GROUND WATER INFORMATION BOOKLET
SOUTH 24 PARGANAS DISTRICT, WEST BENGAL

DISTRICT AT A GLANCE

Sl. No.	Items	Statistics
1.	**GENERAL INFORMATION**	
	i) Geographical Area (Sq.km.)	9960
	ii) Administrative Division (as on 2001)	
	• No. of Subdivision	5 nos.
	• No. of Blocks	29 nos.
	• No. of Panchayat Samities	29 nos.
	• No. of Municipalities	7 nos.
	• No. of Gram Panchayats	312 nos.
	• No. of inhabited villages	4324 nos.
	iii) Population (as on 2001 Census)	69,06,689
	iv) Normal Annual Rainfall	1800 mm
2.	**GEOMORPHOLOGY**	
	i) Major Physiographic Unit	The deltaic plains; the levees; the marshes; and the islands of Sundarbans..
	ii) Major Drainages	
	a) Natural	Hugli Matla, Bidyadhari, Raimangal, Thakuran, Saptamukhi etc.
	b) Artificial	Bhangar *khal,* Kulpi *khal*, Surjapur *khal* etc.
3.	**LAND USE** (As on 2044-05)	
	i) Forest Area	4,263 sq.km
	ii) Net Area Sown	3782.7 sq.km.
4.	**MAJOR SOIL TYPES**	(i) Entisols; (ii) Alfisols; & (iii) Aridisols.
5.	**AREA UNDER PRINCIPAL CROPS** (As on 2004-05) i) Food Grains (Rice, Wheat, Pulses etc) ii) Oil Seeds (Rape, mustard etc.) iii) Fibres (Jute Etc.) iv) Miscellaneous crops (Potato, sugarcane etc,)	 4100 sq.km. 81 sq.km. 16 sq.km. 49 sq.km.
6.	**IRRIGATION BY DIFFERENT SOURCES**	
	i) Shallow Tubewells	136.313 sq.km. area was actually irrigated through 9278 nos. of STW during 2000-01, whereas the culturable command area (CCA)

		through the exiting 9452 nos. of STW was 151.877 sq.km.
	ii) Deep Tubewells	3.434 sq.km area was actually irrigated through 28 nos. of DTW during 2000-01, whereas, the CCA through the existing 29 DTW was 7.10 sq.km.
	iii) Surface Flow	299.794 sq.km area was actually irrigated through 1566 nos. of Surface Flow Schemes during 2000-01, whereas, the CCA through the existing 1575 nos. of SFS was 312.515 sq.km.
	iv) Surface Lift (RLI)	339.128 sq.km area was actually irrigated through 24912 nos. of RLI during 2000-01, whereas, the CCA through the existing 25110 nos. of RLI was 470.925 sq.km.
	v) Actual Area Irrigated by ground water during 2000-01	139.747 sq.km
	vi) Actual Area Irrigated by Surface Water during 2000-01	638.923 sq.km.
7.	**NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB** (as on 31.03.2007)	
	i) Dugwells	8 Nos.
	ii) Piezometers/Tubewells	50 Nos.
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	Quaternary deltaic sediments composed of clay, silt, and sand of various grades, gravels, pebbles etc., underlain by Upper Tertiary formations.
9.	**HYDROGEOLOGY**	
	i) Major Water Bearing Formation	Quaternary & Tertiary alluvium
	ii) Pre-monsoon depth to water level during 2006	0.35 to 5.56 m bgl in Dugwells, and 2.50 to 6.80 m bgl in Tubewells/Piezometers.
	iii) Post-monsoon depth to water level during 2006	0.30 to 1.35 m bgl in Dugwells, and 2.58 to 6.48 m bgl in Tubewells/Piezometers.
	iv) Long term water level trend for last 10 years.	Falling trend of water level to the tune of 0.006 to 0.467 m/yr., and rising trend to the tune of 0.008 to 0.725 m/yr. during pre-monsoon period and falling trend of water level to the tune of 0.009 to 0.280 m/yr and rising trend to the tune of 0.003 to 0.312 m/yr. during post-monsoon period.

10.	**GROUND WATER EXPLORATION BY CGWB (as on 31.3.07)**	
	i) Number of wells drilled	35
	ii) Depth range	170.69 to 650.17 m bgl
	iii) Discharge	3.32 to 61.58 lps
	iv) Transmissivity (T)	397 to 6514 m^2/day
	vi) Storativity (S)	0.0002 to 0.033
11.	**GROUND WATER QUALITY**	
	i) Presence of chemical constituents more than permissible limit	Arsenic, Iron & Salinity
	ii) Type of water	Ca-Mg-HCO_3 to Ca-HCO, types in deeper aquifers; and Na-Cl type in shallower aquifers of coastal area.
12.	**DYNAMIC GROUND WATER RESOURCES**	
	i) Annual groundwater flow through the area	68 MCM
	ii) Annual ground water draft through the abstraction structures	135.77 MCM
13.	**AWARENESS AND TRAINING ACTIVITY**	
	i) Number of Mass Awareness Programme organized	2
	ii) Number of Water Management Training Programme organized	1
14.	**EFFORTS OF ARTIFICIAL RECHARGE AND RAIN WATER HARVESWTING**	
	i) Projects completed by CGWB	Nil
	ii) Projects under technical guidance by CGWB	Nil
15.	**GROUND WATER CONTROL AND REGULATION**	
	i) No. of Blocks notified	Nil
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	1. Arsenic Concentration beyond permissible limit 2. Iron concentration beyond permissible limit 3. Salinity hazards 4. Declining trend of ground water level

GROUND WATER INFORMATION BOOKLET
SOUTH 24 PAPRGANAS DISTRICT, WEST BENGAL

1.0 INTRODUCTION

1.1 Location and area with administrative details	The district is bounded by the latitudes 22˚33´45˝ N and 21˚29´00˝ N and longitudes 89˚4´50˝ E and 88˚3´45˝E. The total geographical area of the district in 9960 sq.km. It has 5 Sub-divisions consisting of 29 Block, 29 Panchayat Samities and 26 Police Stations. There are 312 Gram Panchayats with 4324 villages. Alipore is the headquarters of the district.
1.2 Ground water basin	The district is located in the mature tract of Gangetic delta in Lower Ganga basin.
1.3 Drainage	Hugli, Matla, Bidyadhari, Raimangal, Saptamukhi rivers with their tributaries/distributaries from the main drainage in this district.
1.4 Irrigation practices	Irrigation is done mainly by groundwater through shallow and deep tubewells alongwith surface water from rivers through river lifting and also from canals , ponds etc.
1.5 Studies of CGWB	CGWB has completed Systematic Hydrogeological Survey and is continuing Ground Water Management Studies. Apart from this, Ground Water Exploration is being carried out to delineate the aquifer geometry and to know the aquifer characteristics. Special attention has been given to identify the deeper aquifers and construction of tubewells adopting cement sealing techniques in arsenic and saline infested areas to provide arsenic free and fresh water through state-agencies.

2. RAINFALL AND CLIMATE

2.1 Rainfall	The normal annual rainfall in this district is of the tune of 1800 mm.
2.2 Climate	The district is characterized by hot and humid climate. It receives adequate rainfall from North-East and South-West monsoons which set in the later half of June and withdraw by the middle of October. Pre-monsoon rains are received during March-April. May is the hottest month with temperature as high as 40˚C

and January is the coldest month with temperature as low as 10˚C.

3.0 GEOMORPHOLOGY & SOIL TYPES

3.1 Geomorphology

The district is divided into 4(four) geomorphic units.

i) Deltaic Plains
ii) Levees
iii) Marshes
iv) Islands of Sunderban

3.2 Soil types

The soil type of this district is divided into three groups, namely, (i) Entisols, (ii) Alfisols; and (iii) Aridisols.

The Entisols are present in the western corner of the district, the Alfisols which are typically deltaic alluvium soils, are present in central portion, and the Aridisols which are saline and saline-alkali in nature are present in the southern part of the district.

4.0 GROUND WATER SCENARIO

4.1 Geology

The district is located in the lower deltaic plain on the composite Gangetic Delta and is covered by the Quaternary sediments deposited by the Ganga and its tributaries. The top of the alluvium is clayee in nature with varying thickness of 15 to 75 metres. Fine sand and silty-clay capping also occurs in small patches in the alluvium. Underlying the clay blankets occurs a huge thickness of unconsolidated sediments composed of silt, fine to coarse grained sand and gravel with increasing thickness towards east-southeast. The gravel zone may be considered as a marker horizon which is underlain by another extensive clay zone at varying depths. Beneath this clay zone, occurs a second group of aquifers in the depth range of 160 to 360 metres with considerable aerial extent. A succession of Tertiary and Mesozoic formations within the depth range of 350 m to 4000 metres is established by the exploration conducted by Standard Vacuum Oil Company. These geological horizons are sloping gently towards south-southeast.

4.2 Hydrogeolgoy

The ground water bearing aquifers are present in the district within Quaternary and Tertiary sediments and generally occur under confined condition in the depth range of 75 to 360 metres with numerous alternations of clayee and sandy layers of varying thickness .

The confined aquifers can be divided into two groups in this district from north to extreme south. The upper one, usually in the depth span of 20 to 160

metres has a sandy gravel layer as a marker bed at its base which pinches out eastward. The ground water in general except at a few places occurring in this upper group of aquifers, is brackish to saline (Chloride ranging from 1750 to 6300 ppm) and is not in use.

The lower group of aquifer occurring in the depth range of 160 to 360 metre, is separated from the upper group by a thick impermeable sticky clay bed which is laterally extensive with varying thickness. The ground water occurring in this lower group of aquifer is generally fresh and is used extensively. This confined productive aquifer is recharged by rainwater through the recharging exposed area along Kalyani-Ranaghat-Shantipur area in Nadia district in the north; along Bangaon-Gaighata section in North 24 Parganas district in the north-east; and along Tarakeswar-Nalikul-Mogra-Pandua area in Hugli, district in the north-west.

The piezometric surface of the lower group of confined aquifer as monitored in the year 2006 from the hydrograph network stations, lies from 1.70 m to 6.00 m bgl during pre-monsoon period and from 0.50 m to 5.80 m bgl during post-monsoon period. The average slope of the piezometric surface during pre-monsoon of 2006 in this district is 1:1500 towards the principal direction of South-east.

Aquifer Characteristics: Exploratory ltubewells were constructed by CGWB tapping the productive fresh water bearing zones of depth ranging from 115 to 402 m bgl are capable to yield 100 to 120 m^3/hr., with drawdown ranging from 2.3 to 16.5 metres. Transmissivity values range from 400 to 6500 m^2/day and the Storativity values range from 0.0002 to 0.0015

4.3 Groundwater Resources

Except in a very few parts (where ground water occurs under both unconfined and confined conditions) the fresh water bearing aquifers in this district is under confined condition. Hence it has not been considered for ground water resource estimation by GEC-'97 methodology.

However, in order to have an idea of the dynamic ground water potential of this district, an attempt has been made to estimate the total quantity of ground water flow by applying Darcy's Law equation of flow of fluids through porous media, which is Q = TIL; where Q is the Quantity of water flowing through a section of aquifer, T is the Transmissivity of aquifer, I is the hydraulic gradient of the piezometric surface and L is

the length of groundwater flow-path in the section of the aquifer under consideration, perpendicular to the flow direction.

For the area under consideration in this district and taking average values of T=2000 m^2/day, I = 1:1500 & L = 140 Km., the Q is computed as 68 MCM. Hence, the dynamic groundwater flow towards the principal direction of SE, in this area, is considered to be 68 MCM per annum.

To assess the annual ground water draft through groundwater development structures, the total number of shallow and deep tubewels is taken into account. As per the 3rd Minor irrigation Census 2001, the district has 9278 STWs and 28 DTWs. Considering average unit draft of 0.014 MCM/Yr for STW and 0.21 MCM/Yr for DTW the Net Ground Water draft is computed as 135.77 MCM per annum.

4.4 Groundwater Quality

Chemical analyses results show that groundwater from unconfined aquifer except a few places is fresher within 60 m bgl than the deeper aquifers within 60 to 125 m bgl. Ground water from the unconfined aquifer is generally neutral to mildly alkaline with pH ranging from 7.2 to 8.1.

Ground water in the western and central part of the district is primarily a Calcium-magnesium-Bicarbonate type. The aquifer within the depth range of 150 m bgl in this area is generally marked by brackishness where chloride value ranges from 1750 to 6300 ppm., however, at few places fresh ground water occurs in a linear tract following the Adi Ganga channel.

The deeper group of confined aquifer occurring within the depth range of 160 to 350 m bgl in the southern and south-eastern part of the district contain fresh water and favourable for exploitation. The ground water is neutral to mildly alkaline with pH ranging from 7.4 to 8.1. Electro-conductivity ranges from714 to 2692 µs/cm (at 25˚C) and the chloride value ranges from 14 to 596 ppm., hence suitable for human consumption.

In the coastal belt of this district the aquifers under semi confined to confined condition contain ground water with very high dissolved salts. Maximum value of Electrical conductivity of 8600 µs/cm (at 25˚C) and highest value of Chloride content of 2180 ppm were found at Rajar Taluk in Diamond Harbour II block (as observed from CGWB permanent monitoring wells)

Arsenic content of groundwater has been found to be beyond permissible limit of 0.05 ppm in a number of localized patches in sporadic manner in 9 blocks-Baruipur, Sonarpur-Bhangar-I & II, Joynagar-I,

Bishnupur-I&II, Magrahat-II and Budge Budge-II in this district. The maximum value of Arsenic content was recorded to be 3.2 ppm at Baruipur in this district. It has been found that a sizeable population in the localities has been suffering from Arsenic dermatosis by drinking ground water rich in Arsenic content.

4.5 Status of Ground Water Development (Blockwise)

Sl. No.	Block	Occurrence of aquifer and its potentiality (as per the data available with CGWB)	Feasibility of Ground Water Structure	Ground Water abstraction structures for irrigation (as per 3rd Minor Irrigation Census, 2001)	Depth to piezometric level (m bgl) (from NHS of CGWB)		Ground Water Quality (values for the samples from NHS of CGWB)
					Pre-mon-soon	Post-mon-soon	
1	2	3	4	5	6	7	8
1.	Maheshtala	The upper shallow unconfined aquifer system occurs within 50 m bgl. The lower confined aquifer system occurs in between 70 to 160 m bgl and occurs inbetwen 170 to 360 m bgl. Each aquifer system consists one of more granular zones which are more or less interconnected The Transmissivity (T) ranges from 500 to 2000 m^2/day and co-efficient of Storativity (S) ranges from 0.3 x 10^{-1} to 0.5x10^{-2} in the second i.e., upper confined aquifer system; and in the deper confined aquifer system 'T' ranges from 915 to 3000 m^2/day and 'S' ranges from 0.3 x 10^{-3} to 1.1x10^{-3}.	Low duty shallow tubewells with yield of 20 to 40 m^3/hr, and heavy duty deep tubewells with yield of 50 to 150 m^3/hr are feasible.	Shallow Tubewells (STW) – 0 Deep Tubewells (DTW) – 0	6.35	5.80	Fe 0.44 to 2.91 mg/l Cl 99 to 110 mg/l EC 1020 to 1120 µs/cm at 25˚C
2.	Bishnupur I	-do-	-do-	STW – 1 DTW – 0	5.18	4.98	Sporadic occurrence of Arsenic beyond permissible limit of 0.01

							mg/l Fe – 0.19 mg/l Cl – 60 mg/l EC – 710 µs/cm at 25˚C
3.	Bishnupur II	-do-	-do-		-do-	-do-	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.10 mg/l Cl – 234 mg/l EC – 1150 µs/cm at 25˚C
4.	Budge Budge I	-do-	-do-	STW – 2 DTW – 0	-	-	Fe – 0.15 mg/l Cl – 135 mg/l EC – 955 µs/cm at 25˚C
5.	Budge Budge II	-do-	-do-	STW – 0 DTW – 1	-	-	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l
6.	Sonarpur	-do-	-do-	STW – 578 DTW – 4	4.37 to 5.77	2.35 to 3,20	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.35 to 4.70 mg/l Cl – 135 to 248 mg/l EC – 1080 to 1430 µs/cm at 25˚C
7.	Joynagar I	-do-	-do-	STW – 83 DTW – 1	2.67 to 5.64	1.45 to 5.28	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l
8.	Joynagar II	-do-	-do-	STW – 6 DTW – 1	-do-	-do-	Fe – 0.11 to 7.82 mg/l Cl – 124 to 149 mg/l EC – 1070 to 1300 µs/cm at 25˚C

9.	Baruipur	-do-	-do-	STW – 1120 DTW – 6	2.50 to 5.40	2.19 to 6.30	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.05 to 3.14 mg/l Cl – 46 to 518 mg/l EC – 750 to 2350 µs/cm at 25˚C
10.	Bhangar	-do-	-do-	STW – 2933 DTW – 3	3.15 to 4.60	2.58 to 4.25	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.53 mg/l Cl – 28 mg/l EC – 670 µs/cm at 25˚C
11.	Bhangar II	-do-	-do-	STW 1919 DTW 3	-do-	-do-	Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.05 to 0.31 mg/l Cl – 145 to 177 mg/l EC – 1260 to 1350 µs/cm at 25˚C
12.	Diamond Harbour I	-do-	-do-	STW – 0 DTW – 1	1.35 to 1.68 (Dug well)	1.34 to 1.35 (Dug well)	Fe – 0.22 mg/l Cl – 284 mg/l EC 1500 µs/cm at 25˚C
13.	Diamond Harbour II	-do-	-do-	STW – 0 DTW – 0	-do-	-do-	Fe – 0.22 to 9.03 mg/l Cl – 227 to 2180 mg/l EC 2000 to 8600 µs/cm at 25˚C
14.	Magrahat I	-do-	-do-	STW – 0 DTW – 0	6.80	6.48	Fe – 0.65 to 1.38 mg/l Cl – 53 to 2.20 mg/l EC – 780 to

							1300 µs/cm at 25˚C
15.	Magrahat II	-do-	-do-	STW – 58 DTW – 0	-do-		Sporadic occurrence of Arsenic beyond permissible limit of 0.01 mg/l Fe – 0.02 to 1.20 mg/l Cl – 28 to 5.32 mg/l EC – 570 to 2320 µs/cm at 25˚C
16.	Falta	-do-	-do-	STW – 0 DTW – 3	6.70	6.40	Fe – 0.15 to 0.70 mg/l Cl – 92 to 872 mg/l EC – 1030 to 3700 µs/cm at 25˚C
17.	Caning I	The upper confined aquifer system occurs in between 80 to 150 m bgl containing brackish water, and the deeper second group of confined aquifer occurs in between 160 to 360 m bgl containing fresh water. Each aquifer system consists one or more granular zones which are more or less interconnected. The Transmissivity (T) ranges from 500 to 2000 m^2/day and co-efficient of Storativity (S) ranges from 0.3 x 10^{-1} to 0.5x10^{-2} in the second i.e., upper confined aquifer system; and in the deper confined aquifer system 'T' ranges from 915 to 3000 m^2/day and 'S' ranges from 0.3 x 10^{-3} to 1.1x10^{-3}.	Heavy duty dep tubewells with yield of 50 to 150 m^3/hr are feasible	STW – 406 DTW – 0	2.70 to 2.80	1.35 to 2.75	Fe – 0.61 mg/l Cl – 53 mg/l Ec – 900 µs/cm at 25˚C
18.	Canning II	-do-	-do-	STW – 1093 DTW – 0	-do-	-do-	-

19.	Mathurapur I	-do-	-do-	STW – 67 DTW – 0	3.56 to 5.74	3.30 to 5.34	-
20.	Mathurapur II	-do-	-do-	STW – 363 DTW – 0	-do-	-do-	Fe – 0.04 to 12.27 mg/l Cl – 138 to 869 mg/l EC 1180 to 3500 µs/cm at 25˚C
21.	Mandirbazar	-do-	-do-	STW – 0 DTW – 1	4.90 to 5.90	4.20 to 5.38	-
22.	Basanti	-do-	-do-	STW – 14 DTW – 0	4.14 to 4.18	2.40 to 3.83	Fe – 0.06 to 0.63 mg/l Cl – 110 to 124 mg/l EC 930 to 1150 µs/cm at 25˚C
23.	Gosaba I	-do-	-do-	STW – 349 DTW – 0	3.88	2.00	Fe – 0.27 mg/l Cl – 85 mg/l EC – 1030 µs/cm at 25˚C
24.	Kulpi	-do-	-do-	STW – 2 DTW -2	6.00	5.80	Fe 0.40 to 3.81 mg/l Cl – 121 to 316 mg/l EC 1230 to 1740 µs/cm at 25˚C
25.	Kultali	-do-	-do-	STW – 174 DTW – 0	4.40	3.36	Fe – 0.42 mg/l Cl – 117 mg/l EC – 1060 µs/cm at 25˚C
26.	Kakdwip	-do-	-do-	STW – 3 DTW – 0	5.05 to 6.68	4.08 to 6.06	Fe – 0.65 to 10.3 mg/l Cl – 103 to 450 mg/l EC 940 to 2050 µs/cm at 25˚C
27.	Namkhana	-do-	-do-	STW – 0 DTW – 0	5.65 to 6.25	5.45 to 6.45	Fe – 0.33 mg/l Cl – 227 mg/l EC – 1330 µs/cm at 25˚C
28.	Pathar-pratima	-do-	-do-	STW – 181 DTW -1	5.22 to 6.90	4.50 to 5.75	-
29.	Sagar	-do-	-do-	STW – 0 DTW – 0	5.30 to 5.65	5.25 to 5.61	FE – 1.73 to 2.57 mg/l Cl – 99 to 131 mg/l EC 860 to

							1050 µs/cm at 25˚C

5. GROUND WATER MANAGEMENT STRATEGY

5.1 Groundwater Development

At present groundwater development is controlled by the shallow tubewells and deep tubewells in the district. As per 3rd Minor Irrigation Census, 2001 the district has 9278 shallow and 28 deep tubewells with cumulative draft of 135.77 MCM per annum.

In general ground water in the district occurs under confined condition, and hence total ground water resource could not be estimated by GEC, 1997 method. However, considering Darcy's equation of ground water flow, the annual dynamic ground water flow through the area in the district has been estimated as 68 MCM.

Development of ground water which is almost free from Arsenic and salinity through deeper aquifer for drinking purposes, are taken up by constructing deep tubewells applying cement sealing techniques in the arsenic affected blocks of the district in the northern part, and in the coastal blocks of the district with saline hazards in southern part.

5.2 Water Conservation and Artificial Recharge

So far no structure has been constructed by CGWB in this district.

6. GROUND WATER RELATED ISSUES AND PROBLEMS.

6.1 Groundwater quality problem (Geogenic)

Arsenic in groundwater in sporadic manner has been identified in 9 blocks in this district. The concentration of arsenic varies from 0.001 to 3.32 mg/lit.

Groundwater exploration by CGWB reveals that in arsenic affected area, arsenic free deeper aquifers are available which are capable of yielding arsenic-free water. Accordingly, deeper aquifers are exploited and arsenic-free water is supplied by state authorities.

Apart from this, the state govt., as well as other organization/agencies have installed arsenic-removal plants and domestic filters which are producing water with far below the permissible limit of arsenic content.

6.2 Salinity hazards in coastal belt

Due to brackish/saline nature of shallow aquifers (10 to 150 m bgl) shallow tubewells are not favourable in the coastal blocks. The chemical analyses of the groundwater samples from these shallow aquifers show that, chloride ranges from 1854 to 13581 mg/lit

and Electrical Conductivity ranges from 5960 to 41,350 µs/cm at 25˚C. Due to salinity, shallow tubewells are not feasible for either drinking or irrigation purposes.

To overcome these problems, fresh groundwater bearing deeper aquifers (160-360 m bgl) are tapped and as alternate source, surface water is used for drinking (after treatment) and irrigation purposes.

6.3 Declining trend of water level

From the long-term monitoring data of water level, the average declining trends have been observed in almost all the blocks in the district except Bhangar-II and Kakdwip blocks.

6.4 Risk to natural disaster

Sagar block of this district is highly prone to flood and cyclones as a result, embankment failures and washing off of villages are taking place. Out of 46 villages in this block already 3 villages, namely – Bishalakshmipur, Lohachara and Khasimara were steepened down into th4e sea and about 16 villages were partly destroyed by continuous embankment failures and subsequent destructions.

7. AWARENESS AND TRAINING ACTIVITY

7.1 Mass Awareness Programme(MAP)

Two numbers of Mass Awareness Programmes were conducted in this district till date. The details are as follows:

Sl. No.	Place (Block)	Date	No. of Participants	Theme
1.	Canning (Canning I)	13.01.05	130	Scope of Exploration for fresh water and utility of rain water harvesting in coastal belt.
2.	Diamond Harbour (Diamond Harbour I)	02.11.06	280	Groundwater development and management with scope of Rain water harvesting

7.2 Water Management Training Programme

One number of Water Management Training Programme was conducted in this district. The details are as follows:

Sl. No.	Place (Block)	Date	No. of Participants	Theme
1.	Diamond Harbour (Diamond Harbour I)	03.11.06	18	Groundwater Development and management with special reference to Rain Water Harvesting

7.3 Participation in Exhibition/Mela/Fair

CGWB has participated in a Mela-cum-Exhibition in recent years in this district. The details are as follows:

Sl.	Place (Block)	Date	Organizer	Objectives

No.				
1.	Kultali, Basanti (Basanti)	20th to 29th December, 2005	Kultali Milan Tirtha Society, South 24 Parganas	Displayed various models, charts, maps prepared by CGWB to aware the common people on ground water issues.

8. AREA NOTIFIED BY CGWA/SGWA

List of area : Nil

9. RECOMMENDATIONS

9.1 Groundwater exploration may be continued and the sites may be selected in grid pattern as far as possible for delineating Arsenic-free and saline-free fresh ground water bearing zones. For identifying the potentiality of individual aquifer, Packer test is recommended.

9.2 A comprehensive and representative network of hydrograph stations tapping different aquifers may ensure better feed back of water level conditions and chemical conditions for the effective management of ground water development porogramme.

9.3 During construction of tubewells in Arsenic-free and saline-free fresh groundwater bearing aquifers, proper cement sealing should be done in the thick clay layer for a thickness of 3 to 4 meters for proper protection of the aquifer from the contaminated aquifer.

9.4 The tubewells withdrawing groundwater for drinking purposes, should be frequently tested for Arsenic. Wherever and whenever a tubewell yields Arsenic-contaminated groundwater, either it should be sealed or Arsenic-removal equipment should be used with proper and regular maintenance.

9.5 Modern agricultural management and irrigation practices should be adopted which includes economic distribution of ground water as well as surface water by maintaining minimum pumping hours and also by selecting most suitable cropping patterns which are economic.

9.6 To maintain the sustainability of the tapped aquifer zones, large scale rainwater harvesting may act as effective measure to manage and control the groundwater resources for future. More number of rain water

conservation structures may be constructed to store the huge rainwater during monsoon and may be used for irrigation and drinking purposes in the lean periods. Since, almost all the tubewells are tapping deeper freshwater bearing zones under confined conditions; artificial recharge to ground water is not feasible in this area.

9.7 Conjunctive use of surface water and ground water for irrigation may be given importance in the area wherever technically and economically feasible in the district, to minimize the load of groundwater withdrawal.