“Ground Water Information Booklet”
Pakur District, Jharkhand State

Central Ground Water Board
Ministry of Water Resources
(Govt. of India)
Mid – Eastern Region
PATNA

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GROUND WATER INFORMATION BOOKLET
PAKUR DISTRICT, JHARKHAND STATE

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Fig. 5 : Block wise representing stage of ground water development (%),Pakur district.

PAKUR – DISTRICT AT A GLANCE

Sl No.	ITEMS	Statistics	
1.	GENERAL INFORMATION		
	i) Geographical Area (Sq km.)	1805 Sq. km.	
	(16) Administrative Divisions (As on 2008) Number of Block Number of Panchyat / Villages	 6 106/1252	
	(ii) Population (As on 2001 Census)- in lakhs	7, 01, 616	
	(iii) Average Annual Rainfall (mm)	1399 mm	
2.	GEOMORPHOLOGY		
	Major Physiographic units	Basaltic terrain of Rajmahal hills	
	Major Drainages	Damro. Torai, Bansloi and Tripti.	
3.	LAND USE (Sq Km.)		
	a) Forest area:	207.9	
	b) Net area sown:	578.4	
	c) Cultivable area:	630.5	
4.	MAJOR SOIL TYPES	Alfisols (red sandy soil and red gravelly soil)Light textured Slightly Acidic Poor in N & P Fairly rich in K	
5.	AREA UNDER PRINCIPAL CROPS	Pulses – 50.01 Oilseeds – 9.82 Paddy – 382.83	
6.	IRRIGATION BY DIFFERENT SOURCES (Areas and Number of Structures)	Nos.	Area (ha)
	Dugwell	189	379
	Tube wells /Bore wells	1	4
	Tanks / Ponds	86	186
	Canals	31	6133
	Other Sources	1129	3046
	Net irrigated area		
	Gross irrigated area		9748
7.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-03-07) No of Dugwell No. of Piezometers	 7 Nil	
10.	PREDOMINANT GEOLOGICAL FORMATIONS	Alluvium, Laterite, Rajmahal Trap	
11	HYDDROGEOLOGY		

	➢ Major Water bearing formation ➢ (Pre-monsoon Depth to water level during 2006) ➢ Post-monsoon Depth to water level during 2006) ➢ Long term water level trend in 10 yrs (1996-2005) in m / yr. (Pre – monsoon)	Rajmahal Trap 3.06 to 9.72 mbgl 0.30 to 5.83 mbgl Rise: 0.059 – 0.180 Fall: 0.011 – 0.109
12.	GROUND WATER EXPLORATION BY CGWB (As on 31-03-07)	
	No. of wells drilled (EW, OW, PZ, SH, Total	EW – 6, OW – 4
	Depth Range (m)	50 – 100 mbgl
	Discharge (litres per second)	9 – 51 m^3/hr.
	Storativity (S)	$1.3x10^{-2}$ to $7.3x10^{-2}$
	Transmissivity (m^2/day)	29 – 176 m^2/day
13.	GROUND WATER QUALITY	Good
	Presence of Chemical constituents more than permissible limit (e.g. EC, F, As, Fe)	EC 280 to 2160 micro mhos/cm at 25^0 C.
	Type of Water	Potable
14.	DYNAMIC GROUND WATER RESOURCES (2004) in ham.(Net Ground water Availability)	13168.58 ham / year
	Annual Replenishable Ground Water Resources	14236 ham
	Net Annual Ground Water Draft	1731 ham
	Projected Demand for Domestic and Industrial uses up to 2005	1582 ham
	Stage of Ground Water Development	13.17 %
15.	AWARENESSS AND TRAINING ACTIVITY	
	Mass Awareness Programmes Organized Date Place No. of Participants	 22nd March 2007 Town Hall, Pakur More than 130 people
16.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	
	Projects completed by CGWB (No & Amount spent)	Nil
	Projects under technical guidance of CGWB (Numbers)	Nil
17	GROUND WATER CONTROL AND REGULATION	
	Number Of OE Blocks	Nil
	No. of Critical Block	Nil
	No. of Blocks notified	Nil
18.	MAJOR GROUND WATER PROBLEMS AND ISSUES	Fluoride concentration found more than permissible limit in some of the villages

Ground Water Information Booklet, Pakur District, Jharkhand state

1.0 Introduction

1.1 Administration

The district Pakur is situated in the north – eastern part of the Jharkhand state. It is bounded in the north by the Sahebganj district, in the east by West Bengal, in the south by Dumka district and part of West Bengal state and in the west by Dumka and Godda districts. The district is situated between 24^0 49' 45"and 24^0 14' 00'North latitude and 87^0 24' 00" and 87^0 55' 00" East longitude. The district falls in Survey of India toposheets nos. 72 P/ 5, P/ 6, P/9, P/10, P/ 11, P/ 14 and P/ 15.

The district has one sub division and six blocks namely – Amrapara, Litipara, Hiranpur, Pakur, Maheshpur and Pakuria (Fig. 1). The administrative division and population of the district is given in Table – 1.

1.2. River System

The river Ganges passes at a little distance away, along the north eastern boundary of the district. The other rivers of the district are Gumani, Torai, Bansloi and Brahmni. All the rivers flow from west to east direction except river Gumani which flows from SW to NE direction. The drainage pattern of the district is dendritic. All the rivers are tributaries of river Ganga and are seasonal in nature.

1.3. Irrigation

Undulating topographic features characterize the district. The agricultural activity of the district is solely dependent upon the monsoon rainfall and the kharif crops mainly paddy and maize are grown extensively. Irrigational facilities are not adequate in the district. Dug well is the most common source of irrigation, but this is not very dependable source. The major part of the district

being rocky, it is difficult to dig wells. Where there exists facility for irrigation during Rabi season from the ponds, wheat is the major crop grown in that area.

1.4 Studies

Central Ground Water Board has established a network of observation wells under National Hydrograph Network programme to study the behavior of ground water level and quality of ground water in the district. The systematic hydrogeological survey has been carried out during the AAP 1976 – 77 and field data was collected for the study of ground water conditions in respect of quality and quantity. The board has also carried out exploratory drilling in the district and drilled six bore wells to know the sub surface geology, depth and thickness of water bearing formation with their yield and determine the different aquifer parameters (Table - 2).

2.0 Rainfall and Climate

2.1 Rainfall

The area receives rainfall by South-West monsoon. Rainy season sets in the middle of June and lasts till September. The normal average rainfall in the district is 1399 mm.

2.2 Climate

The district is characterized by humid to sub-humid climate. During summer the hot spell prevails from March to middle of June. Rainy season starts from middle of June to end to September. Winter starts from the middle of November and continues till the end of February. The district experiences great heat from March to May, when the maximum temperature reaches upto 40^0c. December is the coldest month when the minimum temperatures fall down to 4^0c.

3.0 Geomorphology and soil types

3.1Geomorphology

Major part of the district is characterized by undulating topography covered by basaltic flows of Rajmahal Trap. The district is mainly drained by the river Bansloi, Brahmani, Torai and Gumani. All these rivers are seasonal in

nature. Major drainages of the district appear to have a west to easterly flow direction. The main geomorphological features of the district are the rolling peneplain in the south with numerous remnants of ancient ridges and resistant lava plateau of Rajmahal. These plateaus rise above the general level and occupy major part of the district. The general elevation of the hills and plateau varies from 70 to 371 m above MSL.

3.2 Soil

The major soil type of the district is the Rajmahal type soil, which is derived from basaltic lava. These soils black in colour are very fertile and restricted to Rajmahal lava areas. The other soil type of the district are Red soil, eroded scarp soil, foothill soils, Tal soil and alluvial soil. The red soils are light to medium and are red to yellow or light grey in colour. The eroded scarp soil occurs in transverse section of dissected, descending scarp land at various altitude of upland. The yellowish red foothill soils occur in the eastern fringe of the district. The tal soil is found in the back water belt of the Ganga around Pakur where the rain water remains collected in the rainy season.

4.0 Ground Water Scenerio

4.1 Hydrogeology

Rajmahal Trap is the major rock type in the district. The other geological formations of the district are alluvium, Laterite and Gondwana.

In the eastern part of the district, recent alluvium occurs in patches, which is mainly composed of sand and sub ordinate clay. Laterites are mainly of in situ origin and have been formed by sub-aerial eroson of underlying basalts under favorable climatic conditions. Laterites provide a productive ground water reservoir due to their very porous and permeable nature. The most significant Barakar coal measures of Gondwana formation occurs in western part of the district.

Rajmahal traps having a large thickness of basaltic lava flows occur in the major part of the district. The different units of the lava flows are the main water bearing horizons in basaltic formation. The basic properties such as the

ability to receive recharge, capacity to take water into storage and transmit it as ground water by gravity are different for different litho units of the trappean flows. The massive basaltic unit is hard and compact in nature with negligible primary porosity and permeability. But the process of weathering and structural deformations, development of secondary porosity such as joints and fractures make it to act as good ground water reservoir. The vesicular units have abundant vesicles that contribute to high degree of porosity and permeability to serve as potential aquifers. The ground water occurs under water table conditions in near surface weathered, jointed and fractured basaltic zone. The water bearing zone occurring between depths of 15-40 m are either interflow weathered shear zones or directly connected to shallow aquifer in widely spaced major joints and fractures. These forml semi confined aquifer. Below the depth of 40 m, where the fracture porosity is insignificant, the weathered flow contacts are completely cut-off from lower aquifer on account of intervening highly impermeable massive basalts and intertrappean beds give rise to confining conditions.

4.1.1 Exploratory wells: To understand the sub surface geology, identify the various water bearing horizons including their depth, thickness, etc. and for computing the hydraulic characteristics such as Transmissivity and Storativity of the aquifers, exploratory drilling programme was carried out under AAP 1982 – 83. There are 05 exploratory wells and 04 observtion wells were drilled in the district. The depth of exploratory wells ranges between 23.42 to 156.70 mbgl. The static water level of these exploratory wells varies from 1.55 to 11.36 mbgl. The Transmissivity value varies from 26.00 to 86.29 m^2/ day, while the Storativity values varying from 01.30 X 10^{-5} to 06.10 X 10^{-5}.

4.1.2 Depth to Water Level: -

30 key observation wells were established under Ground Water Management Studies in the district during the AAP 2006-07.

Pre monsoon depth to water level: - The pre monsoon depth to water level was observed to vary between 3.06 to 9.72 mbgl. Majority of the wells (63%) fall in the water level range of 6 – 9 mbgl. About 33% wells fall in the water level

range of 3 – 6 mbgl. In the northern part and middle part of the district pre monsoon depth to water level ranges between 6 – 9 mbgl,. While iin western and eastern part of the district water level varies from 3 – 6 mbgl. In the north eastern part of the district, the water level was found 9.00 mbgl. Pre monsoon depth to water level map has been presented in Figure 2.

Post monsoon depth to water level: - The post monsoon depth to water level was found to vary between 0.30 and 5.83 mbgl. About 70% of wells fall in the water level ranges of 0 – 3 mbgl and rest of the wells (30%) fall in ranges of 3 – 6 mbgl. In the northern part and central part (in patches) the water level ranges between 3 – 6 mbgl and rest of the area fall under depth to water level within 0.3 mbgl. Post monsoon depth to water level variation within the district has been presented in figure 3.

4.1.3 Seasonal Fluctuation:- From the pre monsoon and post monsoon depth to water level data collected during May 2006 and November 2006 respectively, water level fluctuations were computed for all key observation wells in the district. The water level fluctuation of the district varies from 1.14 to 7.26 m. The lowest fluctuation of water level was found in the middle – eastern part of the district. About 36% wells show fluctuation between 2 – 4 m and while 46% wells show fluctuation between 4 – 6 m. Rest 13% wells show water level fluctuation more then 6m. The pre monsoon, post monsoon water level data and seasonal fluctuation have been given in Table 3.

4.1.4 Long term water level trend: - Water level of an area depends upon various factors like the stage of ground water development and variation in rainfall over a long period. Central Ground Water Board has established seven National Hyrdograph stations (NHS) for the study of water level behavior in the district. The water level data of each station has been analysed. The pre monsoon and post monsoon long term water level trend has been calculated for the period of 1996 – 2005 (Table 4). The long term water level trend is showing rising trend between 0.004 – 0.024, 0.036 – 0.283 and 0.059 – 0.180 m/ year for

pre monsoon, post monsoon and all period respectively. Similarly, the long term water level trend is showing falling trend between 0.063 – 0.510, 0.070 – 0.195 and 0.011 – 0.109m/ year for pre monsoon, post monsoon and all period respectively. About 28.57% of NHS showing rising trend of ground water while 57.14% of NHS showing falling trend for pre monsoon period. About 42.85% of NHS showing rising trend of ground water while 28.57% of NHS showing falling trend for post monsoon period. Similarly, about 42.85% of NHS showing rising trend and rest 57.14% showing declining trend for all seasons.

4.2 Ground Water Resources

Based on the recommendation of the Ground Water Estimation Committee – 1997 (GEC – 1997), Block wise the ground water resource assessment has been evaluated.. The net ground water availability of the district is 13168 ham. The gross ground water draft for all uses of the district is 1730.75 ham. All blocks of the district falling under “Safe” category. The stage of ground water development varies from 7.42% to 25.17%. (Table – 6, Fig. 5). The net ground water availability for future irrigation development for the district is 10927.51 ham.

4.3 Ground Water Quality

To evaluate the quality of ground water, samples have been collected from 29 representative dug wells during May – 2006. These samples have been considered to assess the chemical quality of ground water and its suitability for drinking and irrigation purposes. The samples represent the phreatic aquifer or the shallow aquifer. The water samples were analysed for major chemical constituents by using standard methods at chemical laboratory in CGWB, MER, Patna. Analysed results are given in Table 5.

The results of ground water samples were evaluated in accordance with the ISI – 1993 standard for drinking purpose. In general the quality of ground

water in the phreatic aquifer is acceptable except few samples, which are showing nitrate concentration more than permissible limit. The nitrate concentration more than permissible limit has been observed in the villages namely Bannawgram, Kaira Chhatar, Parerkola, Litipara and Tarai. The Fluoride concentration more than permissible limit (bore well samples)has been observed in the villages – Dharampur Morh, Amrapara, Bannawgram, Dhekiduba, Jatang Khakhsa and Rajdaha. The EC value ranges from 280 – 2160 micro Siemens/cm at 25^0c. The EC contour map is shown in Figure 4.

4.4 Status of Ground Water Development

There is sufficient scope for development of ground water through shallow as well as deep bore wells. State Govt. department has constructed a large number of bore wells to mitigate the drinking water problem in the district. Central Ground Water Board has drilled 6 bore wells in the district. The depth of bore wells ranges between 80.00 – 170.24 mbgl. The yield of bore wells ranges from 1.08 to 30.00 m^3/hr. The Transmissivity and Storativity value ranges from 26 to 86.29 m^2/day and 01.30 x 10^{-2} to 06.10 x 10^{-5} respectively (Table 2).

5.0. Ground Water Management Strategy

5.1. Ground Water Development

Dug wells and shallow to medium deep (upto 50 m) bore wells are the main ground water extraction structures in the area to meet the increasing demand of domestic water supply and irrigation. The overall stage of ground water development in the district is 13.17% only. Thus, there is sufficient scope for development of ground water through dug wells, shallow and medium deep bore wells.

Construction of dug cum bore well structure is also suitable for enhancing the yield of dug wells which will be vary much coast effective. The ground water development varies in different places depending on the availability of favorable potential zones/ aquifers. For the construction of ground water

structures, knowledge of the local as well as regional hydrogeological condition of the area is necessary.

Ground water potential available for the future development, considering the ground water draft has been worked out as per norms of Ground Water Estimation Committee – 1997 (GEC – 1997) and the details of ground water recharge, net annual ground water availability, annual draft, net ground water balance and stage of ground water development has been assessed and presented in table – 6.

5.2. Water Conservation and Artificial Recharge

In view of the increasing thrust on development of ground water resources, there is urgent need to augment the depleting ground water resources. This gets augmented through natural recharge and can be augmented on an increased scale through artificial recharge. From hydrogeological point of view, rain water conservation is needed to arrest decline in ground water levels and to improve ground water quality by dilution. The construction of water conservation structures, artificial recharge structures, depends on the topographic features, hydrological and hydrogeological conditions of the area. From this point of view, the Pakur district may be divided into two parts – 1) Western part of the district which is having undulating topography with hills is suitable for check dam, gabion structures and contour bunding and trenching 2) Middle and eastern part is suitable for percolation tanks and nala bunds.

6.0 Ground Water Related Issue and Problems

The Fluoride concentration has been found beyond permissible limit in some villages like Dharampur Morh, Amrapara, Bannawgram, Dhekiduba, Jatang Khakhsa and Rajdaha.

7.0. Awareness and Training Activity

7.1. The Mass Awareness Programme (MAP) by CGWB

Central Ground Water Board organized a mass awareness programme at Pakur on 22nd March 2007, on “Rain Water Harvesting and Artificial Recharge”. About 150 people from different organizations participated in the programme including representatives of NGO’S. In the addition to technical lectures a quiz competition on ground water related topic was conducted for college students.

7.2 Participation in Exhibition, Mela, Fair etc. - Nil

7.3 Presentation and Lecture deliver in public forum / Radio / T.V / Institution of repute / Grassroots association / NGO / Academic institution etc. – Nil

8.0 Area Notified by CGWA / CGWA

As per the ground water resource assessmentreport of Jharkhand state, all blocks of the district fall under the safe category. Thus, the authority has not been notified any of the blocks.

9.0 Recommendation

1. Fluoride concentration in ground water (bore well) exceeds the permissible limits in/around villages Dharampur Morh, Amrapara, Bannawgram, Dhekiduba, Jatang Khakhsa and Rajdaha. In fluoride-affected area, the ground water must be used after deflouridation through fluoride removal plants. Alternative source may be identified. The existing fluoride affected sources may be sealed.
2. Nitrate concentration in shallow aquifer (dug well) is found more than permissible limit in/around villages Bannawgram (Pakuria Block), Kairachhatar (Maheshpur Block) and Litipara (Litipara Block). The bore

well may be a better alternate option for the drinking water purposes for the above villages.

3. The exploration data indicates poor success rate of bore wells in the district. Thus geophysical survey may be adopted for selection of suitable sites for ground water exploration and drilling of production bore wells.
4. Rooftop rainwater harvesting and artificial recharge practice may be adopted in Pakur town where the post monsoon water level (NHS) has been found upto 7.72 mbgl.
5. In order to conserve run off water during monsoon, it is suggested to construct the water conservation structures at suitable places to facilitate the ground water recharge. These recharge structure may be constructed in and around Amrapara, Maheshpur and Pakuria blocks, where the long term (1996 – 2005) water level trend is showing declining trend for the pre-monsoon as well as post-monsoon period.

TABLE 1: ADMINISTRATIVE DIVISION AND POPULATION OF PAKUR DISTRICT

Sr. No.	Block	Area (Sq. km)	Rural population			Urban population		
			Male	Female	Total	Male	Female	Total
1	Pakur	221.71	99843	97064	196907	18980	17049	36029
2	Litipara	169.60	44783	42664	87447	--	--	--
3	Amrapara	413.05	27540	25784	53324	--	--	--
4	Hiranpur	273.29	34786	33325	68111	--	--	--
5	Maheshpur	448.93	87173	83412	170585	--	--	--
6	Pakuria	279.01	45440	43821	89261	--	--	--

TABLE 2: DETAILS OF EXLPORATORY WELLS IN PAKUR DISTRICT

Sl. No	Location/ Block	Depth Drilled (mbgl)	Length of casing pipe/ Depth const. (m)	Static Water Level (mbgl)	Discharge (m^3/hr)	Draw-down (m)	Specific Capacity (m^3/hr/m)	Trans-missivity (m^2/day)	Storativity
1	Pakur	100.60	--	--	Abandoned	--	--	--	--
2	Litipara	98.35	11.60	11.36	9.24	13.19	0.7	86.29	--
	OW	99.00	--	--	--	--	--	--	--
3	Amrapara	98.00	7.35	1.55 (magl)	1.08	19.65	0.05	26.00	01.30 X 10^{-5}
	OW	98.00	--	--	--	--	--	--	--
4	Brindawan	92.5	--	2.17	6.12	7.05	0.86	29.00	06.10 X $^{10-5}$
	OW	96.90	--	--	--	--	--	--	--
5	Gaurpara	80.00	--	--	Abandoned	--	--	--	--
6	Maheshpur	170.24	24.50	4.66	30.00	36.00	--	--	--
	SH	23.42	--	--	--	--	--	--	
	OW	156.70	--	--	--	--	--	--	--

TABLE 3: DEPTH TO WATER LEVEL OF KEY OBSERVATION WELLS OF GROUND WATER MANAGEMENT STUDIES IN PAKUR DISTRICT (2006 – 07)

Sl. No.	Village	Block	Depth to water level (mbgl)		Fluctuation (m)
			Pre-monsoon	Post monsoon	
1	Pachathol	Pakur	3.47	0.32	3.15
2	Sahargaon	Maheshpur	7.81	0.55	7.26
3	Devpur	Maheshpur	7.27	1.21	6.06
4	Sonarpada	Maheshpur	5.48	0.74	4.74
5	Maheshpur	Maheshpur	6.97	5.83	1.14
6	Devinagar	Maheshpur	6.23	1.49	4.74
7	Lasipur	Maheshpur	5.66	0.72	4.94
8	Pochaibera	Amrapara	3.88	0.50	3.38
9	Pakuria	Pakuria	5.32	0.53	4.79
10	Bannawgram	Pakuria	4.16	1.09	3.07
11	Khakhsa (Pahar tola)	Pakuria	6.15	1.10	5.05
12	Sindrisol	Pakuria	7.63	0.49	7.14
13	Durgapur	Pakuria	3.06	0.30	2.76
14	Amrapara	Amrapara	5.32	3.15	2.17
15	Alubera	Amrapara	7.38	3.08	4.30
16	Kaira Chhatar	Maheshpur	6.31	2.40	3.91
17	Dangapara	Hiranpur	6.10	0.98	5.12
18	Parerkola	Amrapara	6.03	0.79	5.24
19	Dumberchir	Amrapara	5.39	2.85	2.54
20	Litipara	Litipara	8.80	4.94	3.86
21	Jardiha	Litipara	7.25	1.40	5.85
22	Simlong	Litipara	6.97	3.52	3.45
23	Nabinagar	Pakur	8.85	4.31	4.54
24	Kumarpur	Pakur	9.72	3.79	5.93
25	Amdabad	Pakur	8.67	3.22	5.45
26	Saharpur	Hiranpur	7.43	1.37	6.06
27	Hiranpur	Hiranpur	7.38	4.20	3.18
28	Tarai	Hiranpur	6.83	0.97	5.86
29	Pakur	Pakur	8.73	4.04	4.69
30	Kunjbona	Litipara	4.10	0.57	3.53

TABLE 4: LONG TERM WATER LEVEL TREND FOR EXISTING HYDROGRAPH NETWORK STATIONS IN PAKUR DISTRICT (1996 – 2005)

Sl. No.	Location	Pre monsoon trend (m/year)		Post monsoon trend (m/year)		All period (m/year)	
		Rise	Fall	Rise	Fall	Rise	Fall
1	Amrapara	--	0.067	0.036	--	0.059	--
2	Hiranpur	--	--	--	--	--	0.088
3	Litipara	0.024	--	0.136	--	0.068	--
4	Maheshpur	0.004	--	--	0.195	--	0.011
5	Pakur	--	0.510	--	0.070	--	0.109
6	Pakuria	--	0.063	0.283	--	0.180	--
7	Salgapara	--	0.400	--	--	--	0.026

TABLE 5: CHEMICAL ANALYSIS OF WATER SAMPLES COLLECTED FROM KEY OBSERVATION WELLS DURING GROUND WATER MANAGEMENT STUDIES IN PAKUR DISTRICT (2006 –07)

Sr. No.	Location	Block	EC in micro siemens/ cm at 25^0c	pH	TH as $CaCO_3$	Ca	Mg	Na	K	HCO_3	Cl	SO_4	NO_3	F
						← mg / l →								
1	Pachathol	Pakur	370	7.31	135	38	9.7	16	5.8	189	11	1.9	0.6	0.22
2	Sahargaon	Maheshpur	480	7.32	195	54	15	15	1.5	128	53	6.2	43	0.10
3	Devpur	Maheshpur	700	7.25	275	76	21	22	3.1	201	85	11	31	0.09
4	Sonarpada	Maheshpur	920	7.21	325	88	26	58	0.8	226	142	29	9	1.07
5	Maheshpur	Maheshpur	820	7.46	310	76	29	41	0.4	268	89	23	14	0.01
6	Devinagar	Maheshpur	640	7.48	250	80	12	17	16	195	64	14	37	0.12
7	Lasipur	Maheshpur	550	7.35	215	64	13	19	5.5	232	36	6.7	2.5	0.2
8	Pochaibera	Amrapara	280	7.85	115	26	12	9.2	0.2	140	7.1	1.4	2.5	0.12
9	Pakuria	Pakuria	500	7.90	200	56	15	15	0.4	195	32	10	5.6	0.22
10	Bannawgram	Pakuria	1500	7.45	500	64	83	10.8	3.9	140	320	54	112	0.09
11	Khakhsa	Pakuria	700	7.46	230	46	28	48	5.8	250	78	7.7	6.8	0.12
12	Sindrisol	Pakuria	830	8.02	350	94	28	22	1.2	153	160	12	31	0.09
13	Durgapur	Pakuria	420	8.01	140	34	13	25	1.9	177	21	6	1.2	0.44
14	Amrapara	Amrapara	600	8.1	235	34	36	23	0.3	177	57	22	28	0.09
15	Alubera	Amrapara	300	7.18	115	34	7.3	6.9	11	92	28	4	25	0.04
16	Kaira Chhatar	Maheshpur	2160	7.31	860	262	50	92	1.9	360	369	62	211	0.14
17	Dangapara	Hiranpur	420	7.95	170	50	11	14	1.9	146	39	3.3	22	0.08
18	Parerkola	Amrapara	630	8.11	255	68	21	20	0.4	183	50	13	65	0.08
19	Dumberchir	Amrapara	470	7.98	180	56	9.7	21	1.2	238	11	3.3	3.1	0.14
20	Litipara	Litipara	1420	8.01	610	168	46	39	1.5	159	302	17	130	0.06
21	Jardiha	Litipara	970	8.10	330	88	27	58	8.2	317	121	8.2	1.9	0.12
22	Simlong	Litipara	660	7.95	235	54	24	35	6.2	220	53	23	26	0.14
23	Nabinagar	Pakur	780	7.35	240	64	19	62	0.8	92	160	24	37	0.14
24	Kumarpur	Pakur	520	7.45	180	60	7.3	16	23	98	75	12	37	0.16
25	Amdabad	Pakur	330	7.02	125	40	6	12	4.3	116	32	5.6	32	0.06
26	Saharpur	Hiranpur	280	7.31	115	38	5	5.7	3.1	98	21	7.2	9.3	0.18
27	Hiranpur	Hiranpur	370	7.52	150	40	12	12	2.3	171	14	0.96	5.6	0.13
28	Tarai	Hiranpur	1950	7.85	750	700	7.96			342	383	1.9	52	0.15
29	Pakur	Pakur	700	7.96	230	56	22	41	1.2	201	64	24	26	0.2

TABLE 6: DETAILS OF GROUND WATER RESOURCES AND STAGE OF GROUND WATER DEVELOPMENT IN PAKUR DISTRICTS AS ON 31st MARCH 2004 (in hectare meters)

Sr. No.	Assessment Unit/ District	Net Annual Ground Water Availability	Gross Ground Water Draft for Irrigation	Gross Ground Water Draft for Domestic and Industrial water Supply	Gross Ground Water Draft for all Uses (4+5)	Allocation for Domestic and Industrial Requirement supply upto next 25 years	Net Ground Water Availability for future irrigation development (3 – 4 – 7)	Stage of Ground Water Development (6/3)*100 (%)	Total ground water assessment unit areal extent (in hectare)	Categorisation for future ground water development (safe/ critical/ over - exploited)
1	2	3	4	5	6	7	8	9	10	11
1	Litipara	2490.57	117.04	137.13	254.17	202.46	2171.07	10.21	28200	Safe
2	Amrapara	1806.92	50.60	83.47	134.07	123.24	1633.08	7.42	20500	Safe
3	Hiranpur	1333.84	75.24	106.67	181.91	157.49	1101.11	13.64	15200	Safe
4	Pakur	1723.55	96.69	337.20	433.89	497.82	1129.03	25.17	16100	Safe
5	Maheshpur	3904.56	311.96	267.08	579.04	394.30	3198.30	14.83	35200	Safe
6	Pakuria	1909.15	7.92	139.74	147.66	206.31	1694.92	7.73	21900	Safe
	Total	**13168.58**	**659.45**	**1071.30**	**1730.75**	**1581.62**	**10927.51**	**13.17**	**137100**	

FIG–1

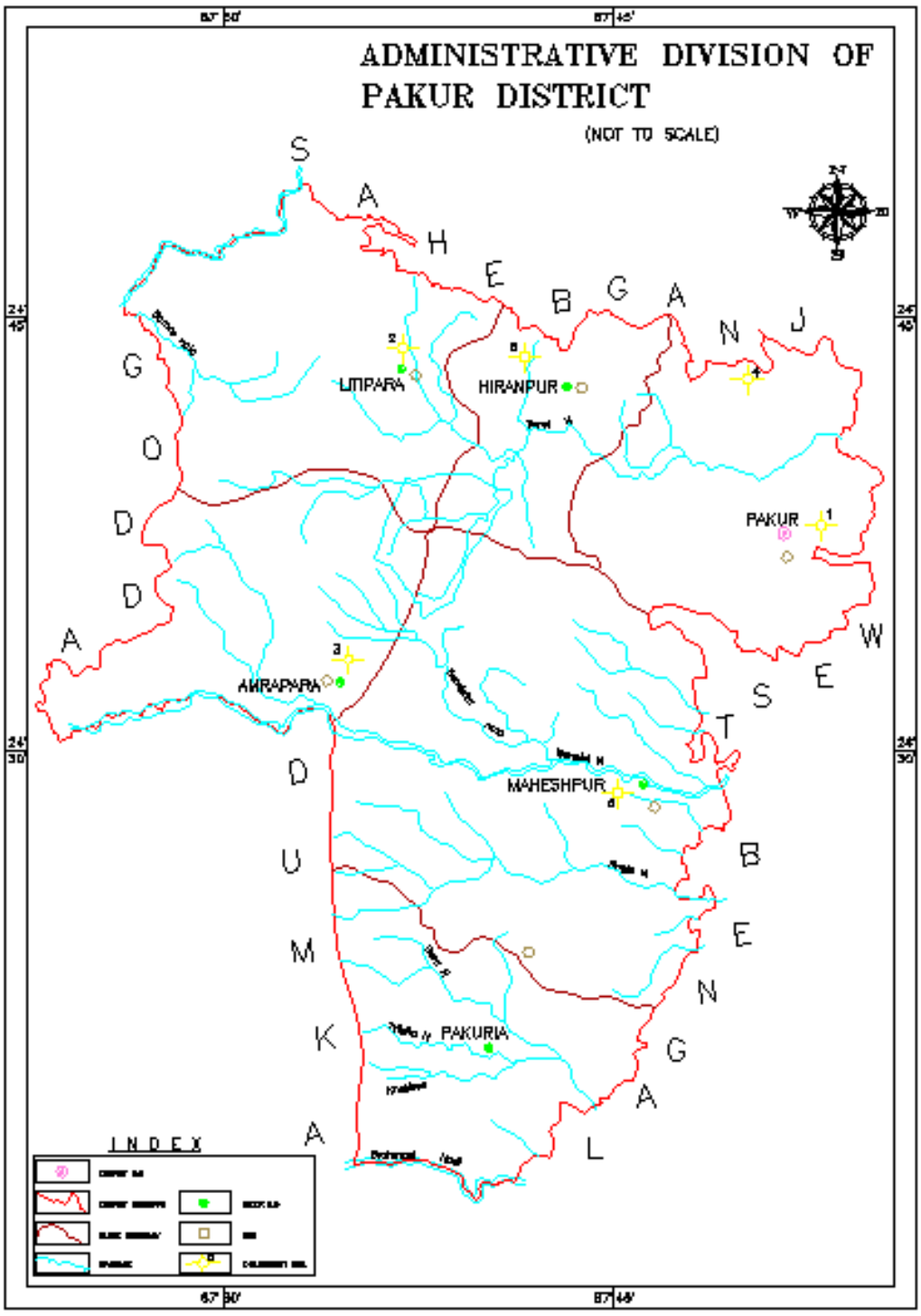

ADMINISTRATIVE DIVISION OF
PAKUR DISTRICT
(NOT TO SCALE)
SAHEBGANJ
GODDA
DUMKA
LITIPARA
HIRANPUR
PAKUR
AMRAPARA
MAHESHPUR
PAKURIA
WEST BENGAL
INDEX

Fig-2

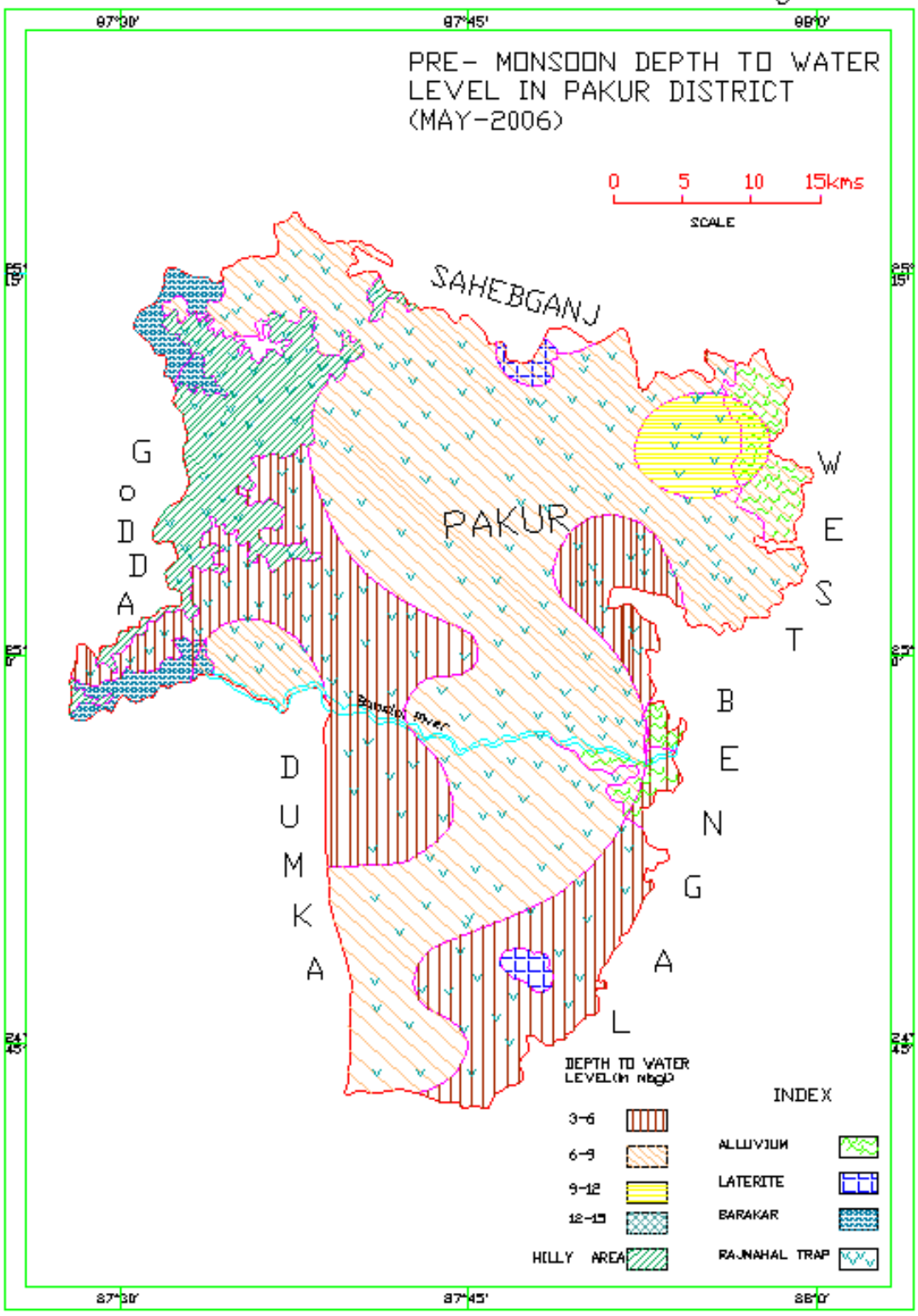

PRE- MONSOON DEPTH TO WATER LEVEL IN PAKUR DISTRICT (MAY-2006)
0 5 10 15kms
SCALE
SAHEBGANJ
GODDA
PAKUR
WEST BENGAL
DUMKA
Bansloi River
DEPTH TO WATER LEVEL(in mbgl)
3-6
6-9
9-12
12-15
HILLY AREA
INDEX
ALLUVIUM
LATERITE
BARAKAR
RAJMAHAL TRAP

Fig-3

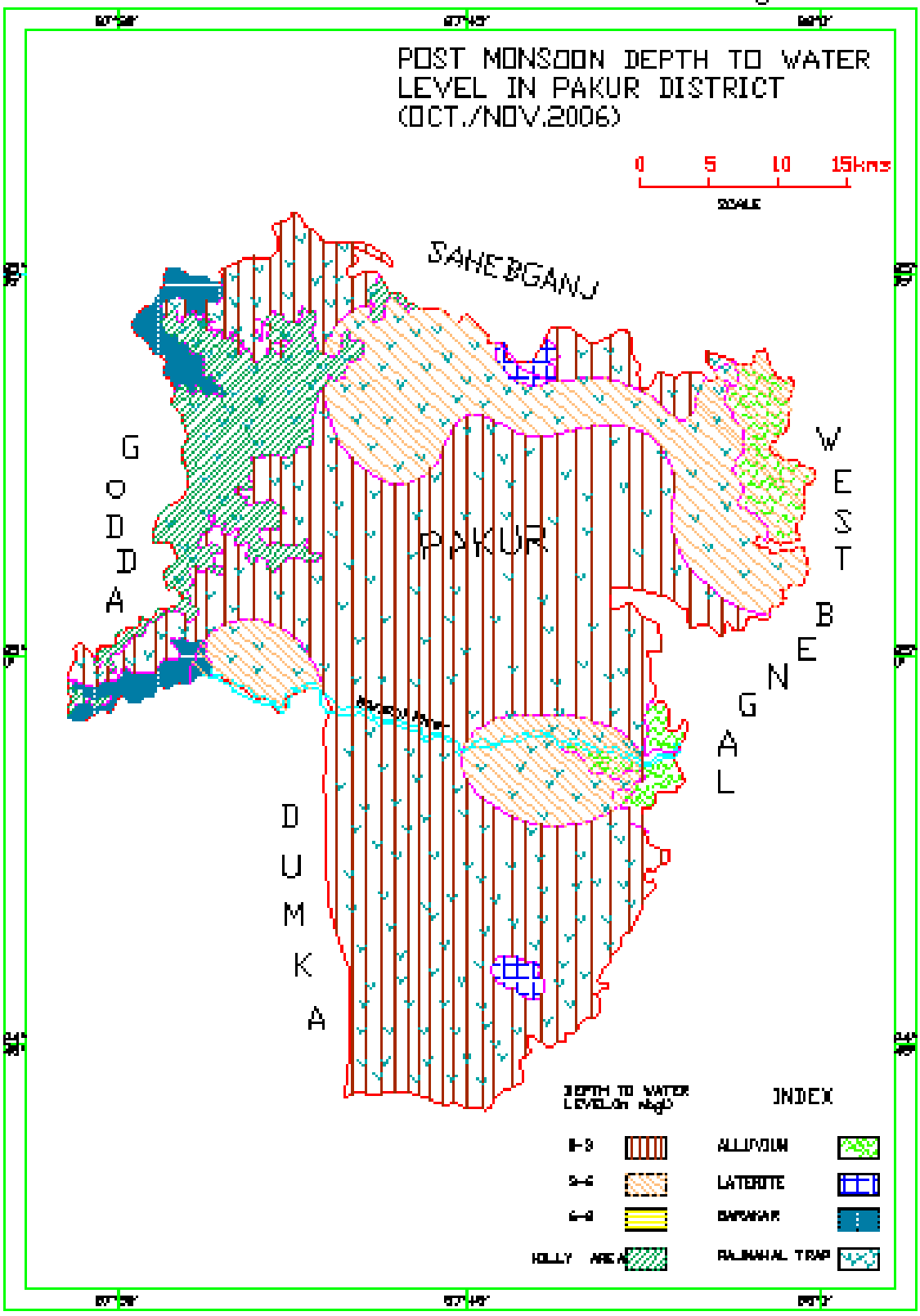
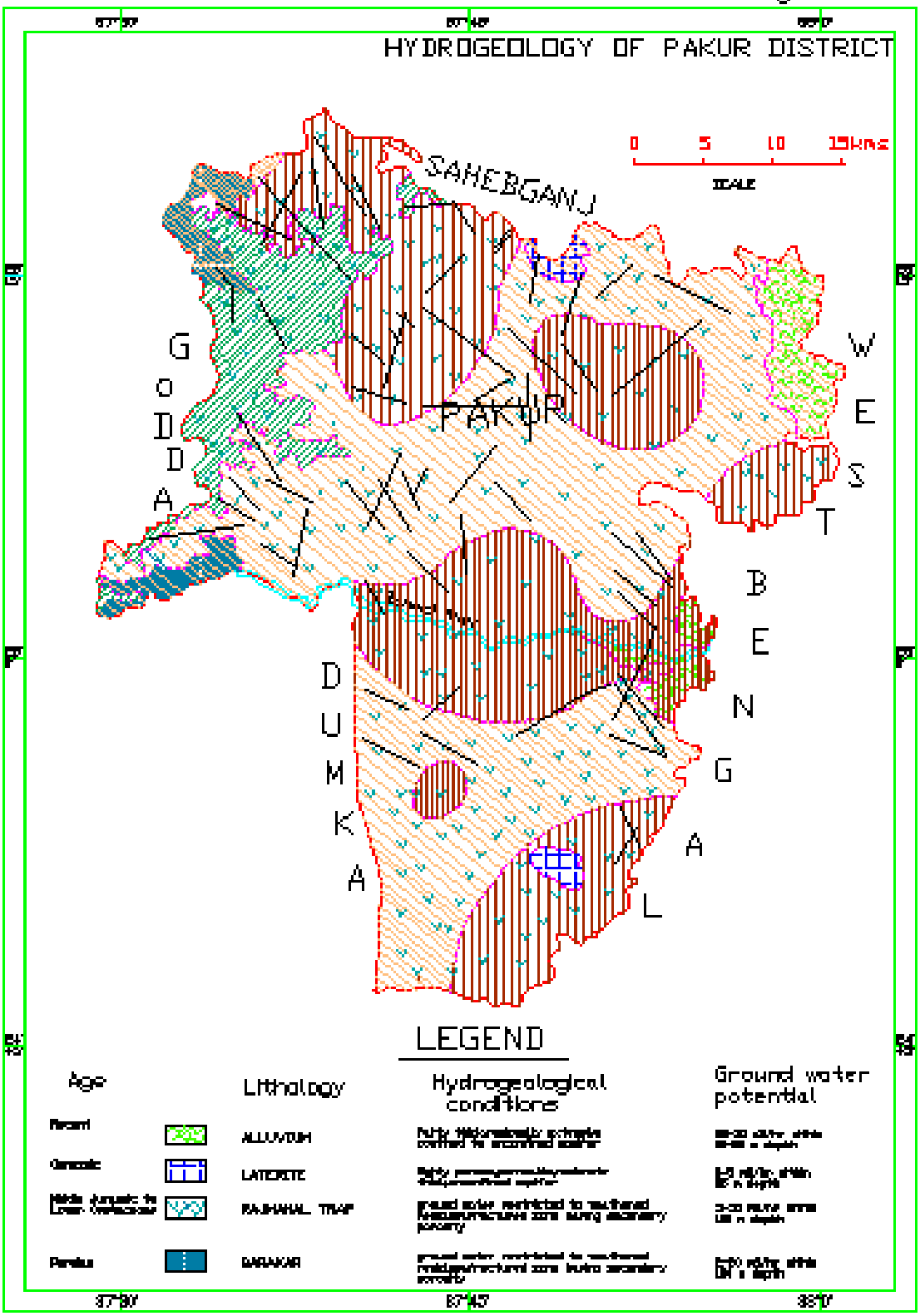
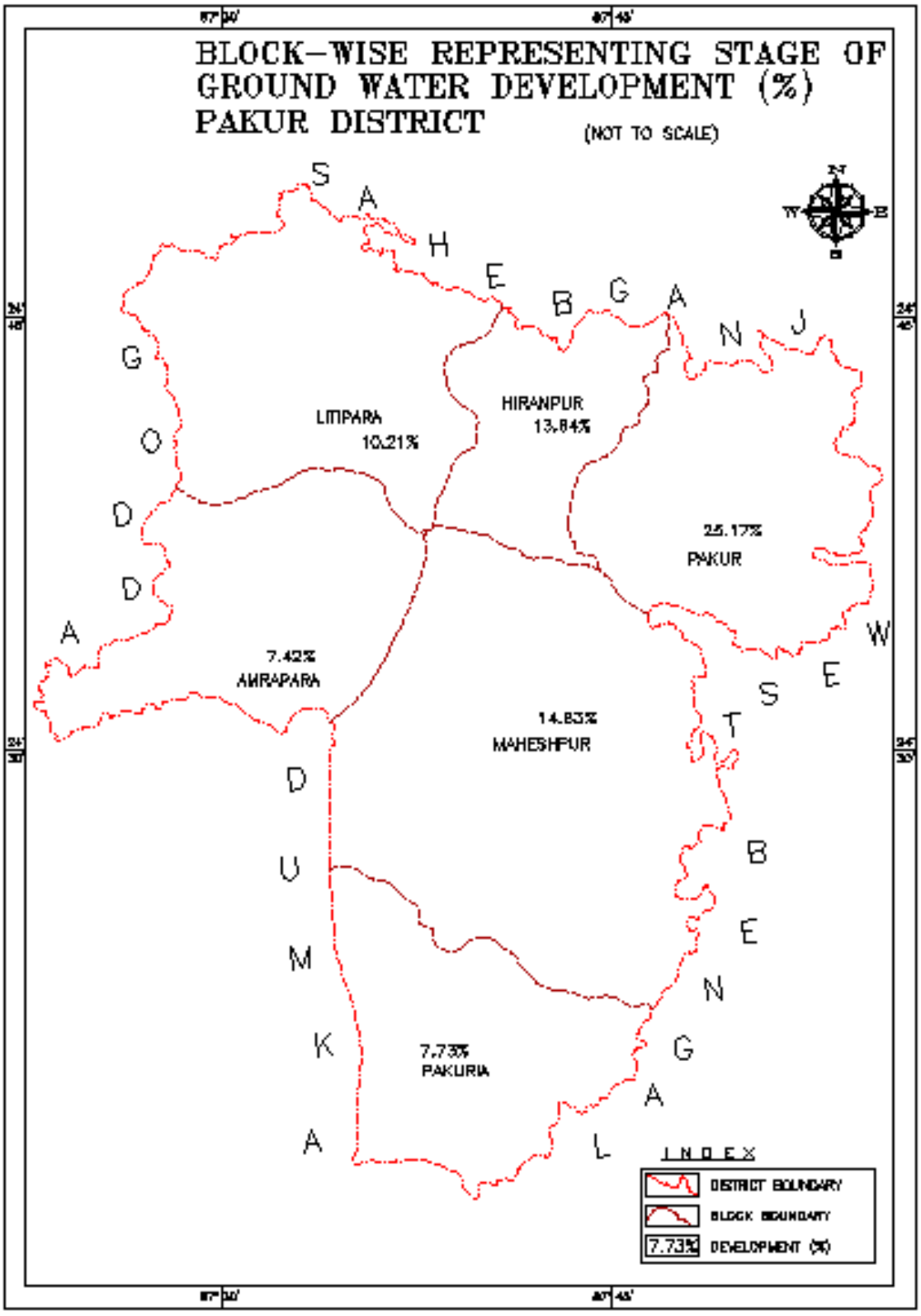

POST MONSOON DEPTH TO WATER LEVEL IN PAKUR DISTRICT (OCT./NOV.2006)
0 5 10 15kms
SCALE
SAHEBGANJ
GODDA
PAKUR
DUMKA
WEST BENGAL
INDEX
ALLUVIUM
LATERITE
RAJMAHAL TRAP
KOLLY AREA

Fig-4


HYDROGEOLOGY OF PAKUR DISTRICT
SAHEBGANJ
PAKUR
GODDA
WEST BENGAL
DUMKA
0 5 10 15kms
SCALE
LEGEND
Age
Lithology
Hydrogeological conditions
Ground water potential
ALLUVIUM
LATERITE
RAJMAHAL TRAP
DAMUDAR

FIG–5


BLOCK–WISE REPRESENTING STAGE OF GROUND WATER DEVELOPMENT (%) PAKUR DISTRICT
(NOT TO SCALE)
SAHEBGANJ
GODDA
DUMKA
LITIPARA
10.21%
HIRANPUR
13.84%
25.17%
PAKUR
7.42%
AMRAPARA
14.83%
MAHESHPUR
7.73%
PAKURIA
INDEX
DISTRICT BOUNDARY
BLOCK BOUNDARY
7.73% DEVELOPMENT (%)