	Open Dug wells	12796	402591
	Shallow tube wells	2	400
	Surface flow	19467	5942849
	Surface Lift Irrigation	311	344400
	Area irrigated by Ground water scheme(Sq.Km.)	402991	
	Area irrigated by Surface water scheme(Sq.Km.)	6287249	
	Total area irrigated (Sq.Km.)	6690240	
7.	**NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.03.07)** No.of Dug wells	62	
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Pre-Cambrian metamorphics	
9.	**HYDROGEOLOGY**		
	➢ Major Water bearing formation	i)Weathered mantle ii) Saprolitic zone iii)Fractured zone of hard rocks ivii)Uunconsolidated sedimentaries	
	➢ Pre-monsoon depth of water level during 2006(mbgl)	4.32 – 11.68	
	➢ Post-monsoon depth of water level during 2006(mbgl)	2.07 – 5.60	
	➢ Long term water level trend in 10 years (1997-2006) in m/yr	Rising	0.001 – 0.38
		Falling	0.007 – 0.45
10.	**GROUND WATER EXPLORATION BY CGWB (As on 31.03.07)**		
	No. of wells drilled (EW)	17	
	Depth Range (m)	30.30 – 183.42	
	Discharge (lps)	0.33 – 6.64	
11.	**GROUND WATER QUALITY**		
	Presence of Chemical constituents more than permissible limit	Fluoride	
	Type of water	Neutral to slightly alkaline	
12.	**DYNAMIC GROUNDWATER RESOURCES in mcm**		
	Annual Replenishable Ground Water Resorces	70147	
	Gross Annual Ground water draft	9666	

	a) Irrigational draft b) Domestic & industrial draft	6000 3666
	Projected Demand for domestic and Industrial uses upto 2025	4940
	Stage of Ground Water Development(%)	13.78
13.	**AWERENESS AND TRAINING ACTIVITY**	
	Number of Mass Awareness program organized	1
	Number of Water Management Training program organised	1
14.	**EFFORTS OF ARTIFICIAL RECHARGE AND RAIN WATER HARVESTING**	
	Projects Completed by CGWB (No. and amount spent)	Total no. of structures – 61 Total amount spent – 50.88 Lakhs
	Projects under technical guidance of CGWB (nos)	-
15.	**GROUND WATER CONTROL AND GEGULATION**	
	No. of over-exploited blocks	-
	No. of Critical Blocks	-
	No. of Blocks notified	-
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	High concentration of Fluoride

GROUND WATER INFORMATION BOOKLET

PURULIA DISTRICT, WEST BENGAL

1.0 INTRODUCTION

Administrative details

Location and area :

The district lies in the south-western part of the state of West Bengal between 22°43' and 23°42' north latitudes and 85°49' and 86°49' east longitudes falling in part of Survey of India toposheet nos. 73 E, 73 I and 73 J. Purulia district covers an area of 6259 sq.km. and has population of 2536516.It is bounded on the north by Barddhaman and Dhanbad(Jharkhand) districts, on the east by Bankura, on the south by Medinipur and Singbhum(Jharkhand) districts and on the west by Ranchi and Hazaribagh(Jharkhand) districts. The district is subdivided into 3 sub-divisions and 3 municipalities, 20 blocks and 170 gram panchayet.

Ground water basin :

The district is located in the lower part of the Ganga basin.

Drainage :

The river Kasai, Damodar and Subarbarekha are the main perennial rivers of the district. Kasai is the most important river in Purulia which is joined by major tributary Kumri, in the southern part of the district. Darakeswar & Silui or Silabati rivers drain small area in the north eastern and eastern part of the district respectively.The drainage pattern developed in the district is either dendritic or radial.

Irrigation practices :

The cultivation is done mainly by surface water from tanks and river along with the ground water mainly open wells.

Studies of C.G.W.B :

CGWB has carried out systematic Hydrogeological survey and Groundwater Management Studies, Groundwater exploration and several short term water supply investigation in the district. These surveys and studies has proved the existence of groundwater worthy zones at different depths.

Feasibility study has also been carried out for Rain Water Harvesting at Purulia Ramkrishna Mission Vidyapith.

2.0 Rainfall & Climate

Rainfall :

The district has a dry tropical climate marked by a moderately cold winter and highly oppressive summer. The normal annual rainfall in the district is about 1322 mm.The main source of rainfall in the district is the south west monsoon, which accounts for 80% of the total rainfall.However because of the high run off factor, western and south western parts of the district are affected by draught.

Climate :

Winter in the area lasts from November to February. Temperature of the atmosphere ranges between 4°C to 13°C. Atmospheric temperature during summer ranges between 38°C to 48°C. Summer lasts from late March to June. Humidity in the area varies between 70 to 85%. Dry, hot wind in summer blows across the district with velocity ranging between 5-6km/hr.

3.0 Geomorphology & Soil Types

Geomorphology :

The district is characterized by undualating topography with rugged hilly terrain in the western and southern part.The general elevation of the land surface ranges between 150m and 300m. The master slope of the land surface being towards the east and the south east. The district can be sub-devided physiographically into two distinct units. The one is hilly terrain in the western and southern part, where Ajodhya, Gargaburu, Raika Pahar,Churni Pahar, Aral Dungri and Gurma Pahar are some of the important hills. The other one is the undulating plain with isolated mounds and hills, which comprises 70% of the total area of the district. Important hill in this terrain are Panchet hill, Tilaboni, Ramchandrapur, Barberia, Jaichandipahar, Maguria etc.

Soil Types :

Soil in the district are in general of the residual type derived from the weathering of the Archaen granites, gneisses and schists. Lateritic soil prevails in the uplands whereas in the valleys reddish clay loam or white to reddish clay are comman. Many textural classes are met with , such as sandy loam, reddish loam, white or reddish stiff clay etc.because of the undualating nature of the topography the soil cover is thin and the soil is generally gravelly. Almost in the entire district soil is acidic and the fertility is low.

4.0 Groundwater Scenario

4.1 Geology :

The district is underlain by Pre-Cambrian metamorphics except in a small area in the northeastern part where sedimentary of Gondwana age predominate. Unconsolidated sediments of Recent to Sub-Recent age are restricted to the narrow river channels and to the valleys. The most common rock of widespread occurrence in the district are granites and granite gneisses into which metabasics occurs as intrusive.

4.2 Hydrogeology :

Ground water in the district occurs mainly in (1) weathered mantle (2) saprolitic zone (3) Fractured zones of Hard rock (4) narrow zone of unconsolidated sediments along the river valleys.

The weathered mantle varies in thickness and attains a maximum thickness of the order of 25m. Ground water occur under water table condition and it is mostly developed by dug/open well. At some places these wells go dry during peak summer, These dug wells yield up to 2.75 lps.

Saprolitic zone is sandwiched between weathered mantle and fresh rock mass in granitic terrain.The depth of this zone varies between 10 – 30 mbgl, with an average thickness of 4m. Ground water occurs under semi-confined condition and yield up to 2.5 lps is recorded. Drawdown in the wells tapping this zone is much less and recovery is quite fast.

In the hard rock ground water exploration has been conducted down to 198 mbgl.The occurance of saturated fractures are generally restricted to 50 to 110 mbgl. The shallow fractures at 50 – 60 m depth are tapped mainly by borewells fitted with hand pump and yield varies from <1 – 2.77 lps. Deeper fracture are encountered at 100 – 110 m depth, yielding around 3 lps as observed at Manbazar. In Gondwana sediments, drilling down to 103 m reveals the existence of fractures within the depth of 24 – 36 mbgl which are capable of yielding 3.3 – 5.5 lps.

Unconsolidated sediment zone along the river valleys are of limited thickness and fall within 5 – 13 mbgl with areal extent not exceeding 1 – 2 km across river valley. Saturated thickness of alluvial tract varies from 1 m -> 5.5m. Open wells and shallow tubewells yield upto 20 m^3/hr at economic drawdown for a considerable period of pumping.

Pre monsoon water level ranges from 4.32-11.68 mbgl and during post monsoon 2.07-5.60 mbgl in ground water monitoring wells during 2006. Seasonal fluctuation shows rise in water level. The maximum rise of 9.01 mbgl is recorded at Hura block. Decadal rising trend(1997-2006) during pre and post monsoon are recorded from Arsha, Bagmundi, Barabazar,Bandwan, Jhalda I&II and Puncha blocks. Rest blocks have been experienced rise as well as fall during pre and post monsoons. Since the regional fluctuation is restricted within 2.00 mbgl only, which can be considered as normal phenomena. No abnormal rise or fall in water level is observed through out the district.

4.3 Groundwater Resources :

The dynamic ground water resources assessment has been done jointly by CGWB and SWID, Govt. of W.B. following the norms laid down by GEC 1997 methodology and projected as on 31.03.04. In Purulia district all blocks are under safe category. The summarized Ground water resources in the district (Block wise) are as under-

Assessment Unit/ District	Command/ non-command/ Total	Net Ground water availability (in ha m)	Existing gross Ground water draft for irrigation (in ha m)	Existing gross Ground water draft for domestic &industrial water supply (in ha m)	Existing gross Ground water draft for all use (in ha m)	Association for domestic and industrial requirement supply upto next 25 years (in ha m)	Net Ground water availability for future irrigation development. (in ha m)	Stage of Ground water Development. (%)
ARSHA	-	3704	48	204	251	274	3382	6.79
BAGHMUNDI	-	2172	417	180	597	243	1513	27.47
BALARAMPUR	-	2988	263	153	416	206	2518	13.93
BARABAZAR	-	6275	248	235	483	317	5711	7.70
BANDWAN	-	2947	77	133	210	179	2691	7.11
HURA	-	3417	132	207	338	279	3007	9.90
JHALDA-I	-	2144	816	180	996	243	1086	46.44
JHALDA-II	-	2707	369	191	560	257	2081	20.68
JOYPUR	-	2090	799	172	972	232	1058	46.49
KASHIPUR	-	6073	764	264	1028	356	4953	16.93
MANBAZAR-I	-	5258	157	214	371	288	4812	7.06
MANBAZAR-II	-	3992	24	144	168	194	3775	4.20
NETURIA	-	2942	138	139	277	188	2617	9.41
PARA	-	3178	146	256	401	344	2688	12.62
PUNCHA	-	4970	257	175	433	236	4476	8.71
PURULIA-I	-	3602	586	199	785	269	2748	21.80
PURULIA-II	-	3781	381	223	604	300	3100	15.97
RAGHUNATHPUR-I	-	2496	168	135	303	182	2147	12.12
RAGHUNATHPUR-II	-	2267	100	146	246	197	1970	10.86
SANTURI	-	3143	112	116	228	156	2875	7.24
	TOTAL	**70147**	**6000**	**3666**	**9666**	**4940**	**59207**	**13.78**

4.4 Groundwater Quality:

Based on the results of chemical analysis of ground water samples, collected from Ground water Monitoring Stations (Premonsoon-2006) the ground water is neutral to slightly alkaline in nature, with pH ranging between 7.6 to 8.2. Electrical conductivity values varies from 141 to 2830 micromohs/cm at 25°C. Chloride value ranges between 11 to 355 mg/l. Iron concentration varies from 0.01 to 1.9 mg/l. Fluoride concentration varies from 0.43 to 1.9 mg/l. The blocks having high concentration of

Fluoride in dug wells, i.e. >1.5 mg/l are Barabazar, Jhalda II, Kashipur, Neturia, Para and Puruliya I .

On the basis of rapid assessment report of fluoride committee Task Force drinking water sources are having high fluoride contamination from bore wells which have tapped fractured granitic rocks within the depth of 50 m. The granitic rocks having aplite veins containing flurospar minerals may enhance the level of flouride in ground water.17 nos of blocks having sporadic occurrence of flouride in ground water above permissible limit (> 1.5 mg/l). The flouride concentration in ground water is maximum ranging beween 1.74-7.70mg/l at Joypur block.

ANALYSED RESULT FROM RAPID ASSESSMENT REPORT OF FLUORIDE TASK FORCE

Sl.No.	Block	Maximum concentration (mg/l)
1.	ARSHA	2.92
2.	BAGHMUNDI	2.38
3.	BALARAMPUR	2.12
4.	BARABAZAR	2.08
5.	HURA	2.10
6.	JHALDA-I	4.93
7.	JOYPUR	7.70
8.	KASHIPUR	2.78
9.	MANBAZAR-I	2.73
10.	NETURIA	1.77
11.	PARA	2.34
12.	PUNCHA	2.41
13.	PURULIA-I	3.53
14.	PURULIA-II	2.54
15.	RAGHUNATHPUR-I	4.30
16.	RAGHUNATHPUR-II	1.74
17.	SANTURI	2.38

CHEMICAL ANALYSIS OF WATER SAMPLES COLLECTED FROM GWMW ON PRE MONSOON-2006

Block	pH	EC µS/cm	Fe	TDS	TH	Ca	Mg	HCO_3	Cl	NO_3	F	SO_4	Na	K
		at 25°c	(mg/l)											
ARSHA	7.70-8.20	313-509	0.15-0.82	100-155	172-280	28-36	4.80-21	92-177	21-355	25-213	0.56-1.35	0-28	18-36	0.70-1.50
BAGHMUNDI	7.80-8.0	233-1831	BDl-0.51	75-255	128-682	24.44	3.68-55	110-220	25-213	0.63-6.50	0.43-1.35	10-93	23-116	1.0-3.10
BALARAMPUR	7.60-8.0	287-1410	BDL-0.67	90-265	158-776	30-38	3.68-41	92-250	25-213	1.30-2.40	1.32-1.39	26-107	29-164	1.20-1.40
BANDWAN	7.80-8.10	354-1340	BDL-0.62	95-255	195-737	26-84	7.33-11	146-207	43-224	1.60-12.0	1.31-1.40	112	45-95	1.50-2.60
BARABAZAR	7.90-8.10	681-1420	0.72-1.25	0.30-420	375-781	26.114	9.77-33	110-397	107-220	4.20-9.30	1.25-1.70	8.10-70	93-117	0.70-5.0
HURA	7.80-8.20	515-1710	0.35-0.68	165-390	485-941	28-56	12.15-78	171-226	71-249	1.90-14	1.40-1.50	4-122	45-142	0.20-1.10
JHALDA-I	7.70-8.10	141-1110	BDL-0.65	35-335	78-611	06-28	4.80-66	029-214	25-213	3.80-13	1.21-1.50	25-86	26-103	0.70-1.60
JHALDA-II	7.60-7.90	258-379	BDL-0.25	75-130	139-208	24-26	2.46-17	67-151	39-53	0-2.50	1.41-1.70	1-22	34-39	0.60
JOYPUR	8.10-8.10	174-1660	0.30-0.68	60-465	96-913	20-118	2.46-41	43-281	28-359	4.20-8.70	1.28-1.30	0.80-63	27-160	0.10-3.60
KASHIPUR	7.70-8.20	247-1330	BDL-0.58	70-485	178-1007	24-86	2.46-95	122-311	11-327	0.50-13.0	1.41-1.80	0-249	36-116	1.10-23
MANBAZAR-I	7.90-7.90	1160-1220	BDL-0.25	385-1290	638-371	72-74	27-49	250-342	192-199	7.90-10	1.40-1.10	89-104	87-114	1.20-3.20
MANBAZAR-II	8.0	422	0.30	165	232	44	13	122	64	5.80	1.10	0.90	2.00	2.50
NETURIA	7.70-8.10	639-807	BDL-0.30	130-245	351-444	24-50	8.57-40	165-317	46-96	0.60-7.90	0.44-1.70	37-94	71-88	1.50-24
PARA	7.60-8.10	545-2160	BDL-1.90	120-570	300-1188	24-148	15-58	195-415	28-231	1.60-8.20	1.10-1.90	4.50-176	40-231	0.10-21
PUNCHA	7.90-8.20	1325-1380	BDL-0.51	95-355	124-759	20-32	3.69-74	85-275	21-202	3.50-7.60	1.38-1.53	22-106	20-130	1.60-7.70
PURULIA-I	7.90-8.0	476-2830	BDL-0.61	120-750	205-262	18-36	7.34-171	177	75-78	3.47-610	1.50-1.56	7-92	56-195	1.80-2.40
PURULIA-II	7.70-8.20	426-1480	BDL-0.57	130-390	234-814	30-58	0.66-60	146-256	60-327	1.30-7.90	1.10-1.30	0-72	34-138	1.10-20
RAGHUNATHPUR-I	7.70-7.90	149-1180	BDL-0.56	105-320	263-688	18-82	2.40-30	61-451	28-156	1.60-8.0	0.56-1.50	0-89	11-96	0.60-48
RAGHUNATHPUR-II	7.90	486	BDL	180	267	48	15	110	57	5.80	1.35	79	48	0.90
SANTURI	7.90-8.0	1060-1255	0.52-0.83	90-95	583-690	14-20	2.40-9.75	195-671	71-131	0.40-13	1.20-1.44	16-115	75-255	0.40-27

4.5 Status of Ground water Development (Blockwise)

Block	Occurrence of Aquifers & its potentiality	Feasibility of GW abstraction structures	Existing Structures Based on Third minor irrigation report (2000-2001)	Remarks	
				Water Level (2006)	
				Pre Monsoon (mbgl)	Post Monsoon (mbgl)
ARSHA	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 80 mbgl	Dug Well - 102	4.96 – 8.48	3.58 – 5.60
BAGHMUNDI	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 892	4.72 – 9.22	2.12 – 4.41
BALARAMPUR	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 562	4.97- 7.61	2.85- 2.92
BARABAZAR	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 529	6.64 – 7.54	3.19 - 4.06
BANDWAN	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 164	9.54 – 12.11	5.39 – 5.48
HURA	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 281	5.42 – 11.66	2.07 – 5.23
JHALDA-I	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 80 mbgl	Dug Well – 1743	6.51 – 9.28	3.63 – 7.19

4.5 Status of Ground water Development (Blockwise)

Block	Occurrence of Aquifers & its potentiality	Feasibility of GW abstraction structures	Existing Structures Based on Third minor irrigation report (2000-2001)	Remarks	
				Water Level (2006)	
				Pre Monsoon (mbgl)	Post Monsoon (mbgl)
ARSHA	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 80 mbgl	Dug Well - 102	4.96 – 8.48	3.58 – 5.60
BAGHMUNDI	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 892	4.72 – 9.22	2.12 – 4.41
BALARAMPUR	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 562	4.97- 7.61	2.85- 2.92
BARABAZAR	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 529	6.64 – 7.54	3.19 - 4.06
BANDWAN	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 164	9.54 – 12.11	5.39 – 5.48
HURA	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps. Deeper fracture at a depth of 110m has been encountered, yielding 0.88 – 2.77 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Bore well 80 mbgl	Dug Well – 281	5.42 – 11.66	2.07 – 5.23
JHALDA-I	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 80 mbgl	Dug Well – 1743	6.51 – 9.28	3.63 – 7.19

Block	Occurrence of Aquifers & its potentiality	Feasibility of GW abstraction structures	Existing Structures Based on Third minor irrigation report (2000-2001)	Remarks	
				Water Level (2006)	
				Pre Monsoon (mbgl)	Post Monsoon (mbgl)
PUNCHA	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl, yielding 2.5 - 2.75 lps. In gondwana rocks the existance of fractures within the depth of 24-26 mbgl	Dug Well upto 20mbgl Bore well 80 mbgl	Dug Well – 550	6.36 – 7.67	3.26 – 3.59
PURULIA-I	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 60 mbgl	Dug Well – 1252	3.12 – 7.71	2.60 – 3.32
PURULIA-II	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 60 mbgl	Dug Well – 814	5.36 – 5.55	2.32 – 2.73
RAGHUNATHPUR-I	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 60 mbgl	Dug Well – 358	4.67 – 11.68	2.49 – 5.41
RAGHUNATHPUR-II	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps.	Dug Well upto 20mbgl Bore well 60 mbgl	Dug Well – 214	5.15 – 10.49	2.80 – 5.09
SANTURI	Within 20 mbgl Saturated weathered zone occurs and potential fracture zone at 50 - 60 mbgl , yielding 2.5 - 2.75 lps. In gondwana rocks the existance of fractures within the depth of 24-26 mbgl has been encountered, which yields 3.3 – 5.5 lps.	Dug Well upto 20mbgl Dug cum bored well at 20 – 40mbgl. Small diameter Bore well 60 mbgl	Dug Well - 239	5.56 – 9.05	2.67 – 4.04

5.0 Groundwater Management Strategy

5.1 Ground water Development

For groundwater rainfall is the principal source of recharge. Other sources are seepage from existing canal system and return flow of irrigation water. Rivers of the district being mostly effluent do not appear to contribute significantly to ground water recharge.
In Purulia district groundwater utilization is yet very little in agriculture and industrial sectors. Industrial development in the district is in an infant stage. Through dug and bored wells draft of ground water is mainly for domestic consumption. The ground water draft for all uses has been calculated to 13.78%, out of which 8.55% is for irrigation only and rest for domestic and industrial uses.

5.2 Water Conservation & Artificial Recharge

In Purulia, where ground water development is limited rainwater conservation is the best option to mitigate the crisis of drinking water problem.
Under Central Sector Scheme(CSS) under VIII & IX Plan Artifical recharge structures completed in Purulia district so far are as under:

Title of Scheme	Type/No. of Structure	Approved cost (Rs)	Implementing Agency	Amount utilised	Remarks
Under VIII Plan period					
Study of Artificial Recharge at Tuin	▪ Sub Surface Dyke: 5	0.38 Lakhs	SWID, Govt. of West Bengal	0.38 Lakhs	The impact of sub-surface dykes across the nala course in water scare hard rock terrain has been studied and an average increment of 0.15 m of ground water level per year was found. It has also been estimated that dynamic utilizable ground water potential of 0.21 mcm in respect of mini-watershed in Tulin area has been created in excess of pre-project period figure

Under IX Plan period					
Integrated approach of Artificial Recharge of Ground Water for improvement in the watershed management in the water scarce area	▪ Farm pond:13 ▪ Sub Surface Dyke: 8 ▪ Re excavation of pond: 15 ▪ Percolation of tank: 15 ▪ Contour bund: 1.2 km ▪ Monitoring well: 5	50.44 Lakhs	SWID, Govt. of West Bengal	50.44 Lakhs	Out of 12 nos of blocks covered under different types of artificial recharge schemes, 6 nos of blocks have been taken into consideration for impact assessment in the first phase for the period 2001-2005 and the resulted impact of arresting surface run off and sub-surface run off reflect the increment of ground water level to the tune of 0.01-2.82m during post-monsoon period.

Apart from this scheme a study by CGWB at Purulia Ramkrishna Mission Vidyapith has established that conservation of rainwater from hostels and staff quarters' rooftops as well as from land surface can cater a huge amount of rainwater. From 6 nos. hostels and from 14 nos. of staff quarters' roof tops, about 5974 m^3 water and from part of land surface of the institute30,624 m^3 of rainwater is expected to be available. However, considering the storage capacity of ponds and also evaporation losses (30%) about 1,56,623 m^3 water (considering all types of losses) can be conserved to cater a huge amount of water requirement for the Vidyapith.

6.0 Ground water related issues & problems

6.1 Drought & water scarcity-

The district as a whole is identified as drought and water scarce area. Because of the complex hydrogeological set up, the area experiences limited scope for large-scale ground water development . Moreover, most of the open wells go dry with the advent of summer season leading to an acute water crisis.

6.2 Water level decline –

Based on the GWMW data, out of 50 wells water level of 34 wells shows rise and 16 wells fall during Pre & Post monsoon decadal trend (1997- 2006) of water level. During pre monsoon 0.001 – 0.37 m/yr rise and 0.006 – 0.44m/yr fall in water level has been recorded and during post monsoon 0.016 – 0.36 m/yr rise and 0.014 – 0.37 m/yr fall has been recorded. Since the regional fluctuation is restricted within 2.00 mbgl only, which can be considered as normal phenomena. No abnormal rise or fall in water level is observed through out thedistrict

6.3 Ground water quality problems(geogenic)

In dug wells fluoride concentration varies from 0.43 to 1.9 mg/l. The blocks having high concentration of Fluoride i.e. >1.5 mg/l are Barabazar, Jhalda II, Kashipur, Neturia, Para and Puruliya I. On the basis of rapid assessment report of fluoride committee Task Force drinking water sources are having high fluoride contamination in bore wells which have been tapped fractured granitic rocks within the depth of 50 m. The granitic rocks having aplite veins containing flurospar minerals may enhance the level of flouride in ground water.17 nos of blocks having sporadic occurrence of flouride in ground water above permissible limit (> 1.5 mg/l). The maximum concentration of flouride in ground water is 1.74 - 7.70mg/l (Joypur block) has been recorded.

7.0 Awareness & Training Activity

Mass Awareness Programme

Sl.No.	Place/Block	Participants	Theme
1	PURULIA town	200	Use & Conservation of Ground water.

Training Activity

Sl.No.	Place/Block	Participants	Theme
1	PURULIA town	20	Rain water harvesting training

8.0 Areas notified by CGWA/SGWA

No area has been identified.

9.0 Recommendations

- The ground water development in Purulia district is very low due to its typical hydrogeological condition. The ground water structures in the district i.e. dug/open or bore well can be constructed depending on its feasibility, available ground water resources and hydrogeological scenario.
- Emphasize should be given on rain water harvesting with suitable structures. Conservation of rainwater can be done both from the rooftop and from the lands.
  - The water that can be available from rooftops can be stored in cemented and PVC tanks. Before conserving, the water should be sand filtered.
  - The rainwater available from any land surface can be stored in any ponds and in this case, sites as well as design of ponds are to be finalized considering local hydrogeological and terrain condition.
  - The surface water which flows through streams/nallahs can be conserved with the help of check dams giving due consideration to farmers' land, local hydrogeological and terrain condition.
  - In undulating terrain gully plugs can be feasible on cultivated lands to conservewater and there by soil moisture can be increased.
- In suitable hydrogeological locations artificial recharge structures should be contructed. Feasibility of artificial recharge to groundwater is site specific. In Purulia district entire block except some areas, where water level is below 3m during post monsoon, artificial recharge to ground water can be done with the help of artificial recharge structures, which are
  - Percolation tanks from which conserved water will percolate into groundwater.
  - Checkdams on sloppy streambed are to be supported by Gabion structures on upstream side to control the velocity of water
  - Dry dug wells after cleaning can be used for artificial recharge. However before recharging the water is to be sand filtered
  - Sub-surface dykes below the streams/nallahs, flowing over plain terrain and ephemeral in nature, are feasible.