquifer Parameters			
	• Transmissivity (m ² /day)	1450-7190		
	• Stortivity	2.00*10 ⁻²		
	• Specified yield	0.072		
7.	GROUND WATER QUALITY		Min	Max
	• EC in µS/cm at 25 ⁰ c	628		628
	• NO3 (mg/l)	24		24
	• F (mg/l)	0.28		0.28
	• As (mg/l)	0.0003		0.0003
8.	DYANMIC GROUND WATER RESOURCES in MCM		2011	
	• Net Ground Water Availability (MCM)	137.86		
	• Existing Gross Ground Water Draft for Irrigation (MCM)	210.17		
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	32.49		
	• Existing Gross Ground Water Draft for all Uses (MCM)	242.67		
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	50.36		
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-122.67		
	• Stage of Ground Water Development / Over Draft (%)	176		
	• 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> 22	Percentage % 44	

10	Volume of unsaturated zone available for recharge (MCM)	339.50		
11.	Volume of water required for recharge (MCM)	451.61		
12.	Volume of surplus water available for recharge(MCM)	16.36		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	1288	4.508	2.012
14	RWH Rural @ Rs. 25000/-	2315	5.787	0.130
15	RWH Urban@ Rs. 25000/-	5941	14.852	0.603
16	Underground pipe line (area in hectares) @ Rs. 50000/-	5313	26.56	52.54
TOTAL			51.702	55.285

BLOCK JANDIALA DISTRICT AMRITSAR, PUNJAB
DEPTH TO WATER LEVEL - DECADAL MEAN POST MONSOON
VS
DECADAL MEAN TREND POST MONSOON
(2004-2013)



Ground Water Scenario of Block

Block Name:- JANDIALA		State:-
District:- AMRITSAR PUNJAB		
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	206.2
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	62 1
	ii) Average Annual Rainfall (mm)	671
	iii) Area feasible for Artificial Recharge	197
	iv) Village identified under scarcity of Water	44
	v) Village covered under water supply	44
	vi) Water Tank exists in the village	16
2.	GEOMORPHOLOGY	
	Major Physiographic	Alluvium Plain
	Major drainages Basin Sub-Basin	Ravi 100%
3.	LAND USE	
	<ul style="list-style-type: none"> • Area According to Village Papers (Sq.Km) 	181.95
	<ul style="list-style-type: none"> • Net Area Sown (Sq.Km) 	161.53
	<ul style="list-style-type: none"> • Area Sown More than Once (Sq.Km) 	299.03
	<ul style="list-style-type: none"> • Total Cropped Area (Sq.Km) 	460.56
	<ul style="list-style-type: none"> • Cropping Intensity 	2.85
	<ul style="list-style-type: none"> • Area under Thur and Sem (Sq.Km) 	0
4.	PREDOMINAT 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)
	<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) 16.90—19.20-(mbgl) 	10.00-40.00 (mbgl)
	<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) 6.40—18.82 (mbgl) 	

6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	• No of wells drilled	2	
	• Depth Range (m)	302.32—375.0	
	• Discharge (lpm)	2750-4845	
	Aquifer Parameters		
	• Transmissivity (m ² /day)	1450-7190	
	• Stortivity	2.00*10 ⁻²	
	• Specified yield	0.072	
7.	GROUND WATER QUALITY	Min	Max
	• EC in $\mu\text{S/cm}$ at 25 ⁰ c	535	535
	• NO ₃ (mg/l)	19	16
	• F (mg/l)	0.76	0.76
	• As (mg/l)	0.001	0.001
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	• Net Ground Water Availability (MCM)	125.13	
	• Existing Gross Ground Water Draft for Irrigation (MCM)	244.66	
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	3.86	
	• Existing Gross Ground Water Draft for all Uses (MCM)	248.52	
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	6.04	
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-125.57	
	• Stage of Ground Water Development / Over Draft (%)	199	
	• 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> 24	Percentage % 48

10	Volume of unsaturated zone available for recharge (MCM)	209.98		
11.	Volume of water required for recharge (MCM)	279.31		
12.	Volume of surplus water available for recharge(MCM)	10.12		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	2282	7.987	2.259
14	RWH Rural @ Rs. 25000/-	2541	6.352	0.201
15	RWH Urban@ Rs. 25000/-	565	1.412	0.060
16	Underground pipe line (area in hectares) @ Rs. 50000/-	12890	64.45	61.17
	TOTAL		80.201	63.69

Ground Water Scenario of Block

Block Name:- MAJITHA		State:- PUNJAB	
District:- AMRITSAR			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	271.9	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	103 1	
	ii) Average Annual Rainfall (mm)	699	
	iii) Area feasible for Artificial Recharge	0	
	iv) Village identified under scarcity of Water	88	
	v) Village covered under water supply	88	
	vi) Water Tank exists in the village	26	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	Ravi 90% Beas 10%	
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) 	251.14 226.84 418.11 644.95 2.84 0	
	4.	PREDOMINAT 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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 8.10-14.60(mbgl) 	5.00- 20.00(mbgl)
<ul style="list-style-type: none"> • Post –monsoon: (Nov2014) • 6.80-15.10 (mbgl) 			
6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		

	<ul style="list-style-type: none"> No of wells drilled 	0	
	<ul style="list-style-type: none"> Depth Range (m) 	302.32-375.0	
	<ul style="list-style-type: none"> Discharge (Ipm) 	2750-4845	
	Aquifer Parameters		
	<ul style="list-style-type: none"> Transmissivity (m²/day) 	1450-7190	
	<ul style="list-style-type: none"> Stortivity 	2.00*10 ⁻²	
	<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 	0	0
	<ul style="list-style-type: none"> NO3 (mg/l) 	0	0
	<ul style="list-style-type: none"> F (mg/l) 	0	0
	<ul style="list-style-type: none"> As (mg/l) 	0.0024	0.0024
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> Net Ground Water Availability (Ham) 	159.12	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Irrigation (MCM) 	286.19	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM) 	0.41	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for all Uses (MCM) 	286.59	
	<ul style="list-style-type: none"> Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM) 	.064	
	<ul style="list-style-type: none"> Net Ground Water Availability for Future Irrigation Development (MCM) 	-127.71	
	<ul style="list-style-type: none"> Stage of Ground Water Development / Over Draft (%) 	180	
	<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> 26	Percentage % 52
10	Volume of unsaturated zone available for recharge (MCM)	276.88	
11.	Volume of water required for recharge (MCM)	368.30	

12.	Volume of surplus water available for recharge(MCM)	13.34		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	2699	9.446	2.259
14	RWH Rural @ Rs. 25000/-	2802	7.005	0.201
15	RWH Urban@ Rs. 25000/-	270	0.675	0.060
16	Underground pipe line (area in hectares) @ Rs. 50000/-	11048	55.24	71.55
	TOTAL		72.366	74.07

Ground Water Scenario of Block

Block Name:- RAYYA		State:- PUNJAB	
District:- AMRITSAR			
1.	GENERAL INFORMATION		
	i) Geographical area (sq km)	326.4	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	91 0	
	ii) Average Annual Rainfall (mm)	6326.4	
	iii) Area feasible for Artificial Recharge	326.4	
	iv) Village identified under scarcity of Water	63	
	v) Village covered under water supply	59	
	vi) Water Tank exists in the village	67	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	Beas 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) 	297.85 232.36 452.62 684.98 2.95 0	
	4.	PREDOMINAT 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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) • 14.53-15.70(mbgl) • Post –monsoon: (Nov2014) • 12.70-15.15(mbgl) 	10.00-20.00 (mbgl)
6.		GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)	

	<ul style="list-style-type: none"> No of wells drilled 	<i>1</i>	
	<ul style="list-style-type: none"> Depth Range (m) 	<i>302.32—375.0</i>	
	<ul style="list-style-type: none"> Discharge (Ipm) 	<i>2750-4845</i>	
	Aquifer Parameters		
	<ul style="list-style-type: none"> Transmissivity (m²/day) 	<i>1450-7190</i>	
	<ul style="list-style-type: none"> Stortivity 	<i>2.00*10⁻²</i>	
	<ul style="list-style-type: none"> Specified yield 	<i>0.072</i>	
7.	GROUND WATER QUALITY	Min	Max
	<ul style="list-style-type: none"> EC in $\mu\text{S}/\text{cm}$ at 25⁰c 	<i>770</i>	<i>770</i>
	<ul style="list-style-type: none"> NO₃ (mg/l) 	<i>65</i>	<i>65</i>
	<ul style="list-style-type: none"> F (mg/l) 	<i>0.37</i>	<i>0.37</i>
	<ul style="list-style-type: none"> As (mg/l) 	<i>-</i>	<i>-</i>
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	<ul style="list-style-type: none"> Net Ground Water Availability (MCM) 	<i>171.38</i>	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Irrigation (MCM) 	<i>272.66</i>	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM) 	<i>0.14</i>	
	<ul style="list-style-type: none"> Existing Gross Ground Water Draft for all Uses (MCM) 	<i>272.80</i>	
	<ul style="list-style-type: none"> Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM) 	<i>0.14</i>	
	<ul style="list-style-type: none"> Net Ground Water Availability for Future Irrigation Development (MCM) 	<i>-101.42</i>	
	<ul style="list-style-type: none"> Stage of Ground Water Development / Over Draft (%) 	<i>159</i>	
	<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> <i>30</i>	Percentage % <i>60</i>
10	Volume of unsaturated zone available for recharge (MCM)	<i>332.38</i>	
11.	Volume of water required for recharge (MCM)	<i>442.13</i>	

12.	Volume of surplus water available for recharge(MCM)	16.01		
RECHARGE/ CONSERVATION STRUCTURES		Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge@rS. 35000/-	2831	9.908	3.219
14	RWH Rural @ Rs. 25000/-	3160	7.90	0.287
15	RWH Urban@ Rs. 25000/-	776	1.94	0.082
16	Underground pipe line (area in hectares) @ Rs. 50000/-	12709	63.54	68.17
	TOTAL		83.29	71.758

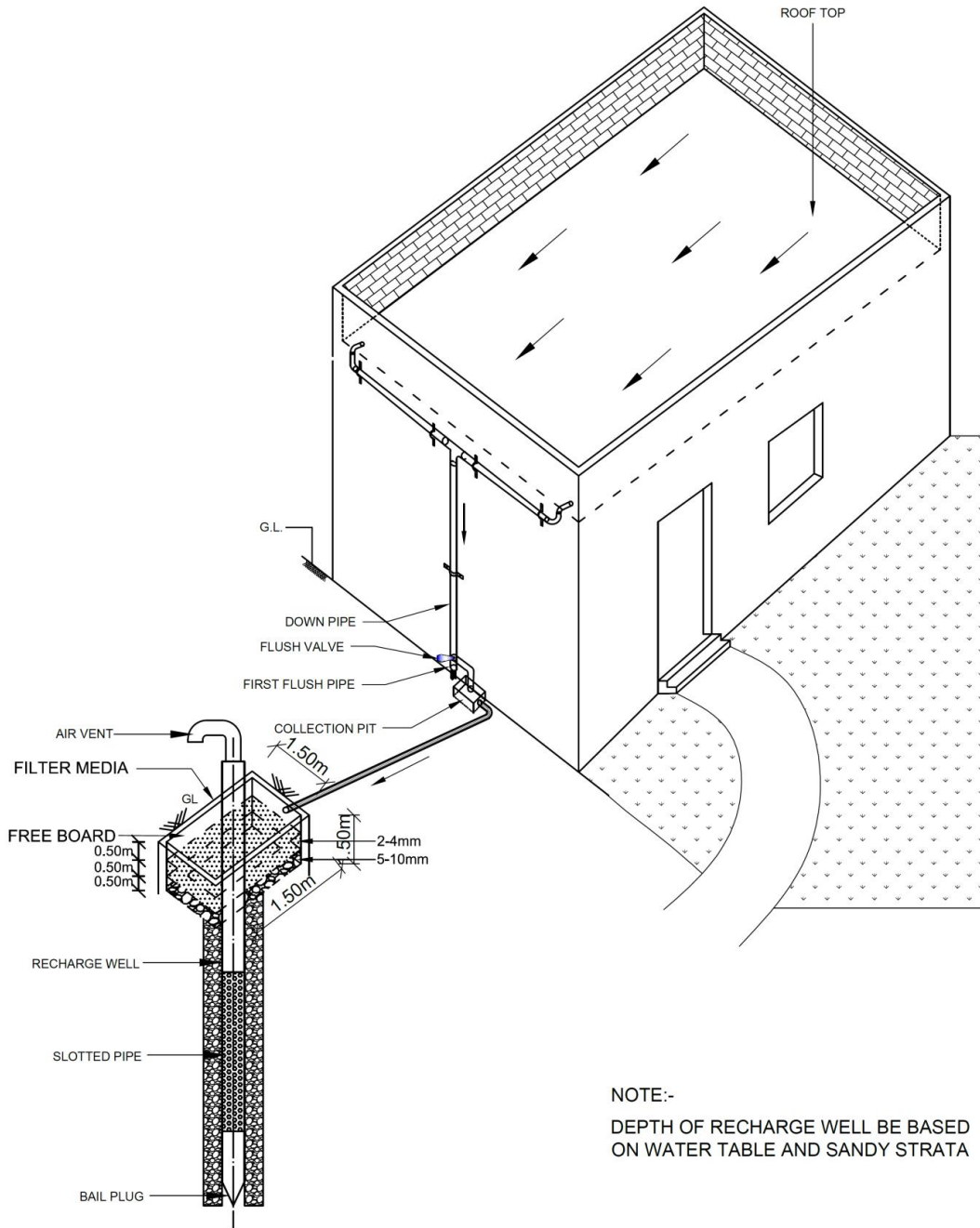
Ground Water Scenario of Block

Block Name:- TARSIKA			
District:- AMRITSAR		State:- PUNJAB	
1.	GENERAL INFORMATION		
	vii) Geographical area (sq km)	236.5	
	<ul style="list-style-type: none"> • Number of Villages inhabited • Un-inhabited 	82 1	
	viii) Average Annual Rainfall (mm)	769	
	ix) Area feasible for Artificial Recharge	0	
	x) Village identified under scarcity of Water	81	
	xi) Village covered under water supply	58	
	xii) Water Tank exists in the village	23	
2.	GEOMORPHOLOGY		
	Major Physiographic	Alluvium Plain	
	Major drainages Basin Sub-Basin	<i>Ravi 15%</i> <i>Beas 85%</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) 	242.03 224.75 450.99 675.94 3.01 0	
	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)
		<ul style="list-style-type: none"> • Pre- monsoon: (May 2015) <i>10.85-17.80(mbgl)</i> • Post –monsoon: (Nov2014) <i>9.98-17.80(mbgl)</i> 	<i>10.00-20.00 (mbgl)</i>

6.	GROUND WATER EXPLORATION BY CGWB (As on 31.03.2015)		
	• No of wells drilled	1	
	• Depth Range (m)	302.32—375.0	
	• Discharge (Ipm)	2750-4845	
	Aquifer Parameters		
	• Transmissivity (m ² /day)	1450-7190	
	• Stortivity	2.00*10 ⁻²	
7.	GROUND WATER QUALITY	Min	Max
	• EC in $\mu\text{S}/\text{cm}$ at 25 ⁰ c	501	501
	• NO ₃ (mg/l)	-	19
	• F (mg/l)	0.06	0.06
	• As (mg/l)	-	-
8.	DYANMIC GROUND WATER RESOURCES in MCM	2011	
	• Net Ground Water Availability (MCM)	140.24	
	• Existing Gross Ground Water Draft for Irrigation (MCM)	241.66	
	• Existing Gross Ground Water Draft for Domestic and Industrial Water Supply (MCM)	3.07	
	• Existing Gross Ground Water Draft for all Uses (MCM)	244.74	
	• Allocation for Domestic and Industrial Requirement Supply up to next 25 years (MCM)	4.89	
	• Net Ground Water Availability for Future Irrigation Development (MCM)	-106.31	
	• Stage of Ground Water Development/ Over Draft (%)	175	
	• Category of Block	OE	
	Any specific reasons for high stress on ground water leading to Overexploitation and decline in ground water level	Extensive Irrigation	Extensive Irrigation
9.	Percentage of sand thickness up to 50 m depth (Average)	Thickness(m) 28	Percentage % 56
10	Volume of unsaturated zone available for recharge (MCM)	240.83	

11.	Volume of water required for recharge (MCM)	320.35		
12.	Volume of surplus water available for recharge(MCM)	11.60		
	RECHARGE/ CONSERVATION STRUCTURES	Total Number of Recharge Structures	Total Cost (Rs. in crores)	Total Recharge in mcm
13	Farm Recharge @Rs. 35000/-	2585	9.047	2.935
14	RWH Rural @ Rs. 25000/-	2429	6.072	0.232
15	RWH Urban@ Rs. 25000/-	-	-	-
16	Underground pipe line (area in hectares) @ Rs. 50000/-	17384	86.92	60.42
	TOTAL		102.039	63.587

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



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

TYPICAL DESIGN FOR RECHARGE PIT IN FARM

