

DISTRICT GROUND WATER INFORMATION BOOKLET



DHAR DISTRICT MADHYA PRADESH



Ministry of Water Resources
Central Ground Water Board
North Central Region
BHOPAL
2013

DISTRICT PROFILE - DHAR DISTRICT

S. No	ITEMS	STATISTICS
1.	<u>GENERAL INFORMATION:</u> (As per 2011 census).	
	(i) Geographical Area	8153 sq.kms.
	(ii) Administrative Divisions :	
	Number of Tehsils	7
	Number of Blocks	13
	Number of Panchayats	762
	Number of Villages	1548
	(iii) Population (2011):	21,84,672
	(iv) Normal Rainfall	833.61(mm)

2.	<u>GEOMORPHOLOGY</u> <u>Major Physiographic units</u> : Malwa plateau in the north Vindhayanchal range in the central zone The Narmada valley along the southern boundary. <u>Major Drainages</u> : The southern part of the district lies in the catchment area of the Narmada which forms the southern boundary. The north – eastern part is drained by the Chambal and its tributaries. The north – western part drains into the Mahi.
----	---

3.	<u>LAND USE</u> (2009)	
	(a) Forest Area :	117000 ha
	(b) Net area sown :	504500 ha
	(c) Cultivable area :	504500 ha

4.	<u>MAJOR SOIL TYPES:</u> (a) Black cotton soil (b) Loamy soils. c) Lateritic soils.
----	--

5.	<u>AREA UNDER PRINCIPAL CROPS</u> (As on 2009 – 10)			
	(a) Kharif :		426000 ha	
	(b) Rabi :		257200 ha	
	Soyabean	Wheat	Cotton	Maize
	250300	216300	116700	59000

6. IRRIGATION BY DIFFERENT SOURCES (2009)

Types. of Structures	Irrigated Area (ha.)	Nos. of Structures
Tube wells / Bore wells	122700	34185
Dug wells	82100	52034
Canals	13300	74
Tanks / ponds	12000	471
Other sources	51800	176
Gross irrigated area	281900	=

7. NUMBER OF GROUND WATER MONITORING WELLS OF C.G.W.B.

(As on 31.3.2013).

No. of Dug wells – 25 No. of Piezometers – 22.

8. PREDOMINANT GEOLOGICAL FORMATIONS :

<u>AGE</u>		<u>FORMATIONS</u>
Recent	---	Alluvium , Laterite
Lower Eocene		
to Upper Cretaceous	---	Deccan Trap (Malwa Trap with Intertrappen)
Cretaceous	---	Lameta , Bagh beds.
Archaeans	---	Intrusive, Metasediments.

9. **HYDROGEOLOGY :**

Major Water Bearing Formations : Alluvium
Weathered , jointed / fractured Basalt
Lameta & Bagh beds.

Pre – monsoon Depth to water level during 2012: 4.65 to 21.35 m.b g l.

Post – monsoon Depth to water level during 2012: 3.00 to 12.80 m.b.g.l.

Long term water level trend in 10 yrs. (2003 – 2012)

Rising trend – 0.035 to 1.38 m/yr. (Pre-monsoon)

Declining trend – 0.025 to 1.14 m/yr. (Pre-monsoon)

10. **GROUND WATER EXPLORATION BY C.G.W.B. (As on 31.3.2013)**

No. of wells drilled	EW – 4 (In-house) & 25 (Outsourcing)
Depth Range (m)	21-153.05
Discharge (lps)	1.3-6.6
Storativity (s)	5.4×10^{-4}
Transmissivity (m^2/day)	7-182

11. **GROUND WATER QUALITY :**

EC (mmhos/cm at 25°C): 300 – 1440

Fluoride (mg/l): 0.1 – 1.4

12. **DYNAMIC GROUND WATER RESOURCES (31.3.2009)**

Net Annual Ground Water Availability : 97163 ham

Gross Annual Ground Water Draft for all Uses: 80451 ham

Stage of Ground Water Development : 83 (%)

13. **AWARENESS AND TRAINING ACTIVITY :**

Mass Awareness Programmes organized – 2:

Water management training Programe-1

14. **EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING :**

Projects completed by CGWB – Nil

Projects under technical guidance of CGWB – Nil

15. **GROUND WATER CONTROL AND REGULATION :**

No. of Over Exploited Blocks – 4 (Badnawar, Dhar, Dharampuri, Nalcha)

No. of Semi-critical Blocks – 2 (Tirla, Manawar)

No. of Blocks notified – 2 (Manawar, Dhar)

16. **MAJOR GROUND WATER PROBLEMS AND ISSUES :**

Increase in salinity.

1.0 INTRODUCTION

Dhar District is situated in the south – western part of Madhya Pradesh. It lies between the parallels of North latitude 22°01'14" and 23°08'49" and East longitude 74°28'15" and 75°42'43"E. The district is bounded by Ratlam in the north, Ujjain in the north-east, West Nimar (Khargone) in the south and Jhabua in the west. The name, Dhar is derived from Dhara Nagri, the city of sword blades. The district falls in the Survey of India topo-sheets nos.46J,46M & 46N. Population of the district is 21,84,672 which comprises 11,14,267 male and 10,70,405 female. Population growth rate is 25.53%.

Administrative Details

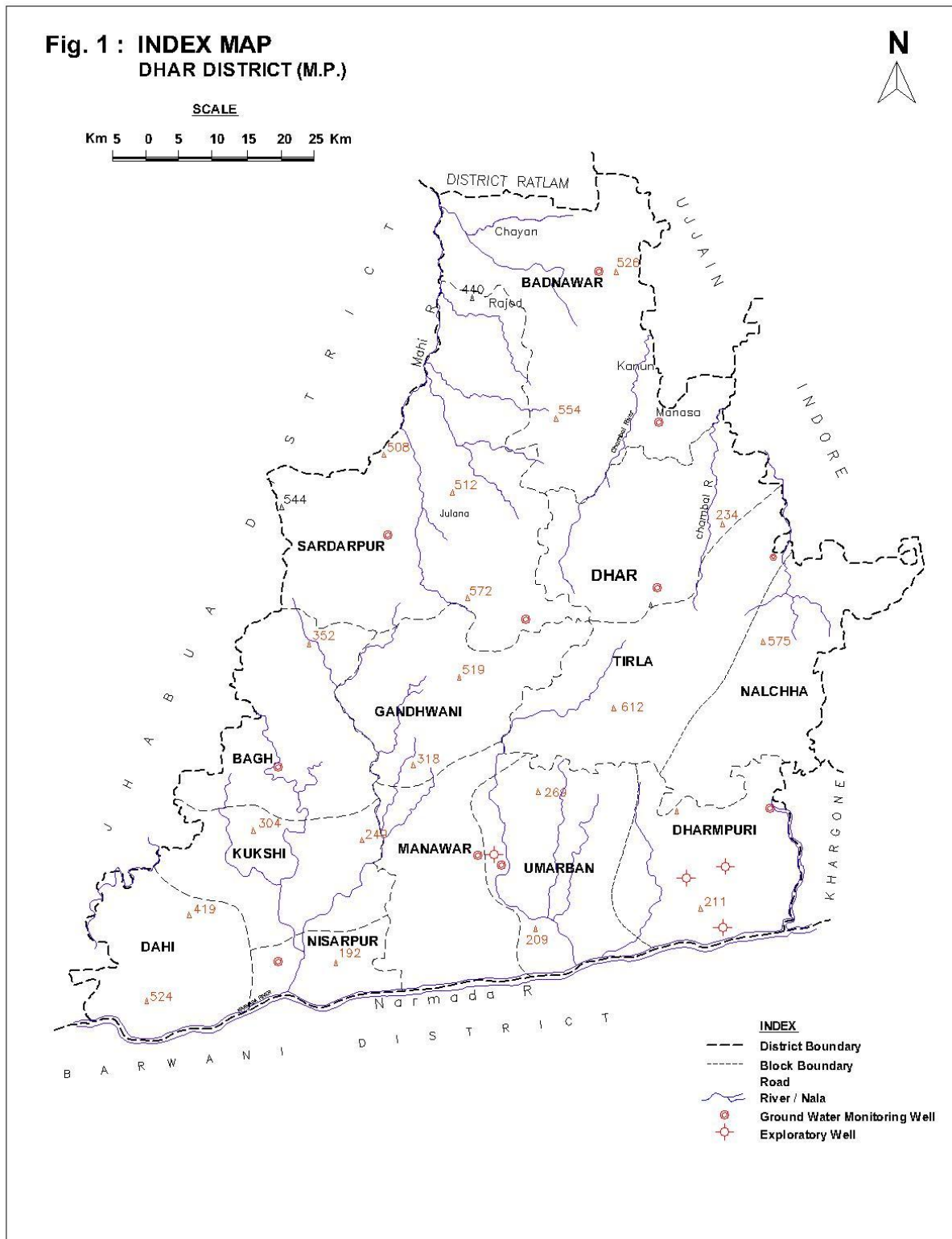
After the merger of states, the district was carved from Kukshi, Badnawar, Dhar, Mandu and Dharampuri tahsils of erstwhile Dhar state, Sardarpur and Manawar (Bagh – Bakaner Pargana) tahsils of the erstwhile Gwalior state and Nisarpur tahsils of former Nimar district of Indore State. The district has 7 tehsils and 13 blocks.

Table : 1 Administrative Divisions, Dhar district (M.P.).

S.No.	Block	Area (Sq.km.)	No. of Villages
1.	Badnawar	1064	165
2.	Bagh	512	89
3.	Dahi	482	62
4.	Dhar	602	99
5.	Dharampuri	429	100
6.	Gandhwani	736	144
7.	Kukshi	343	47
8.	Manawar	555	99
9.	Nalchha	784	180
10.	Nisarpur	353	60
11.	Sardarpur	1280	190
12.	Tirla	534	140
13.	Umarban	479	99
	District	8153	1548

Drainage

The north-western portion of the district lies in the watershed of the Mahi River and its tributaries, while the north-eastern part of the district lies in the watershed of the Chambal River, which drains into the Ganges via the Yamuna River. The portion of the district south of the ridge of the Vindhyas lies in the watershed of the Narmada River, which forms the southern boundary of the district.



CGWB,NCR(S.L. MEENA) DO No. 170/08

Irrigation Practices & Cropping pattern

In the year 2000 – 01 the irrigated area was 15.70 % of the total cultivated land, gradually it was increased to 21 % in the year 2001 – 02, 21.45 % in 2002 – 03, 42.87 % in 2003 – 04, 46.90 % in 2004 – 05 and 55.87% in 2009-10. The total

irrigated land was 281.9 ha. The principal crops grown in the district are Soyabean, Wheat, Maise, etc.

2.0 RAINFALL AND CLIMATE

The average annual rainfall of the district is 833.6 mm. Dhar district receives maximum rainfall during south – west monsoon period i.e. June to September. About 91.1 % of the annual rainfall received during monsoon season. Only 8.9 % of the annual rainfall takes place between October to May period. Thus surplus water for ground water recharge is available only during the south – west monsoon period. The climate of Dhar district is characterized by a hot summer and general dryness except during the south west monsoon.

The normal maximum temperature received during the month of May is 39.9° C and minimum during the month of January 9.6°C. The normal annual means maximum and minimum temperature of the district is 31.3°C & 17.5°C respectively. During the south – west monsoon season, relative humidity exceeds 88 % (July / August month). The rest of the year is dry. The driest part of the year is the summer season, when relative humidity is less than 30 %. April is the driest month of the year.

The wind velocity is higher during the pre – monsoon period as compared to post monsoon period. The maximum wind velocity is 27.0 km / hr observed during the month of June and minimum 7.1 km / hr during the month of December. The average normal annual wind velocity of the district is 15.9 km / hr.

3.0 GEOMORPHOLOGY & SOIL TYPES

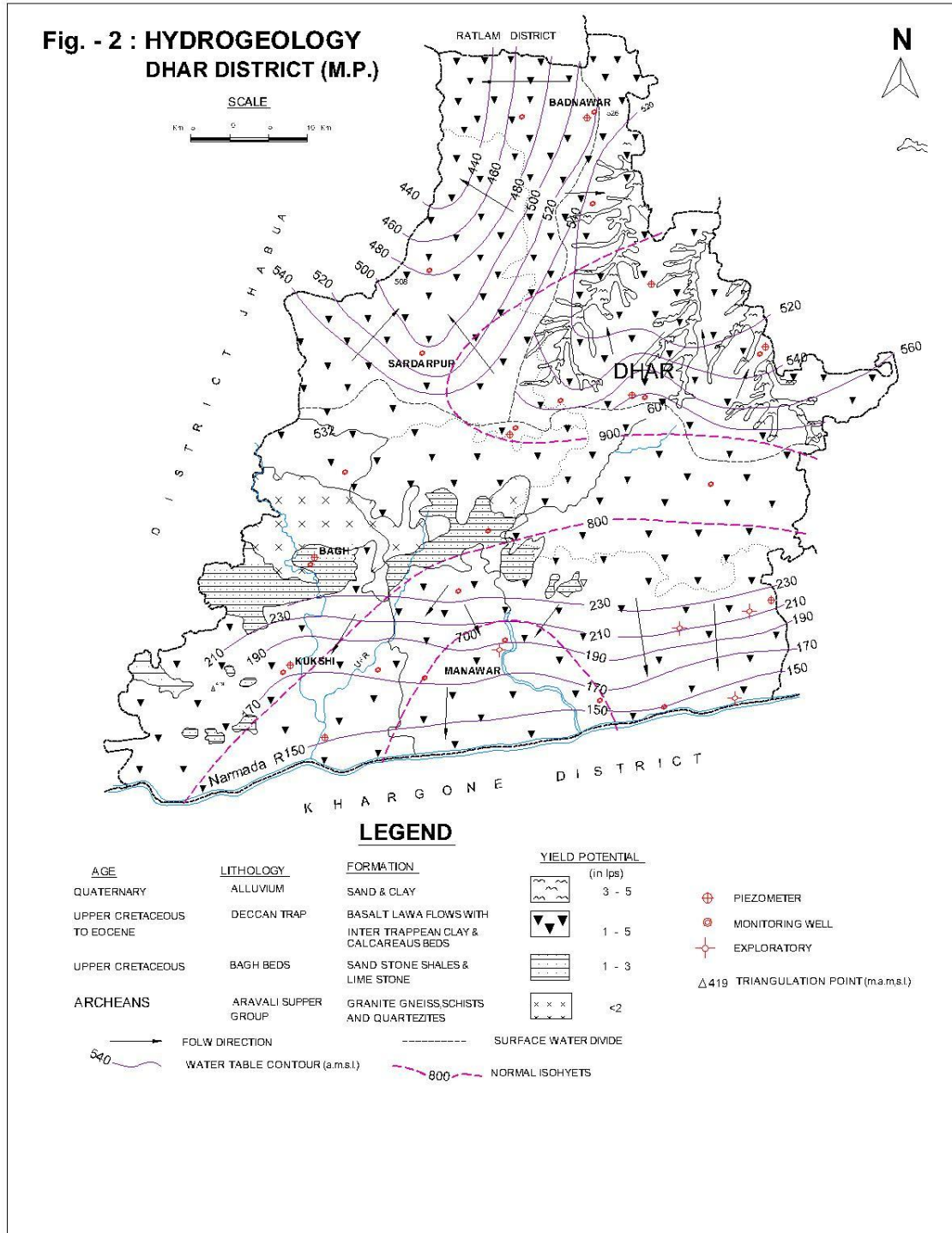
The district extends over three physiographic divisions viz. (1) The Malwa plateau in the north (2) The Vindhya range in the central zone and (3) The Narmada valley along the southern boundary. It is situated between 350 m a m.s.l. to 550 m a m.s.l. The highest peak attains the height of 751m amsl at Magraba.

The area is undulating plain underlain by various lava flows of Deccan Trap. The area near Bagh & Kukshi is covered by Bagh & Lameta sandstone. The main soil types developed in the area are black cotton soils, loamy soils and lateritic soils.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

Ground water occurs mostly in the weathered, jointed and fractured basalts.



CGWB, NCR (S.C. GUPTA) DO No. 171/08

Aquifer Parameters

The Bagh & Lameta beds are highly potential. In Basaltic terrain the granular / fractured zones encountered at the depths 8-18, 14-20.8 and 37.40-48.60 mbgl.

Discharge of bore – wells varies from 1.3 lps to 6.6 lps. The transmissivity found in the tune of $7\text{m}^2 / \text{day}$ and storativity found 5.4×10^{-4}

4.2 Groundwater Regime monitoring

Variation of groundwater levels in an area is an important component of hydrological cycle because it is a physical reflection of aquifer systems. As the change in groundwater level is directly related to groundwater balance and its continuous records provide direct information of subsurface geo-environmental changes due to withdrawal of groundwater. To monitor the seasonal and annual change in quantity and quality of groundwater, CGWB has established 25 Groundwater Monitoring Wells and 22 Piezometers in the entire district. The monitoring of groundwater levels in these wells is being carried out by CGWB during the month of May, August, November and January. The details of groundwater level in the district for the year 2012 is as follows:

4.2.1 Pre-monsoon (May 2012)

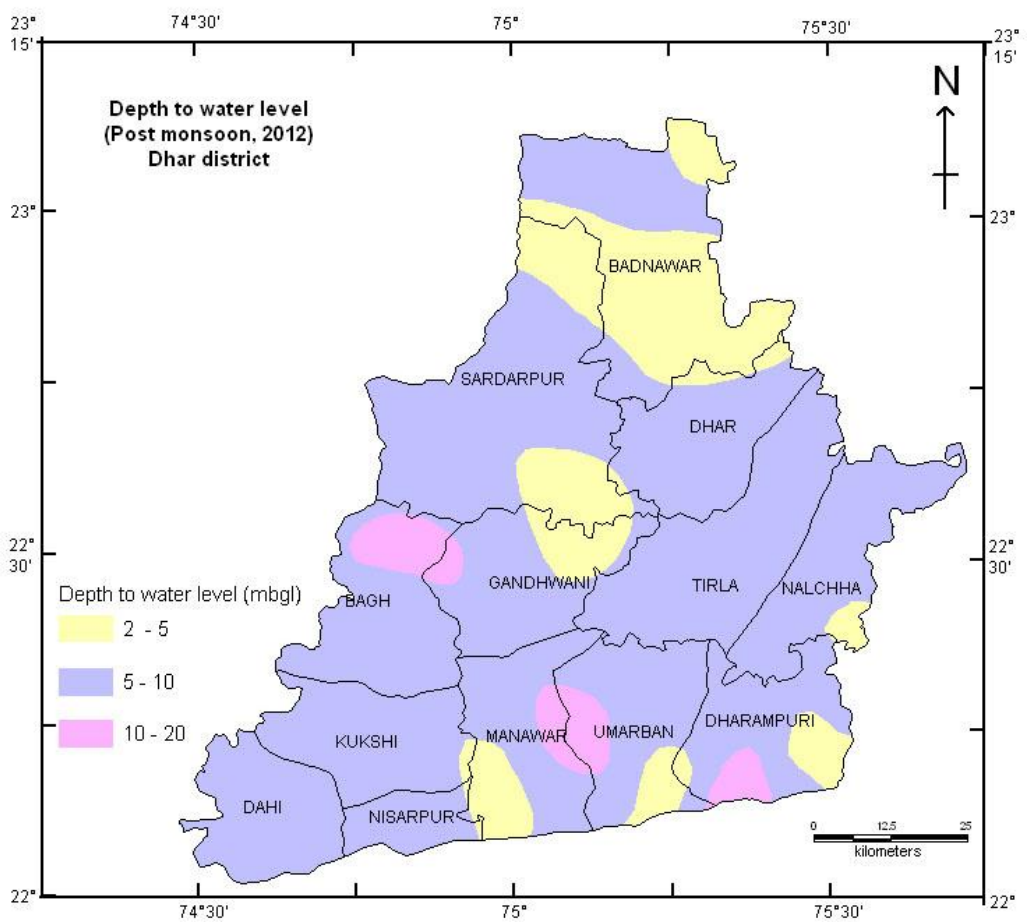
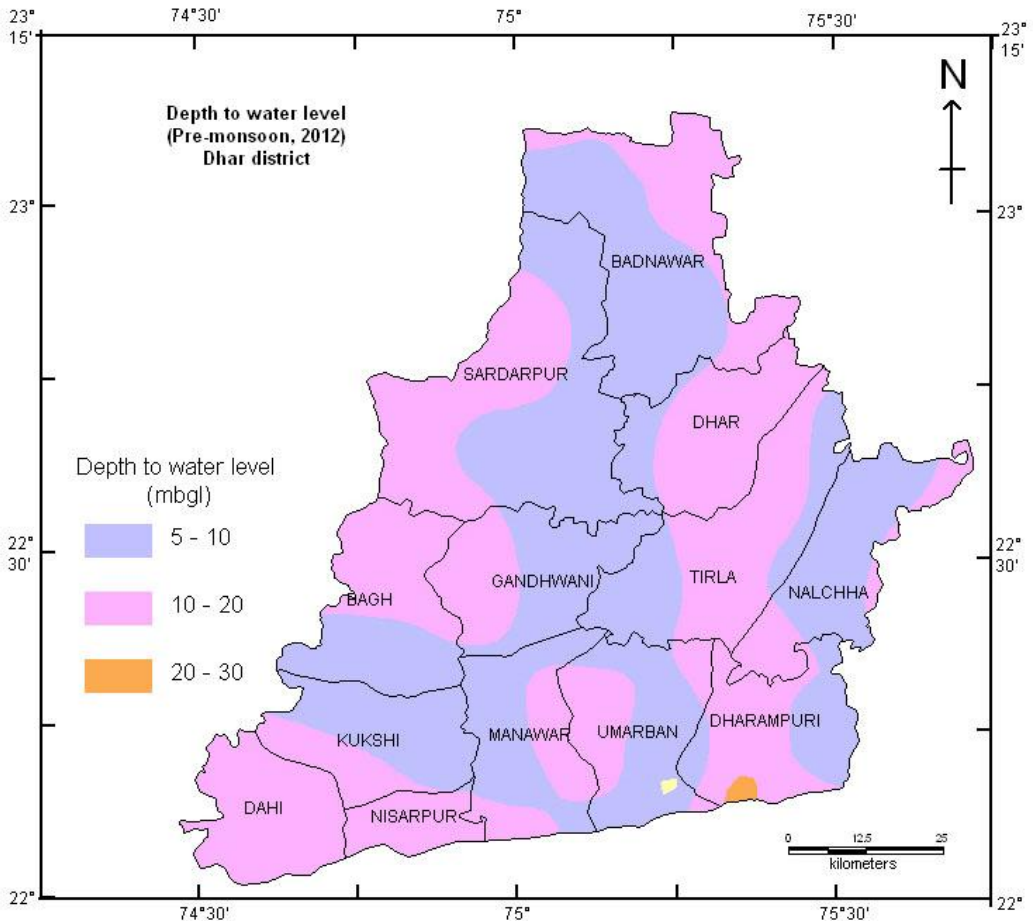
In pre-monsoon period, May 2012, depth to water level ranges between 4.65 m bgl at Tawlai to 21.35 m bgl at Dharampuri. The major part of the district has water level in the range of 5-20 m bgl during the pre monsoon. Water level more than 20 m bgl has been recorded at isolated locations in Dharampuri block.

4.2.2 Post-monsoon (November 2012)

During post-monsoon period, November 2012, depth to water level ranges from 3 m bgl (Amjhira, Dhamnod, Kanun & Tawlai) to 12.80 m bgl (Dharampuri). Major part of the district has water level in the range of 5 to 10 mbgl.

4.2.3 Groundwater level trend (May 2003 to May 2012)

Analyses of Groundwater level data of pre-monsoon period indicate rising as well as declining trend in water level. Declining trend in water level is in the range of 0.025 to 1.14 m/year whereas rising trend is in the range of 0.035 to 1.38m/year. About 64% wells shows rising trend.



4.2 Ground Water Resources (ham)

Dhar district is underlain by mainly Basaltic lava flows of Deccan trap. Dynamic ground water resources of the district have been estimated for base year - 2008/09 on block-wise basis. Out of 815300 ha of geographical area, 812640 ha (99%) is ground water recharge worthy area and 2660 ha (less than 1%) is hilly area. There are thirteen number of assessment units (block) in the district which fall under non-command (97 %) and command (3 % Manawar, Ghandwani and Dharamपुरi) sub units. Bagh, Dahi, Gandhwani, Kukshi, Nisarpur, Sardarpur and Umran blocks of the district are categorized as safe blocks, Non command of Manawar and Tirla as semi critical (over exploited in 2003/04) and Dharamपुरi (semi critical in 2003/04). Badnawar, Dhar and Nalchha as over exploited with highest stage of ground water development is computed as 121 % in Dhar block.

Ground Water Resources (As on 31.3.2009)

District/ Assessment Unit	Sub-unit Command/ Non-Command/	Net Annual Ground water Availability (ham)	Existing Gross Ground water Draft for Irrigation (ham)	Existing Gross Ground water Draft for Domestic & Industrial water Supply (ham)	Existing Gross Ground water Draft for All uses (11+12) (ham)	Provision for domestic, and industrial requirement supply to next 25 year (2033) (ham)	Net Ground water Availability for future irrigation development (ham)	Stage of Ground water Development $\{(13/10)*100\}$ (%)	Category
Badnawar	Command								
	Non-Command	14779	15873	457	16330	457	-1551	110	Over exploited
	Block Total	14779	15873	457	16330	458	-1552	110	Over exploited
Bagh	Command								
	Non-Command	4951	1695	348	2043	493	2764	41	Safe
	Block Total	4951	1695	348	2043	493	2764	41	Safe
Dahi	Command								
	Non-Command	5499	2461	235	2696	373	2665	49	Safe
	Block Total	5499	2461	235	2696	373	2665	49	Safe
Dhar	Command								
	Non-Command	8479	10021	261	10282	261	-1803	121	Over exploited
	Block Total	8479	10021	261	10282	261	-1803	121	Over exploited
Dharamपुरi	Command	828	255	251	506	313	260	61	Safe
	Non-Command	4581	4564	247	4811	247	-230	105	Over exploited
	Block Total	5409	4819	499	5317	560	30	98	Safe

District/ Assessment Unit	Sub-unit Command/ Non-Command/	Net Annual Ground water Availability (ham)	Existing Gross Ground water Draft for Irrigation (ham)	Existing Gross Ground water Draft for Domestic & Industrial water Supply (ham)	Existing Gross Ground water Draft for All uses (11+12) (ham)	Provision for domestic, and industrial requirement supply to next 25 year (2033) (ham)	Net Ground water Availability for future irrigation development (ham)	Stage of Ground water Development $\{(13/10)*100\}$ (%)	Category
Gandhwani	Command	863	29	27	56	48	785	7	Safe
	Non-Command	5734	2694	394	3088	528	2512	54	Safe
	Block Total	6597	2723	421	3144	576	3297	48	
Kukshi	Command								
	Non-Command	3807	2319	171	2490	258	1230	65	Safe
	Block Total	3807	2319	171	2490	258	1230	65	Safe
Manawar	Command	3959	1265	102	1367	157	2537	35	Safe
	Non-Command	4216	3964	236	4201	425	-173	100	Semi Critical
	Block Total	8175	5229	339	5568	582	2364	68	
Nalcha	Command	0							
	Non-Command	9276	9353	908	10261	908	-985	111	Over exploited
	Block Total	9276	9353	908	10261	908	-985	111	Over exploited
Nisarpur	Command								
	Non-Command	4350	2700	207	2907	383	1267	67	Safe
	Block Total	4350	2700	207	2907	383	1267	67	Safe
Sardarpur	Command	-	-	-	-	-	-	-	
	Non-Command	13470	8830	540	9370	743	3897	70	Safe
	Block Total	13470	8830	540	9370	743	3897	70	Safe
Tirla	Command								
	Non-Command	7411	6497	191	6689	358	556	90	Semi Critical
	Block Total	7411	6497	191	6689	358	556	90	Semi Critical
Umraban	Command	-	-	-	-	-	-	-	
	Non-Command	4960	2520	836	3355	959	1481	68	Safe
	Block Total	4960	2520	836	3355	959	1481	68	Safe
	District Total	97163	75039	5412	80451	6912	15212	83	

The net ground water availability in the district is 97,163 ham and ground water draft for all uses is 80,451 ham, making stage of ground water development 83 % (100 % in 2004) as a whole for district. After making allocation for future domestic and industrial supply for next 25 years, balance available ground water for future irrigation would be 15,212 ham.

4.3 Ground Water Quality

The quality of Ground Water in the shallow / dug well aquifer is generally potable except in some isolated places, while in deeper aquifer, excess fluoride content i.e. more than 1.5 mg/l, has been observed in the parts of Nalchha, Tirla, Badnawar, Manawar, Dhar blocks and parts of Pithampur area.

4.4 Status of Ground Water Development

Depth of dug wells ranges from 5.80 m to 20 m while the depth of bore wells ranges from 29.50 m to 120m. Diameter of dug wells ranges from 3 m to 12 m, while the diameter of the bore wells is ranging from 100 mm. to 152 mm. Generally, electrical centrifugal pumps of 3 bhp and 5 bhp are in use in the area but there are diesel turbine pumps are also used at places. The yield of wells in general poor to moderate, say in the range of 1 lps to 6 lps.

5.0 GROUND WATER DEVELOPMENT AND MANAGEMENT STRATEGY

5.1 Ground Water Development

The Ground water development is less than 70% in the blocks of Bagh, Dahi, Gandhwani, Kukshi, Nisarpur & Sardarpur. Therefore, the areas falling under these blocks may be taken up for further development of the groundwater. It is also observed that the granular / jointed /fractured zones are encountered within the 50 m. depth. Therefore, construction of shallow depth bore-wells is recommended in the area.

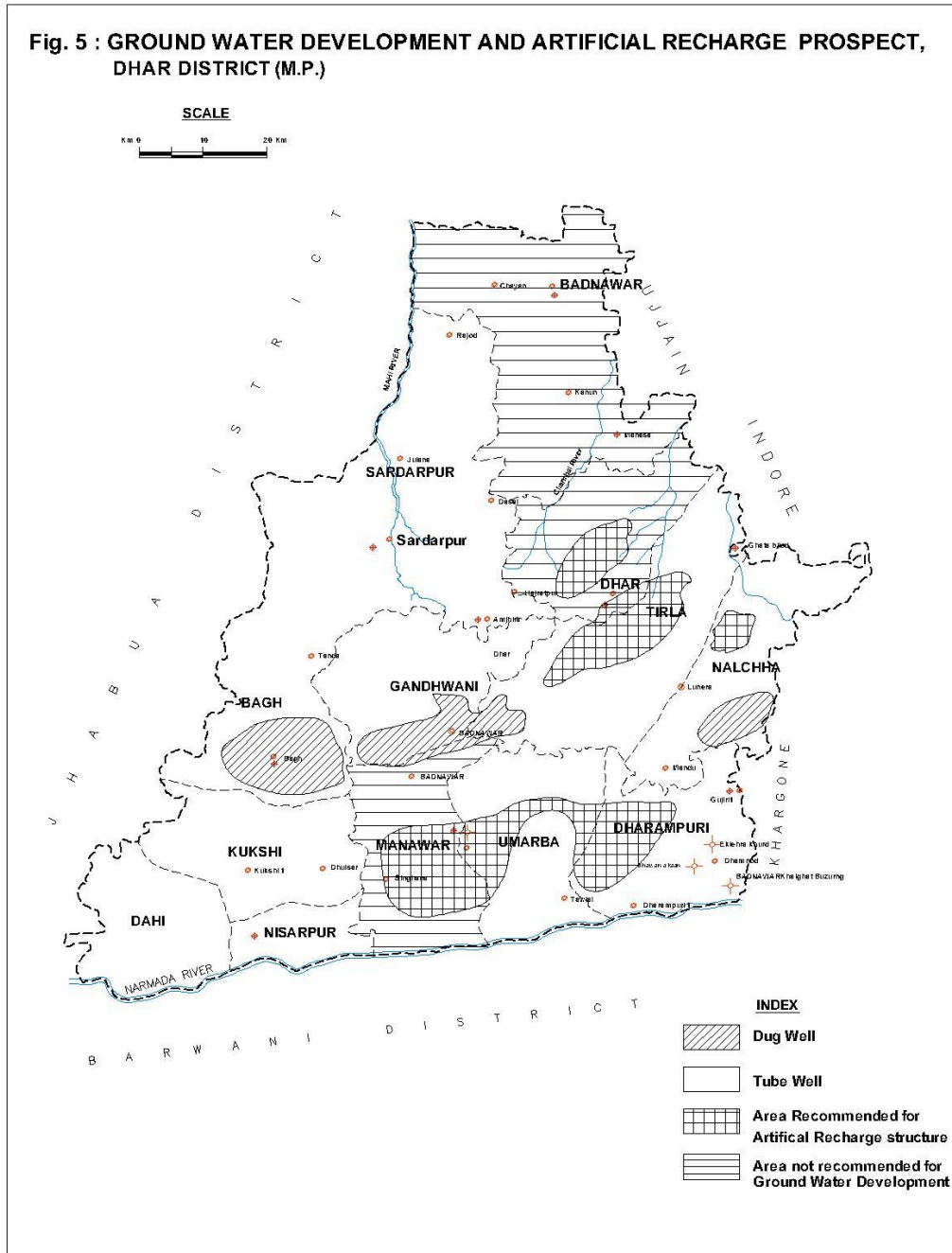
5.2 Water Conservation & Artificial Recharge

The details of water conservation and artificial recharge works carried out by the CEO, Dhar is given below:

Rajiv Gandhi Mission 2000-2006 (Total area 22500 ha)

S No.	Block	Micro-watershed	Area (sq.km.)
1.	Sardarpur	Kumarpat	2.95
2.	„	Govindpura	2.86
3.	„	Shyampura Thakur	3.14
4.	„	Chhipapura	3.00
5.	„	Khajuni	3.31
		Total	15.26
1.	Bagh	Barda	4.15
2.	„	Tarsinga	2.52
3.	„	Gardi	6.02
4.	„	Guda	2.69
5.	„	Narwali	4.84
6.	„	Gatla	2.20
		Total	22.42
1.	Kukshi	Jhardi	4.63
2.	„	Banki	6.97
3.	„	Teki	5.81
4.	„	Nimthal	5.88
		Total	23.29
1.	Dahi	Phiphera	12.16
2.	„	Amlal	12.52
3.	„	Atarsuma	6.69
4.	„	Badwanya	8.34
		Total	39.71
1.	Nisarpur	Chiprata	4.70
2.	„	Bhainslaya	6.83
3.	„	Ghatganv	3.28
4.	„	Tanda	3.50
		Total	18.31
1.	Manawar	Jatpur	6.06
2.	„	Sondul	5.46
3.	„	Gonlpura	4.80
4.	„	Temriya	5.37
		Total	21.69
1.	Gandhwani	Kodi	4.50
2.	„	Badipura	2.59
3.	„	Pithanpura	3.06
4.	„	Sangibawdi	3.80
5.	„	Katarpura	
6.	„	Dhavardha	5.61
7.	„	Bilda	7.39
8.	„	Kokri	2.06
9.	„	Kota	5.68
		Total	34.69
1.	Umarban	Ukhalda	8.46
2.	„	Dekli	2.48
3.	„	Jamanya	3.99

4.	,,	Bhamlawada	2.18
5.	,,	Khaudimoli	5.56
6.	,,	Pathachhoti	2.51
7.	,,	Pathamoti	3.98
8.	,,	Bhikanya Khedi	3.66
9.	,,	Banjari	4.84
10.	,,	Kuwad	11.97
		Total	49.63



6.0 GROUND WATER RELATED ISSUES & PROBLEMS

The excess fluoride content is reported in some parts of the district at deeper level. There is slightly saline water reported in some isolated parts of the district. The area is not drought prone, however there are many parts in the district having water scarcity. The quality of ground water is potable except in some parts where higher concentration of fluoride is reported at deeper level. Drilling problems may occur due to collapsible red bole formation.

Artesian Wells

Recently the artesian wells are reported from Jalvat and Badwanya (Schoolpura) villages during the construction of hand-pumps, the artesian conditions occur in both the places.

7.0 AWARENESS & TRAINING ACTIVITY

A mass awareness programme was Organised by Central Ground Water Board, Bhopal dated 27.02.2004 on "Ground Water Potential in Pithampur Audhyogik area and problem of Ground Water pollution" at Pithampur district Dhar.

The exhibition and lectures were delivered covering various aspects related to ground water with special emphasis of Artificial Recharge & Rain water harvesting. The participants belongs to representatives of various industries of Pithampur area, NGOs, Government officials/officers of various departments, local public, journalist and president of municipal corporation of Pithampur.

8.0 AREAS NOTIFIED BY CGWA / SGWA

The Dhar block of the district has been notified by CGWA for Ground Water Regulation & Development.

9.0 RECOMMENDATIONS

- The construction of Ground water abstraction structures in the blocks of Badnawar, Dhar, Dharampuri, Manawar, Nalchha, Tirla & Umraban may be regulated as stage of ground water development has already crossed 100% or approaching 100%.
- There is need of artificial recharge of Ground water in the suitable and over exploited areas of the district.
- The fluoride affected areas may be explored to find out alternative source / aquifers of ground water.