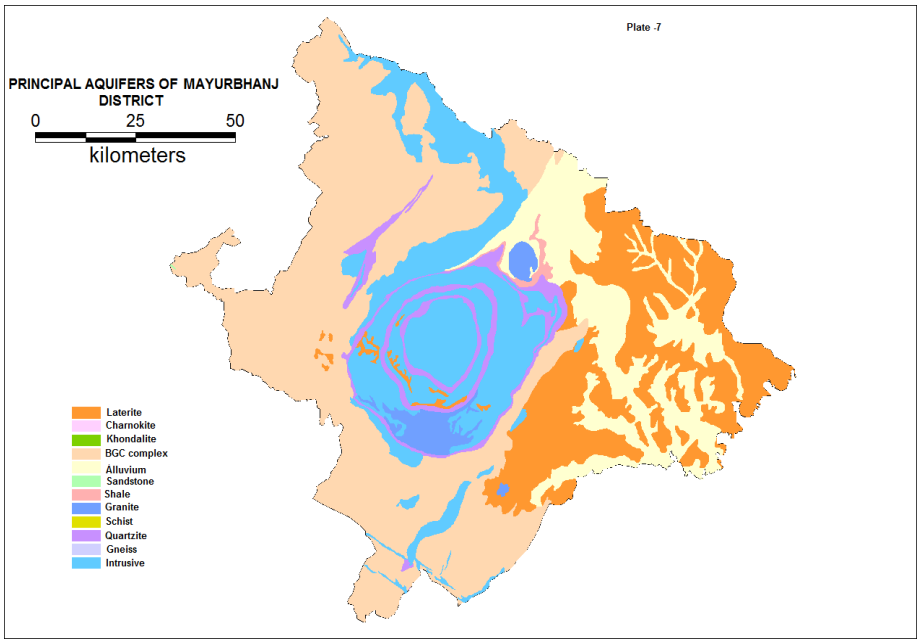
GROUND WATER INFORMATION BOOKLET

MAYURBHANJ DISTRICT, ORISSA



Ministry of Water Resources
Central Ground Water Board,SER
Bhubaneswar
March, 2013

MAYURBHANJ DISTRICT AT A GLANCE

I. General Particulars

(i) Location : 21°16’ and 22°34’ Latitude (North)
85°40’ and 87°11’ Longitudes (East)

(ii) Area : 10418 sq.km.

(iii) Subdivisions : 4 (Four)

1. Baripada
2. Kaptipada
3. Bamanghati
4. Panchapir

(iv) Blocks :

Baripada

1. Baripada 2. Morada
3. Rasagovindapur 4. Betnoti
5. Shamakhunta 6. Kuliana
7. Suliapada 8. Bangriposi
9. Sarasakana 10. Barasahi

Kaptipada

1. Kaptipada
2. Udala
3. Khunta
4. Gopabandhunagar

Bamanghati

1. Rairangpur 2. Bahalada
3. Tiring 4. Bijatola

			5. Bisoi 6. Kusumi 7. Jamada **Panchapir** 1. Karanjia 2. Joshipur 3. Raruan 4. Sukruli 5. Thakurmunda
(v)	District Headquarters	:	Baripada
(vi)	Sub-divisional Headquarters	:	Baripada, Karanjia, Rairangpur, Udala
(vii)	Population	:	2513895 (2011 Census)

II. Climatology

(i)	Average annual rainfall	:	1197
(ii)	Maximum Temperature	:	50.0°C
(iii)	Minimum Temperature	:	4.5°C
(iv)	Relative Humidity	:	26 to 84°C

III. Land Use

(i)	Total Geographical area	:	482300 Hectares
(ii)	Total Forest Area	:	88589 Hectares
(iii)	Net Area Sown	:	320551 Hectares (Kharif)

IV. Irrigation

Major and Medium Irrigation Projects (Area in Ha)		Minor Irrigation Projects (Flow) (Area in Ha)		Lift Irrigation Projects (Area in Ha)	
Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
37948	4448	27020	1525	10860	6686

V. Ground Water Exploration (as on March 2011)

(i) Boreholes drilled 98 Nos. (Including observation wells, piezometers and deposit wells)

VI. Ground Water Resources (as on March 2009)

(i)	Total annual ground water recharge	:	148194 HAM
(iii)	Net Draft	:	40329 HAM
(iv)	Net Ground Water Availability for future irrigation development	:	106150 HAM
(viii)	Stage of ground water development (as on December 2009)	:	27.21%

1.0 Introduction

1.1 Administrative details

The Mayurbhanj district lies between north latitudes 21^0 17' and 22^0 34' and east longitudes 85^0 40' and 87^0 10' falling in the survey of India toposheet nos 73F, 73G, 73J and 73K. It is bounded on the north by the district Singbhum of Jharkhand and Midnapur district of West Bengal, on the south by Balasore and Keonjhar districts and on the west by Keonjhar and Singhbhum districts and on the east Midnapur and Balasore districts.The district comprises of 4 subdivisions namely sadar sub-division with headquarter at Baripada,Bamanghaty sub-division with headquarter at Rairangpur, Pancpir with headquarter at Karangia and Kaptipda sub-division with headquretr at Udala. (Plate 1). There are 9 Thehsils. The geographical area of the district is 10418 sq km. There are 26 blocks and 3945 villages out of which 227 villages are uninhabited.

The district is having good network of all weather roads. The NH-5 and NH-6 passes through the district having total length of 139 km. There is broad-gauge railway line connecting Baripada to Bhubaneswar and Badampahad to Tatanagar.

The total population (2011census) of the district is 2513895. Population density is 241 per sq.km.

1.2 Drainage

. The district is mainly drained by the Budhabalanga, Kharkai, Jamira and several other tributaries originate from Similipal hills. All these rivers exhibit dendritic type of drainage pattern and are structurally controlled.

1.3 Studies carried out by CGWB

The systematic geological mapping and groundwater survey in the district was under taken by Geological Survey of India and later by Central Ground Water Board 1980-1986. Systematic geohydrogeological surveys were carried out by N.C.Bhatnagar (1963-64) of GSI and by D.Mitra(1974-75) and S.C.Behera (1985-86, 1986-87) of Central Ground Water Board. This was followed by reappraisal hydrogeological survey by A. Subhuraj (1987-88), A.kar (1988-89) of Central Ground Water board.

2.0 Rainfall & Climate

The district is characterized by tropical to sub tropical climate with hot summer, high and well distributed rainfall during the monsoon and a cold winter. The summer season lasts from March to Middle of June followed by rainy season from June to September and post monsoon period from October and November. May is the hottest month with maximum temperature of 47^0C and December is the coldest month with minimum temperature of 6^0C. The average annual rain fall in the district is 1500mm. The mean monthly potential evapotranspiration values range from 40mm in January to 347 mm in May.

3.0 Geomorphology & Soil Types

3.1 Physiography: The Mayurbhanj district shows conspicuous physiographic variations and mainly represented by high hills/ isolated hillocks/ domal granitic outcrops, vast undulating plains and alluvial tract.

3.1.1 Lateritic Upland : It occupy the eastern part of Baripada. The hard crust of the laterite in the region is followed downward by litho-margic clay and highly weathered bed rock. The general topography is characterized by gently undulating plain.

3.1.2 Alluvial Plain: It occurs along a narrow stretch in the south-eastern and southern part of the district lying adjacent to the river Budhabalanga.

3.1.3 Flood Plain: This hydromorphic unit has been mapped in the southern part and south eastern part of the district and in the northern part, of Bangiriposi block. In this unit buried channel and migrated river courses from hydrogeologically significant units**.**

3.1.4 Intermontane Valleys: These valleys are restricted mainly to the north western part and sporadically to the central part of the district and consist of phyllite and other Iron ore group of rocks. Groundwater potential is moderately good**.**

3.1.5 Denudational Hills: These hills are identified by their high relief. Granitic hills represents this geomorphic land form in the area. Rate of infiltration is very poor except along fractures/joints. These generally act as runoff zones**.**

3.1.6 Shallow and Deeply weathered Pediplain: These geomorphic unit occur throughout the area except in the extreme eastern part of the district and consists of Singhbhum granite. Occurance of ground water in these unit are moderate to good.

3.2 Soil Types: The soils of the district may be broadly grouped into two categories depending upon their occurance, physical and chemical properties e.g. Alfisols,Ultisols.

3.2.1 Alfisols : It is distributed throughout the district,these include older alluvial soil and red earth soil. These soil are generally deficient in P O and N, pH varies between 6.5-7.3.

3.2.2 Ultisols: These soils include laterite, lateritic soil, red and yellow soil. These soils are poor in nitrogen, phosphate, potassium and oraganic matter. The pH ranges from 4.5-6.0

4.0 Ground Water Scenario

4.1 Hydrogeology :

4.1.1 **Water bearing formations**- The water bearing formation of the area can be divided into (a) areas underlain by fractured, fissured and consolidated basement rock formations (b) areas underlain by recent unconsolidated alluvial formations.

(a) Consolidated Formation- These are most predominant rock types occurring in the undulating plains of the ditrict. Groundwater occur under unconfined condition in the shallow weathered zone and circulates through fractures and joints. The thickness of the weathered zone varies from 3 to 35 m. Depth of open wells in these formations varies from 5 to 14 m below ground level.

(b) Unconsolidated alluvial formations-The unconsolidated formations consists of laterite and alluvium. Laterites at places are highly consolidated and used as building stones. The laterites have high degree of effective porosity and form potential aquifers commonly tapped in dug wells.

The alluvium comprises an admixture of clay, silt, sand and calcareous concretions in varying proportions. The coarse sediments like sand and gravel form the main repository of ground water. Ground water occurs under both unconfined condition in shallow aquifers and in confined condition in deeper parts.

4.1.2 Occurrence of ground water:

4.1.2.1 Mica-schist : These are occurring as patches in topographic low areas. Ground water occurs under water table condition in the weathered zone and in fractures and fissures below. The depth of the dug wells varies from 6-13 mbgl and depth to water level varies from 4-8 mbgl during pre-monsoon period and 3-8 mbgl during post-moonsoon period. The yield in these formations are in range 3-7 lps

4.1.2.2 Qurtzites: These are generally massive and compact and not generally suitable for ground water development except when fractured and fissured. The depth of open wells varies from 5-11.5 mbgl and depth to water level ranges from 3-6.5 mbgl and 2.57-5.2 mbgl during pre-monsoon and post-monsoon periods respectively. The yield of wells taping these formations is generally poor.

4.1.2.4 Granite gneiss: These formations occupy vast area of the district and form good source of ground water when fractrured. Yield in these formations varies in the range of 1-10 lps.

4.1.2.2 : Unconsolidated Alluvial formation:

4.1.2.2.1 Quarternary and upper Tertiary sediments: Sands, gravels and pebbles form the main aquifer systems in quarternary alluvial deposits under lain by Tertiary sediments. Groundwater occurs under pheratic condition at shallow depth and semi

confined to confined in deeper depth in these formation. The shallow near surface aquifers which are mainly exploited by dug wells yield fresh water in the entire district. The yield of the existing dug well varies from 12 to 15 lps. The average depth of these dug well is around 6 to 7 m. The thickness of the alluvium varies from 15 to 95 mbgl.

4.1.2.2.2 Laterites : It generally forms the shallow aquifer and ground water mostly tapped by shallow dug wells. On an average the yield from dug wells in laterites is around 25 to 30 m^3/day with the maximum of 40 to 45 m^3 /day. Ground water occurs in unconfined condition in this formation. Specific capacity of wells ranges from 0.82-1.94 lpm/m drawdown.

4.1.3 GROUND WATER EXPLORATION:

Exploration drilling is being carried out in the district to delineate occurrence, distribution and yield potential of the deeper aquifers. A total of 69 well have been drilled till March, 2011. 52 EW and 19 OW have been drilled in hard rock terrain. 10 EW and 9 OW have been drilled in tertiary formation. 8 Pz have been drilled in hard rock terrain.

The depth of the wells in hard rocks varied from 59 to 200.4m and yield varied from negligible to 10.83 lps. In the hard rock terrain in Rangamatia-Jamda-Rairangpur-bisoi-Jamsola tract the yield varied from negligible to 10.83 lps. In Jamkeswar-Raruan tract in the Western part of the district the yield varied from 0.16 to maximum of 11 lps at Raruan. In the southeastern part, the well at Udala yielded 8.84lps.

The saturated fractures in the hard rocks are generally restricted within 100 m depth.

The depth of the exploratory wells in semi-consolidated Tertiary formation varied from 131.16 to 303.0m and the yield varied from 5.47 to 18 lps. Two to seven aquifer zones with a cumulative thickness of 10 to 48m occurs within this depth. The static water levels varied from 8.33 to 14.70 m bgl.

The transmissivity (T) values of Tertiary formations ranged from 28.8 to 507.84 m^2/day with an average value of 100 m^2/day. The values of storage co-efficient varied from 0.18×10^{-3} to 0.89×10^{-4}

4.1.3.1 Aquifer parameter:

The aquifer parameter of shallow and deep aquifers were determined from the pumping test data conducted during the hydrogeological survey and exploratory drilling. Aquifer characteristics of shallow and deeper aquifers are noted below.

a) Shallow Aquifers: Near surface aquifer in which ground water occurs under unconfined (phreatic) condition and is mainly tapped by dug wells for ground water extraction is generally identified as shallow aquifer. The specific capacity and hydraulic conductivity in different formations are stated in table 1

Table-1 Specific capacity and hydraulic conductivity in different formations

Formation	Specific capacity index(m^3/min/m)	Transmissivity (m^2/day)
Alluvium	0.0035 to 0.241	4.0 to 102
Laterite	1.1-2.89	3.66-9.23
Older metamorphic group	4 to 39	0.0013 to .0106
Proterozoic volcanics	Transmissivity and Specific capacity in this zone appears to be low.	
Iron ore group (shales, BHJ, BHQ and Kolhans)	Transmissivity and Specific capacity in this zone appears to be low.	
Singbhum granite	1 to 28	0.0009 to 0.034

b) Deeper Aquifers: Aquifers, which occur below the phreatic zone and extends down to a greater depth, are termed as deeper aquifers. Ground water in deeper aquifers occurs under semi-confined to confined conditions. Deeper aquifers are tapped by tube/bore wells for ground water extraction. Characteristics of deeper aquifers are noted below.

Table-2 Specific capacity and hydraulic conductivity in different formations in deeper aquifers

Formation	Specific capacity index(m^3/min/m)	Transmissivity (m^2/day)
Older metamorphic group	2.5 to 38	0.8 to 13
Proterozoic volcanics	0.4 to 80.66	0.24 to 25
Iron ore group (shales, BHJ, BHQ and Kolhans)	11.76 to 21.56	3.4 to 8.6
Singbhum granite	0.77 to 59	0.5 to 9

4.1.4.1 Depth to water level (Pre & post monsoon 2011) : The depth to water level map for pre and post monsoon periods 2011 are prepared based on the ground water monitoring data of 77 Nos of National Hydrograph Stations of C.G.W.B. monitored during the month of April and November 2006 are presented in **Plate 2** Plate **3** respectively **.** The pre and post monsoon depth to water levels in the district range from 3.54 to 14.50 m below ground level and 1.39 to 8.20 m below ground level respectively. It is observed that during pre monsoon about 75% of the total areas show the water level varying between 5 to 10 m below ground level. During post monsoon nearly 60% of the area has water levels within 2 to 5 m, while the

rest part has between 0 to 2 and 4 to 6 m below ground levels. In localized part of Muruda, Kaptipada and Thakurmunda the water level is > 5 mt.

4.1.4.2Seasonal Fluctuation: The seasonal fluctuation of water levels with respect to pre and post monsoon periods (2011) varies from nil to 8.60 m. The depth to water levels in different seasons and seasonal fluctuation of water levels are more in central and eastern part, which gradually decreases towards north.

4.1.4.3 Long term water level trend in last 10 years: Long-term trend analysis (2001-2011) of water levels on dug wells shows that in 35 % of wells there is a rising trend where as the rest shows a falling trend. Both rise and fall in general restricted to 1 m.

4.2 Ground Water Resources:

As per the ground water resources assessed during 2009, the net ground water resources availability in the district are 148194 ham. The block wise ground water resources are given in Table 3. 6365 ham of the total ground water is used in domestic and industrial water supply. The existing gross ground water draft for irrigation in net terms is 33963 ham**.** The Net ground water availability for future irrigation development 106150 ham. Over all the present level of ground water development is only 27.21 percent in the district with the maximum in Badasahi block viz. 64.65% and minimum in Bijatala block (9.79%). Hence the district as well as all the blocks come under the white category.

Sl No	Block	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for domestic & Industrial Supply	Existing Gross Ground Water Draft for all uses	Provision for domestic & industrial requirement supply for next 25 years	Net Ground Water Availability for future irrigation development	Stage of Ground Water Development
		(ham)	(ham)	(ham)	(ham)	(ham)	(ham)	(%)
1	2	3	4	5	6	7	8	9
1	Badasahi	7739.00	4675.07	327.99	5003.00	472.00	2592.00	64.65
2	Bahalda	5809.00	1227.00	385.51	1612.00	273.00	4309.00	27.75
3	Bangiriposi	4185.00	1095.00	283.61	1379.00	334.00	2755.00	32.95
4	Baripada	5546.00	898.00	457.65	1356.00	562.00	4086.00	24.45
5	Betnoti	8837.00	3780.00	319.42	4099.00	468.00	4589.00	46.38
6	Bijatala	8388.00	640.00	180.18	821.00	223.00	7524.00	9.79
7	Bisoi	4049.00	398.00	174.05	572.00	240.00	3411.00	14.13
8	Gopabandhu Nagar	3477.00	981.00	188.00	1169.00	240.00	2256.00	33.62
9	Jamda	2054.00	251.00	163.34	414.00	202.00	1601.00	20.16
10	Jashipur	6154.00	1329.00	228.12	1557.00	320.00	4505.00	25.30
11	Kaptipada	8477.00	1285.00	411.05	1695.00	478.00	6714.00	20.00

12	Karanjia	5227.00	847.00	295.03	1142.00	375.00	4005.00	21.85
13	Khunta	6673.00	1211.00	238.30	1449.00	246.00	5216.00	21.71
14	Kuliana	6169.00	1227.00	223.65	1451.00	319.00	4623.00	23.52
15	Kusumi	9054.00	853.00	208.46	1061.00	298.00	7903.00	11.72
16	Moroda	6778.00	1829.00	252.30	2082.00	338.00	4611.00	30.72
17	Rairangpur	6881.00	784.00	213.48	997.00	280.00	5817.00	14.49
18	Raruan	2699.00	684.00	155.00	839.00	213.00	1802.00	31.09
19	Rasgovindpur	7191.00	2763.00	223.00	2986.00	303.00	4125.00	41.52
20	Saraskana	4821.00	1221.00	244.00	1465.00	323.00	3277.00	30.39
21	Shamakhunta	7625.00	710.00	197.86	908.00	256.00	6659.00	11.91
22	Sukruli	2049.00	687.00	149.00	836.00	189.00	1173.00	40.80
23	Suliapada	5017.00	1911.00	253.79	2165.00	336.00	2770.00	43.15
24	Thakurmunda	7284.00	983.00	249.11	1233.00	332.00	5970.00	16.93
25	Tiring	1266.00	330.00	134.00	464.00	177.00	759.00	36.65
26	Udala	4745.00	1364.00	210.00	1574.00	283.00	3098.00	33.17
	District Total	**148194.00**	**33963.07**	**6365.90**	**40329.00**	**8080.00**	**106150.00**	**27.21**

Details of over exploited, critical and semi critical areas – Stage of ground water development shows that all blocks fall under safe category.

4.3:Ground water Quality : The chemical quality of ground water in the district has been assessed on the basis of chemical analysis of ground water samples collected during groundwater monitoring, Hydrogeological surveys and groundwater exploration. The results of the chemical analysis are presented in Table 4.

Table 4: Showing chemical constituents in aquifers

Constituent	**Shallow aquifer**	**Deeper aquifer**
pH	6.97 – 8.25	6.84 – 8.25
Sp. Conductance (micromohs/cm at 25 C)	53 – 974	92 – 867
TDS (mg/l)	58 – 1430	106 – 429
Calcium (mg/l)	6 – 92	16 – 86
Magnesium (mg/l)	0.6 – 17	3.6 – 22
Sodium (mg/l)	1.6 – 100	3.5 – 168
Potassium (mg/l)	0.4 – 8	<1 --6.4
Bicarbonate (mg/l)	15 – 256	49 – 366
Chloride (mg/l)	7 – 238	5.3 – 85
Sulphte (mg/l)	0.1 – 9	<1 – 82
Nitrate (mg/l)	<0.01 – 53	0.1 – 78
Fluoride (mg/l)	0.08 – 20.3	0.21 – 0.61
Total hardness as calcium carbonate	10 – 245	35 - 285

4.3.1 Suitability of Ground Water for Drinking Purpose : The concentration of major chemical constituents and also the pollutants like fluoride and nitrate content in fresh ground water of shallow and deeper aquifers are well within permissible limit of drinking water specification (Indian Standard 1991). Hence the fresh ground water may be used as safe drinking water source.

4.3.2 Suitability of Ground Water for Agricultural Purpose: Ground water in general is suitable for irrigation purpose. Ground water from shallow and deeper aquifers belongs to C_1S_1 and C_2S_1 class of USSL Classification., which indicates that ground water, in general is fit for most type of crops except

4.4 Status of Ground Water Development (Block wise): The existing ground water draft as on 31.03.2009 in the district for all purposes was 40329 ham and the block wise the same is tabulated in table-3.

Over all the present level of ground water development is only 27.21 percent in the district with the maximum in Badasahi block viz. 64.65% and minimum in Bijatala block. Block wise development figure indicate that all the blocks come under the white categories. Thus there is ample scope for development of groundwater in the district to augment irrigation potentials through suitable ground water abstraction structure . Based on the hydrogeologocal conditions of the district the feasibility of various ground water structures with some important features are tabulated in table-3

Table: 5 Feasibility of various ground water structures with some important features

Hydro-geological setting	Type of structures	Depth range (m bgl)	Dia meter(m0	Probable Yield (lps)	Water lifting device
Crystalline and Semiconsolidated area	Dug wells	10-12	4.5-6	3-5	Turbine pump 2 HP
Alluvial area	Dug wells	8-10	2-4	Upto 5	Turbine pump 2 HP
Alluvial area	Filter point and Shallow tube wells.	Upto 50	15 cm	5-20	Submersible/turbine pump 5HP
Crystalline formation	Medium deep tube/bore wells.	100 – 120 mmm	15 cm	Upto20	Submersible /turbine pump 10HP

5.0 Ground Water Management Strategy:

5.1 Ground Water Development:

The ground water development is being done through dug wells, bore wells and tube wells. Tube wells include filter point and, shallow, medium deep tube wells. The use of ground water is for both domestic and as well as irrigation purposes.

5.1.1 Ground water for irrigation:

The utilizable ground water resources available for irrigation is 117109 ham and the present draft is only 27553 ham. Hence the balanced resource for irrigation is 89556 ham which indicate that there is a huge scope for ground water development. The irrigation potential, from ground water in term of area, created so far is 295149 ha.

5.2. Ground water management:

The balance resources for irrigation and block wise stage of ground water development indicates that there is a huge scope for ground water development. In all the blocks of the district .Based on the hydrogeological conditions of the district, the feasibility of various ground water structures and their yield prospects are given in table-5.

5.2.1. Structure suitable for ground water development in different formation:

Depending on the hydrogeological condition the abstraction structures suitable in different formations are described below.

Dug wells : Dug wells are feasible in all the blocks of the district. The depth of the dug wells in hard rocks and semi consolidated rocks should be 10 to 12m while the depth of the wells in unconsolidated formations i.e. in the central and eastern part of the district may be 8-10m. The diameter of the wells in both the case (older and recent alluvium) may be 4 to 5m. The expected yield of the wells from unconsolidated formation is upto 50 m^3 / day while in other formation it is up to 40 m^3 / day . The distane between any two dug wells should be kept at least 100m. to avoid interference.

Filter Point Tube Wells: These tube wells are feasible in unconsolidated formation i.e. mainly in central and eastern part of the district. These structure are found very successful on the recent flood plain deposit occurring along the banks of river and stream. The depth of these structures may be 15 to 30m and dia 10cm x 5cm or all through 5 cm. 2 H.P submersible or centrifugal pumps may be fitted. The yield of these wells is generally within 5 lps but field experiences indicate that these wells can yield upto 10 lps, when thick aquifer zones (> 4m) are tapped. These wells can be run for 6 to 8 hours daily.

Shallow Tube Wells: The shallow tube wells are feasible in the unconsolidated deposits. These are feasible in alluvial tract of Budhabalanga, Kharkai and Jamira.

The depth of the shallow tube wells may be restricted within 50 mbgl and the diameter is 15cm. The depth of shallow tube wells may be restricted within 25 to 30 m.. The expected yield is generally within 20 lps and submersible pumps of 3 to 5 H.P may be installed. The spacing between two tube wells should be at least 300m.

Deep tube wells: As the thickness of alluvium gradually increases towards east / northeast (towards Betnati) and southeast (Badasahi, Puruna Baripada) medium deep tubewell may be feasible down to 90 m bgl depending on availability of adequate thickness of aquifer as confirmed through resistivity surroundings.

Borewells: The bore wells are feasible in most part of the area which tap deeper saturated fractures in the depth range of 100 to 120 m.. The depth of the wells should be restricted to 200 m. Yield on an average 3 to 7 lps. The loose zones down to 25 to 30 m. depth may be cased and rest part should be left uncased. Generally 2 to 3 saturated fractured zones occurs within 120m depth. Spacing of wells should not be less than 150m

5.3 Water conservation and artificial recharge:

The scope for artificial recharge exits in hard rock terrain in the district. In most part of the district in Thakurmunda, Karanjia, Jasipur blocks water levels during post monsoon rest between 3 to 5.5 m. bgl and on an average below 4m and during pre-monsoon on an average the water level rests below 7m depth. The artificial recharge structures like infiltration tank, contour bunding, gully plugging are feasible in the area. In some area in addition to above structures subsurface dykes, may also be constructed. All these structure will be help in augmenting ground water resources in those areas resulting mitigation of water scarcity during summer.

6.0 Ground Water Related Issues & Problems :

The ground water related issues generally include the water logged area, polluted area and water table depleted area and these are discussed in the following paragraphs**.**

6.1 Water logged area: No area in the district is found to be under water logging condition.

6.2 Ground water quality problems: There is no large scale pollution in the district .

6.3 Water Table Depleted area: The long term trend analysis data of water level from the network station of district indicate that no significant water table depleted area is noted in the district as the hydrograph net work stations have shown both rise and fall in water level and these are restricted within 1 m.

7.0 Awareness & Training Activity :

Mass Awareness Programme organised :

Place	: Betanati
No of Participants	: 160

Water Management and Training Programme Organised

Place	: Baripada
No of Participants	:32

8.0 Area notified by CGWA/SGWA: Nil

9.0 Conclusions:- In Mayurbhanj district the availability of irrigation facility is comparatively less in the district which is 15.2% of the cultivable area during Kharif season and 5.31% during Rabi season. There is no completed major irrigation project in the district. The Subarnarekha irrigation project is however under execution. There are at present 249 minor irrigation projects in the district. The groundwater development potentials in Mayurbhanj district generally limited to the vast buried pediment, valley fills, intermontane valleys, laterites and alluvial plains. Exploration has revealed the dug cum bore wells and bore wells are also likely to be successful in the buried pediments, intermontane valleys when sited close to fracture lineaments.

Recommendations:

1) Intensive groundwater exploration should be taken up to delineate deeper potential water saturated fracture zones and to compute aquifer parameter.
2) Large scale planning for ground water development should be preceded by intensive hydrogeological and geophysical surveys aided by remote sensing studies.
3) Effective measures may be taken to conserve the surface run off by contour bunding at suitable sites. Also proper maintenance of reservoir, tanks and spring channels by periodical disiltation should be carried out.
4) Existing dugwells should be deepened to tap the maximum saturated thickness of the weathered mantle or vertical bores may be drilled through the bottom to enhance the well yield.
5) Energisation of wells already constructed should be stepped up to ensure optimal utilization of the irrigation potential already created.
6) The farmers should be educated through agricultural extension services fro adopting suitable cropping pattern for optimal utilization of available groundwater resources.

7) Programmes for artificial recharge may also be taken up for augmentation of groundwater through construction of percolation tanks, subsurface dykes, and check dams and through contour bunding etc.
8) An intensive network of groundwater monitoring stations are required to be established in the command areas of irrigation projects to monitor the changes in groundwater regime consequent on application of surface water irrigation.

Plate No. 1

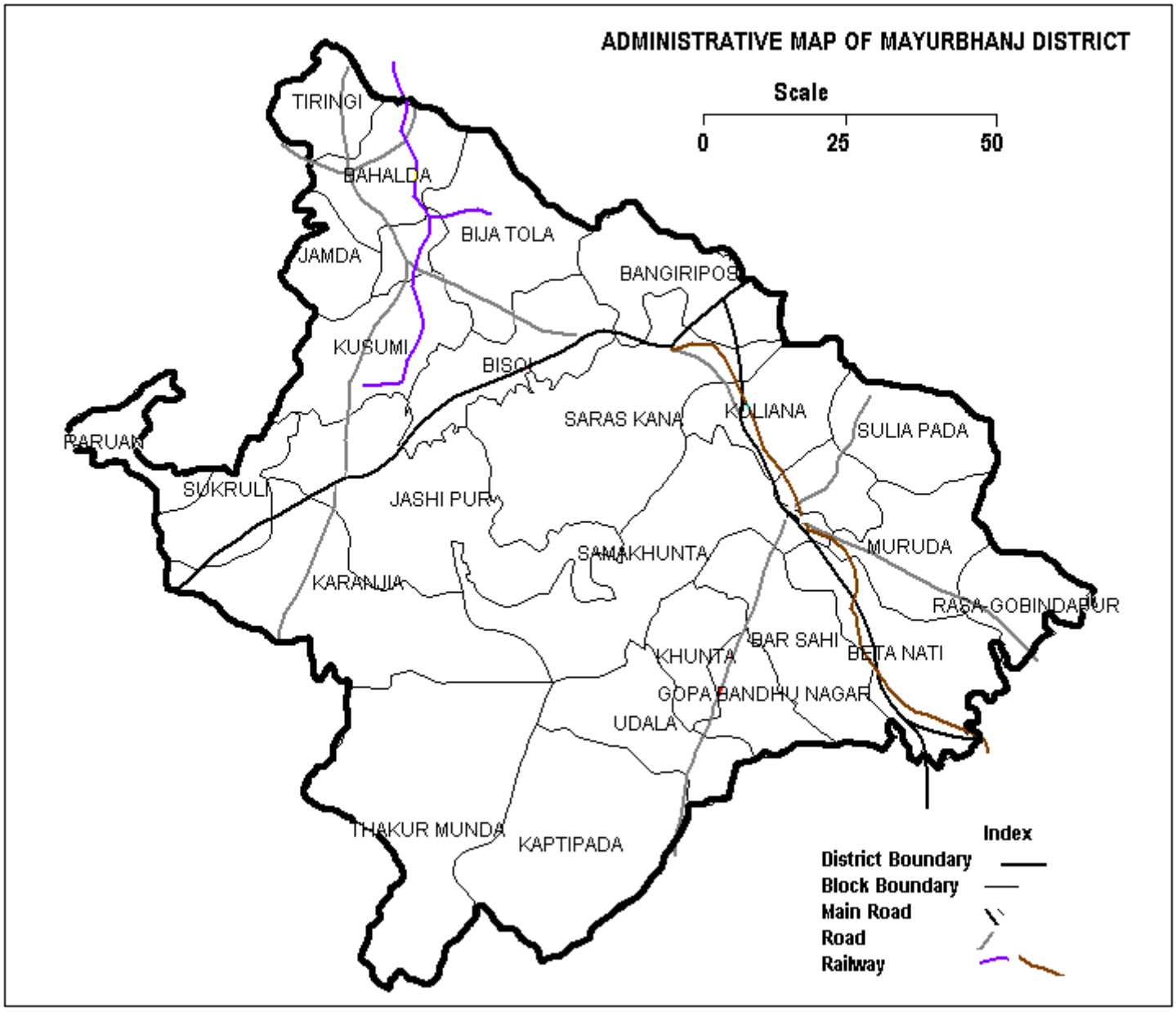

ADMINISTRATIVE MAP OF MAYURBHANJ DISTRICT
Scale
0
25
50
TIRINGI
BAHALDA
BIJA TOLA
JAMDA
BANGIRIPOSI
KUSUMI
BISOI
SARAS KANA
KOLIANA
SULIA PADA
PARUAN
SUKRULI
JASHI PUR
MURUDA
SAMAKHUNTA
KARANJIA
RASA GOBINDAPUR
BAR SAHI
KHUNTA
BETA NATI
GOPA BANDHU NAGAR
UDALA
THAKUR MUNDA
KAPTIPADA
Index
District Boundary
Block Boundary
Main Road
Road
Railway

Plate No.2

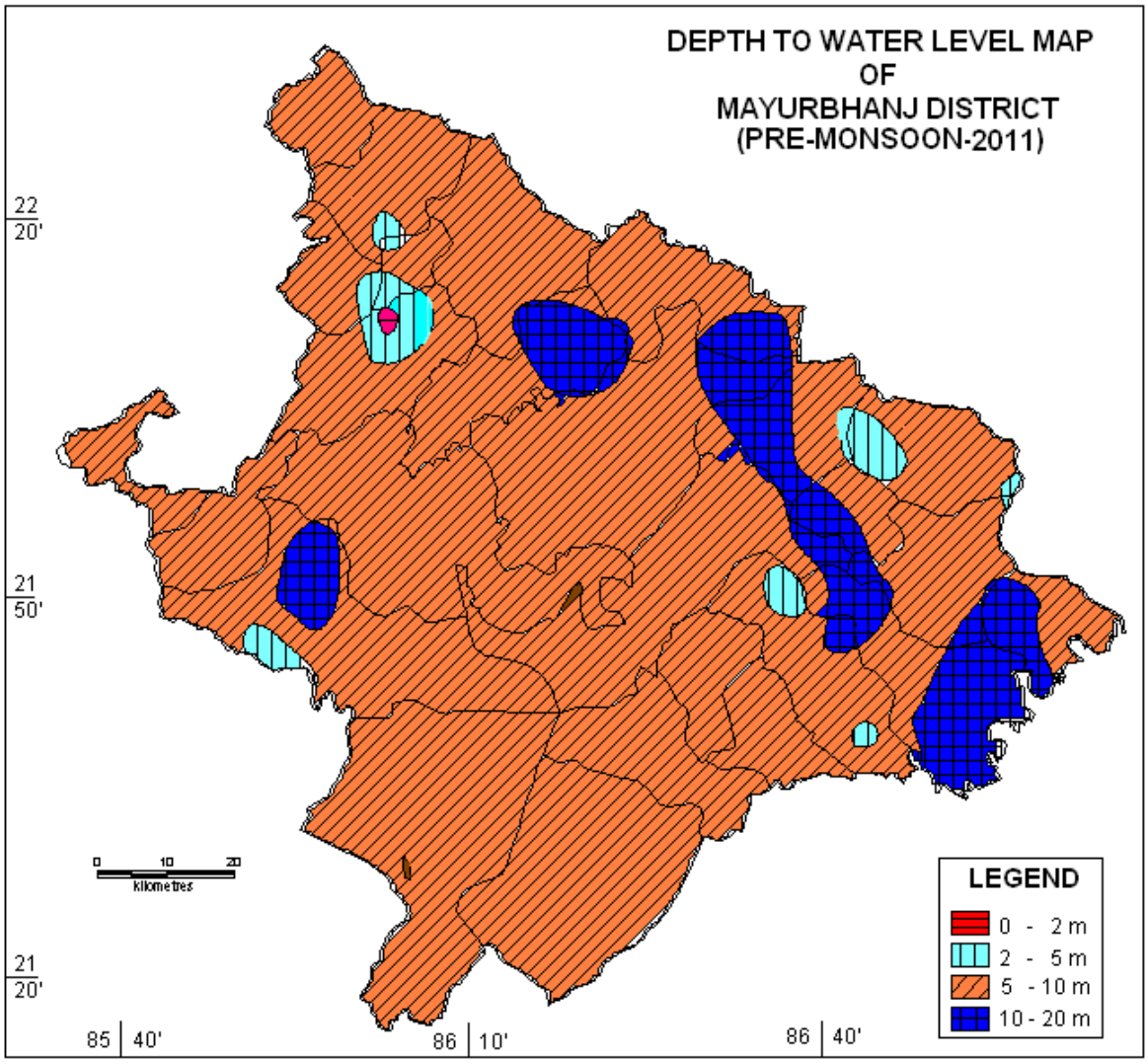

DEPTH TO WATER LEVEL MAP
OF
MAYURBHANJ DISTRICT
(PRE-MONSOON-2011)
22 20'
21 50'
21 20'
85 40'
86 10'
86 40'
0 10 20
kilometres
LEGEND
0 - 2 m
2 - 5 m
5 - 10 m
10 - 20 m

Plate No 3

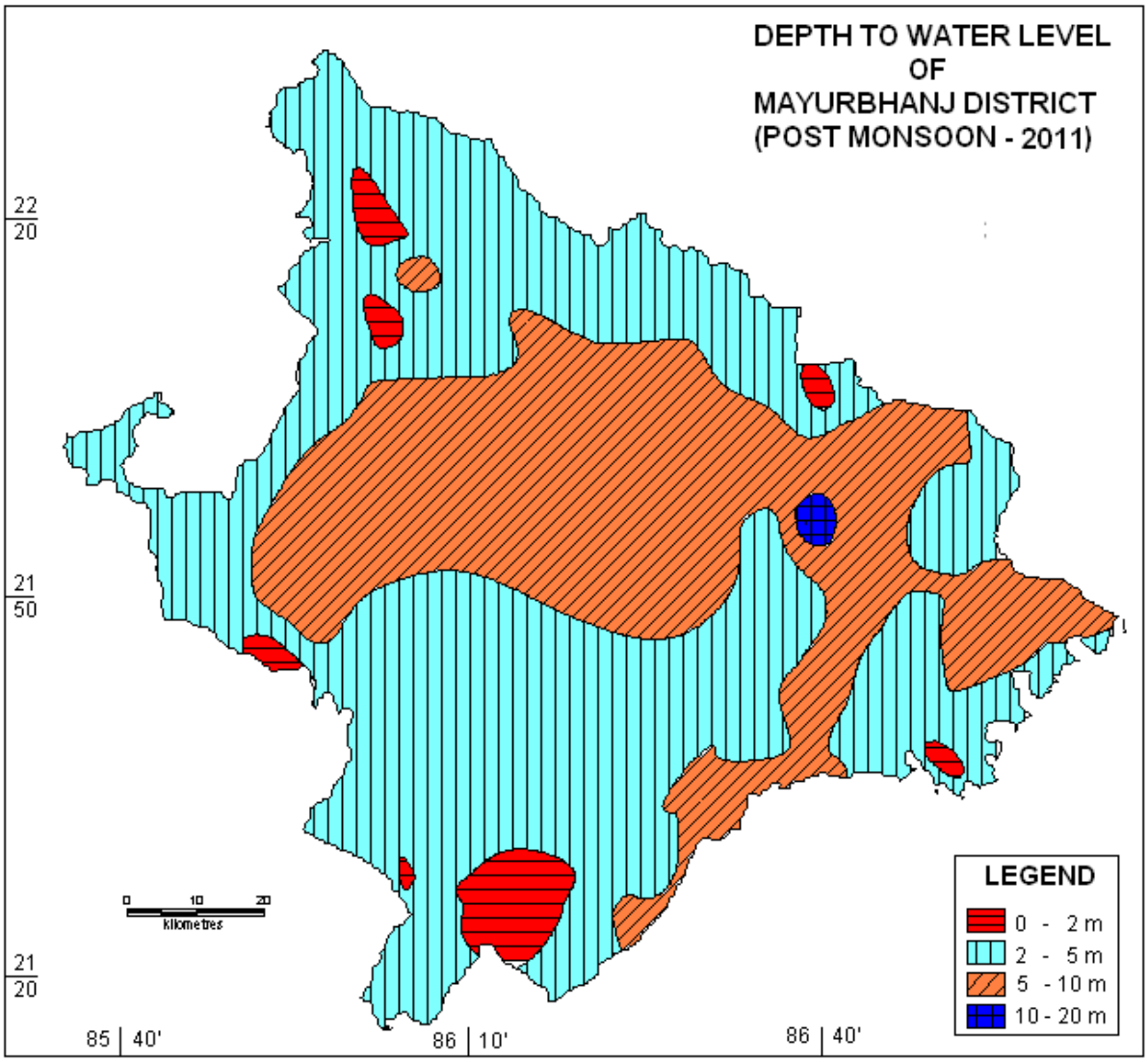
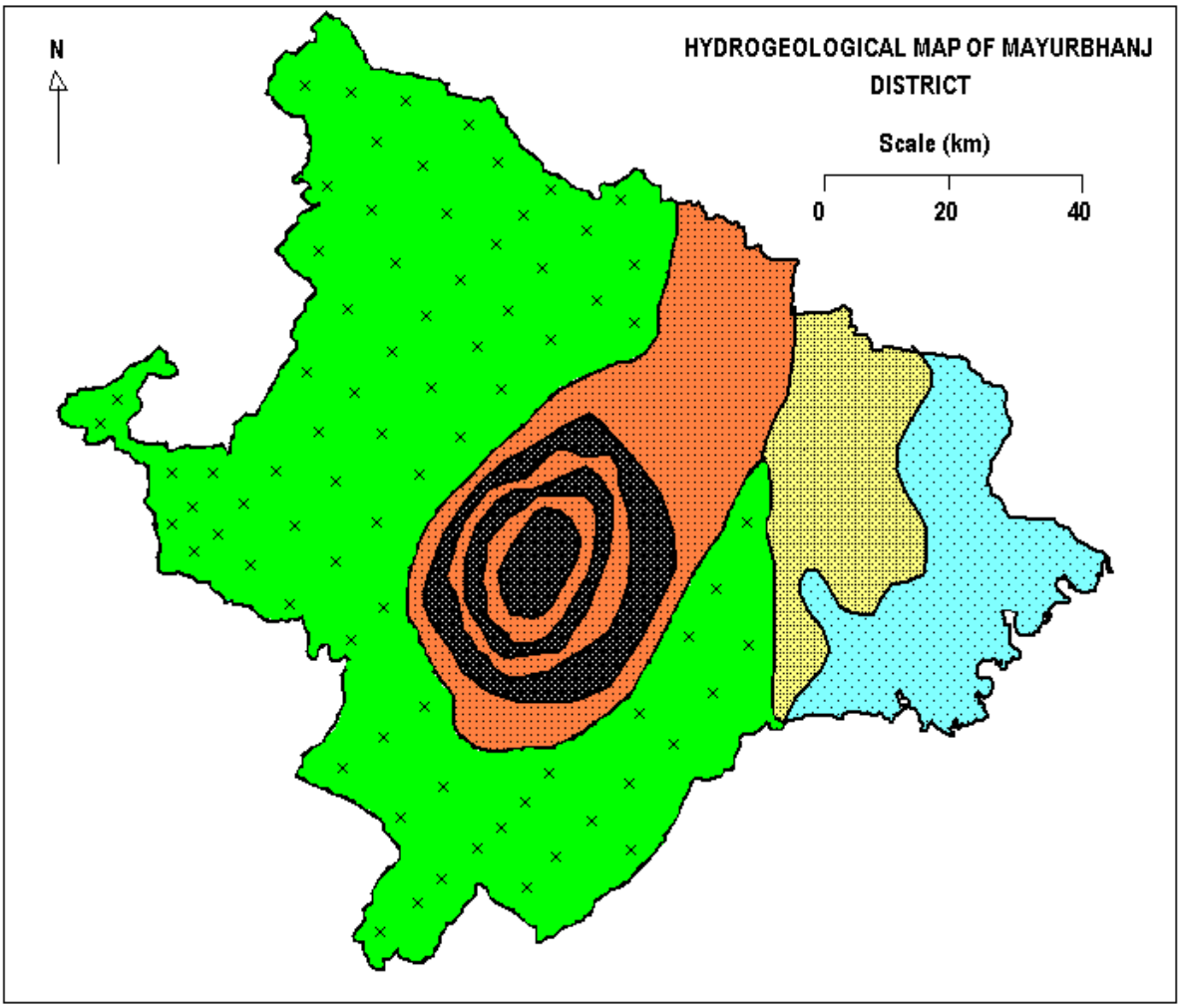

DEPTH TO WATER LEVEL
OF
MAYURBHANJ DISTRICT
(POST MONSOON - 2011)
22 / 20
21 / 50
21 / 20
0 10 20
kilometres
LEGEND
0 - 2 m
2 - 5 m
5 - 10 m
10 - 20 m
85 | 40'
86 | 10'
86 | 40'

Plate No. 4



LEGEND

Age Group	Lithology	Hydrogeological Condition & Groundwater Potential
Quaternary Upper Tertiary	Recent Alluvium, Clay, Silt, Sand, Gravel, Pebble etc.	Fairly thick regionally extensive unconfined/confined aquifer down to 30m yield up to 25lps.
	Older Alluvium and laterite, silt, sand ferruginous/Calcareous, concretion, lithomergic clay	Moderately thick and regionaly extensive confined/unconfined aquifer down to 150m yield less than 15lps.
Precambrian	Volcanics, Epidorites etc.	Groundwater resticted to weatherd residuum/fracture zones having secondary porosity yield 5-10lps. Low yield 1-5lps.
	Slate, Phyllites, Schist, Gneiss, Marble	
	Granite & Granite Gneiss	Groundwater restricted to weathered residuum and farcture zone yield 5 lps. In weatherd mantle and 10-15lps. In fracture and fissured formation

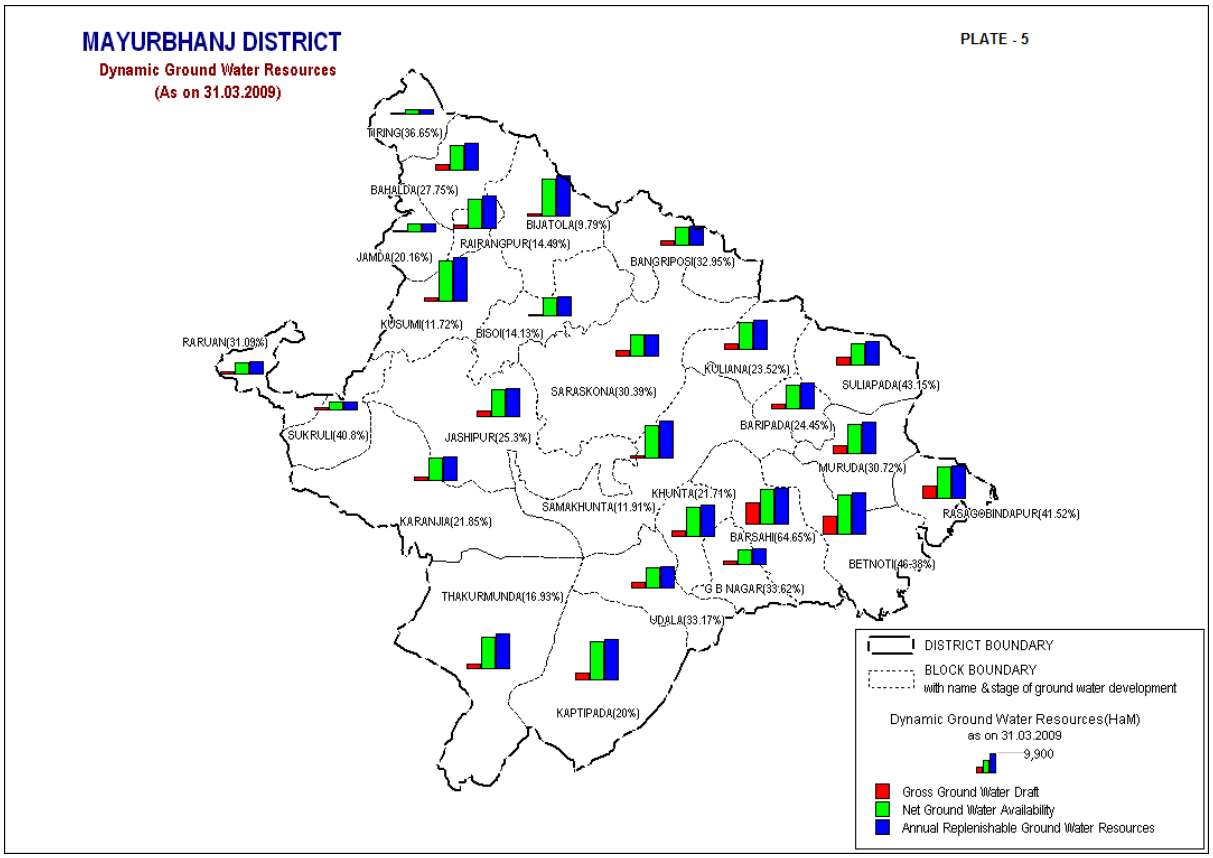
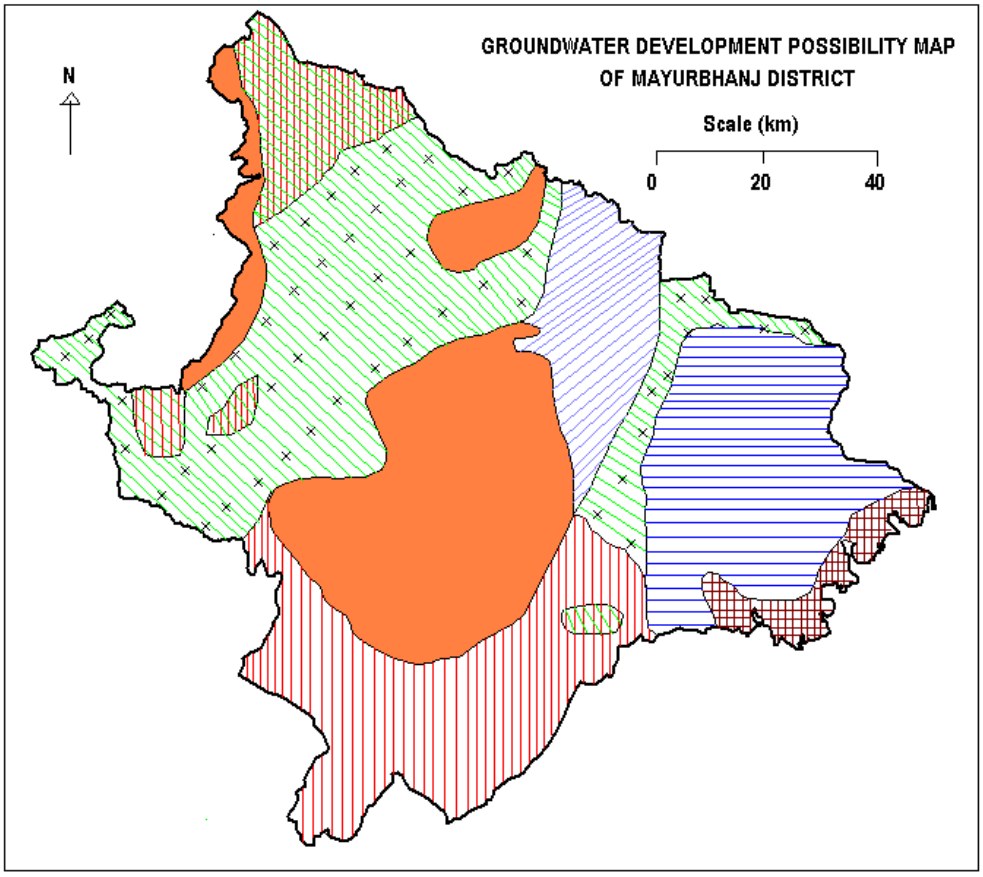
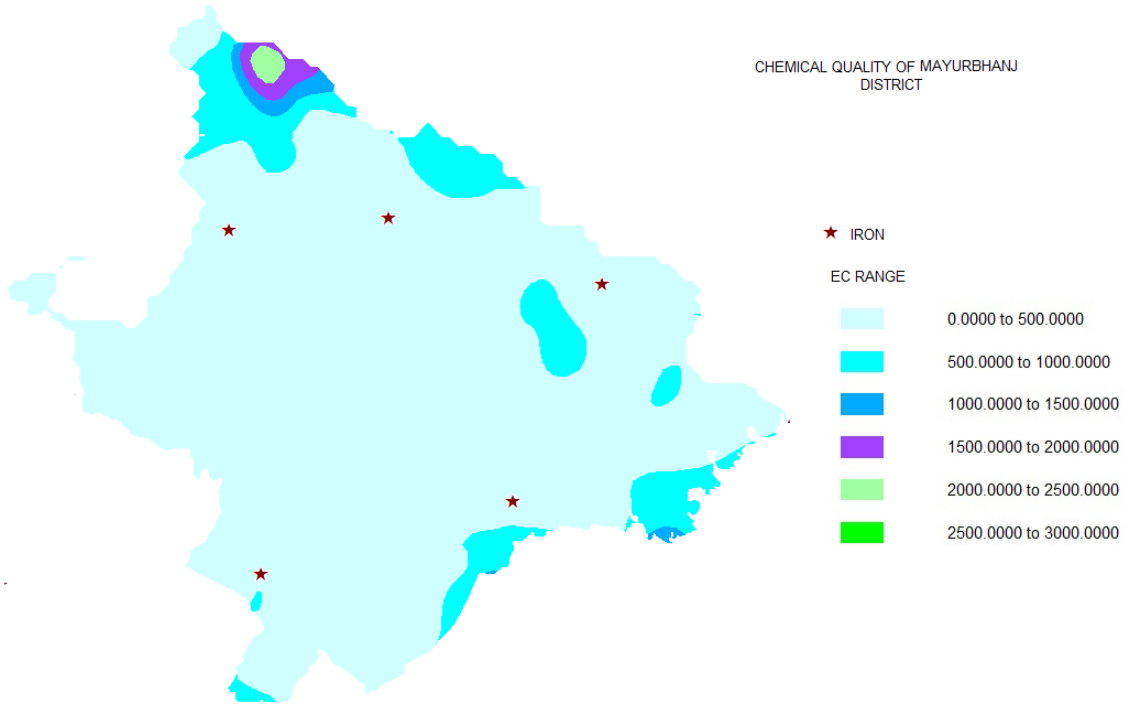

MAYURBHANJ DISTRICT
Dynamic Ground Water Resources
(As on 31.03.2009)
PLATE - 5
TIRING(36.65%)
BAHALDA(27.75%)
BIJATOLA(9.79%)
RAIRANGPUR(14.49%)
JAMDA(20.16%)
BANGRIPOSI(32.95%)
KUSUMI(11.72%)
BISOI(14.13%)
RARUAN(31.08%)
KULIANA(23.52%)
SULIAPADA(43.15%)
SARASKONA(30.39%)
BARIPADA(24.45%)
SUKRULI(40.8%)
JASHIPUR(25.3%)
MURUDA(30.72%)
KHUNTA(21.71%)
SAMAKHUNTA(11.91%)
RASGOBINDAPUR(41.52%)
KARANJIA(21.85%)
BARSAHI(64.65%)
BETNOTI(46.38%)
THAKURMUNDA(16.93%)
G B NAGAR(33.62%)
UDALA(33.17%)
KAPTIPADA(20%)
DISTRICT BOUNDARY
BLOCK BOUNDARY
with name & stage of ground water development
Dynamic Ground Water Resources(HaM)
as on 31.03.2009
9,900
Gross Ground Water Draft
Net Ground Water Availability
Annual Replenishable Ground Water Resources

Plate No 6



LEGEND

Structure	Design Pump Specification Yield
Dug well	9 -12m deep, 4.5-6m dia, centrifugal pump,2-3 HP yield, 2.5 lps
Dug well	10-12m deep, 4.5-6m dia, centrifugal/submersible pump, 2 HP yield less than 5 lps.
Medium/Deep tube well	Upto 250m deep,15cm dia, submersible/turbine pump 5 - 12.5HP. yield 7 - 20 lps.
Bore well	100 - 150m deep, 15cm dia, submersible pump 2 HP, yield less than 5 lps.
Bore well	100 - 150m deep, 15cm dia, submersible pump 2-3 HP, yield less than10 lps.
Shaline/F.P. T.W	Less than 30 -40m, deep, 10 cm dia, submersible/turbine pump 2-5 HP,yield up to 20 lps.
D.W/B.W In pockets (Hilly area)	Dug well 10 -15m deep, 4.5-6m dia, small dia bore well 60m, deep yield less than 1 lps.


CHEMICAL QUALITY OF MAYURBHANJ DISTRICT
IRON
EC RANGE
0.0000 to 500.0000
500.0000 to 1000.0000
1000.0000 to 1500.0000
1500.0000 to 2000.0000
2000.0000 to 2500.0000
2500.0000 to 3000.0000

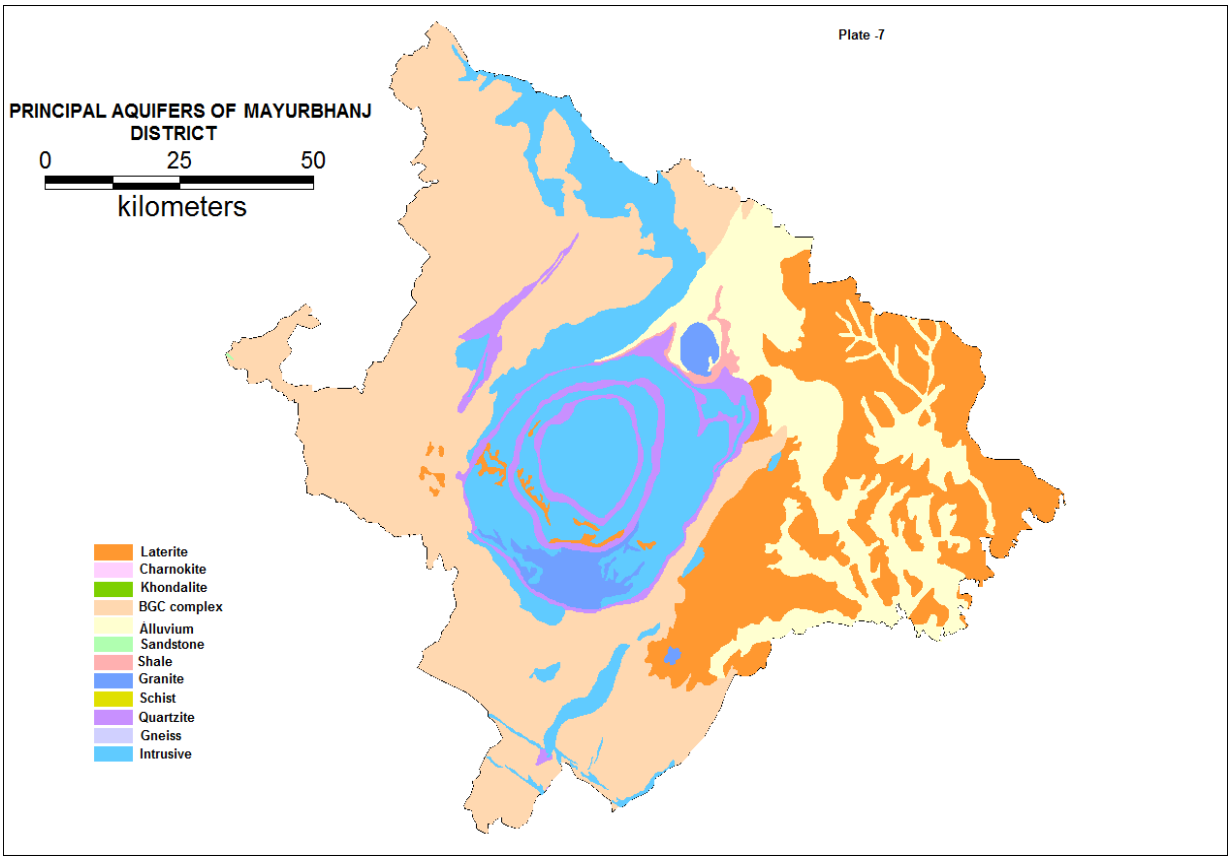


Plate -7
PRINCIPAL AQUIFERS OF MAYURBHANJ DISTRICT
0
25
50
kilometers
Laterite
Charnokite
Khondalite
BGC complex
Alluvium
Sandstone
Shale
Granite
Schist
Quartzite
Gneiss
Intrusive