AQUIFER SYSTEMS of INDIA

Compiled Under Supervision of
Dr. S C Dhiman
Chairman

CENTRAL GROUND WATER BOARD
MINISTRY OF WATER RESOURCES
GOVERNMENT OF INDIA

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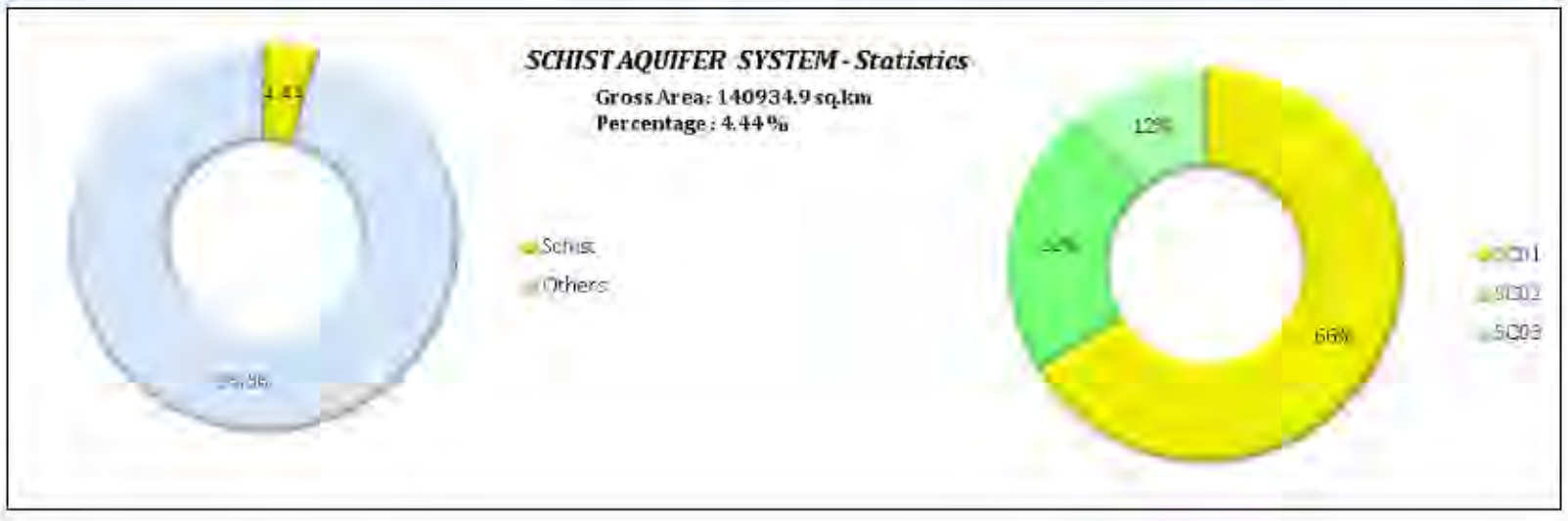
2012

Table 26: State wise Distribution and Characteristics of Schist Aquifer System

STATE NAME	Major Aquifers (Area in sq km)			Aquifer Properties								
	Schist	Phyllite	Slate	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Dec.Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	SC01	SC02	SC03			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	13386	106		Single	Unconfined Semi-Confined	5-45	20-170	5-10	2-80	40 - 100	Upto 3	1000-3000
Arunachal Pradesh	1228	1644	Not Explored									500-750
Bihar	12		242	Single	Unconfined to Semi-Confined	4-32	15-112	5-10	3-95	15-65	Upto 1.5	500-1000
Chhattisgarh	23	1495	14	Single	Unconfined, to Semi-Confined	20-60	20-80	5-10	3-70	100 - 300	Upto 1.5	500-1000
Goa	890			Single	Unconfined , Semi-confinedto confined	60	20-80	5-10	3-70	100 - 300	Upto 2	> 500
Gujarat	7622	816		Single	Unconfined, Semi-confined to confined	10-72	30 - 40	10-20	2-65	40-120	Upto 2	1000-5000
Himachal Pradesh	2694	3187	12045	Single	Unconfined, Semi-confined to confined	10-44	10-70	10-20	2-65	2.73 - 43.2	Upto 1.5	500-1000
Jammu & Kashmir	9365	452	2288	Single	Unconfined to Semi-confined	6 - 15	100 - 140	10-20	2-60	12 - 360	Upto 1.5	> 500
Jharkhand	2299	7703		Single	Unconfined to Semi-confined	10-65	10-100	5-10	4-80	3-95	Upto 1.5	500-1000
Karnataka	28458			Single	Unconfined to Semi-confined	35	60	10-20	4-80	86.4-562	Upto 2	500-2000
Kerala	419	Not Explored										
Madhya Pradesh	2300	4147		Single	Unconfined to Semi-confined	15 - 25	60 - 175	10-20		70 - 350		500-1000
Maharashtra	5530			Single	Unconfined to Semi-confined	12-30	20-60	5-10	4-90	10 - 33	Upto 1.5	500-1000
Orissa	1115	3730		Single	Unconfined to Semi-confined	15 - 20	< 180	5-10	2-60	86 - 173	Upto 1.5	> 500
Rajasthan	4419	2312	541	Single	Unconfined to Semi-confined	10-80	25-150	10-20	5-84	30-60	Upto 5-2	1000-2500
Sikkim	1661			Single	Unconfined to Semi-confined			5-10				> 500
Tamil Nadu	20	383		Single	Unconfined to Semi-confined			5-10				
Uttarakhand	9023	3954	1191	Single	Unconfined to Semi-confined	20-70	30-150	5-10	5-60	30-60	Upto 1	500-1000
Uttar Pradesh		1453		Single	Unconfined to Semi-confined	10-50	20-70	10-20	5-50	12-60	Upto 1	500-1000
West Bengal	2561	207		Single	Unconfined to Semi-confined	10-50	20-70	5-10	5-80	20-70	Upto 1.2	500-1000
Total Area	**93026**	**31589**	**16321**									

DTW : Depth to water level

m bgl: Meter below ground level



INFORMATION / DATA SOURCE

1. Agricultural Department, Ministry of Agriculture, Govt. of India
2. Central Ground Water Board, Ministry of Water Resources, Govt. of India
3. Central Pollution Control Board, Ministry of Environment & Forest, Govt. of India
4. Central Water Commission, Ministry of Water Resources, Govt. of India
5. Directorate of Census, Ministry of Home Affairs, Government of India
6. Election Commission of India
7. Forest Survey of India, Ministry of Environment & Forest, Govt. of India
8. Geological Survey of India, Ministry of Mines, Government of India
9. India Metrological Department, Ministry of Earth Sciences, Government of India
10. Survey of India, Ministry of Science & Technology, Government of India

WAY FORWARD

- This compilation provides valuable information on the areal and vertical extents of major aquifers and their characteristics. This will serve as the foundation for the National Aquifer Mapping Programme being contemplated during the XII and XIII Plan period, which aims at detailed mapping of the aquifers on 1:50,000 or larger scales .

- However, considering the diversity of geomorphic and hydrogeological settings and the hydrochemical variations in the aquifer systems in the country, the present compilation is the starting point to formulate micro level strategies for ensuring long-term sustainability of ground water resources to achieve water and food security of the nation.

- Since, ground water is mostly being developed in India in unscientific manner, looking forward in this direction to enable the stakeholders to manage their own water resources on scientific and even at the community level; attempt has made to outline the issues, approach and activities for initiating the national aquifer mapping programme for detailed understanding of aquifer systems and planning ground water development and management strategies.

- The national aquifer mapping involves collation, integration of existing data from various sources, data gap identification and generation of additional data required for the refinement of aquifer disposition, its geometry and characteristics. The outcome of the national aquifer mapping programme would culminate in delineating the regional / local level aquifers, typology, geometry, ground water availability, hydraulic characteristics and quality aspects for developing aquifer wise ground water management plans in an integrated water management approach.

- Strategies for ensuring long-term sustainability of ground water resources in identified aquifers by adopting the supply side and demand side management. This may involve various measures such as recharge augmentation, ground water regulation, water conservation, aquifer remediation, improvements in water use efficiency etc. depending on the characteristics of aquifers and the vulnerability of the aquifers to ensure the environmental and ecological balances.

- In order to support the scientifically viable management interventions for aquifer management, it is required to develop calibrated ground water flow and solute transport models at appropriate scales to function as Decision Support Systems.

- Finally, the aquifer mapping programme aims at developing a user friendly web based Aquifer Information and Management System which will enable the stakeholders to execute the aquifer management and water security plans at the local level. This will facilitate management of ground water resources in a scientific way even by the community itself.

Table 36: Ground Water Management Plan-a Summary

Sl. No.	Aquifer	Total Area (Sq. Km.)	Priority Area Suitable for Artificial Recharge		Area Suitable for Development		Area Suitable for Conservation	
			Sq. Km.	%	Sq. Km.	%	Sq. Km.	%
1	Alluvium	945754	309499	9.97	679551	21.90	49715	1.60
2	Laterite	40926	7807	0.25	36841	1.19	9028	0.29
3	Basalt	512302	105088	3.39	383854	12.37	95407	3.07
4	Sandstone	260416	56641	1.83	137179	4.42	90618	2.92
5	Shale	225397	35015	1.13	82842	2.67	107138	3.45
6	Limestone	62899	11531	0.37	35903	1.16	3987	0.13
7	Granite	100992	7255	0.23	30377	0.98	50346	1.62
8	Schist	140935	14067	0.45	75377	2.43	44160	1.42
9	Quartzite	46904	10423	0.34	22603	0.73	15862	0.51
10	Charnockite	76360	21221	0.68	39741	1.28	36884	1.19
11	Khondalite	32914	5948	0.19	19413	0.63	17029	0.55
12	BGC	478383	82713	2.67	321753	10.37	112705	3.63
13	Gneiss	158753	36253	1.17	89355	2.88	49971	1.61
14	Intrusives	19896	1479	0.05	9002	0.29	12607	0.41
Total		**3102829**	**704940**	**22.72**	**1963791**	**63.29**	**695457**	**22.41**

Area in sq km (area of Unclassified not included), % of total area

Table 36: Ground Water Management Plan-a Summary

Sl. No.	Aquifer	Total Area (Sq. Km.)	Priority Area Suitable for Artificial Recharge		Area Suitable for Development		Area Suitable for Conservation	
			Sq. Km.	%	Sq. Km.	%	Sq. Km.	%
1	Alluvium	945754	309499	9.97	679551	21.90	49715	1.60
2	Laterite	40926	7807	0.25	36841	1.19	9028	0.29
3	Basalt	512302	105088	3.39	383854	12.37	95407	3.07
4	Sandstone	260416	56641	1.83	137179	4.42	90618	2.92
5	Shale	225397	35015	1.13	82842	2.67	107138	3.45
6	Limestone	62899	11531	0.37	35903	1.16	3987	0.13
7	Granite	100992	7255	0.23	30377	0.98	50346	1.62
8	Schist	140935	14067	0.45	75377	2.43	44160	1.42
9	Quartzite	46904	10423	0.34	22603	0.73	15862	0.51
10	Charnockite	76360	21221	0.68	39741	1.28	36884	1.19
11	Khondalite	32914	5948	0.19	19413	0.63	17029	0.55
12	BGC	478383	82713	2.67	321753	10.37	112705	3.63
13	Gneiss	158753	36253	1.17	89355	2.88	49971	1.61
14	Intrusives	19896	1479	0.05	9002	0.29	12607	0.41
Total		**3102829**	**704940**	**22.72**	**1963791**	**63.29**	**695457**	**22.41**

Area in sq km (area of Unclassified not included), % of total area

Table 35: Area Suitable for Ground Water Development

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	19332	1610	7398	18678	15585	9250	11155	13265	8076	7471	8555	93273	8928	100	**222676**
Arunachal Pradesh	4490				5			5							**4500**
Assam	57070			5576	4348				193			1681			**68868**
Bihar	81803	20	34	2503	3	82	518	254	257	3		4214	839	18	**90548**
Chandigarh	115														**115**
Chhattisgarh	130	1391	557	23405	14052	15255	3778	1514	539	1157	12	29645	18810	3678	**113922**
Dadra and Nagar Haveli			349												**349**
Daman and Diu			53												**53**
Delhi	452								1						**453**
Goa	42	1332	34	267			18	609				323		232	**2856**
Gujarat	14849		35960	1102	169	674	1209	7274	750				1092	28	**63106**
Haryana	16234			587					105				4		**16930**
Himachal Pradesh	54371			28	2										**54401**
Jammu and Kashmir	23841			1											**23842**
Jharkhand	5497	576	3087	4096		583	1784	9333	1321	196		44984	2059	651	**74167**
Karnataka	638	2928	21943	603		3392		20510				61597			**111611**
Kerala	3143	1444					145	175	70	11640	2940	207	8717	123	**28604**
Madhya Pradesh	34329	2064	109990	46818	23731	4571	1595	5894	1916			25951	586	401	**257846**
Maharashtra	11268	4213	201585	7231	588	1917	7395	4347	535			215	15669	649	**255612**
Manipur	3956			7	1										**3964**
Meghalaya	1002				10427		300					10			**11739**
Mizoram	0				7										**7**
Nagaland	537			198	430										**1165**
Orissa	37706	4676		4447	2223		785	3744	2548	5140	6819	39366	83	2442	**109979**
Puducherry	196	8		28						2			4		**238**
Punjab	10676			690											**11366**
Rajasthan	27426	22	2062	7576	4522	31	436	3860	894	38	31	3678	2075	207	**52857**
Sikkim	19							3							**22**
Tamil Nadu	14915	2281		6119	128	64	859	389	29	14094	1056	4524	30390	162	**75010**
Tripura	602			5519	3887										**10008**
Uttarakhand	7867			11											**7878**
Uttar Pradesh	190184		559	953	2430			1453	5367			7663			**208609**
West Bengal	56861	14276	244	736	304	84	400	2748	2			4422	99	311	**80488**
Total	**679551**	**36841**	**383854**	**137179**	**82842**	**35903**	**30377**	**75377**	**22603**	**39741**	**19413**	**321753**	**89355**	**9002**	**1963791**

Area in Sq Km

Table 35: Area Suitable for Ground Water Development

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	19332	1610	7398	18678	15585	9250	11155	13265	8076	7471	8555	93273	8928	100	**222676**
Arunachal Pradesh	4490				5			5							**4500**
Assam	57070			5576	4348				193			1681			**68868**
Bihar	81803	20	34	2503	3	82	518	254	257	3		4214	839	18	**90548**
Chandigarh	115														**115**
Chhattisgarh	130	1391	557	23405	14052	15255	3778	1514	539	1157	12	29645	18810	3678	**113922**
Dadra and Nagar Haveli			349												**349**
Daman and Diu			53												**53**
Delhi	452								1						**453**
Goa	42	1332	34	267			18	609				323		232	**2856**
Gujarat	14849		35960	1102	169	674	1209	7274	750				1092	28	**63106**
Haryana	16234			587					105				4		**16930**
Himachal Pradesh	54371			28	2										**54401**
Jammu and Kashmir	23841			1											**23842**
Jharkhand	5497	576	3087	4096		583	1784	9333	1321	196		44984	2059	651	**74167**
Karnataka	638	2928	21943	603		3392		20510				61597			**111611**
Kerala	3143	1444					145	175	70	11640	2940	207	8717	123	**28604**
Madhya Pradesh	34329	2064	109990	46818	23731	4571	1595	5894	1916			25951	586	401	**257846**
Maharashtra	11268	4213	201585	7231	588	1917	7395	4347	535			215	15669	649	**255612**
Manipur	3956			7	1										**3964**
Meghalaya	1002				10427		300					10			**11739**
Mizoram	0				7										**7**
Nagaland	537			198	430										**1165**
Orissa	37706	4676		4447	2223		785	3744	2548	5140	6819	39366	83	2442	**109979**
Puducherry	196	8		28						2			4		**238**
Punjab	10676			690											**11366**
Rajasthan	27426	22	2062	7576	4522	31	436	3860	894	38	31	3678	2075	207	**52857**
Sikkim	19							3							**22**
Tamil Nadu	14915	2281		6119	128	64	859	389	29	14094	1056	4524	30390	162	**75010**
Tripura	602			5519	3887										**10008**
Uttarakhand	7867			11											**7878**
Uttar Pradesh	190184		559	953	2430			1453	5367			7663			**208609**
West Bengal	56861	14276	244	736	304	84	400	2748	2			4422	99	311	**80488**
Total	**679551**	**36841**	**383854**	**137179**	**82842**	**35903**	**30377**	**75377**	**22603**	**39741**	**19413**	**321753**	**89355**	**9002**	**1963791**

Area in Sq Km

Table 34 : Area Delineated for Water Conservation and Harvesting

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	7	1	2491	6095	3321	952	1678	59	1853	3830	3275	5234	3060		31854
Arunachal Pradesh	3308		1397	25	34985	173	8672	2023	0				1880		52462
Assam	10534			4471	3385		0	0	693			6951			26033
Bihar	614		2	408	3	9	198	12	2			727	261	4	2240
Chandigarh	1			0											1
Chhattisgarh	0	1413	690	13966	1843	240	2099	1128	441	916	9	20035	11224	3513	57516
Dadra and Nagar Haveli			240												240
Daman and Diu															0
Delhi															0
Goa		239	0				0	278				0		167	685
Gujarat	1866	6	10605	601	874	415	1336	1729	464			0	248		18143
Haryana	245			343	0			0	134						722
Himachal Pradesh	215			2545	499	307	2456	5940	2844			2390	1882	24	19102
Jammu and Kashmir	2955		846	5672	4268	5	21602	7031				2249	2223	2971	49821
Jharkhand	84	440	993	919		42	631	2680	161	24		9130	661	138	15903
Karnataka	160	1613	1864	22		198	0	9759		0		20628			34245
Kerala	4	37					158	357		7472	2499	1380	5237	88	17232
Madhya Pradesh	2195	933	30677	27359	6398	944	373	3048	1176			11146	297	163	84710
Maharashtra	459	1620	43292	3603	13	485	5172	2978	405			73	6722	569	65389
Manipur	2042			4628	9571									201	16441
Meghalaya	678			0	8816		834					7201	167		17695
Mizoram	0			2551	15675										18225
Nagaland	245			3464	9382									543	13635
Orissa	6030	1112		2244	1251		745	2041	3037	10943	10504	21513	40	3558	63019
Pondicherry	2			3											5
Punjab	720			550											1270
Rajasthan	12124	55	1927	6765	2064	165	3546	1301	2841		2	1588	5879	224	38482
Sikkim	19			67	130	4	36	1591	74			0	3419		5340
Tamil Nadu	312	177		795	2	7	149	13	1	13699	740	829	6600	177	23501
Tripura	119			2882	3709										6711
Uttarakhand	571			176	166	42	648	602	586			33	171	254	3248
Uttar Pradesh	455		383	277	781			955	1149			384			4384
West Bengal	3750	1382	1	187	3		16	634				1214		15	7202
Total	**49715**	**9028**	**95407**	**90618**	**107138**	**3987**	**50346**	**44160**	**15862**	**36884**	**17029**	**112705**	**49971**	**12607**	**695457**

Area in Sq Km

Table 34 : Area Delineated for Water Conservation and Harvesting

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	7	1	2491	6095	3321	952	1678	59	1853	3830	3275	5234	3060		31854
Arunachal Pradesh	3308		1397	25	34985	173	8672	2023	0				1880		52462
Assam	10534			4471	3385		0	0	693			6951			26033
Bihar	614		2	408	3	9	198	12	2			727	261	4	2240
Chandigarh	1			0											1
Chhattisgarh	0	1413	690	13966	1843	240	2099	1128	441	916	9	20035	11224	3513	57516
Dadra and Nagar Haveli			240												240
Daman and Diu															0
Delhi															0
Goa		239	0				0	278				0		167	685
Gujarat	1866	6	10605	601	874	415	1336	1729	464			0	248		18143
Haryana	245			343	0			0	134						722
Himachal Pradesh	215			2545	499	307	2456	5940	2844			2390	1882	24	19102
Jammu and Kashmir	2955		846	5672	4268	5	21602	7031				2249	2223	2971	49821
Jharkhand	84	440	993	919		42	631	2680	161	24		9130	661	138	15903
Karnataka	160	1613	1864	22		198	0	9759		0		20628			34245
Kerala	4	37					158	357		7472	2499	1380	5237	88	17232
Madhya Pradesh	2195	933	30677	27359	6398	944	373	3048	1176			11146	297	163	84710
Maharashtra	459	1620	43292	3603	13	485	5172	2978	405			73	6722	569	65389
Manipur	2042			4628	9571									201	16441
Meghalaya	678			0	8816		834					7201	167		17695
Mizoram	0			2551	15675										18225
Nagaland	245			3464	9382									543	13635
Orissa	6030	1112		2244	1251		745	2041	3037	10943	10504	21513	40	3558	63019
Pondicherry	2			3											5
Punjab	720			550											1270
Rajasthan	12124	55	1927	6765	2064	165	3546	1301	2841		2	1588	5879	224	38482
Sikkim	19			67	130	4	36	1591	74			0	3419		5340
Tamil Nadu	312	177		795	2	7	149	13	1	13699	740	829	6600	177	23501
Tripura	119			2882	3709										6711
Uttarakhand	571			176	166	42	648	602	586			33	171	254	3248
Uttar Pradesh	455		383	277	781			955	1149			384			4384
West Bengal	3750	1382	1	187	3		16	634				1214		15	7202
Total	**49715**	**9028**	**95407**	**90618**	**107138**	**3987**	**50346**	**44160**	**15862**	**36884**	**17029**	**112705**	**49971**	**12607**	**695457**

Area in Sq Km

Table 33: State wise Area Prioritized for Artificial Recharge

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	201	598	654	480	4365	577	1744	158	1675	3	260	16780	27	9	**27530**
Arunachal Pradesh	12														**12**
Assam	18228			9	344				80			835			**19495**
Bihar	191			0	0				0			256	215	0	**662**
Chandigarh	115			0											**115**
Chhattisgarh	91	132	22	6048	5589	4235	371	17	3	289	0	4601	1249	181	**22828**
Dadra and Nagar Haveli															**0**
Daman and Diu															**0**
Delhi	1318								137						**1455**
Goa															**0**
Gujarat	11965	1	1356	2943	2086	72	17	63					12		**18516**
Haryana	41217			590	0				275				4		**42086**
Himachal Pradesh	630			1664	319	143	153	751	458			57	181		**4357**
Jammu and Kashmir	1274			6			0								**1281**
Jharkhand	378	13	111	961	0	40	7	267	56			2883	359	8	**5083**
Karnataka	144	13	11049	247		2523	0	3903				25541	0	0	**43420**
Kerala	293	561					109	227	63	6445	3142	340	5426	29	**16635**
Madhya Pradesh	21587	1237	38535	36588	18357	3605	117	3934	488			13563	492	320	**138823**
Maharashtra	10682	1236	52329	697	36	279	955	91	9			0	2593		**68907**
Manipur															**0**
Meghalaya	48											283			**332**
Mizoram															**0**
Nagaland															**0**
Orissa	529	353		8	3			0	231	562	1903	923	0	416	**4928**
Puducherry	6	3											1		**10**
Punjab	42106			738			0								**42844**
Rajasthan	20753	22	435	986	714	38	3124	494	313			3778	3743	118	**34519**
Sikkim															**0**
Tamil Nadu	5754	58		2311	144	1	507	6		13922	643	2719	19761	288	**46116**
Tripura	53			240	101										**394**
Uttarakhand	3915			950	467	17	11	2085	2436			1341	2160	107	**13488**
Uttar Pradesh	103928		572	1122	2419	0		1453	4198			8245	0	0	**121937**
West Bengal	24080	3579	25	50	71		139	618	2			569	30	4	**29166**
Total	**309499**	**7807**	**105088**	**56641**	**35015**	**11531**	**7255**	**14067**	**10423**	**21221**	**5948**	**82713**	**36253**	**1479**	**704941**

Area in Sq Km

Table 33: State wise Area Prioritized for Artificial Recharge

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	201	598	654	480	4365	577	1744	158	1675	3	260	16780	27	9	**27530**
Arunachal Pradesh	12														**12**
Assam	18228			9	344				80			835			**19495**
Bihar	191			0	0				0			256	215	0	**662**
Chandigarh	115			0											**115**
Chhattisgarh	91	132	22	6048	5589	4235	371	17	3	289	0	4601	1249	181	**22828**
Dadra and Nagar Haveli															**0**
Daman and Diu															**0**
Delhi	1318								137						**1455**
Goa															**0**
Gujarat	11965	1	1356	2943	2086	72	17	63					12		**18516**
Haryana	41217			590	0				275				4		**42086**
Himachal Pradesh	630			1664	319	143	153	751	458			57	181		**4357**
Jammu and Kashmir	1274			6			0								**1281**
Jharkhand	378	13	111	961	0	40	7	267	56			2883	359	8	**5083**
Karnataka	144	13	11049	247		2523	0	3903				25541	0	0	**43420**
Kerala	293	561					109	227	63	6445	3142	340	5426	29	**16635**
Madhya Pradesh	21587	1237	38535	36588	18357	3605	117	3934	488			13563	492	320	**138823**
Maharashtra	10682	1236	52329	697	36	279	955	91	9			0	2593		**68907**
Manipur															**0**
Meghalaya	48											283			**332**
Mizoram															**0**
Nagaland															**0**
Orissa	529	353		8	3			0	231	562	1903	923	0	416	**4928**
Puducherry	6	3											1		**10**
Punjab	42106			738			0								**42844**
Rajasthan	20753	22	435	986	714	38	3124	494	313			3778	3743	118	**34519**
Sikkim															**0**
Tamil Nadu	5754	58		2311	144	1	507	6		13922	643	2719	19761	288	**46116**
Tripura	53			240	101										**394**
Uttarakhand	3915			950	467	17	11	2085	2436			1341	2160	107	**13488**
Uttar Pradesh	103928		572	1122	2419	0		1453	4198			8245	0	0	**121937**
West Bengal	24080	3579	25	50	71		139	618	2			569	30	4	**29166**
Total	**309499**	**7807**	**105088**	**56641**	**35015**	**11531**	**7255**	**14067**	**10423**	**21221**	**5948**	**82713**	**36253**	**1479**	**704941**

Area in Sq Km

Table 32 : State wise and Aquifer wise Annual Replenishable Recharge (m/yr)

State Name	Alluvium		Laterite		Basalt		Sandstone		Shale		Limestone		Granite		Schist		Quartzite		Charnockite		Khondalite		BGC		Gneiss		Intrusives	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Andhra Pradesh	0.00	0.45	0.03	0.44	0.04	0.62	0.00	0.49	0.00	0.38	0.00	0.55	0.04	0.29	0.00	0.44	0.00	0.55	0.00	0.81	0.00	0.62	0.00	0.75	0.02	0.41	0.12	0.13
Arunachal Pradesh	0.00	0.85			0.00	0.67	0.25	0.68	0.00	0.52	0.03	0.39	0.00	0.13	0.00	0.51	0.25	0.45							0.00	0.51		
Assam	0.26	0.66					0.26	0.58	0.26	0.65			0.27	0.52	0.42	0.58	0.27	0.58					0.27	0.66				
Bihar	0.09	0.72	0.25	0.28	0.28	0.28	0.10	0.45	0.15	0.31	0.10	0.37	0.11	0.32	0.12	0.31	0.10	0.32	0.12	0.12			0.09	0.34	0.10	0.35	0.09	0.34
Chhattishgarh	0.10	0.16	0.06	0.91	0.08	0.22	0.07	0.22	0.06	0.22	0.06	0.64	0.06	0.91	0.08	0.57	0.06	0.03	0.06	0.16	0.11	0.17	0.06	0.55	0.06	0.55	0.06	0.84
Delhi	0.07	0.43															0.07	0.28										
Goa	0.08	0.22	0.06	0.22	0.06	0.22	0.07	0.13					0.11	0.11	0.06	0.20	0.20	0.20					0.06	0.22			0.06	0.11
Gujarat	0.00	0.25	0.10	0.19	0.00	0.50	0.00	0.42	0.00	0.26	0.00	0.83	0.07	0.23	0.01	0.22	0.07	0.22					0.10	0.13	0.00	0.22	0.09	0.18
Haryana	0.10	0.62					0.16	0.37	0.31	0.37					0.21	0.35	0.14	0.49							0.26	0.26		
Jammu & Kashmir	0.00	0.68			0.00	0.43	0.00	0.68	0.00	0.68	0.04	0.17	0.00	0.68	0.04	0.61							0.00	0.68	0.00	0.61	0.00	0.68
Jharkhand	0.05	0.40	0.06	0.22	0.06	0.34	0.05	0.34	0.08	0.13	0.06	0.28	0.07	0.22	0.05	0.40	0.06	0.28	0.10	0.17			0.05	0.40	0.05	0.22	0.06	0.15
Karnataka	0.07	0.21	0.03	0.26	0.03	0.45	0.04	0.28	0.06	0.16	0.03	0.16	0.05	0.25	0.03	0.45			0.06	0.13			0.03	0.45	0.05	0.18	0.06	0.10
Kerala	0.15	0.50	0.15	0.50			0.23	0.23					0.19	0.33	0.18	0.26	0.22	0.26	0.10	0.58	0.12	0.43	0.18	0.48	0.10	0.58	0.20	0.22
Madhya Pradesh	0.04	0.62	0.05	0.26	0.05	0.45	0.04	0.37	0.04	0.34	0.05	0.29	0.05	0.15	0.05	0.29	0.05	0.29					0.03	0.26	0.06	0.28	0.05	0.17
Maharashtra	0.01	0.30	0.01	0.17	0.01	0.44	0.07	0.91	0.07	0.18	0.07	0.17	0.07	0.91	0.07	0.91	0.07	0.19	0.09	0.12			0.07	0.16	0.08	0.91	0.07	0.16
Manipur	0.18	0.19					0.18	0.18	0.18	0.19																	0.18	0.18
Meghalaya	0.22	0.83					0.60	0.60	0.22	0.83			0.36	0.60			0.22	0.60					0.22	0.83				
Mizoram	0.33	0.36					0.24	0.48	0.24	0.48																		
Nagaland	0.11	0.19					0.11	0.19	0.11	0.19															0.11	0.16	0.11	0.16
Orissa	0.00	0.57	0.05	0.49			0.08	0.30	0.07	0.45			0.06	0.45	0.06	0.31	0.08	0.45	0.05	0.31	0.05	0.31	0.05	0.45	0.06	0.21	0.06	0.45
Punjab	0.08	0.89					0.08	0.59					0.17	0.17														
Rajasthan	0.00	0.60	0.05	0.08	0.02	0.19	0.01	0.32	0.01	0.19	0.01	0.19	0.01	0.20	0.01	0.17	0.01	0.32	0.03	0.04	0.03	0.04	0.01	0.20	0.00	0.20	0.01	0.20
Sikkim	0.01	0.18					0.04	0.18	0.01	0.01	0.04	0.18	0.01	0.04	0.01	0.18	0.01	0.18					0.02	0.04	0.01	0.18		
Tamil Nadu	0.00	0.57	0.13	0.21			0.04	0.68	0.12	0.52	0.14	0.51	0.06	0.48	0.03	0.27	0.18	0.30	0.03	0.08	0.07	0.42	0.03	0.55	0.00	0.68	0.05	0.48
Tripura	0.41	0.51					0.41	0.51	0.41	0.51																		
Uttar Pradesh	0.01	0.95			0.13	0.13	0.01	0.64	0.01	0.41	0.02	0.02			0.02	0.13	0.01	0.64					0.01	0.18	0.01	0.02	0.02	0.02
Uttarakhand	0.00	0.88					0.00	0.62	0.00	0.57	0.00	0.40	0.00	0.57	0.00	0.57	0.00	0.43					0.00	0.41	0.00	0.57	0.00	0.00
West Bengal	0.00	0.89	0.00	0.77	0.08	0.52	0.00	0.71	0.00	0.41	0.00	0.71	0.00	0.25	0.00	0.71	0.11	0.11					0.00	0.63	0.00	0.18	0.05	0.33

Table 31: State wise Distribution and Characteristics of Intrusives

STATE NAME	Major Aquifers (Area in sq km)		Aquifer Properties									
	Basic-Dolerite/ Anorthosite	Ultrabasic-Epidiorite/ Granophyre	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Dec.Avg)	Transmissivity	Yield	Specific yield	Quality (EC in Micromhos/cm)	Remarks
	IN01	IN02			m	m bgl	mbgl	m^2/day	m^3/day	%		
Andhra Pradesh		108										
Chhattishgarh	4352				13	12-17	5-10		0.02	Up to 2	500-750	Act as barrier for GW movement.
Goa	402										500	
Gujarat	51		Single				10-20				1000-2000	
Himachal Pradesh	61		Single						10		500-1000	Not productive. Developed through springs.
Jammu & Kashmir	19	4926									500-750	Act as barrier for GW movement.
Jharkhand	475	180					5-10			Up to 2	500-1000	
Karnataka											1000-2000	
Kerala	129	38										Very small area
Madhya Pradesh	401		Single	Unconfined, Semi-confined Confined			5-10			Up to 2	500-750	
Maharashtra	649						5-10					Act as barrier for GW movement.
Manipur		303									> 500	
Nagaland		632									> 500	
Orissa	2922	1948	Single	Unconfined, Semi-confined	6 - 8	100 - 150	5-10	0.71 - 81	86 - 258	Up to 2	500-1000	
Rajasthan	463	263		Unconfined			5-10			Up to 1.5	2000-4500	
Tamil Nadu	216	295	Single								2000-2500	Act as GW Barrier
Uttarakhand	736										500-1000	
West Bengal	275	36									500-1000	
Total Area	**11167**	**8729**	**Limited Yield prospects**									

DTW : Depth to water level

m bgl: Meter below ground level

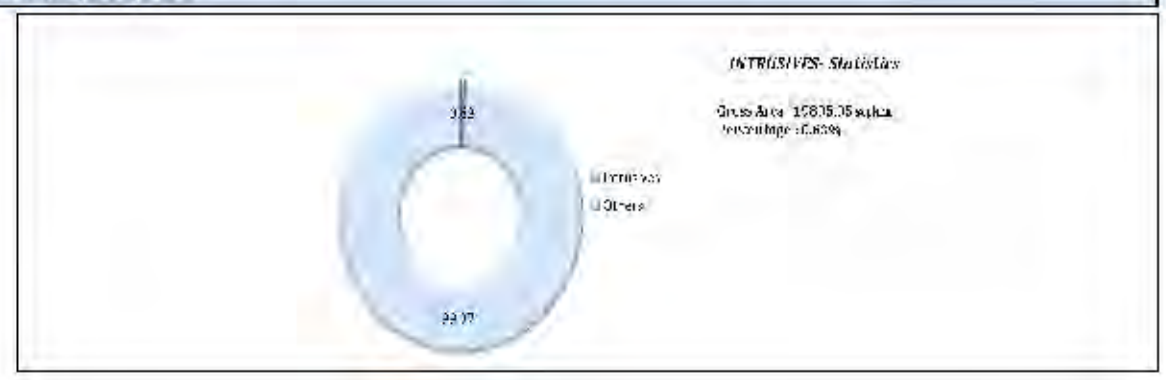


Table 30: State wise Distribution and Characteristics of Laterite Aquifer System

STATE NAME	Major Aquifers (Area in sq km)	Aquifer Properties								
	Laterite/ Ferruginous Concretions	Aquifer System	Type of Aquifer	Thickness	DTW (Decadal Avg)	Zones Encountered	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	LT01			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	1761	Single	Unconfined	5 - 25	10-20	10-15	300 - 1500	180 - 864	Upto 3	500
Chhattishgarh	1912	Single	Unconfined	2 - 30	5-10	2-7	2 - 30	1728 - 6048	Upto 2.5	500-1000
Goa	1573	Single	Unconfined	5 - 15	5-10	2-7	4 - 1440	50 -150	Upto 3	500-750
Jharkhand	743	Single	Unconfined	5 - 40	10-20	8-15		10	Upto 3	500-1000
Karnataka	3628	Single	Unconfined	5 - 15	5-10	2-8	4 - 1400	50 - 150	Upto 2	500-2000
Kerala	1454	Single	Unconfined	2 - 30	5-10	2-7		5 - 6	Upto 9	500-750
Madhya Pradesh	2141	Single	Unconfined	10 - 15	5-10	5-15	3 - 275	70 -210	Upto 2.5	500-1000
Maharashtra	5516	Single	Unconfined	5 - 30	10-20	8-20	63 - 136	13 - 56	Upto 3	> 500
Orissa	5305	Single	Unconfined	12 - 20	5-10	7-15	2 - 20	105 - 140	Upto 3	500-1000
Rajasthan	115	Single	Not Explored							
Tamil Nadu	2417	Single	Unconfined	10 - 30	5-10	10-25		15 - 150	Upto 2.5	2000-3000
West Bengal	14280	Single	Unconfined	8-20	5-10	8-15		20-60	Upto 3	500-1000
Total Area	**40926**									

DTW : Depth to water level

m bgl: Meter below ground level

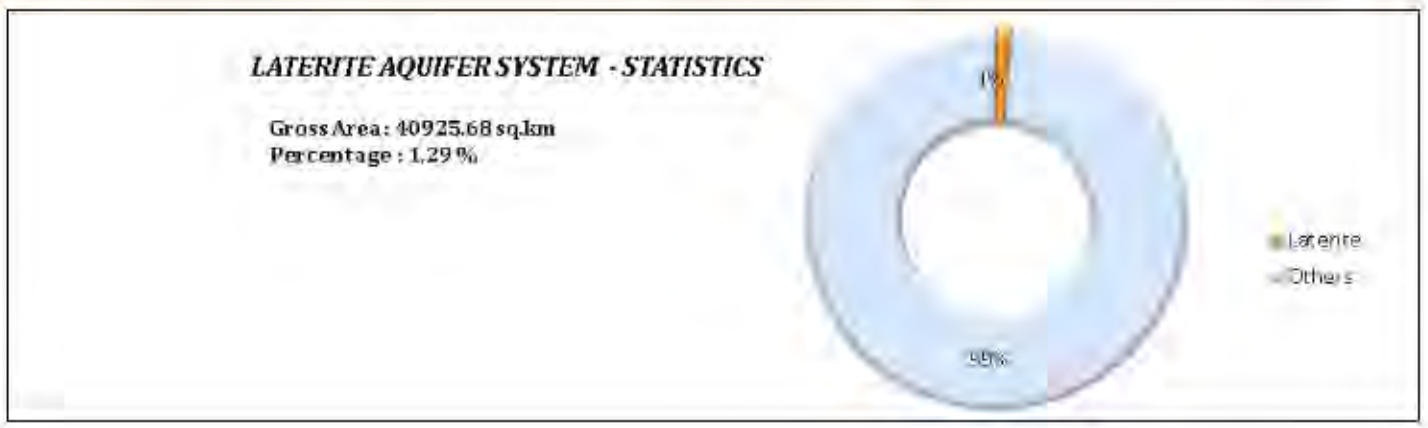


Table 29: State wise Distribution and Characteristics of Khondalite Aquifer System

STATE NAME	Major Aquifers (Area in sq km)	Aquifer Properties								
	Khondalite/ Granulite	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	KH01			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	12091	Single	Unconfined to semi-confined	5-20	60	5-10	10-120	20 - 180	Upto 3	500-3000
Chhattisgarh	12	Single	unconfined	Hilly area, Not explored						
Kerala	4223	Single	Semi-confined	5-15	4 - 40	5-10	15-80	50-150	Upto 3	500-1000
Orissa	14351	Single	Unconfined Semi-confined	15 - 20	100 - 150	5-10	-	172 - 432	Upto 3	500-1000
Rajasthan	105	-	-	Hilly area, Not explored						
Tamil Nadu	2009	Single	Unconfined Semi-confined	5 - 20	15 - 291	5-10	200 - 476	100-1500	Upto 2	1000-4000
Total Area	32914									

DTW : Depth to water level

m bgl: Meter below ground level

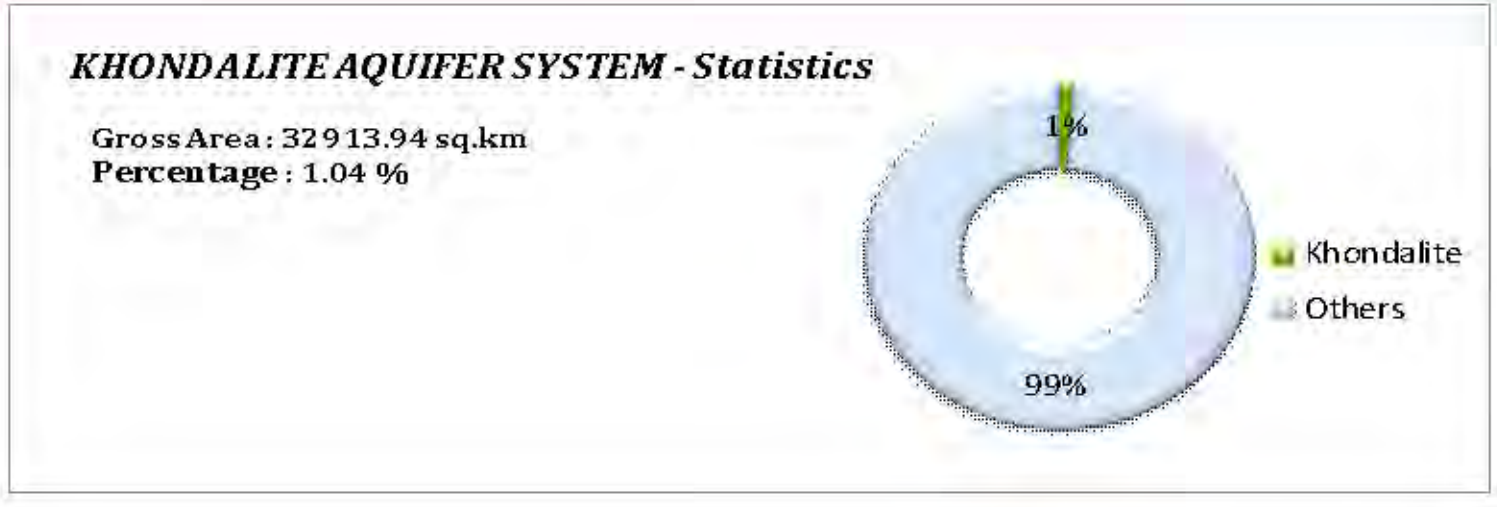


Table 28: State wise Distribution and Characteristics of Charnockite Aquifer System

STATE NAME	Major Aquifers (Area in sq km)	Aquifer Properties								
	Charnockite	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	CK01			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	11302	Single	Unconfined Semi-confined	8 - 15	15 - 60	2-5	5-60	50 - 180	Upto 4	500-3000
Chhattisgarh	1212	Single	Unconfined	10-25	83 - 430	5-10	20-135	0.5 - 250	Upto 2	500-1000
Jharkhand	196	Single	Unconfined Semi-confined	15 - 20	100 - 140	5-10	40-186	12 - 360	-	500-1000
Kerala	16071	Single	Unconfined Semi-confined	5-20	60 - 175	5-10	28-112	70 - 3024	Upto 2	500-1000
Orissa	13784	Single	Unconfined Semi-confined	15 - 20	100 - 150	5-10	24-90	86 - 258	Upto 5	500-1000
Rajasthan	211	Single	Unconfined Semi-confined	10-45	60-140	20-40	5-75	-	-	2000-2500
Tamil Nadu	33580	Single	Unconfined, Semi-confined Confined	5 - 18	15 - 291	5-10	200 - 476	80 - 2500	Upto 2	500-3000
Total Area	**76360**									

DTW : Depth to water level

m bgl: Meter below ground level

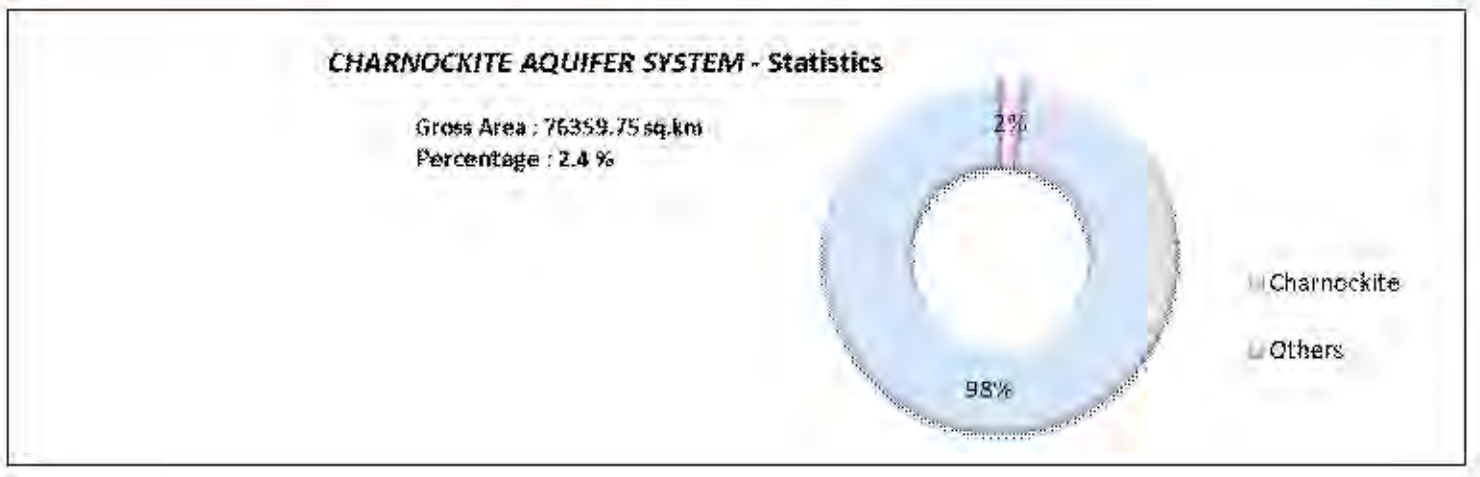


Table 27: State wise Distribution and Characteristics of Quartzite Aquifer System

STATE NAME	Major Aquifers (Area in sq km)		Aquifer Properties								
	Quartzite	Quartzite	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	QZ01	QZ02			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	11305	49	Single	Unconfined Semi-confined	8 - 15	15 - 60	10-20	10-50	10 - 240	1-2.5	1000-3000
Assam	10	706	Not Explored								
Bihar	-	257	Single	Unconfined Semi-confined	10 - 15	50- 150	5-10	20 - 80	10 - 300	1-2.5	500-1000
Chhattisgarh	505	42	Single	Unconfined Semi-confined	20-20	20 - 70	10-20	20-100	10 - 200	1-2.5	500-750
Delhi	137	-	Single	Unconfined Semi-confined	10-20	16 - 125	20-40	3-125	55 - 265	1-2.5	1000-3000
Gujarat	-	977	Single	Unconfined Semi-confined	5-15	25-75	5-20	5-140	20-400	1-2.5	2000-4500
Haryana	342	-	Single	Unconfined Semi-confined	10-20	14-70	20-40	2.7-25	2-76	1-2.5	1000-3000
Himachal Pradesh	409	4228	Single	Unconfined Semi-confined	8-15	20-70	5-10	5-40	10- 260	1-2.5	500-1000
Jharkhand		1488	Single	Unconfined Semi-confined	15-20	30-70	5-10	3-123	10-240	1-2.5	500-1000
Madhya Pradesh	1062	954	Single	Unconfined Semi-confined	12-25	30-70	10-20	16-119	40-300	1-2.5	1000-2000
Maharashtra	293	475	Single	Unconfined Semi-confined	15-25	40-75	5-10	3-27	10-250	1-2.5	>500
Orissa	828	3223	Single	Unconfined Semi-confined	12-25	35-50	5-10	12-211	20-300	1-2.5	500-1000
Rajasthan		6456	Single	Unconfined Semi-confined	12-30	40-150	10-20	4-114	50-400	1-2.5	1500-2500
Uttarakhand	561	7033	Single	Unconfined Semi-confined	15-20	35-50	20-40	10-50	40-300	1-2.5	
Uttar Pradesh	5378		Single	Unconfined Semi-confined	15-25	40-100	10-20	10-50	88-288	1-2.5	500-1000
Total Area	**20830**	**26074**									

DTW : Depth to water level

m bgl: Meter below ground level

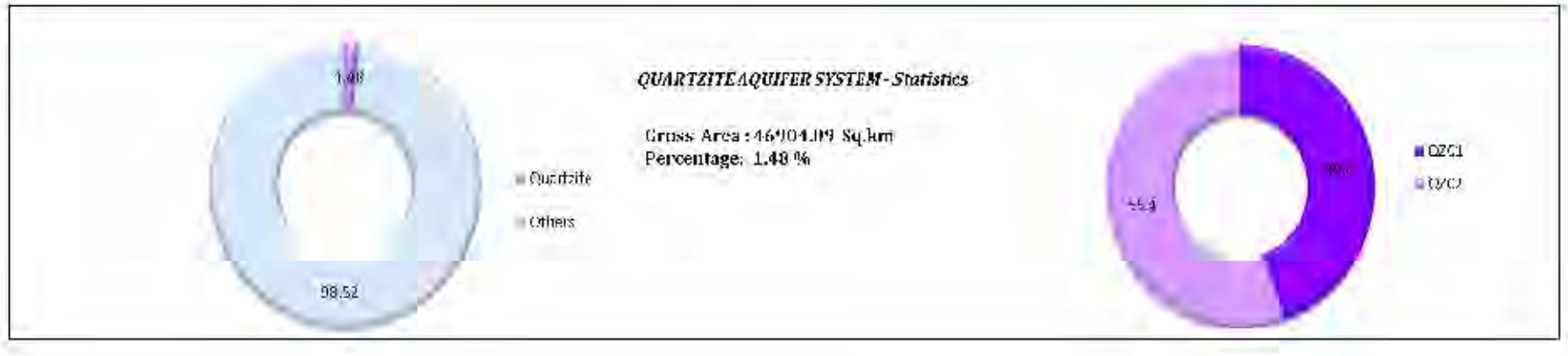


Table 17 a : Aquifer wise Area under Over Exploited (OE) Blocks

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	218	150	198	480	4365	577	1505	77	1675		258	11943	1	7	**21455**
Delhi	866								136						**1002**
Gujarat	15828		1059	1469	860	376	57						16		**19664**
Haryana	25262								201						**25463**
Jharkhand	229			124			2	344	17			500	56	1	**1273**
Karnataka	64	215	12575	118		2464		5323				46717			**67475**
Kerala													266		**266**
Madhya Pradesh	480	33	18176	320	357	0									**19365**
Maharashtra	2828		5001	2											**7831**
Punjab	37770			46											**37816**
Rajasthan	123621	74	7433	20502	11748	904	12157	3257	5367	173	74	17658	15712	470	**219149**
Tamil Nadu	5959	136		2247	123		503	7		13138	617	2207	18939	298	**44174**
Uttar Pradesh	20115			157					11			1356			**21639**
Grand Total	**233240**	**608**	**44441**	**25464**	**17453**	**4321**	**14224**	**9009**	**7407**	**13311**	**948**	**80380**	**34990**	**776**	**486573**

Table 17 b : Aquifer wise Area under Critical Blocks

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Total
Andhra Pradesh	7	444	497	281			237	76				4414	28		**5984**
Delhi	392														**392**
Gujarat	4765	6	790	1861	1635	44	119	88	41				17		**9807**
Haryana	7297			1					37				4		**7339**
Jharkhand				18				2		42		438			**501**
Karnataka	74	28	2721			42		922				9366	0		**13152**
Kerala	45	7								6			468		**527**
Madhya Pradesh	454	6	1127	349	1180	636		9					15		**3776**
Punjab	995														**995**
Rajasthan	11389			1210	714		139	2	85			13	986	41	**14580**
Tamil Nadu	1041			349			94	112		3724	132	627	4330	13	**10422**
Uttar Pradesh	7801				10				141			620			**8572**
Grand Total	**34414**	**492**	**5135**	**4068**	**3538**	**722**	**589**	**1211**	**304**	**3773**	**132**	**15480**	**5847**	**54**	**76201**

Categorization Based on Dynamic Ground Water Resources of India, 2009
Area in Sq Km

Table 25: State wise Distribution and Characteristics of Granite Aquifer System

STATE NAME	Major Aquifers (Area in sq km)		Aquifer Properties								
	Effusives Acidic Rocks	Intrusive Acidic Rocks	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractured Zones Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	GR01	GR02			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh		13597	Single	Unconfined, Semi-Confined	10 - 15	15 - 60	10-20	2.3 - 12.6	10-200	Upto 2	1500-2500
Arunachal Pradesh		8672	Not Explored								500-750
Bihar		518	Single	Unconfined, Semi-Confined	10-20	20-60	5-10	4-50	10-220	Upto 2	500-1000
Chhattisgarh		4140	Single	Unconfined, Semi-confined	40	20-60	5-10	5-45	70 - 350	Upto 2	500-750
Gujarat	115	2386	Single	Semi Unconfined	10-32	30 - 40	20-40	5-40	1 - 100	Upto 2	1500-2000
Himachal Pradesh		2719	Single	Semi Unconfined	5-18	20-60	5-10	5-45	20-200	Upto 2	500-1000
Jammu & Kashmir		39111	Not Explored								> 500
Jharkhand		1786	Single	Unconfined	10-40	20-60	5-10	5-50	10-700	Upto 3	500
Kerala		188	Single	Not Explored						Upto 2	
Madhya Pradesh		1615	Single	Semi Unconfined	10-20	20-60	5-10	4-50	10-200	Upto 2	500-1000
Maharashtra		7618	Single	Not Explored						Upto 3	500-1000
Meghalaya		1018	Single	Unconfined, Semi-confined	38	20-55	5-10	Upto 24	406	Upto 3	500-750
Orissa		1259	Single	Unconfined, Semi-Confined	12 - 15	100 - 150		0.32 - 115	172 - 430	Upto 2	500-1000
Rajasthan	18	13190	Single	Unconfined, Semi-Confined	10-30	30-40	20-40	5-40	1-100	Upto 3	1500-2500
Tamil Nadu		1399	Single	Unconfined, Semiconfined to confined	5 - 25	40 - 200		50 - 500	288 - 1440	Upto 2	1000-2500
Uttarakhand		1188	Single	Unconfined, Semiconfined to confined	5-18	20-60	5-10	5-45	15-200		500-750
West Bengal		400	Single								500-1000
Total Area	**133**	**100858**									

DTW : Depth to water level
m bgl: Meter below ground level

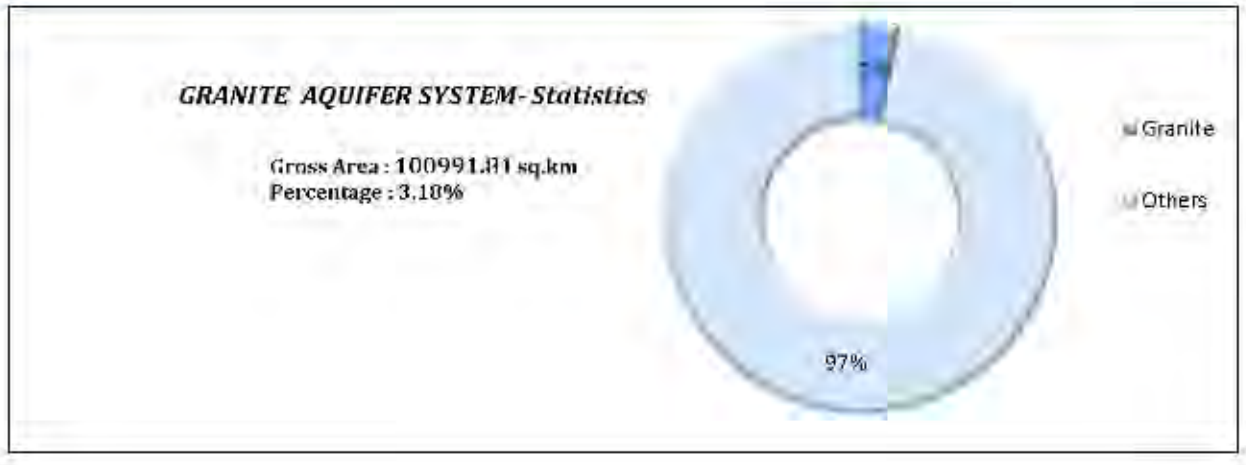


Table 24: State wise Distribution and Characteristics of Limestone Aquifer System

STATE NAME	Major Aquifers (Area in sq km)					Aquifer Properties								
	Milliolitic Limestone	Limestone/ Dolomite	Limestone/ Dolomite	Limestone with Shale	Marble	Aquifer System	Type of Aquifer	Thickness	Zones Encountered	DTW (Decadal (Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	LS01	LS02	LS03	LS04	LS05			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh		146	8613	1721		Single	Unconfined, Confined	8 to 200	115-190	10-20	1.2-24	20-2100	Upto 3	1500-2500
Arunachal Pradesh		130	168			Not Explored								500-750
Chhattisgarh			13122	2133	1	Single	Unconfined Semi confined	30-450	25-150	5-10	20-450	9-1728	Upto 3	500-1000
Gujarat	2943	1836			175	Multiple	Unconfined	55-250	20-100	10-20	20-250	200	Upto 3	1000-3000
Himachal Pradesh		5510	713	184		Single	Unconfined to Confined	40-150	50-140	5-15	10-180	4-965	Upto 3	500-1000
Jammu & Kashmir		10399				Not Explored								
Jharkhand			503		98	Single	Unconfined, Semi Confined to Confined	50-200	50-75	5-10	20-300	12-432	Upto 2	>500
Karnataka			5872			Single	Unconfined, Semi Confined to Confined	40-150	40-120	10-20	20-180	20-300	Upto 2	2000-5000
Madhya Pradesh		201	4512		89	Single	Unconfined, Semi Confined	50-450	25-150	10-20	63-136	140-350	Upto 3	500-1000
Maharashtra			187	1376	356	Single	Unconfined, Semi Confined	50-450	25-175	10-20	20-200	13-240	Upto 2.5	1000-1500
Rajasthan	3	5	810		277	Single	Unconfined, Semi Confined	50-451	30-160	>40	30-180	20-200	Upto 2	2500-3000
Uttarakhand		1457	122			Not Explored								500-750

DTW : Depth to water level
m bgl: Meter below ground level

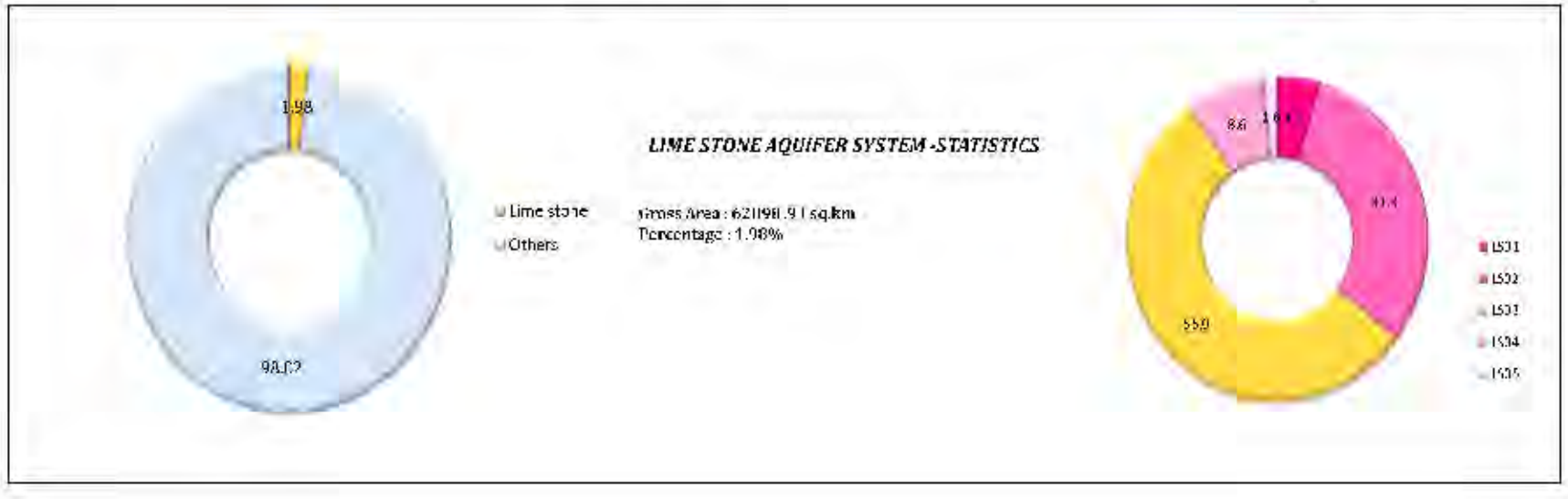


Table 23: State wise Distribution and Characteristics of Shale Aquifer System

STATE NAME	Major Aquifers (Area in sq km)						Aquifer Properties								
	Shale with Limestone	Shale with Sandstone	Shale, Limestone and Sandstone	Shale	Shale/ Shale with Sandstone	Shale with Limestone	Aquifer System	Aquifer Type	Aquifer Thickness	DTW (Decadal Avg)	Fractures Encountered	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	SH01	SH02	SH03	SH04	SH05	SH06			m	m bgl	mbgl	m^2/day	m^3/day	%	
Andhra Pradesh	-	93	656	59	21453	-	Single	Semi Confined to Confined	Up to 100m	5-10	24-60	upto 740	60-160	Up to 3	1500-3000
Arunachal Pradesh	-	23801	11761	-	-	-	Single		Up to 100m	-	-	-	-	-	500-1000
Assam	-	3076	1481	-	-	-	Single	Unconfined and Semi-confined to confined	Up to 150m	5-10	23-90	10-172	8 to 84	-	500-750
Chhattisgarh	-	-	199	-	5170	9411	Single	Unconfined and Semi-confined to confined	Up to 100m	5-10	20-70	20-600	70-1200	Up to 1	500-1000
Gujarat	-	1124	1029	3479	-	-	Single	Unconfined and Semi-confined to confined	Up to 150m	10-20	20-30	20-550	80-600	Up to 1.5	500-6000
Himachal Pradesh	147	308	-	1501	975	-	Single	Unconfined to Semi confined	40-250	5-10	50-150	20-120	80-400	Up to 2	500-1000
Jammu & Kashmir	2727	5200	22032	-	157	-	Not Explored								500-750
Madhya Pradesh	-	31	1959	872	22477	331	Single	Unconfined and Semi-confined to confined	Up to 50m	10-20	20-40	20-600	10-20	Up to 1.5	500-1500
Maharashtra	-	471	-	-	-	117	Single	Unconfined	Up to 50m	5-10	15-40	20-600	10-240	Up to 2	500-2000
Manipur		11952					Not Explored							Up to 2	500-750
Meghalaya	-	7834	4536	-	-	-	Not Explored							Up to 2.5	> 500
Mizoram	-	17150	-	-	-	-	Not Explored							Up to 2.5	500-750
Nagaland		10722					Not Explored							Up to 2	500-650
Orissa	-	-	-	26	1745	1152	-	Unconfined to Semi confined	Up to 100m	5-10	25-60	20-300	86-129	Up to 3	500-1000
Rajasthan	170	10	1247	-	12127	3349	-	Unconfined to Semi confined	Up to 100m	20-40	40-80	20-350	-	Up to 2	1000-4500
Tamil Nadu	246	-	5	-	-	-	-	Unconfined to Semi confined	Up to 80m	5-10	25-40	20-120	80-240	Up to 2	2000-3000
Tripura	-	3895	-	-	-	-	Single	Unconfined to Semi confined	-	-	-	-	-	Up to 2.5	> 500
Uttarakhand	494	1801	504	-	156	1309	Single	Unconfined	40-250	5-10	50-150	20-120	-	Up to 2	500-750
Uttar Pradesh	-	-	-	-	0	2430	Single	Unconfined , Semi Confined	50-100	5-10	upto 100	40-500	288-2880	Up to 2	500-1000
Total Area	**3784**	**87467**	**45539**	**5938**	**64262**	**18100**									

DTW : Depth to water level
m bgl: Meter below ground level

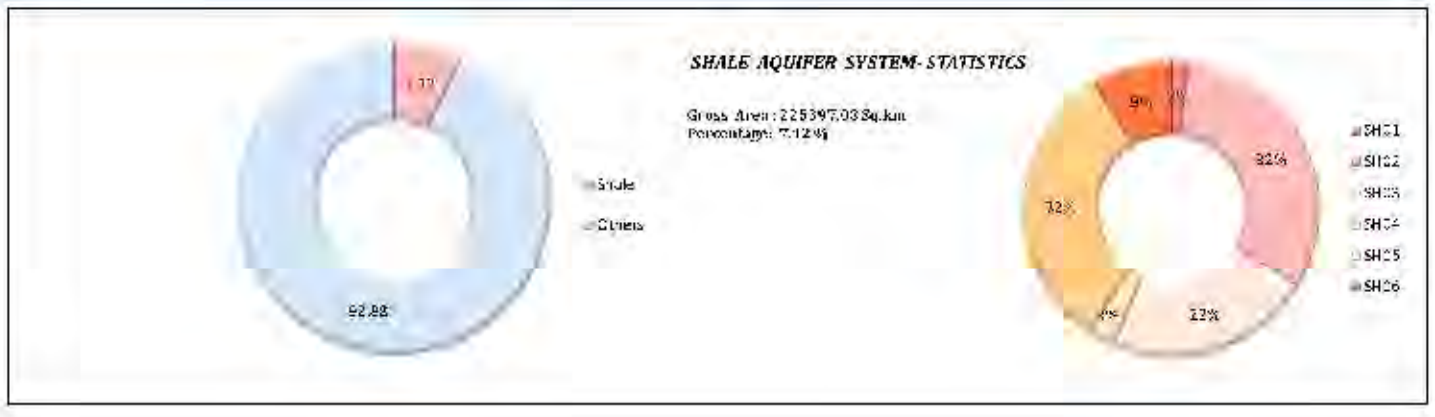


Table 22: State wise Distribution and Characteristics of Sandstone Aquifer System

STATE NAME	Major Aquifers (Area in sq km)						Aquifer Properties								
	Sandstone/ Conglomerate	Sandstone with Shale	Sandstone with coal	Sandstone with clay	Sandstone/ Conglomerate	Sandstone with Shale	Aquifer System	Aquifer Type	Aquifer Thickness	DTW (Decadal Avg)	Fractures Encountered	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	ST01	ST02	ST03	ST04	ST05	ST06			m	m bgl	mbgl	m^2/day	m^3/day	%	
Andhra Pradesh	4540	1828	150	10851	1985	810	Multiple	Unconfined	20-150	5-10	38 - 100	100-1000	50 - 1200	Upto 3	1500-3000
Assam	-	2765	2681	144	-	-	Multiple	Semi-Confined, Confined	50-600	2-5	-	200-700	5 -100	Upto 3	500-1500
Bihar	279	13	-	-	2212	-	Multiple	Semi-Confined Confined	60-400	5-10	20-120	50-250	70-700	Upto 3.5	500-1000
Chhattisgarh	-	10818	8766		7644	824	-	Unconfined, Semiconfined	400	5-10	20 - 120	50-250	70 - 700	Upto 2.5	1000-1500
Goa	-	-	-	-	270	-	Not Explored								> 500
Gujarat	5381	4075	359	365	-	12	Multiple	Unconfined, Semiconfined to Confined	60-400	5-20	-	50-700	60-400	Upto 8	4500-5500
Haryana	401	189	-	-	-	-	Single	-	50-200	20-40	20-120	50-600	50-600	Upto 3	1000-2000
Himachal Pradesh	7439	864	-	1692	61	458	Single/ Multiple	Unconfined, Semi-confined to Confined	50-350	10-20	50-160	200-1000	20-3662	Upto 3	500-750
Jammu & Kashmir	20034	15745	8392	1859	-	-	Multiple	Unconfined, Semi-confined	40-280	5-10	-	3 - 5	24 - 720	Upto 6	> 500
Jharkhand	106	664	3174	-	253	24	Single/ Multiple	Unconfined, Semi-confined	50-600	5-10	50-120	50-250	70-600	Upto 3	500-1000
Karnataka	-	-	-	-	721	-	Single	Unconfined	60-80	5-10	50-120	30-180	100 - 300	Upto 1.5	500-700
Madhya Pradesh	21	18029	-	-	32913	1073	Single/ Multiple	Unconfined, Semiconfined to Confined	60-400	5-20	60-120	50-200	10 - 350	Upto 3	500-1500
Maharashtra	1179	3658	366	-	1430	784	Single/ Multiple	Unconfined, Semiconfined to Confined	60-400	5-10	60-120	50-250	13 - 300	Upto 3	1000-1500
Manipur	-	402	4712	123	-	-	Not Explored							Upto 15	500-1500
Mizoram	-	128	3010	-	-	-	Not Explored								500-750
Nagaland	-	0	3906	-	-	-	Not Explored								500-1500
Orissa	2248	429	1209	-	993	112	Single	Unconfined, Semiconfined to Confined	upto 375	5-10	-	25-250	70 - 1036	Upto 6	500-750
Punjab	694	44	-	-	-	-	Single	-	-	10-20	-	100-1000	86 - 864	-	> 500
Rajasthan	3122	9117	411	-	7833	14757	-	-	-	20-40	-	-	-	-	2500-4500
Tamil Nadu	3748	-	-	4739	-	-	Single	Unconfined, Semiconfined to Confined	20 - 500	5-10	-	500-6000	860 - 4800	-	1000-2000
Tripura	-	3777	-	1762	-	-	Single	Semi-confined to Confined	40 - 200	5-20	-	-	-	Upto 8	500-750
Uttarakhand	612	2260	-	-	-		Multiple	Semi-confined to Confined	50-350	5-10	-	50-300	80-600	Upto 3	500-2000
Uttar Pradesh	99	171	287	-	0	566	Single	Unconfined, Semi-confined	-	10-20	-	-	-	Upto 8	500-1500
West Bengal	24	479	229	4	-	-	-	-	-	5-10	-	-	-	Upto 3	500-1000
Total Area	50026	75355	37720	21540	56364	19420									

DTW : Depth to water level

m bgl: Meter below ground level

Table 21 : State wise Distribution and Characteristics of Gneiss Aquifer System

STATE NAME	Major Aquifers (Area in sq km)			Aquifer Properties								
	Gneiss	Gneiss	Migmatitic Gneiss	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific yield	Quality (EC in Micromhos/cm)
	GN01	GN02	GN03			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	1216	7708	3151	Single	Unconfined Semi-confined	8 - 15	20 - 100	5-10	12-40	80 - 240	Upto 1.5	500-750
Arunachal Pradesh	280	1599	-	Single	Unconfined Semi-confined	5-20	20-60	5-10	20-60	80-180	Upto 1.5	250-500
Bihar	839	-	-	Single	Unconfined Semi-confined	10-25	30-90	5-10	15-52	40-270	Upto - 3.5	500-1000
Chhattisgarh	19679	181	-	Single	Unconfined Semi-confined	10 - 15	20-70	5-10	13-57	25-320	Upto 5	500-1000
Gujarat	142	1117	-	Single	Unconfined Semi-confined	5-20	30-90	5-10	18-37	30-370	Upto 2	2500-4000
Himachal Pradesh	22	4041	-	Single	Unconfined Semi-confined	3-15	20-40	5-15	5-25	50-70	Upto 1.5	500-1500
Jammu & Kashmir	2351	3773	-	Single	Unconfined Semi-confined	5-10	-	-	-	-	-	-
Jharkhand	2095	19	-	Single	Unconfined Semi-confined	15 - 20	100 - 140	5-10	17-56	12 - 360	Upto 5	500-750
Kerala	-	11980	0	Single	Unconfined Semi-confined	5-25	30-90	5-10	14-80	75-205	Upto 2	500-1500
Madhya Pradesh	68	631	-	Single	Unconfined	15 - 25	60 - 175	5-10	19-50	60-140	Upto 1.5	1000-1500
Maharashtra	9481	7095	-	Single	Unconfined	10-25	70-130	5-10	6-27	10 - 80	Upto 1.5	500-1500
Nagaland	178	-	-	-	-	5-10	-	5-10	-	-	-	-
Orissa	-		109	Single	Unconfined Semi-confined	15 - 20	100 - 150	-	18-76	172 - 432	Upto 4	500-1500
Rajasthan	17168	555	1174	Single	Unconfined Semi-confined	8-20	20 - 200	5-10	17-44	14 - 864	Upto 1.5	2000-4000
Sikkim	-	3419	-	-	Unconfined	-	-	-	-	-	-	500-750
Tamil Nadu	-	451	51675	Single	Unconfined Semi-confined	3-25	40-160	5-10	12-32	80 - 2500	Upto 2	1000-2500
Uttarakhand	5735	697	-	Single	Unconfined Semi-confined	3-15	35-170	5-10	20-80	20-90	Upto 1.5	500-750
Total Area	**59260**	**43266**	**56228**									

DTW : Depth to water level
m bgl: Meter below ground level

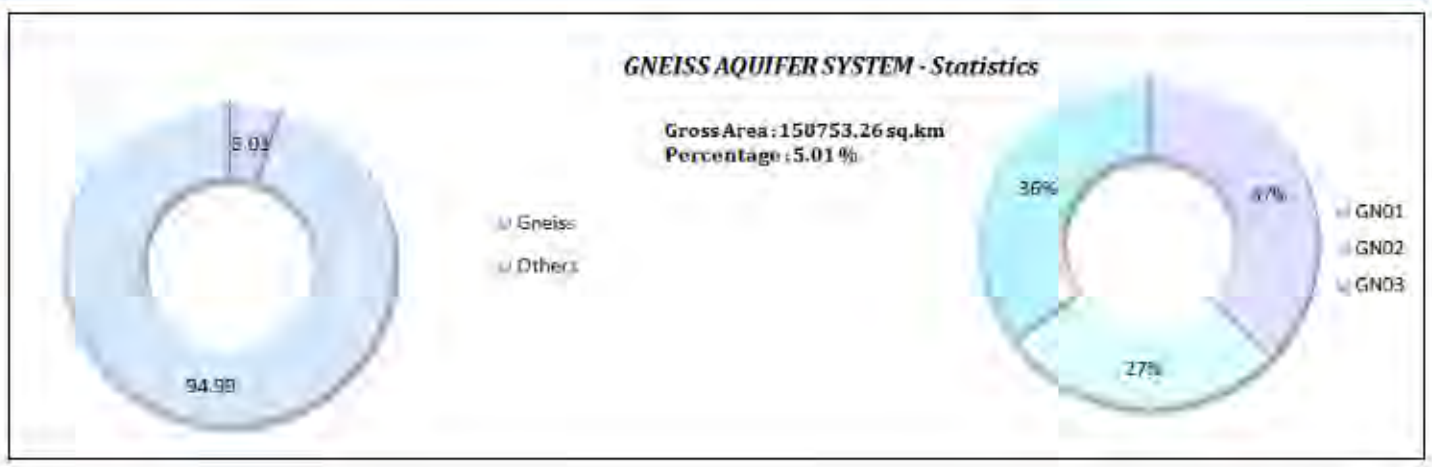


Table 20 : State wise Distribution and Characteristics of Banded Gneissic Complex (BGC) Aquifer System

STATE NAME	Major Aquifer (Area in sq.km)	Aquifer Properties								
	BGC	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	Fractures Encountered	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	BG01			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	110284	Single	Unconfined to Semi-confined	3-15	12 - 60	5-20	6 - 40	30 - 260	Upto 3	500-3500
Assam	7642	Single	Unconfined to Semi-confined	5-25	-	5-10	6 - 15	350	-	500-750
Bihar	4214	Single	Unconfined to Semi-confined	10 - 20	150	5-10	5 - 50	360 - 480	Upto 3	500-1000
Chhattisgarh	37756	Single	Unconfined to Semi Confined	Up to 60	-	5-15	2 - 100	86.4 - 432	Upto 2	500-1000
Goa	323	Single	Unconfined Semi-confined to Confined	Up to 60	-	5-10	-	100 - 400	Upto 3	500-750
Himachal Pradesh	3534	Single	At higher elevation area not explored					-	-	500-750
Jammu & Kashmir	11709	-	At higher elevation area not explored					-	-	>500
Jharkhand	46174	Single	Unconfined, Semi-confined to Confined	Up to 100	-	5-15	2 - 186	24 - 3624	Upto 2	500-1000
Karnataka	114943	Single	Unconfined, Semi-confined to Confined	Up to 60	-	5-20	2-176	100 - 400	Upto 2	500-5500
Kerala	1398	Single	Unconfined, Semi-confined	10-40	60 - 175	5-10	6-145	2 - 10	Upto 2	-
Madhya Pradesh	30253	Single	Unconfined, Semi-confined	5 - 15	> 150	5-20	5-119	43 - 210	Upto 2	500-1500
Maharashtra	262	Single	-	10-30	30-80	5-10	11-77	10 - 80	Upto 2	>500
Meghalaya	7204	Single	Unconfined, Semi-confined	5-15	20-40	5-10	5-40	5-10	Upto 2	
Orissa	54961	Single	Unconfined, Semi-confined	12 - 15	100 - 200	-	5 - 15	258 - 691	Upto 3	500-1500
Rajasthan	21506	-	-	10-40	60-170	5-20	3-45	-	Upto 2	500-2000
Tamil Nadu	7038	Single	Unconfined, Semi-confined	5 - 20	40 - 150	5-10	12 - 22	150 - 200	Upto 2	500-4000
Uttarakhand	5008	Not Explored								500-750
Uttar Pradesh	9283	Single	Unconfined, Semi-confined	Up to 40	70	5-20	4-79	43 - 432	Upto 1.5	500-1000
West Bengal	4893	Not Explored								500-1500
Total Area	478383									

DTW : Depth to water level
m bgl: Meter below ground level

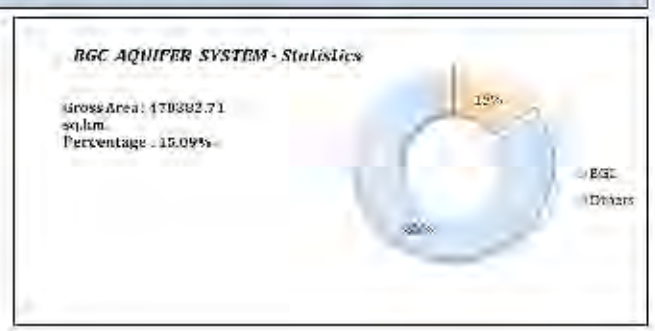


Table 19 : State wise Distribution and Characteristics of Basalt Aquifer System

STATE NAME	Major Aquifers (Area in sq km)		Aquifer Properties								
	Basic Basalt	Ultra Basic	Aquifer System	Type of Aquifer	Thickness of Weathered Zone	DTW (Decadal Avg)	Fractures Encountered	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/ cm)
	BS01	BS02			m	m bgl	m bgl	m^2/day	m^3/day	%	
Andhra Pradesh	9066	-	Single/Multiple	Unconfined to semiconfined	5 - 20	10-20	40-80	6 - 740	90 - 180	1-1.5	1500-2000
Arunachal Pradesh	1397	-	Not Explored								
Bihar	34	-	Single	Unconfined	40	5-10	60-130	10-300	100-200	1-1.5	500-1000
Chhattisgarh	836	-	Single	Unconfined	10 - 20	5-10	upto 150	5 - 50	360 - 480	1-2	500-750
Goa	35	-	Single	Unconfined	60	5-10	70-120	10-200	100-200	2-3	3500-5000
Gujarat	74297	-	Single	Unconfined Semi-confined	20-40	5-10	100 - 280	20-250	1 - 30	1-2	1500-8000
Jammu & Kashmir	6173	-	Not Explored								
Jharkhand	3085	7	Single/Multiple	Unconfined Semi-confined	10-35	5-10	100 - 130	26 - 176	12 - 240	2-3	500-750
Karnataka	34892	-	-	Unconfined	10-45	5-10	60-125	20-180	80-175	1-2	2000-3500
Madhya Pradesh	136433	-	Single/Multiple	Unconfined to semi confined	15 - 25	10-20	60 - 175	100 - 250	70 - 350	1.5-2	500-2000
Maharashtra	235903	-	Single/Multiple	Unconfined Semi-confined to Confined	15-30	5-10	20-200	20-200	45 - 90	2-3	500-2500
Rajasthan	9794	5	-	-	29-45	10-20	60-120	18-180	50-150	1-2	2500-3000
Uttar Pradesh	572	-	Single	Unconfined	5-30	10-20	30-150	-	-	-	500-1000
West Bengal	244	-	Single	-	10-25	5-10	35-90	-	-	-	500-750
Total Area	**512290**	**12**									

DTW : Depth to water level
m bgl: Meter below ground level

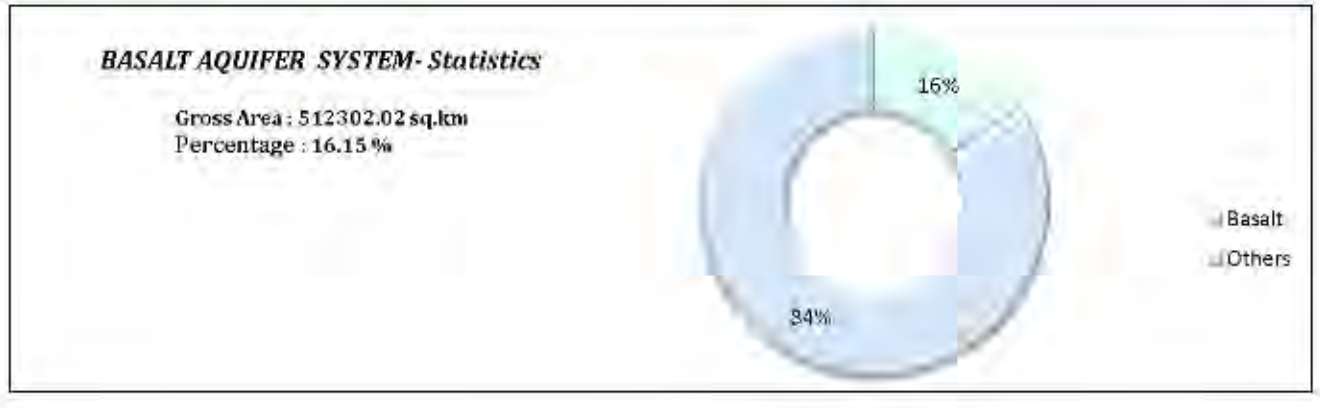


Table 18 : State wise Distribution and Characteristics of Alluvium Aquifer System

STATE NAME	Major Aquifers (Area in sq. km)						Aquifer Properties								
	Younger Alluvium	Pebble/Gravel	Older Alluvium	Aeolian Alluvium	Coastal Alluvium	Valley Fills	Aquifer System	Type of Aquifer	Thickness	Zones Tapped	DTW (Decadal Avg)	Transmissivity	Yield	Specific Yield	Quality (EC in Micromhos/cm)
	AL01	AL02	AL03	AL04	AL05	AL06			m	m bgl	m bgl	m²/day	m³/day	%	
Andhra Pradesh	13204	-	-	-	6920	-	Multiple	Unconfined	50-80	60-80	2-5	300 to 2000	180 to 264	6 - 10	500-3000
Arunachal Pradesh	68	-	4423	-	-	-	Multiple	Semi-confined Confined	upto 200	50-80	2-5	467 to 3111	1488 to 2400	8 - 16	500-1000
Assam	52381	-	4678	-	-	-	Multiple	Semi-confined Confined	30-200	50 - 166	2-5	upto 9000	2160 to4752	8 - 15	500-750
Bihar	73971	-	7833	-	-	-	Multiple	Semi-confined to Confined	50-650	50 - 248	5-10	3000-12000	200 to 1500	8 - 12	500-1000
Chhattisgarh	130	-	-	-	-	-	Multiple	Unconfined	Not explored						
Delhi	194	-	1056	68	-	-	Multiple	Semi Confined to confined	20-400	50-200	5-10	500-1200	800-2000	8 - 15	2000-3000
Goa	8	-	-	-	35	-	Single	Unconfined	2 - 10	-	-	2 to 2438	50 - 500	6 - 8	-
Gujarat	7035	-	25106	8948	19048	2309	Multiple	Semi-confined to Confined	10-475	50 - 435	10-20	200-800	200-2000	6 - 10	2000-5500
Haryana	2751	460	25855	12766	-	-	Multiple	Semi-confined to Confined	20-400	50-200	5-10	500-1200	800-2000	6 - 12	1000-4500
Himachal Pradesh	967	-	186	-	-	650	Multiple	Semi-confined to Confined	33 - 220	50 - 108	5-10	31 - 3336	104 - 5152	6 - 16	500-750
Jammu & Kashmir	21025	-	-	2816	-	-	Multiple	Semi-confined to Confined	40-160	50-120	5-10	100-600	200-1200	6 - 15	500-750
Jharkhand	2927	513	2286	-	-	-	Multiple	Semi-confined to confined	40- 130	50-70	5-10	208- 570	12 - 960	6 - 10	500-1000
Karnataka	703	-	-	-	-	-	Multiple	Unconfined	20-60	30-60	5-10	2-48	50 -500	8	500-2000
Kerala	3145	-	-	-	-	-	Multiple	Unconfined	30-350	100-350	2-5	3 - 275	25.92 - 86.4	8 - 16	-
Madhya Pradesh	21714	-	13094	-	-	-	Multiple	Unconfined	40 - 300	70-250	5-10	500 - 6700	864 - 2592	8 - 12	500-1000
Maharashtra	12427	434	-	-	1236	-	Multiple	Semi-confined to confined	50 - 400	80-300	10-20	63 - 136	13 - 56	6 - 10	500-1500
Manipur	1897	-	-	-	2059	-	Multiple	Semi-confined to confined	50-100	50-80	5-10	200-800	240 - 720	8 - 15	1500
Meghalaya	1002	-	-	-	-	-	Not Explored								
Nagaland	537	-	-	-	-	-	Multiple	Unconfined Semi-confined	40- 100	40 - 70	5-10	100 - 9000	864 - 3888	8 - 15	500-1500
Orissa	6773	-	24941	595	5405	-	Multiple	Semi-confined to confined	20-400	70 - 350	2-5	15 - 8000	70 - 6480	8 - 15	500-2000
Puducherry	310	-	-	-	112	-	-	-	-	-	2-5	-	-	8 - 14	1000-3000
Punjab	5592	460	33094	8967	-	335	Multiple	Semi-confined to Confined	20 - 600	70 - 450	10-20	100 - 7720	432 - 5184	8 - 15	500-2000
Rajasthan	3390	6	80114	114989	-	-	Multiple	Semi-confined to Confined	40-700	50-400	10-40	200-400	500-1200	8 - 10	-
Tamil Nadu	16915	78	-	56	5845	-	Multiple	Confined	40-400	70 - 350	2-5	50 - 5000	10 - 690	6 - 8	1000-3000
Tripura	602	-	-	-	-	-	Multiple	Semi-confined to Confined	10 - 15	-	-	-	240	-	500-1000
Uttarakhand	670	1247	6277	-	-	-	Multiple	-	30-200	50-100	5-10	30-3000	100-2000	8 - 15	500-750
Uttar Pradesh	37437	1960	172526	-	-	-	Multiple	Confined	100-650	100 - 650	5-10	upto 16000	1500 - 4000	8 - 18	500-3000
West Bengal	51464	8	5940	-	-	571	Multiple	Semi-confined to Confined	50-700	50 - 400	5-10	600-4000	200-1500	8 - 20	500-2000
Total Area	339298	5203	407490	148208	40660	3864									

DTW : Depth to water level
m bgl: Meter below ground level

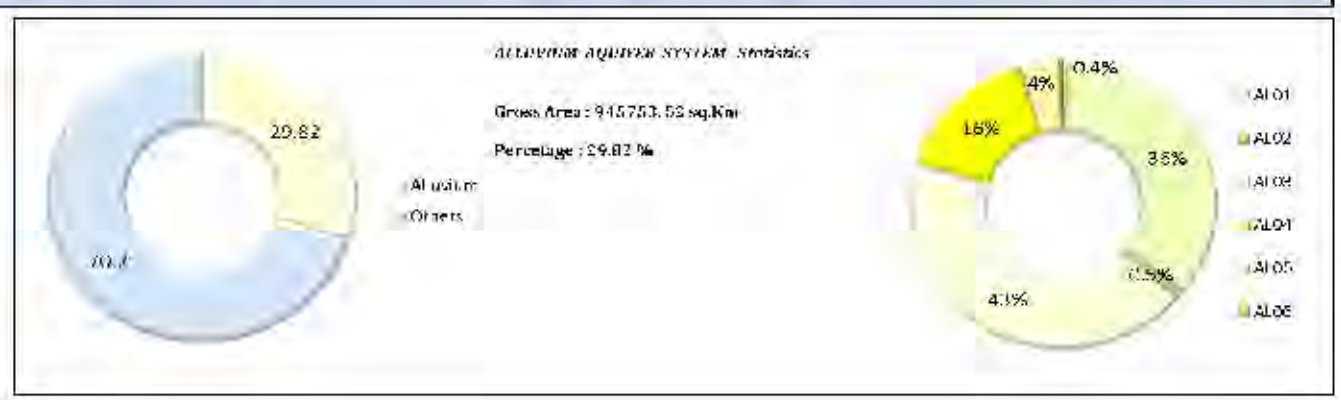


Table 6: Population Census - India

Sl. No.	Name of the State	Area (Sq. Km)	Population				
			Total Population			Sex ratio (females per 1000 males)	Density (Per sq.km)
			Persons	Males	Females		
1	**Andhra Pradesh**	275069	84665533	42509881	42155652	992	308
2	**Arunachal Pradesh**	83743	1382611	720232	662379	920	17
3	**Assam**	78438	31169272	15954927	15214345	954	397
4	**Bihar**	94163	103804637	54185347	49619290	916	1102
5	**Chhattisgarh**	136034	25540196	12827915	12712281	991	189
6	**Goa**	3702	1457723	740711	717012	968	394
7	**Gujarat**	196024	60383628	31482282	28901346	918	308
8	**Haryana**	44212	25353081	13505130	11847951	877	573
9	**Himachal Pradesh**	55673	6856509	3473892	3382617	974	123
10	**Jammu & Kashmir**	222236	12548926	6665561	5883365	883	124
11	**Jharkhand**	79714	32966238	16931688	16034550	947	414
12	**Karnataka**	191791	61130704	31057742	30072962	968	319
13	**Kerala**	38863	33387677	16021290	17366387	1084	859
14	**Madhya Pradesh**	308144	72597565	37612920	34984645	930	236
15	**Maharashtra**	307713	112372972	58361397	54011575	925	365
16	**Manipur**	22327	2721756	1369764	1351992	987	122
17	**Meghalaya**	22429	2964007	1492668	1471339	986	132
18	**Mizoram**	21081	1091014	552339	538675	975	52
19	**Nagaland**	16579	1980602	1025707	954895	931	119
20	**Orissa**	155707	41947358	21201678	20745680	978	269
21	**Punjab**	50362	27704236	14634819	13069417	893	550
22	**Rajasthan**	342240	68621012	35620086	33000926	926	201
23	**Sikkim**	7096	607688	321661	286027	889	86
24	**Tamil Nadu**	130058	72138958	36158871	35980087	995	555
25	**Tripura**	10493	3671032	1871867	1799165	961	350
26	**Uttar Pradesh**	240928	199581477	104596415	94985062	908	828
27	**Uttarakhand**	53484	10116752	5154178	4962574	963	189
28	**West Bengal**	88752	91347736	46927389	44420347	947	1029
29	**Andaman & Nicobar Islands**	8249	379944	202330	177614	878	46
30	**Chandigarh**	114	1054686	580282	474404	818	9252
31	**Dadra & Nagar Haveli**	491	342853	193178	149675	775	698
32	**Daman & Diu**	112	242911	150100	92811	618	2169
33	**Delhi**	1483	16753235	8976410	7776825	866	11297
34	**Lakshadweep**	32	64429	33106	31323	946	2013
35	**Puducherry**	479	1244464	610485	633979	1038	2598
Total		**3288015**	**1210193422**	**623724248**	**586469174**	**933**	**325**

source: censusindia.gov.in-Census-2011

Table 16 : Districts showing Arsenic in Ground Water In different states of India

Sl. No.	State	Name of districts (in parts) with Arsenic (As> 0.05 mg/ l) in Ground Water
1	Assam	Dhemaji
2	Bihar	Begusarai, Bhagalpur, Bhojpur, Buxar, Darbhanga, Katihar, Khagaria, Kishanganj, Lakhiserai,Munger, Patna, Purnea, Samastipur, Saran, Vaishali
3	Chhattisgarh	Rajnandgaon
4	Uttar Pradesh	Agra, Aligarh, Balia, Balrampur, Gonda, Gorakhpur, Lakhimpur Kheri, Mathura, Muradabad
5	West Bengal	Bardhaman, Hooghly, Howrah, Malda, Murshidabad, Nadia, North 24 Paraganas, South 24 Paraganas

Data Source - Central Ground Water Board along with Task force & State Agencies

Table 15: Districts showing Nitrate in Ground Water in Different States of India

Sl. No.	State	Name of districts (in parts) with Nitrate (>45 mg/litre) in Ground Water
1	Andhra Pradesh	Adilabad, Anantpur, Chittoor, Cuddapah, East Godavari, Guntur, Hyderabad, Karimnagar, Khammam, Krishna, Kurnool, Mahbubnagar, Medak, Nalgonda, Nellore, Nizamabad, Prakasam, Ranga Reddy, Srikakulam, Visakhapatnam, Vizianagaram, Warangal, West Godavari
2	Bihar	Aurangabad, Banka, Bhagalpur, Bhojpur, Kaimur(Bhabua), Patna, Rohtas, Saran, Siwan
3	Chhattisgarh	Bastar, Bilaspur, Dantewada, Dhamtari, Jashpur, Kanker, Kawardha, Korba, Mahasamund, Raigarh, Raipur, Rajnandgaon
4	Delhi	Central Delhi, New Delhi, North Delhi, North West Delhi, South Delhi, South West Delhi, West Delhi
5	Goa	North Goa
6	Gujarat	Ahmadabad, Amreli, Anand, Banaskantha, Bharuch, Bhavnagar, Dohad, Jamnagar, Junagadh, Kachchh, Kheda, Mehsana, Narmada, Navsari, Panchmahals, Patan, Porbandar, Rajkot, Sabarkantha, Surat, Surendranagar,Vadodara,
7	Haryana	Ambala, Bhiwani, Faridabad, Fatehabad, Gurgaon, Hissar, Jhajjar, Jind, Kaithal, Karnal, Kurukshetra, Mahendragarh, Panchkula, Panipat, Rewari, Rohtak, Sirsa, Sonepat, Yamuna Nagar
8	Himachal Pradesh	Una
9	Jammu & Kashmir	Jammu, Kathua
10	Jharkhand	Chatra, Garhwa, Godda, Gumla, Lohardaga, Pakaur, Palamu, Paschimi Singhbhum, Purbi Singhbhum, Ranchi, Sahibganj
11	Karnataka	Bagalkot, Bangalore, Belgaum, Bellary, Bidar, Bijapur, Chikmagalur, Chitradurga, Davangere, Dharwad, Gadag, Gulburga, Hassan, Haveri, Kodagu, Kolar, Koppal, Mandya, Mysore, Raichur. Shimoga, Udupi, Uttara Kannada
12	Kerala	Alappuzha, Idukki, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad, Pathanamthitta, Thiruvananthapuram, Thrissur, Wayanad
13	Maharashtra	Ahmednagar, Akola, Amravati, Auragabad, Beed, Bhandara, Buldana, Chandrapur, Dhule, Gadchiroli, Gondia, Hingoli, Jalgaon, Jalna, Kohlapur, Latur, Nagpur, Nanded, Nandurbar, Nashik, Osmanabad, Parbhani, Pune, Sangli, Satara, Solapur, Wardha, Washim, Yavatmal
14	Madhya Pradesh	Anuppur, Ashok Nagar, Balaghat, Barwani, Betul, Bhind, Bhopal, Burhanpur, Chhatarpur, Chhindwara, Damoh, Datia, Dewas, Dhar, Gwalior, Harda, Hoshangabad, Indore, Jabalpur, Jhabua, Katni, Khandwa, Khargaon, Mandla, Mandsaur, Morena, Narsimhapur, Neemuch, Panna, Raisen, Rajgarh, Ratlam, Rewa, Sagar, Satna, Sehore, Seoni, Shahdol, Shajapur, Sheopur, Shivpuri, Sidhi, Tikamgarh, Ujjain, Umaria, Vidisha
15	Orissa	Angul, Balasore, Bargarh, Bhadrak, Bolangir, Baudh, Cuttack, Deogarh, Dhenkanal, Gajapati, Ganjam, J.Singhpur, Jajpur, Jharsuguda, Kalahandi, Kendrapara, Keonjhar, Khurda, Koraput, Malkangiri, Mayurbhanj, Nawapada, Nayagarh, Phulbani, Puri, Sambalpur, Sundergarh, Sonapur
16	Punjab	Amritsar, Bhathinda, Faridkot, Fatehgarh Sahib, Firozepur, Gurdaspur, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana, Mansa, Moga, Muktsar, Nawan Shahr, Patiala, Rupnagar, Sangrur
17	Rajasthan	Ajmer, Alwar, Banaswara, Baran, Barmer, Bundi, Bharatpur, Bhilwara, Bikaner, Chittaurgarh, Churu, Dausa, Dhaulpur, Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jalor, Jhalawar, Jhunjhunu, Jodhpur, Karauli, Kota, Nagaur, Pali, Partapgarh, Rajsamand, Sirohi, Sikar, Sawai Madhopur, Tonk, Udaipur
18	Tamil Nadu	Chennai, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kancheepuram, Kanyakumari, Karur, Madurai, Namakkal, Nilgiris, Perambalur, Pudukkottai, Ramanathapuram, Salem, Sivaganga, Theni, Thiruvannamalai, Thanjavur, Tirunelveli, Thiruvallur, Trichi, Tuticorin, Vellore, Villupuram, Virudhunagar
19	Uttar Pradesh	Agra, Aligarh, Allahabad, Ambedkar Nagar, Auraiya, Badaun, Baghpat, Balrampur, Banda, Barabanki, Bareilly, Basti, Bijnor, Bulandshahr, Chitrakoot, Etah, Etawa, Fatehpur, Firozabad, GB Nagar, Ghaziabad, Ghazipur, Hamirpur, Hardoi, Jaunpur, Jhansi, Kannauj, Kanpur Dehat, Lakhimpur, Mahoba, Mathura, Meerut, Moradabad, Muzaffarnagar, Raebareli, Rampur, Sant Ravidas Nagar, Shahjahanpur, Sitapur, Sonbhadra, Sultanpur, Unnao
20	Uttrakhand	Dehradun, Hardwar, Udhamsinghnagar
21	West Bengal	Bankura, Bardhaman

Table 14: Districts Showing Fluoride in Ground Water in different states of India

Sl.No	State	Name of districts (in parts) with Flouride (>1.5mg/litre) in Ground Water
1	Andhra Pradesh	Adilabad, Anantpur, Chittoor, Guntur, Hyderabad, Karimnagar, Khammam, Krishna, Kurnool, Mahbubnagar, Medak, Nalgonda, Nellore, Prakasam, Ranga Reddy, Visakhapatnam, Vizianagaram, Warangal, West Godavari
2	Assam	Goalpara, Kamrup, Karbi Anglong, Nagaon,
3	Bihar	Aurangabad, Banka, Buxar, Jamui, Kaimur(Bhabua), Munger, Nawada, Rohtas, Supaul
4	Chhattisgarh	Bastar, Bilaspur, Dantewada, Janjgir-Champa, Jashpur, Kanker, Korba, Koriya, Mahasamund, Raipur, Rajnandgaon, Surguja
5	Delhi	East Delhi, North West Delhi, South Delhi, South West Delhi, West Delhi
6	Gujarat	Ahmadabad, Amreli, Anand, Banaskantha, Bharuch, Bhavnagar, Dohad, Junagadh, Kachchh, Mehsana, Narmada, Panchmahals, Patan, Rajkot, Sabarkantha, Surat, Surendranagar,Vadodara,
7	Haryana	Bhiwani, Faridabad, Gurgaon, Hissar, Jhajjar, Jind, Kaithal, Kurushetra, Mahendragarh, Panipat, Rewari, Rohtak, Sirsa, Sonepat
8	Jammu & Kashmir	Rajauri, Udhampur
9	Jharkhand	Bokaro, Giridih, Godda, Gumla, Palamu, Ranchi
10	Karnataka	Bagalkot, Bangalore, Belgaun, Bellary, Bidar, Bijapur, Chamarajanagar, Chikmagalur, Chitradurga, Davangere, Dharwad, Gadag, Gulburga, Haveri, Kolar, Koppal, Mandya, Mysore, Raichur, Tumkur
11	Kerala	Palakkad
12	Maharashtra	Amravati, Chandrapur, Dhule, Gadchiroli, Gondia, Jalna, Nagpur, Nanded
13	Madhya Pradesh	Bhind, Chhatarpur, Chhindwara, Datia, Dewas, Dhar, Guna, Gwalior, Harda, Jabalpur, Jhabua, Khargaon, Mandsaur, Rajgarh, Satna, Seoni, Shajapur, Sheopur, Sidhi
14	Orissa	Angul, Balasore, Bargarh, Bhadrak, Bandh, Cuttack, Deogarh, Dhenkanal, Jajpur, Keonjhar, Sonapur
15	Punjab	Amritsar, Bhatinda, Faridkot, fatehgarh Sahib, Firozepur, Gurdaspur, Mansa, Moga, Muktsar, Patiala, Sangrur
16	Rajasthan	Ajmer, Alwar, Banaswara, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittaurgarh, Churu, Dausa, Dhaulpur, Dungarpur, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jalor,Jhunjhunun, Jodhpur, Karauli, Kota, Nagaur, Pali, Rajsamand, Sirohi, Sikar, SawaiMadhopur, Tonk, Udaipur
17	Tamil Nadu	Coimbatore, Dharmapuri, Dindigul, Erode, Karur, Krishnagiri, Namakkal, Perambalur, Puddukotai, Ramanathapuram, Salem, Sivaganga, Theni, Thiruvannamalai, Tiruchirapally, Vellore, Virudhunagar
18	Uttar Pradesh	Agra, Aligarh, Etah, Firozabad, Jaunpur, Kannauj, Mahamaya Nagar, Mainpuri, Mathura, Mau
19	West Bengal	Bankura, Bardhaman, Birbhum, Dakshindinajpur, Malda, Nadia, Purulia, Uttardinajpur

Table 13: Districts showing Salinity in Ground Water in Different States of India

Sl. No.	State	Name of districts (in parts) with EC > 3000 µS/cm in Ground Water
1	Andhra Pradesh	Anantapur, Chittoor*,Kurnool, Kadapa(Cuddapah), Nellore, Prakasam, Guntur, Mahbubnagar, Nalgonda, Krishna, Khammam, Warangal, Medak, East Godavari, Srikakulam, Visakhapatnam
2	Delhi	North West, West, South West
3	Gujarat	Ahmadabad, Amreli, Anand, Bharuch, Bhavnagar, Banaskantha, Dohad,Porbandar, Jamnagar, Junagadh, Kachchh, Kheda, Mehsana, Navsari, Patan, Panchmahals, Rajkot, Sabarkantha, Surendranagar, Surat, Vadodara,
4	Haryana	Bhiwani, Faridabad , Fatehabad, Gurgaon, Hissar, Jhajjar, Kaithal, Mahendragarh, Panipat, Rewari, Rohtak, Sirsa, Sonepat, Yamunanagar*
5	Himachal Pradesh	Mandi*
6	Karnataka	Bijapur,Bagalkot, Belgaun, Bellary, Chitradurga, Chikmagalur, Davangiri, Dharwar,Gadag, Gulburga, Hassan*, Haveri, Mandya*, Raichur, Udupi
7	Kerala	Palakkad*
8	Maharashtra	Ahmadnagar,Aurangabad*,Akola, Amravati, Beed*, Buldana, Chandrapur, Dhule*, Jalna,Jalgaon,Nagpur*,Nasik, Parbhani, Raigarh*, Satara, Solapur*, Wardha
9	Madhya Pradesh	Bhind, Indore, Jhabua*, Sheopur*, Ujjain
10	Orissa	Jagatsinghpur*
11	Punjab	Bhathinda, Firozepur, Faridkot, Gurudaspur*, Mansa, Muktsar, Patiala*,Sangrur
12	Rajasthan	Ajmer, Alwar, Barmer, Bharatpur, Bhilwara, Bundi, Bikaner, Churu, Chittaurgarh, Dhaulpur, Dausa, Ganganagar, Hanumangarh, Jaipur, Jaisalmer, Jalor,Jhunjhununn, Jodhpur,Karoli, Nagaur, Neemuch, Pali, RajaSamand, Sirohi, Sikar, Sawai Madhopur, Tonk, Udaipur
13	Tamil Nadu	Coimbatore, Chennai, Cuddalore, Dindigul,Dharmapuri, Erode, Pudukkottai, Ramanathapuram, Salem, Karur, Namakkal, Perambalur, Thiruvannamalai, Tiruchirapalli, Thanjavur, Thoothukkudi, Tirunelveli, Theni*,Vellore, Villupuram, Virudhanagar
14	Uttar Pradesh	Agra, Allahabad*, Aligarh, Hamirpur*, Hathras, Jyotibaphulenagar*, Mathura
15	West Bengal	Bankura*,Haora, Medinipur,N-24 Pargana, S-24 Parganas

* Isolated Pockets

Table 12: State wise Post Monsoon Depth to Water level (Decadal Mean 2002 - 2011)

State Name	Alluvium		Laterite		Basalt		Sandstone		Shale		Limestone		Granite		Schist		Quartzite		Charnockite		Khondalite		BGC		Gneiss		Intrusives	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Andhra Pradesh	0.1	17.7	0.1	17.7	0.1	10.4	0.1	10.4	2.0	10.4	2.0	6.6	2.0	17.7	0.1	17.7	0.1	10.4	0.1	10.4	0.1	6.6	0.1	17.7	0.1	17.7	10.4	17.7
Arunachal Pradesh	0.1	4.6					2.0	3.6	0.1	4.6	2.0	3.0			2.0	3.0	2.0	3.0										
Assam	0.1	10.4					0.1	6.6	0.1	6.6	2.0	3.0	0.1	6.6	2.0	3.0	0.1	6.6					0.1	6.6				
Bihar	0.1	6.6	3.6	4.6	3.6	4.6	2.0	6.6	3.6	6.6	3.6	6.6	3.0	6.6	2.0	6.6	2.0	6.6	3.6	4.6			2.0	6.6	2.0	6.6	3.0	4.6
Chandigarh	10.4	31.9					10.4	17.7																				
Chhattisgarh	3.0	6.6	2.0	10.4	3.0	10.4	2.0	17.7	0.1	10.4	0.1	6.6	2.0	10.4	2.0	17.7	2.0	10.4	2.0	10.4	2.0	3.6	2.0	17.7	2.0	17.7	2.0	6.6
Dadra & Nagar Haveli					2.0	4.6																						
Daman & Diu					3.6	4.6					4.6	6.6																
Delhi	4.6	17.7															10.4	17.7										
Goa	2.0	6.6	2.0	10.4	2.0	6.6	3.6	10.4					2.0	3.6	2.0	10.4	3.0	4.6					2.0	10.4			2.0	6.6
Gujarat	2.0	31.9	4.6	10.4	2.0	31.9	3.6	31.9	3.0	31.9	3.6	31.9	3.6	31.9	3.6	31.9	4.6	17.7					4.6	6.6	3.6	31.9	4.6	10.4
Haryana	3.6	59.4					6.6	17.7	10.4	17.7					10.4	17.7	6.6	59.4							10.4	17.7		
Himachal Pradesh	3.0	17.7					3.0	17.7	10.4	17.7			4.6	6.6														
Jammu & Kashmir	3.6	6.6					4.6	6.6																				
Jharkhand	2.0	10.4	2.0	10.4	3.0	10.4	2.0	10.4	2.0	6.6	3.0	10.4	2.0	6.6	2.0	10.4	2.0	10.4	3.0	4.6			2.0	10.4	3.0	10.4	2.0	10.4
Karnataka	2.0	10.4	2.0	17.7	2.0	17.7	2.0	17.7	3.6	4.6	2.0	17.7	2.0	17.7	2.0	17.7			4.6	17.7			2.0	17.7	4.6	17.7	2.0	17.7
Kerala	0.1	10.4	0.1	10.4			6.6	10.4					4.6	10.4	3.6	10.4	3.6	6.6	0.1	10.4	3.0	10.4	3.6	10.4	2.0	17.7	3.6	10.4
Madhya Pradesh	3.0	31.9	2.0	17.7	2.0	31.9	2.0	17.7	2.0	17.7	2.0	17.7	2.0	17.7	2.0	17.7	2.0	17.7					2.0	17.7	3.0	10.4	3.0	10.4
Maharashtra	0.1	17.7	2.0	17.7	0.1	17.7	2.0	17.7	2.0	6.6	3.6	10.4	2.0	6.6	2.0	6.6	2.0	6.6	4.6	6.6			2.0	10.4	2.0	10.4	3.0	6.6
Manipur	0.1	3.0					0.1	3.0	2.0	3.0																		
Meghalaya	0.1	4.6					0.1	3.6	0.1	6.6			0.1	6.6			0.1	6.6					0.1	6.6				
Mizoram	0.1	3.0					2.0	3.6	0.1	4.6																		
Nagaland	2.0	6.6					0.1	6.6	0.1	4.6																		
Orissa	0.1	10.4	0.1	10.4			2.0	10.4	2.0	6.6			2.0	6.6	2.0	6.6	2.0	6.6	0.1	10.4	0.1	10.4	0.1	10.4	2.0	6.6	2.0	6.6
Puducherry	0.1	17.7	2.0	3.6			3.6	10.4											6.6	10.4					2.0	17.7		
Punjab	0.1	31.9					3.6	17.7					4.6	6.6														
Rajasthan	3.6	112.6	4.6	17.7	3.6	31.9	3.6	112.6	3.0	112.6	3.6	112.6	3.6	59.4	4.6	112.6	4.6	112.6	6.6	17.7	6.6	17.7	3.6	59.4	3.6	59.4	4.6	59.4
Sikkim	3.6	4.6											3.6	4.6	3.6	4.6	3.6	4.6					3.6	4.6	3.6	4.6		
Tamil Nadu	0.1	31.9	2.0	31.9			0.1	59.4	2.0	31.9	6.6	31.9	3.0	17.7	3.6	17.7	4.6	10.4	0.1	17.7	2.0	17.7	2.0	17.7	2.0	31.9	3.0	17.7
Tripura	2.0	4.6					2.0	4.6	2.0	4.6																		
Uttarakhand	3.0	17.7					3.6	17.7																				
Uttar Pradesh	0.1	31.9			4.6	10.4	3.6	17.7	3.6	17.7	3.6	6.6			4.6	6.6	2.0	17.7					2.0	10.4	4.6	10.4	4.6	6.6
West Bengal	0.1	10.4	2.0	10.4	2.0	6.6	2.0	6.6	2.0	4.6	3.0	4.6	2.0	6.6	2.0	10.4	3.0	4.6					2.0	6.6	2.0	6.6	2.0	6.6
India	0.1	112.6	0.1	31.9	0.1	31.9	0.1	112.6	0.1	112.6	0.1	112.6	0.1	59.4	0.1	112.6	0.1	112.6	0.1	17.7	0.1	17.7	0.1	59.4	0.1	59.4	2.0	59.4

Unit : m bgl (meter below ground level)

Table 11 : State wise Pre-monsoon Depth to Water Level (Decadal mean 2002-2011)

State Name	Alluvium		Laterite		Basalt		Sandstone		Shale		Limestone		Granite		Schist		Quartzite		Charnockite		Khandalite		BGC		Gneiss		Intrusives	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Andhra Pradesh	4.3	5.8		9.1	7.0	10.7	6.0	7.9	6.9	8.9	6.2	9.1	6.8	9.1	6.1	7.5	6.2	7.8	5.6	6.7	5.8	6.9	6.1	8.4	6.1	7.8	8.7	13.3
Arunachal Pradesh	1.9	4.5			0.0	4.0	3.0	5.2	2.6	4.9			0.0	4.0	0.0	4.0	0.0	4.0							0.0	4.0		
Assam	3.6	5.7					3.1	5.5	3.0	5.4			1.0	4.3	0.0	4.0	2.1	4.6					2.0	4.7				
Bihar	3.6	5.7	5.3	6.3	5.7	6.7	5.0	6.5	6.5	7.5	5.3	6.3	6.3	7.4	6.9	8.1	6.8	8.0	6.0	7.0			6.8	7.9	6.4	8.0	6.9	7.9
Chandigarh	10.0	20.0					10.0	20.0																				
Chhattisgarh	6.3	7.6	7.1	8.3	7.4	8.9	7.1	8.4	6.6	7.8	7.1	8.3	7.2	8.4	7.1	8.3	7.3	8.8	6.6	8.2	6.0	7.0	7.2	8.8	7.2	8.4	7.3	8.6
Dadra & Nagar Haveli					5.8	6.8																						
Daman & Diu					7.5	9.0																						
Delhi	7.7	10.6															6.5	7.5										
Goa	3.5	5.1	3.6	5.3	4.1	6.1	2.0	4.5			3.6	5.3	4.5	5.5	4.8	5.9	5.0	6.0					3.7	5.5			5.0	6.7
Gujarat	9.3	16.6	10.0	20.0	9.0	16.0	8.6	14.8	9.7	18.4	10.0	20.0	10.4	20.7	9.9	18.8	9.8	19.1					9.0	15.0	10.1	19.7	9.1	15.7
Haryana	8.9	16.0					10.0	20.0	10.0	20.0					10.0	20.0	13.5	29.5							10.0	20.0		
Himachal Pradesh	7.5	10.7					7.6	11.9	8.2	12.6			8.0	13.1	7.8	12.1	8.1	12.7					6.8	8.5	7.7	11.3	6.0	10.0
Jammu & Kashmir	5.1	7.1			4.2	6.2	4.9	6.7	4.8	6.6			4.0	6.2	5.3	6.7							3.9	5.8	3.1	5.4	4.7	6.1
Jharkhand	7.4	9.1	7.2	8.7	7.1	8.2	7.2	8.6	7.3	8.8	7.2	8.7	7.2	8.6	7.2	8.6	7.6	9.4	6.7	7.7			7.1	8.4	7.0	8.2	6.9	8.0
Karnataka	6.9	8.2	7.5	9.8	7.6	11.5	7.3	10.3	8.0	10.0	7.5	9.8	6.5	8.2	6.9	8.9			8.0	12.2			7.0	9.5	7.6	10.9	6.0	7.3
Kerala	5.6	8.6	6.0	8.2			8.0	10.0			6.0	8.2	6.1	8.4	5.8	6.8	8.3	12.7	5.3	7.3	5.7	7.1	7.0	10.3	6.3	8.5	6.7	10.7
Madhya Pradesh	9.4	16.8	7.9	11.5	8.2	12.0	8.7	14.3	8.7	14.4	7.9	11.5	7.4	9.1	7.7	10.5	8.1	10.9					7.6	10.7	8.0	10.3	7.7	9.4
Maharashtra	5.4	10.0	6.8	8.8	8.2	13.3	7.9	10.8	7.2	9.0	6.8	8.8	7.4	8.8	7.3	9.1	6.9	8.3	8.0	10.0			7.9	11.1	7.5	9.4	7.5	9.1
Manipur	4.9	7.2					5.5	8.2	6.7	10.1																	8.6	13.0
Meghalaya	3.7	5.6					0.0	4.0	1.6	4.5			0.5	4.1			1.0	4.3					1.8	4.6				
Mizoram	0.0	4.0					1.2	4.4	1.8	4.6																		
Nagaland	6.4	7.7					6.3	7.9	7.2	10.0															5.8	7.0	6.0	7.2
Orissa	3.7	5.7	5.0	6.3			5.4	6.5	5.7	6.8	5.0	6.3	5.6	6.7	6.0	7.0	5.7	6.7	5.6	6.6	5.4	6.4	5.5	6.6	5.3	6.3	6.1	7.3
Puducherry	4.2	5.8	4.0	5.0			4.0	5.0			4.0	5.0							4.0	5.0					5.3	6.3		
Punjab	7.4	12.0					6.1	8.5					4.0	5.0														
Rajasthan	15.5	35.9	9.4	17.0	9.2	16.8	17.6	39.8	13.0	27.9	9.4	17.0	15.4	36.1	13.3	29.2	14.4	32.8	10.0	20.0	10.0	20.0	11.5	24.0	11.3	23.4	11.3	23.3
Sikkim	5.3	6.3					4.0	5.0	5.5	6.5			4.2	5.2	4.7	5.7	4.0	5.0					5.0	6.0	4.7	5.7		
Tamil Nadu	5.6	8.1	5.9	7.3			6.4	8.6	6.6	8.7	5.9	7.3	7.6	11.1	7.0	9.6	4.9	5.9	7.3	10.3	7.0	9.1	7.6	11.4	7.0	9.5	8.1	13.4
Tripura	1.6	4.5					2.6	4.8	2.2	4.6																		
Uttarakhand	7.9	13.1					8.4	14.1	10.3	20.0			10.0	20.0	10.9	22.0	9.9	18.9					11.6	24.0	11.0	22.3	10.8	22.5
Uttar Pradesh	7.2	10.9			7.7	9.3	8.1	12.3	7.5	9.8					7.8	9.5	7.6	10.5					7.5	10.1	8.0	10.0	8.0	10.0
West Bengal	5.9	7.3	6.6	8.5	7.2	8.9	6.4	7.8	6.2	7.5	6.6	8.5	7.6	9.9	7.2	9.2	8.0	10.0					6.3	7.7	6.5	7.8	6.6	8.3
India	0.0	35.9	3.6	20.0	0.0	16.8	0.0	39.8	1.6	27.9	3.6	20.0	0.0	36.1	0.0	29.2	0.0	32.8	4.0	20.0	5.4	20.0	1.8	24.0	0.0	23.4	4.7	23.3

Unit : m bgl (meter below ground level)

Table 10 : State wise and Aquifer wise distribution of GW Observation Wells (Dugwells/ Peizometers) - Number of Wells per Toposheet (Wells / 720 sq km)

State Name	Total Area (sq km)	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Unclassified	Total No of DW	Total No of PZ	Total
Andaman & Nicobar Islands	6701	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	64 (7)	64	0	64
Andhra Pradesh	268105	67/31 (4)	8/8 (7)	19/16 (3)	44/33 (3)	30/19 (2)	20/12 (2)	27/27 (3)	24/9 (2)	8/2 (1)	28/10 (2)	53/7 (4)	212/222 (3)	40/7 (3)	0 (0)	0 (0)	580	402	982
Arunachal Pradesh	79334	8 (1)	NA (0)	0 (0)	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	NA (0)	0 (0)	12	0	12
Assam	75576	255/10 (3)	NA (0)	NA (0)	8 (1)	13 (2)	NA (0)	NA (0)	0 (0)	3 (3)	NA (0)	NA (0)	13 (1)	NA (0)	NA (0)	0 (0)	292	10	302
Bihar	90549	315/12 (3)	0 (0)	1 (21)	3 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (3)	0 (0)	NA (0)	9 (2)	0 (0)	0 (0)	0 (0)	329	12	341
Chandigarh	115	1/27 (175)	NA (0)	NA (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	1	27	28
Chhattisgarh	130908	2 (11)	3 (1)	2 (2)	87/54 (4)	76/48 (6)	65/52 (6)	14 (4)	1 (0)	0 (0)	3 (2)	0 (0)	143/52 (4)	61/30 (3)	4 (1)	NA (0)	461	248	709
Dadra & Nagar Haveli	477	NA (0)	NA (0)	7 (11)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	7	0	7
Daman & Diu	81	NA (0)	NA (0)	9 (189)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	9	5	14
Delhi	1455	19/127 (80)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	6/10 (84)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	25	137	162
Goa	3553	0 (0)	19/32 (23)	1 (21)	2/11 (35)	NA (0)	NA (0)	1 (39)	8/5 (11)	NA (0)	NA (0)	NA (0)	5/11 (36)	NA (0)	7 (13)	NA (0)	43	59	102
Gujarat	175560	201/257 (5)	1 (14)	273/53 (3)	28/16 (3)	20/9 (4)	48/18 (10)	13/5 (5)	36/15 (4)	3 (2)	NA (0)	NA (0)	NA (0)	10/2 (7)	0 (0)	4/1 (0)	637	376	1013
Haryana	42769	196/265 (8)	NA (0)	NA (0)	2 (2)	NA (0)	NA (0)	NA (0)	NA (0)	0/1 (2)	NA (0)	NA (0)	NA (0)	0 (0)	NA (0)	NA (0)	198	266	464
Himachal Pradesh	54596	36 (14)	NA (0)	NA (0)	51 (3)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	NA (0)	NA (0)	0 (0)	0 (0)	0 (0)	NA (0)	89	0	89
Jammu & Kashmir	221487	106/19 (4)	NA (0)	0 (0)	67 (1)	0 (0)	0 (0)	0 (0)	0 (1)	NA (0)	NA (0)	NA (0)	0 (0)	5 (1)	0 (0)	0 (0)	178	19	197
Jharkhand	76702	31 (4)	1 (1)	8 (2)	17 (3)	0 (0)	1 (1)	3 (1)	21/4 (11)	0 (0)	1 (4)	NA (0)	122/8 (2)	8 (3)	2 (2)	NA (0)	215	12	227
Karnataka	195256	13/4 (17)	25/8 (7)	212/63 (6)	3/2 (5)	NA (0)	23/13 (4)	NA (0)	123/36 (0)	NA (0)	0 (0)	NA (0)	735/247 (6)	0 (0)	NA (0)	0 (0)	1134	373	1507
Kerala	41803	109/74 (42)	51/13 (32)	NA (0)	NA (0)	NA (0)	NA (0)	5 (19)	6/2 (34)	2/1 (31)	235/71 (14)	82/34 (20)	0 (0)	166/70 (14)	2/2 (17)	0 (0)	658	267	925
Lakshawadeep	25	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	0	0	0
Madhya Pradesh	296232	140/32 (4)	9/3 (4)	372/215 (3)	103/34 (2)	110/38 (4)	16/7 (3)	8/1 (4)	17/3 (3)	3/1 (1)	NA (0)	NA (0)	92/39 (3)	0/1 (1)	0/1 (2)	NA (0)	870	376	1246
Maharashtra	296387	55/19 (4)	26/4 (4)	799/175 (3)	30/13 (4)	4/2 (7)	5/1 (2)	31/2 (3)	27/2 (0)	11 (10)	NA (0)	NA (0)	2 (6)	84/10 (4)	1 (1)	0 (0)	1075	227	1302
Manipur	21448	13/10 (4)	NA (0)	NA (0)	0 (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	0 (0)	13	10	23
Meghalaya	21594	5 (4)	NA (0)	NA (0)	NA (0)	16/5 (1)	NA (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	10 (1)	NA (0)	NA (0)	NA (0)	31	5	36
Mizoram	20289	NA (0)	NA (0)	NA (0)	0 (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0	0	0
Nagaland	15977	5/4 (12)	NA (0)	NA (0)	1 (0)	6/3 (1)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	0 (0)	0 (0)	12	7	19
Orissa	148798	320/46 (7)	52/12 (9)	NA (0)	32/5 (5)	17/1 (4)	NA (0)	7/2 (5)	25 (4)	13/2 (3)	31/5 (2)	38/1 (2)	421/60 (6)	1 (7)	16/3 (3)	0 (0)	973	137	1110
Puducherry	499	4/7 (19)	0 (0)	NA (0)	0 (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	NA (0)	0 (0)	4	7	11
Punjab	49185	156/202 (5)	NA (0)	NA (0)	3 (3)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	159	202	361
Rajasthan	329784	341/295 (2)	0 (0)	31/5 (3)	72/24 (2)	46/11 (2)	5 (3)	36/12 (3)	37/15 (5)	19/4 (3)	1 (3)	0 (0)	79/13 (3)	54/16 (3)	1 (1)	0 (0)	722	396	1118
Sikkim	6885	0 (0)	NA (0)	NA (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	NA (0)	NA (0)	NA (0)	0 (0)	NA (0)	0 (0)	0	0	0
TamilNadu	122501	141/74 (7)	10/1 (3)	NA (0)	40/38 (7)	1 (3)	1 (11)	6/3 (5)	0/1 (2)	0 (0)	107/104 (5)	5/6 (4)	26/61 (9)	226/296 (7)	3/4 (10)	0 (0)	566	589	1155
Tripura	10036	4/2 (7)	NA (0)	NA (0)	24/7 (4)	4 (1)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	NA (0)	0 (0)	32	9	41
Uttarakhand	52224	36/94 (11)	NA (0)	NA (0)	2 (1)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	NA (0)	NA (0)	0 (0)	0 (0)	0 (0)	0 (0)	39	94	133
Uttar Pradesh	232162	762/247 (3)	NA (0)	1 (1)	4 (3)	9 (3)	0 (0)	NA (0)	4 (2)	12 (2)	NA (0)	NA (0)	26 (2)	NA (0)	NA (0)	NA (0)	818	247	1065
West Bengal	82104	281/355 (8)	100/60 (8)	3/3 (18)	7 (7)	3/1 (9)	0 (0)	2 (4)	20 (5)	0 (0)	NA (0)	NA (0)	50/1 (8)	0 (0)	2 (5)	0 (0)	468	420	888
Grand Total	3171158	3622/2213 (4)	305/142 (8)	1738/534 (3)	630/239 (2)	362/137 (2)	184/102 (3)	153/62 (2)	349/93 (2)	81/20 (2)	406/190 (6)	178/47 (5)	1945/715 (4)	655/433 (5)	38/11 (2)	68/1 (1)	10714	4939	15653

DW/ PZ
(Density) NA - Aquifer Not Available ; DW - Dugwell ; PZ- Peizometer

Table 9 : State wise & Aquifer wise distribution of Ground Water Exploratory Tube Wells/ Bore Wells

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Unclassified	Total
Andhra Pradesh	95	43	76	132	99	52	70	75	18	40	63	789	71	0	0	**1623**
Arunachal Pradesh	16	NA	0	0	7	1	0	0	NA	NA	NA	NA	0	NA	0	**24**
Bihar	140	0	0	0	0	0	0	2	0	0	NA	19	2	0	0	**163**
Chandigarh	1	NA	NA	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1**
Chhattisgarh	0	0	0	143	176	183	31	1	2	2	0	220	46	5	NA	**809**
Dadra & Nagar Haveli	NA	NA	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**14**
Delhi	116	NA	NA	NA	NA	NA	NA	NA	9	NA	NA	NA	NA	NA	NA	**125**
Gujarat	527	1	523	63	10	23	21	58	14	NA	NA	NA	13	0	2	**1255**
Haryana	290	NA	NA	3	NA	NA	NA	NA	2	NA	NA	NA	0	NA	NA	**295**
Himachal Pradesh	66	NA	NA	78	4	1	1	4	3	NA	NA	0	0	0	NA	**157**
Jammu & Kashmir	214	NA	1	44	3	0	5	2	NA	NA	NA	2	12	14	7	**304**
Jharkhand	33	1	9	6	0	1	7	18	5	1	NA	211	5	1	NA	**298**
Karnataka	12	22	177	3	NA	56	NA	99	NA	0	NA	566	0	NA	0	**935**
Kerala	90	32	NA	NA	NA	NA	2	13	2	98	52	0	103	1	0	**393**
Madhya Pradesh	259	2	345	67	35	9	3	6	3	NA	NA	34	2	0	NA	**765**
Maharashtra	431	11	1165	177	3	9	3	22	0	NA	NA	0	76	0	0	**1897**
Meghalaya	9	NA	NA	NA	11	NA	0	NA	NA	NA	NA	3	NA	NA	NA	**23**
Orissa	306	82	NA	52	10	NA	21	83	13	28	38	535	0	18	0	**1186**
Puducherry	1	0	NA	0	NA	NA	NA	NA	NA	NA	NA	NA	0	NA	0	**1**
Punjab	135	NA	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	**142**
Rajasthan	1202	1	30	146	63	4	60	48	32	0	1	86	94	5	NA	**1772**
Tamil Nadu	296	32	NA	135	1	1	12	7	0	206	18	70	440	4	0	**1222**
Uttarakhand	61	NA	NA	8	0	0	0	0	1	NA	NA	0	0	0	0	**70**
Uttar Pradesh	369	NA	0	0	0	0	NA	0	5	NA	NA	0	NA	NA	NA	**374**
West Bengal	326	79	1	13	0	1	1	10	0	NA	NA	32	0	NA	0	**463**
Grand Total	**4995**	**306**	**2341**	**1077**	**422**	**341**	**237**	**448**	**109**	**375**	**172**	**2567**	**864**	**48**	**9**	**14311**

Source: Central Ground Water Board ; NA - Aquifer Not Available

Table 8 a : River Gauge and Discharge (G & D) Sites in Different Aquifers

Sl No.	Aquifer Code	Aquifer Systems	Number of G & D Sites
1	AL	Alluvium	323
2	LT	Laterite	16
3	BS	Basalt	92
4	ST	Sandstone	49
5	SH	Shale	49
6	LS	Limestone	13
7	GR	Granite	7
8	SC	Schist	52
9	QZ	Quartzite	9
10	CK	Charnockite	19
11	KH	Khondalite	6
12	BG	BGC	101
13	GN	Gneiss	49
14	IN	Intrusives	6
Total			791

Table 8 b: River Basin wise number of Gauge and Discharge Sites

Sl No.	Basin Name	Number of G & D Sites
1	BHADAR	2
2	BHATSOL	27
3	BRAHMANI	25
4	BRAHMPUTRA	84
5	CAUVERY	32
6	CHAMBAL	20
7	CHENAB	10
8	GODAVARI	65
9	IMPHAL	3
10	JHELUM	8
11	KRISHNA	61
12	KUTCH	10
13	LOWER GANGA	107
14	LUNI	3
15	MAHANADI	36
16	MAHI	13
17	NARMADA	20
18	PENNAR	20
19	PERIYAR	28
20	RAVI	1
21	SABARMATI	11
22	SURMA	39
23	SUTLEJ	1
24	TAPI	16
25	UPPER GANGA	89
26	VAIPPAR	6
27	VAMSADHARA	13
28	YAMUNA	41
Total		791

source: Central Water Commission

Table 7 : Aquifer distribution - River Basin wise

Basin Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Unclassified	Total
Barmer	38277	-	-	14433	3621	676	986	17	71			3	34	44		**58161**
Beas	6286	-	-	6030	182	130	1169	2078	1678			367	1691			**19561**
Bhadar	6084	-	26123	219	225	3344	459							5		**36460**
Bhatsol	2753	6434	31407	268		19	149	9192	737			3461		400		**54819**
Brahmani	22253	6248	46	2255	134	125	394	12569	4357	639	713	25730	343	3994		**79800**
Brahmaputra	67325		1397	6744	51429	386	9494	5020	793			13429	5298		25532	**186847**
Cauvery	7772	454	387	2344	162	30	868	1248		11248	178	36946	23854	456		**85448**
Chambal	21485	259	47144	16543	14458	428	1460	1921	1926	211	103	16630	7996	109		**130671**
Chenab	2775			6081	1943	156	1518	11843	96			2852	1945	660	51	**29921**
Churu	59611			4901	1198	23	302	8	183			22	29	32		**66310**
Ghaghar	50254			640	373	4	46	3	77			13	8	22		**51438**
Godavari	5475	3597	128409	26094	7007	3544	15261	6404	1183	8526	5618	52474	33782	4483		**301856**
Imphal	3956			3882	15522								178	935		**24472**
Indus	6191		5611	14924	23103	11363	31849	4856				8782	1884	372	28657	**137593**
Jhelum	4934		562	8766	3605		3911	3				860	2670	3914		**29225**
Krishna	8792	2125	98370	4239	3377	10083	5604	19226	3582	1767	1828	105421	1087			**265501**
Kutch	20921	52	15114	6816	2021	946	1610	459	1				1561	45	3281	**52829**
Lower Ganga	125643	13535	7482	28993	4905	2317	2667	6827	1032	199		48059	4268	680		**246607**
Luni	47885		14371	6621	4487	125	8588	342	791		2		3214	171	790	**87385**
Mahanadi	14608	970	323	19045	12943	14822	2683	2575	964	5335	6697	47048	3642	2040		**133644**
Mahi	7060	25	11403	165	355	568	749	8938	381			4565	4191	228	70	**38699**
Narmada	16264	1152	53074	6243	3809	721	2237	2917	1313			4589	1071	7		**93397**
Pennar	11170	1546	929	3698	17152	5093	2631	13328	7729	17189	261	44678	14278	200		**139882**
Periyar	3536	2340	711	23			80	1609	70	16282	4577	12019	13176	129		**54552**
Qura-Qush	8385			15445	1273		1453					936			2167	**29659**
Ravi	6122			1430	123	27	677	4776	16			4		49		**13224**
Sabarmati	14140		1385	855		222	856	3362	1832				2165	13	164	**24995**
Surma	4766			13262	29386		231					2629				**50274**
Sutlej	34493			3618	2013	4946	1038	4074	1480			1123	1643	11		**54441**
Tapi	14908	25	47642	327		222						213		9		**63345**
Upper Ganga	173534	11		9437	9966	2504	815	12224	10107			5196	6405	735	190	**231125**
Vaippar	9458	1440		2852			291		29	7195	1280	1229	14779			**38551**
Vamsadhara	7843	487	28	561			181		50	7769	11656	14853	7316	43		**50787**
Yamuna	111469	214	20318	22599	10617	1043	753	5115	6428			24230	749	107		**203642**
Total	**946379**	**40915**	**512237**	**260348**	**225390**	**63867**	**100961**	**140935**	**46905**	**76360**	**32911**	**478363**	**158755**	**19894**	**60903**	**3165123**

Area in Sq Km
Area of Andaman & Nicobar and Lakshwadeep Islands are not included

Table 5 : Parliamentary Constituencies of India

Sl. No.	Name of the State	Area (Sq. Km)	Number of Constituency	
			Parliament	Legislative Assembly
1	Andhra Pradesh	275069	42	294
2	Arunachal Pradesh	83743	2	60
3	Assam	78438	14	126
4	Bihar	94163	40	243
5	Chhattisgarh	136034	11	90
6	Goa	3702	2	40
7	Gujarat	196024	26	182
8	Haryana	44212	10	90
9	Himachal Pradesh	55673	4	68
10	Jammu & Kashmir	222236	6	89
11	Jharkhand	79714	14	81
12	Karnataka	191791	28	224
13	Kerala	38863	20	140
14	Madhya Pradesh	308144	29	230
15	Maharashtra	307713	48	288
16	Manipur	22327	2	60
17	Meghalaya	22429	2	60
18	Mizoram	21081	1	40
19	Nagaland	16579	1	60
20	Orissa	155707	21	147
21	Punjab	50362	13	117
22	Rajasthan	342240	25	200
23	Sikkim	7096	1	32
24	Tamil Nadu	130058	39	234
25	Tripura	10493	2	60
26	Uttar Pradesh	240928	80	403
27	Uttarakhand	53484	5	70
28	West Bengal	88752	42	294
29	Andaman & Nicobar Islands	8249	1	-
30	Chandigarh	114	1	-
31	Dadra & Nagar Haveli	491	1	-
32	Daman & Diu	112	1	-
33	Delhi	1483	7	70
34	Lakshadweep	32	1	-
35	Puducherry	479	1	5
Total		**3288015**	**543**	**4097**

source: censusindia.gov.in

Table 4 : Aquifer Systems of India

Sl.No	Principal Aquifer Systems		Aquifer Characteristics				Major Aquifers		Area Covered (Sq. km)	Age (As per Geological time scale)
	Code	Name	DTW - Decadal Average (m bgl)	Thickness of Aquifer */ Weathered Zone (m)	Granular / Fracture Zones Encountered (m bgl)	Yield (m^3/ day)	Code	Name		
1	AL	Alluvium (945753 sq km) (29.82%)	2-40	Upto 700 *	30-1000	10-6500	AL01	Younger Alluvium (Clay/Silt/Sand/ Calcareous concretions)	339298	Quartemary
2							AL02	Pebble / Gravel/ Bazada/ Kandi	5203	Quartemary
3							AL03	Older Alluvium (Silt/Sand/Gravel/ Lithomargic clay)	407490	Quartemary
4							AL04	Aeolian Alluvium (Silt/Sand)	149208	Quartemary
5							AL05	Coastal Alluvium (Sand/Silt/Clay)	40661	Quartemary
6							AL06	Valley Fills	3864	Quartemary
7							AL07	Glacial Deposits	31	Quartemary
8	LT	Laterite (40925 sq km) (1.29%)	5-20	5 - 40 *	10-30	5-6000	LT01	Laterite / Ferruginous concretions	40926	Quartemary
9	BS	Basalt (512302 sq km) (16.15%)	5-20	5-60	30 - 280	1-480	BS01	Basic Rocks (Basalt)	512290	Mesozoic to Cenozoic
10							BS02	Ultra Basic	12	Mesozoic to Cenozoic
11	ST	Sandstone (260415 sq km) (8.21%)	2-40	20 - 600 *	20-160	5-3700	ST01	Sandstone/Conglomerate	50026	Upper Palaeozoic to Cenozoic
12							ST02	Sandstone with Shale	75355	Upper Palaeozoic to Cenozoic
13							ST03	Sandstone with shale/ coal beds	37720	Upper Palaeozoic to Cenozoic
14							ST04	Sandstone with Clay	21540	Upper Palaeozoic to Cenozoic
15							ST05	Sandstone/ Conglomerate	56354	Proterozoic to Cenozoic
16							ST06	Sandstone with Shale	19420	Proterozoic to Cenozoic
17	SH	Shale (225397 sq km) (7.11%)	5-40	40-250 *	20-150	8 - 2900	SH01	Shale with limestone	3784	Upper Palaeozoic to Cenozoic
18							SH02	Shale with Sandstone	87771	Upper Palaeozoic to Cenozoic
19							SH03	Shale, limestone and sandstone	45539	Upper Palaeozoic to Cenozoic
20							SH04	Shale	5938	Upper Palaeozoic to Cenozoic
21							SH05	Shale/Shale with Sandstone	64265	Proterozoic to Cenozoic
22							SH06	Shale with Limestone	18100	Proterozoic to Cenozoic
23	LS	Limestone (62898 sq km) (1.98%)	5-40	8-451 *	20-190	4 - 2100	LS01	Miliolitic Limestone	2946	Quartemary
24							LS02	Limestone / Dolomite	19747	Upper Palaeozoic to Cenozoic
25							LS03	Limestone/Dolomite	34708	Proterozoic
26							LS04	Limestone with Shale	5499	Proterozoic
27							LS05	Marble	995	Azoic to Proterozoic
28	GR	Granite (100991 sq km) (3.18%)	5-40	5-40	15-200	10-1440	GR01	Acidic Rocks (Granite,Syenite, Rhyolite etc.)	133	Mesozoic to Cenozoic
29							GR02	Acidic Rocks (Pegmatite, Granite, Syenite, Rhyolite etc.)	100858	Proterozoic to Cenozoic
30	SC	Schist (140934.90 sq km) (4.44%)	5 - 20	5 - 72	10-180	3-550	SC01	Schist	93026	Azoic to Proterozoic
31							SC02	Phyllite	31589	Azoic to Proterozoic
32							SC03	Slate	16321	Azoic to Proterozoic
33	QZ	Quartzite (46904 sq km) (1.48%)	5 - 40	8-30	15-150	2 - 400	QZ01	Quartzite	20830	Proterozoic to Cenozoic
34							QZ02	Quartzite	26074	Azoic to Proterozoic
35	CK	Charnockite (76359 sq km) (2.41%)	2-40	5 - 45	15 - 291	1-3000	CK01	Charnockite	76360	Azoic
36	KH	Khondalite (32913 sq km) (1.04%)	5-10	5 - 20	4.0-291	20-1500	KH01	Khondalites, Granulites	32914	Azoic
37	BG	Banded Gneissic Complex (478382 sq km) (15.09%)	5-20	5-100	30 - 200	2 - 3600	BG01	Banded Gneissic Complex (BGC)	478383	Azoic
38	GN	Gneiss (158753 sq km) (5.01%)	5-15	3-25	20 - 200	10 - 2500	GN01	Undifferentiated metasedimentaries/ Undifferentiated metamorphic	59260	Azoic to Proterozoic
39							GN02	Gneiss	43266	Azoic to Proterozoic
40							GN03	Migmatitic Gneiss	56228	Azoic
41	IN	Intrusive (19895 sq km) (0.63%)	5-20	6 - 13	12-150	Low Yield	IN01	Basic Rocks (Dolerite, Anorthosite etc.)	11167	Proterozoic to Cenozoic
42							IN02	Ultra Basics (Epidiorite, Granophyre etc.)	8729	Proterozoic to Cenozoic

DTW : Depth to Water Level

Table 3: State wise Distribution of Principal Aquifer Systems

State Name	Alluvium	Laterite	Basalt	Sandstone	Shale	Limestone	Granite	Schist	Quartzite	Charnockite	Khondalite	BGC	Gneiss	Intrusives	Unclassified	Total Area
	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	Area (%)	
Andaman & Nicobar Islands	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6701 (100)	6701
Andhra Pradesh	20124 (7.51)	1761 (0.66)	9066 (3.38)	20164 (7.52)	22262 (8.3)	10481 (3.91)	13597 (5.07)	13492 (5.03)	11354 (4.24)	11238 (4.19)	12100 (4.51)	110284 (41.13)	12075 (4.5)	108 (0.04)	0 (0)	268105
Arunachal Pradesh	4490 (5.66)	0 (0)	1397 (1.76)	71 (0.09)	35562 (44.83)	297 (0.37)	8672 (10.93)	2872 (3.62)	0 (0)	0 (0)	0 (0)	0 (0)	1880 (2.37)	0 (0)	24093 (30.37)	79334
Assam	57070 (75.51)	0 (0)	0 (0)	5590 (7.4)	4557 (6.03)	0 (0)	0 (0)	0 (0)	717 (0.95)	0 (0)	0 (0)	7642 (10.11)	0 (0)	0 (0)	1 (0)	75576
Bihar	81804 (90.34)	20 (0.02)	34 (0.04)	2504 (2.76)	3 (0)	82 (0.09)	518 (0.57)	254 (0.28)	257 (0.28)	3 (0)	0 (0)	4214 (4.65)	839 (0.93)	18 (0.02)	0 (0)	90549
Chandigarh	115 (99.67)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	115
Chhattisgarh	130 (0.1)	1912 (1.46)	836 (0.64)	28052 (21.43)	14781 (11.29)	15255 (11.65)	4140 (3.16)	1532 (1.17)	547 (0.42)	1370 (1.05)	385 (0.29)	37756 (28.84)	19860 (15.17)	4352 (3.32)	0 (0)	130908
Dadra & Nagar Haveli	0 (0)	0 (0)	477 100	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	477
Daman & Diu	0 (0)	0 (0)	53 65.57	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	28 (34.43)	81
Delhi	1318 (90.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	137 9.4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1455
Goa	42 (1.2)	1573 (44.26)	35 (0.98)	270 (7.59)	0 (0)	0 (0)	18 (0.52)	890 (25.05)	0 (0)	0 (0)	0 (0)	323 (9.09)	0 (0)	402 (11.32)	0 (0)	3553
Gujarat	62447 (35.57)	52 (0.03)	74297 (42.32)	10192 (5.81)	5632 (3.21)	4778 (2.72)	2501 (1.42)	8439 (4.81)	977 (0.56)	0 (0)	0 (0)	0 (0)	1259 (0.72)	51 (0.03)	4935 (2.81)	175560
Haryana	41833 (97.81)	0 (0)	0 (0)	590 (1.38)	0 (0)	0 (0)	0 (0)	0 (0)	342 (0.8)	0 (0)	0 (0)	0 (0)	4 (0.01)	0 (0)	0 (0)	42769
Himachal Pradesh	1803 (3.3)	0 (0)	0 (0)	10514 (19.26)	2932 (5.37)	6407 (11.73)	2718 (4.98)	17926 (32.83)	4638 (8.49)	0 (0)	0 (0)	3534 (6.47)	4063 (7.44)	61 (0.11)	0 (0)	54596
Jammu & Kashmir	23841 (10.76)	0 (0)	6173 (2.79)	46030 (20.78)	30117 (13.6)	10399 (4.7)	39111 (17.66)	12106 (5.47)	0 (0)	0 (0)	0 (0)	11709 (5.29)	6124 (2.77)	4945 (2.23)	30932 (13.97)	221487
Jharkhand	5726 (7.47)	743 (0.97)	3092 (4.03)	4220 (5.5)	0 (0)	503 (0.66)	1786 (2.33)	10002 (13.04)	1488 (1.94)	196 (0.26)	0 (0)	46174 (60.2)	2115 (2.76)	655 (0.85)	0 (0)	76702
Karnataka	703 (0.36)	3628 (1.86)	34892 (17.87)	721 (0.37)	0 (0)	5872 (3.01)	0 (0)	28458 (14.57)	0 (0)	6024 (3.09)	0 (0)	114943 (58.87)	0 (0)	0 (0)	15 (0.01)	195256
Kerala	3145 (7.52)	1454 (3.48)	0 (0)	0 (0)	0 (0)	0 (0)	188 (0.45)	419 (1)	70 (0.17)	18756 (44.87)	4223 (10.1)	1398 (3.35)	11980 (28.66)	167 (0.4)	2 (0.01)	41803
Lakshwadeep	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	25 (100)	25
Madhya Pradesh	34809 (11.75)	2141 (0.72)	135433 (45.72)	52036 (17.57)	25670 (8.67)	4712 (1.59)	1615 (0.55)	6447 (2.18)	2015 (0.68)	0 (0)	0 (0)	30253 (10.21)	699 (0.24)	401 (0.14)	0 (0)	296232
Maharashtra	14097 (4.76)	5516 (1.86)	235903 (79.59)	7316 (2.47)	588 (0.2)	1563 (0.53)	7618 (2.57)	5530 (1.87)	767 (0.26)	0 (0)	0 (0)	262 (0.09)	16576 (5.59)	649 (0.22)	1 (0)	296387
Manipur	3956 (18.44)	0 (0)	0 (0)	5237 (24.42)	11952 (55.73)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	303 (1.41)	0 (0)	21448
Meghalaya	1002 (4.64)	0 (0)	0 (0)	0 (0)	12370 (57.28)	0 (0)	1018 (4.71)	0 (0)	0 (0)	0 (0)	0 (0)	7204 (33.36)	0 (0)	0 (0)	0 (0)	21594
Mizoram	0 (0)	0 (0)	0 (0)	3138 (15.47)	17150 (84.53)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	20289
Nagaland	537 (3.36)	0 (0)	0 (0)	3906 (24.45)	10722 (67.11)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	178 (1.11)	632 (3.95)	3 (0.02)	15977
Orissa	37713 (25.35)	5305 (3.57)	0 0	4991 (3.35)	2923 (1.96)	0 (0)	1259 (0.85)	4845 (3.26)	4051 (2.72)	13689 (9.2)	14092 (9.47)	54951 (36.93)	109 (0.07)	4870 (3.27)	0 (0)	148798
Puducherry	422 (84.56)	8 (1.63)	0 (0)	28 (5.58)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (0.84)	0 (0)	37 (7.4)	499
Punjab	48446 (98.5)	0 (0)	0 (0)	738 (1.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	49185
Rajasthan	198530 (60.2)	115 (0.03)	9798 (2.97)	35240 (10.69)	16902 (5.13)	818 (0.25)	13208 (4.01)	7272 (2.21)	6456 (1.96)	211 (0)	105 (0.03)	21506 (6.52)	18897 (5.73)	726 (0.22)	0 (0)	329784
Sikkim	19 (0.28)	0 (0)	0 (0)	97 (1.41)	130 (1.89)	4 (0.06)	36 (0.52)	1661 (24.13)	76 (1.11)	0 (0)	0 (0)	0 (0)	3419 (49.66)	0 (0)	1442 (20.95)	6885
Tamil Nadu	22894 (18.69)	2417 (1.97)	0 (0)	8487 (6.93)	251 (0.2)	64 (0.05)	1399 (1.14)	403 (0.33)	29 (0.02)	24872 (20.3)	2009 (1.64)	7038 (5.75)	52126 (42.55)	511 (0.42)	0 (0)	122501
Tripura	602 (6)	0 (0)	0 (0)	5539 (55.19)	3895 (38.81)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	10036
Uttarakhand	8194 (15.69)	0 (0)	0 (0)	2872 (5.5)	4264 (8.17)	1579 (3.02)	1188 (2.27)	14168 (27.13)	7594 (14.54)	0 (0)	0 (0)	5008 (9.59)	6432 (12.32)	735 (1.41)	190 (0.36)	52224
Uttar Pradesh	211923 (91.28)	0 (0)	572 (0.25)	1122 (0.48)	2430 (1.05)	0 (0)	0 (0)	1453 (0.63)	5378 (2.32)	0 (0)	0 (0)	9283 (4)	0 (0)	0 (0)	0 (0)	232162
West Bengal	57983 (70.62)	14280 (17.39)	244 (0.3)	736 (0.9)	304 (0.37)	84 (0.1)	400 (0.49)	2768 (3.37)	2 (0)	0 (0)	0 (0)	4893 (5.96)	99 (0.12)	311 (0.38)	0 (0)	82104
Grand Total	945754 (29.82)	40926 (1.29)	512302 (16.15)	260416 (8.21)	225397 (7.11)	62899 (1.98)	100992 (3.18)	140935 (4.44)	46904 (1.48)	76360 (2.41)	32914 (1.04)	478383 (15.09)	158753 (5.01)	19896 (0.63)	68407 (2.16)	3171158

Area in Sq. Km
(% in respect to the total area of the State)

Table 2: River Basins of India

Sl. No	Name of the Basin	Area		No. of Sub-Basin	No. of Watersheds
		Sq. Km.	% of area		
1	**Barmer**	58161	1.84	1	1
2	**Beas**	19561	0.62	1	24
3	**Bhadar**	36460	1.15	2	38
4	**Bhatsol**	54819	1.73	2	67
5	**Brahmani**	79800	2.52	3	104
6	**Brahmaputra**	186847	5.90	2	278
7	**Cauvery**	85448	2.70	3	87
8	**Chambal**	130671	4.13	4	160
9	**Chenab**	29921	0.95	1	49
10	**Churu**	66310	2.10	1	1
11	**Ghaghar**	51438	1.63	2	11
12	**Godavari**	301856	9.54	8	282
13	**Imphal**	24472	0.77	2	53
14	**Indus**	137593	4.35	4	157
15	**Jhelum**	29225	0.92	1	51
16	**Krishna**	265501	8.39	7	260
17	**Kutch**	52829	1.67	2	47
18	**Lower Ganga**	246607	7.79	4	382
19	**Luni**	87385	2.76	2	47
20	**Mahanadi**	133644	4.22	3	116
21	**Mahi**	38699	1.22	2	40
22	**Narmada**	93397	2.95	3	163
23	**Pennar**	139882	4.42	4	125
24	**Periyar**	54552	1.72	3	55
25	**Qura-Qush**	29659	0.94	2	27
26	**Ravi**	13224	0.42	1	15
27	**Sabarmati**	24995	0.79	2	25
28	**Surma**	50274	1.59	3	104
29	**Sutlej**	54441	1.72	2	39
30	**Tapi**	63345	2.00	3	59
31	**Upper Ganga**	231125	7.30	7	230
32	**Vaippar**	38551	1.22	2	38
33	**Vamsadhara**	50787	1.60	2	38
34	**Yamuna**	203642	6.43	3	275
	Total	**3165123**		**94**	**3448**

Source: Watershed Atlas of India, CGWB

Table 1: Administrative Divisions of India

Sl. No.	Name of the State	Area (Sq. Km)	Administrative Units			
			No. of Districts	No. of Villages		
				Total	Inhabited	Uninhabited
1	Andhra Pradesh	275069	23	28,123	26,613	1,510
2	Arunachal Pradesh	83743	16	4,065	3,863	202
3	Assam	78438	27	26,312	25,124	1,188
4	Bihar	94163	38	45,098	39,015	6,083
5	Chhattisgarh	136034	27	20,308	19,744	564
6	Goa	3702	2	359	347	12
7	Gujarat	196024	26	18,539	18,066	473
8	Haryana	44212	21	6,955	6,764	191
9	Himachal Pradesh	55673	12	20,118	17,495	2,623
10	Jammu & Kashmir	222236	22	6,652	6,417	235
11	Jharkhand	79714	24	32,615	29,354	3,261
12	Karnataka	191791	30	29,406	27,481	1,925
13	Kerala	38863	14	1,364	1,364	0
14	Madhya Pradesh	308144	50	55,393	52,117	3,276
15	Maharashtra	307713	35	43,711	41,095	2,616
16	Manipur	22327	9	2,391	2,315	76
17	Meghalaya	22429	7	6,034	5,782	252
18	Mizoram	21081	8	817	707	110
19	Nagaland	16579	11	1,317	1,278	39
20	Orissa	155707	30	51,349	47,529	3,820
21	Punjab	50362	20	12,673	12,278	395
22	Rajasthan	342240	33	41,352	39,752	1,600
23	Sikkim	7096	4	452	450	2
24	Tamil Nadu	130058	32	16,317	15,400	917
25	Tripura	10493	8	870	858	12
26	Uttar Pradesh	240928	75	16,826	15,761	1,065
27	Uttarakhand	53484	13	107,452	97,942	9,510
28	West Bengal	88752	19	40,783	37,945	2,838
29	Andaman & Nicobar Islands	8249	3	547	501	46
30	Chandigarh	114	1	24	23	1
31	Dadra & Nagar Haveli	491	1	70	70	0
32	Daman & Diu	112	2	23	23	0
33	Delhi	1483	9	165	158	7
34	Lakshadweep	32	1	24	8	16
35	Puducherry	479	4	92	92	0
Total		3288015	657	638596	593731	44865

Source: censusindia.gov.in- Census-2011

ed, analysed and integrated to define the extent and characteristics of aquifer systems.

CGWB is mandated to carry out hydrogeological mapping aided with ground water exploration, geophysical surveys, evaluation of aquifer parameters, ground water resource estimation and ground water regime monitoring. Over the years, CGWB through its studies has created huge database in the form of water levels, water quality, sub-surface lithological & geophysical logs and aquifer parameters. Analysis of the data base has enabled the preparation of hydrogeological maps including the ground water management plans where the aquifer wise area suitable for ground water recharge, development and conservation have been identified.

The present endeavour is an effort of aquifer mapping on 1:250,000 scale by integrating the geological and hydrogeological data of CGWB & GSI respectively and various other ground water related thematic data / information from other Agencies. This includes preparation of paper maps showing the major aquifer systems on 1:250,000 scale for the entire country.

In order to carry out the present exercise, all the data generated by CGWB along with data collected from different agencies is integrated in GIS platform. The outputs are depicted as thematic layers with location of ground water observation wells, exploratory wells, ground water quality hot spots in terms of high incidence of geogenic contaminants, stage of ground water development etc. in different maps. Detailed accounts of the aquifer types, their characteristics and spatial extents are given in the succeeding sections. Attempt has also been made to delineate aquifer wise areas suitable for conservation, recharge as well as exploitation of ground water.

Based on the hydrogeological characteristics, the entire country has been classified into 14 Principal Aquifer Systems and 42 major aquifers. Alluvium is the major aquifer system which covers maximum area of around 31% of the entire country and available in Uttar Pradesh, Bihar, West Bengal, Assam, Odisha and Rajasthan. The sandstone aquifer covers around 8% area in the country and available in Chhattisgarh, Andhra Pradesh, Madhya Pradesh, Gujarat, Karnataka and Rajasthan. The rest of the country is covered with the other formations that cover around 60% of the area. Among these, Basalt aquifer covers maximum of around 17% area of the country and mainly spread over Maharashtra, Madhya Pradesh, Gujarat, Rajasthan and Karnataka. Shale aquifer accounts for around 7% of area in the country and is available mostly in Chhattisgarh, Andhra Pradesh, Madhya Pradesh, Rajasthan and in the north-eastern states as well as in the Himalayan terrain. Limestone aquifer covers a very small area of around 2% in the country and mainly available in the states of Chhattisgarh, Andhra Pradesh, Karnataka, and Gujarat and in the Himalayan states. Around 20% of the area of the country is covered by Banded Gneissic Complex (BGC) and Gneiss aquifers which are available almost in all the peninsular states as well as the Himalayan states. The rest 15% of the entire area is covered by aquifers namely; Schist, Granite, Quartzite, Charnockite, Khondalite, Laterites and Intrusive.

An attempt has been made to prioritize areas based on the sustainability and quality related ground water issues and presented in the atlas. Various ground water management strategies have also been suggested.

Central Ground Water Board, Ministry of Water Resources is contemplating National Aquifer Mapping Programme at 1:50,000 or larger scales during XII and XIII Plan periods. This ambitious venture will involve compilation and synthesis of all relevant data collected by CGWB and various other agencies, to identify existing data gaps, creation of additional data through suitable investigations and finally, to bring out comprehensive aquifer maps along with their ground water potential as well as realistic and scientific management plans to ensure long-term sustainability.

The present compilation will form abase for National Aquifer Mapping Programme as an overview of the aquifer systems in the country. Further downscaling can be taken up based on the regional understanding of the aquifers presented in the atlas.

AQUIFER SYETEMS OF INDIA

PREAMBLE

Water is the median for development of civilizations all over the world and plays vital role in socio- economic development. Ground water is the most preferred resource to meet various requirements and is the Nation's principal reserve of fresh water.India is largest user of ground water and irrigates about 39 Million Ha of land through ground water irrigation followed by China and USA.It is estimated that more than 90% of the rural and more than 50% of urban water supply is being met by ground water. As per the latest well census, the number of ground water abstraction structures have increased to about 21 million in last two decades with an estimated annual ground water withdrawal of about 221 Billion Cubic Meter (BCM).

Rapid developments in the water resources sector have been taking place in the country in the last few decades, resulting in various undesirable environmental impacts. The drying up of a large number of bore wells in some areas due to declining groundwater levels have had a direct impact on water supply for irrigation, industrial and domestic needs in India. Demands for safe drinking water and requirements to maintain healthy ecosystems are increasing, and complex social and scientific questions have arisen about how to assess and manage ground water resources.

The sustainability of ground water sources are jeopardised due to various reasons, concerns about ground water resources involve questions about depletion of ground water levels, reductions in resources, sustainability of wells, potential loss of ground water-dependent ecosystems, land subsidence, saltwater intrusion, and changes in ground water quality etc. In order to evolve the remedies for such issues understanding of the system in which ground water is contained and its relationship with the surrounding ecosystem is very essential. The understanding of occurrence and distribution of ground water in time and space essentially requires an establishing the lateral and vertical extent of aquifer systems along with their characterization. In view of this, an exercise of aquifer mapping has been carried out by CGWB by collating the existing data on ground water and related themes and bringing them into common GIS platform

The atlas entitled "Aquifer Systems of India" provides a country wide overview and summary of the most important information available for each principal and major aquifer systems..It is an outcome of the extensive hydrogeological studies carried out by Central Ground Water Board (CGWB) including exploratory drilling, geophysical, hydro-chemical, hydrological investigations etc. since its inception..

PURPOSE

- To define the extent of principal and major aquifer systems of India with their characterisation on regional scale and depict aquifer wise ground water scenario along with major issues and challenges which needs immediate attention for sustainable management of ground water resources.
- Creating a baseline data in GIS platform for initiating National Aquifer Mapping Programme and demarcating priority areas for aquifer wise management of ground water resources on scientific and sustainable basis.

The Atlas describes the location, extent, aquifer characteristics of all the important aquifers in the country, including those not studied by CGWB. The purpose of the atlas of "Aquifer Systems of India" is to summarize the ground water data in one publication through a common format illustrating the important ground-water related information that has been collected over many years by the CGWB.

The Atlas has been prepared keeping in view the utilities and user friendliness in understanding by the nonprofessional as well as professional Hydrogeologist. Simple presentation of tables is used to explain aquifer wise ground water scenario in the country. Attempt has been made to represent the correlations of various thematic layers such as climate, topographic, and geologic settings on the occurrence, movement, and chemical quality of ground water in map forms. The Atlas will be of immense use for Regional and National ground-water resources planning by the Policy makers and anyone who needs to understand ground-water scenario in the country. This atlas will be very handy tool for academia at the institution level and as an overview of ground-water conditions for stakeholders who need aquifer specific information.

AQUIFER MAPPING

Aquifer mapping is a multidisciplinary scientific process wherein a combination of geological, hydrogeological, geophysical, hydrological, and quality data are integrated to characterize the quantity, quality and movement of ground water in aquifers. The Geological formations mapped by Geological Survey of India (GSI) are forming different aquifers based on their origin, sedimentation history and hydrogeological characteristics. Hydrogeological information collected by CGWB through its survey, investigations and exploration were collat-

AQUIFER SYSTEMS OF INDIA

Contents

Foreword

Messages Secretary Water Resources

Messages Minister of State

Messages Minister Water Resources

ADMINISTRATIVE DIVISIONS

N
W E
S

0 250 500
kilometers

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AGARTALA
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGEND

- State Capital
- State Boundary
- National Boundary
- River
- National Highway
- Railway

Central Ground Water Board
Ministry of Water Resources
Government of India

PRIORITY AREA FOR AQUIFER MAPPING

0 250 500
kilometers

N
W E
S

SRINAGAR
Indus R.
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
JAIPUR
LUCKNOW
Ganga R.
PATNA
BHUTAN
GANGTOK
ITANAGAR
Brahmaputra R
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
BANGLADESH
MYANMAR
AGARTALA
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
Narmada R
RAIPUR
Mahanadi R
BHUBANESHWAR
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Godavari R
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Krishna R
ARABIAN SEA
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
Kaveri R
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

LEGEND

GW Management Issues

- Over Exploited
- Ground Water Sustainability
- Springs Revival
- Open cast and underground mining
- Fluoride
- Arsenic
- Sea water ingress
- Urban/ Industrial

Aquifers

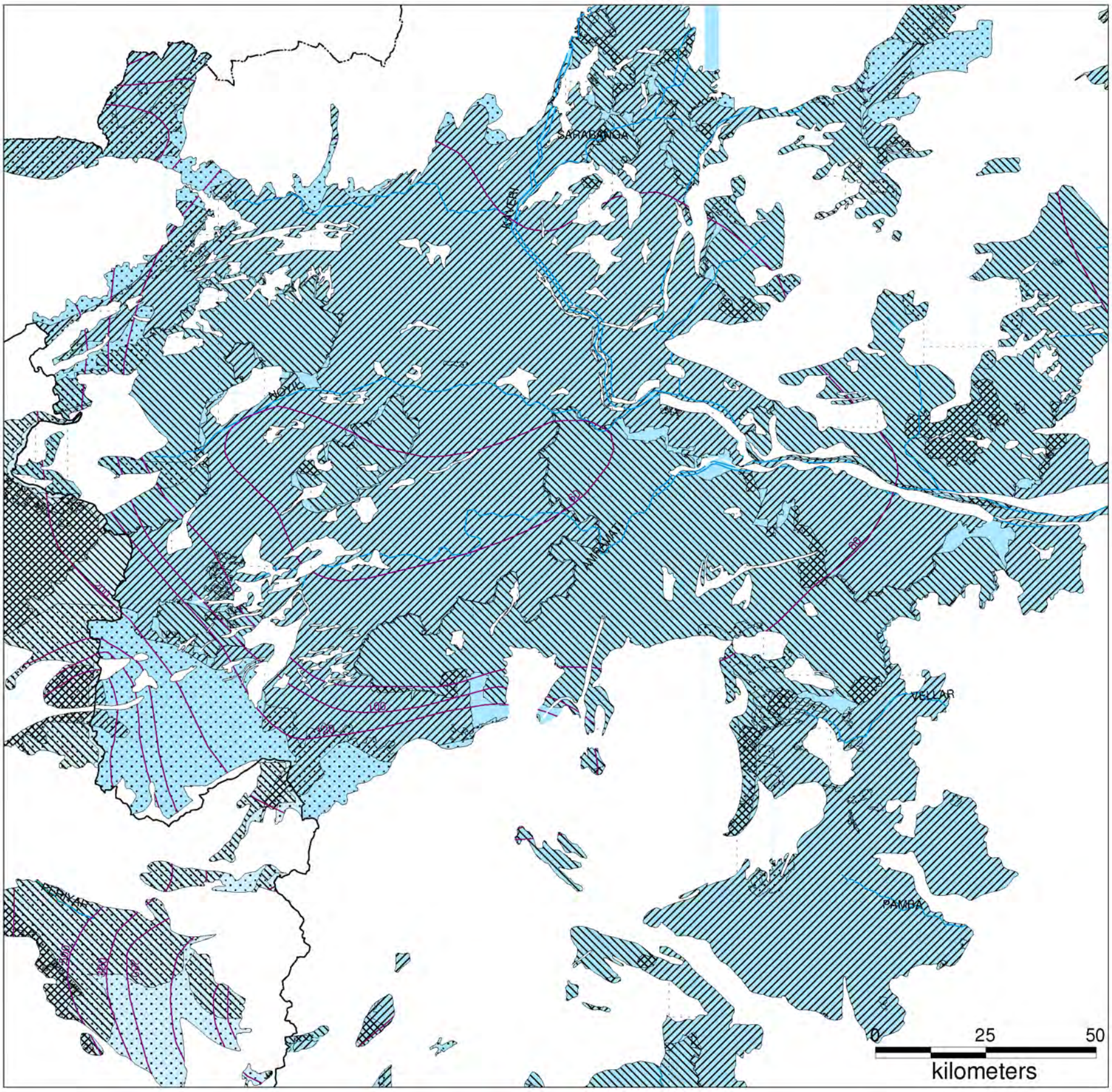
- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

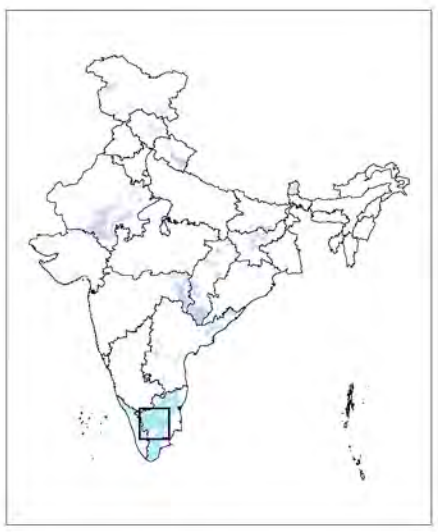
- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

AQUIFER MANAGEMENT PLAN

(PARTS OF KERALA AND TAMIL NADU - GNEISS AQUIFER)





LEGEND

MANAGEMENT PLAN

- Area prioritised for Artificial Recharge
- Area Suitable for Development
- Area Suitable for Development with recharge measures
- Area Suitable for Water Conservation

AQUIFERS

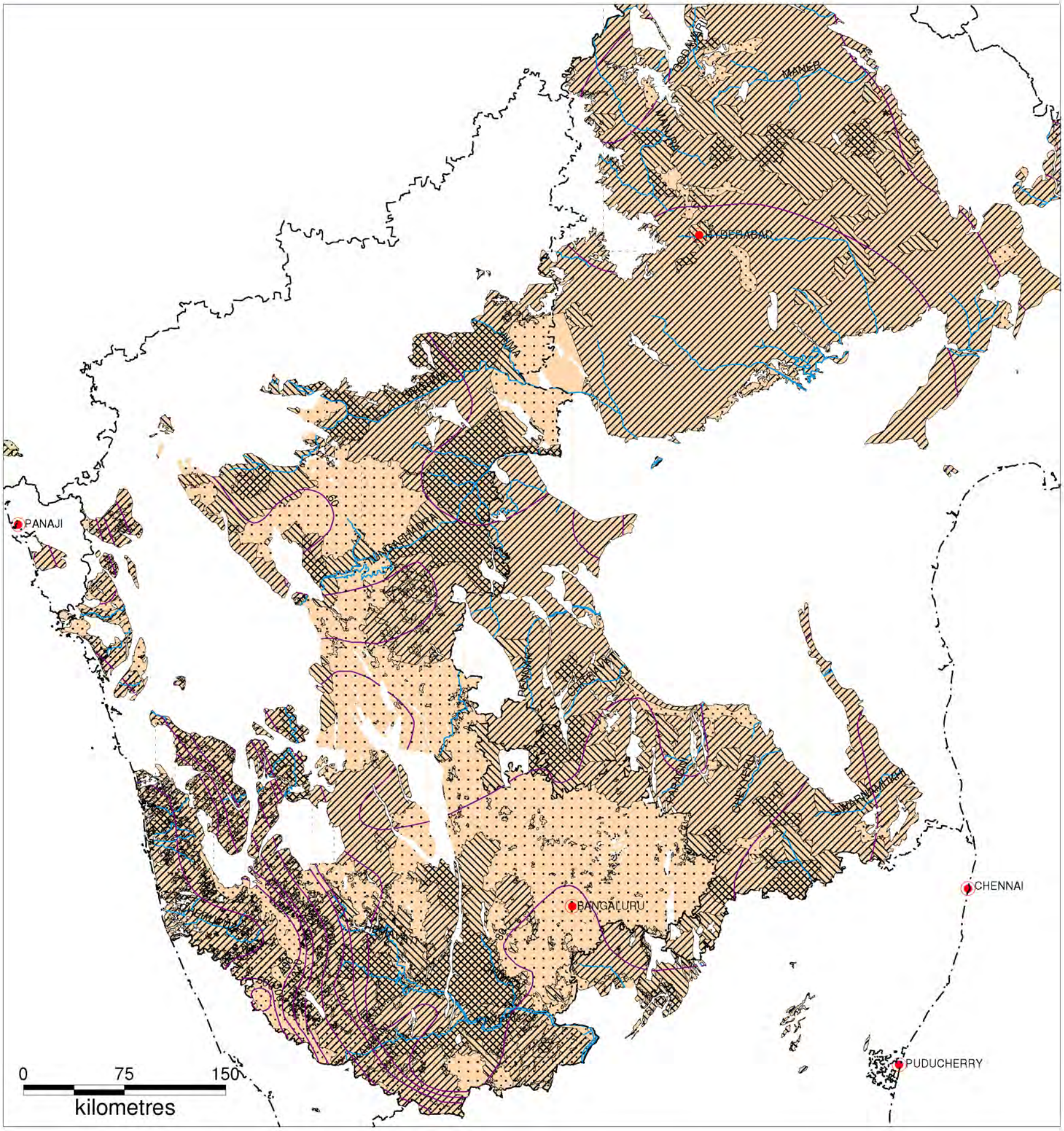
- Gneiss (GN02)
- Migmatitic Gneiss (GN03)

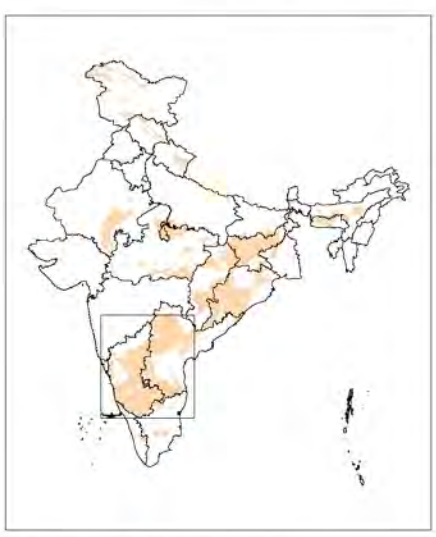
- State Capital
- State Boundary
- Drainage
- 20 Isohyete

Central Ground Water Board
Ministry of Water Resources
Government of India

AQUIFER MANAGEMENT PLAN

(PARTS OF KARNATAKA, TAMIL NADU AND ANDHRA PRADESH - BGC)





LEGEND

MANAGEMENT PLAN

- Area Prioritised for Artificial Recharge
- Area Suitable for Development
- Area Suitable for Development with recharge measures
- Area Suitable for Water Conservation

AQUIFER

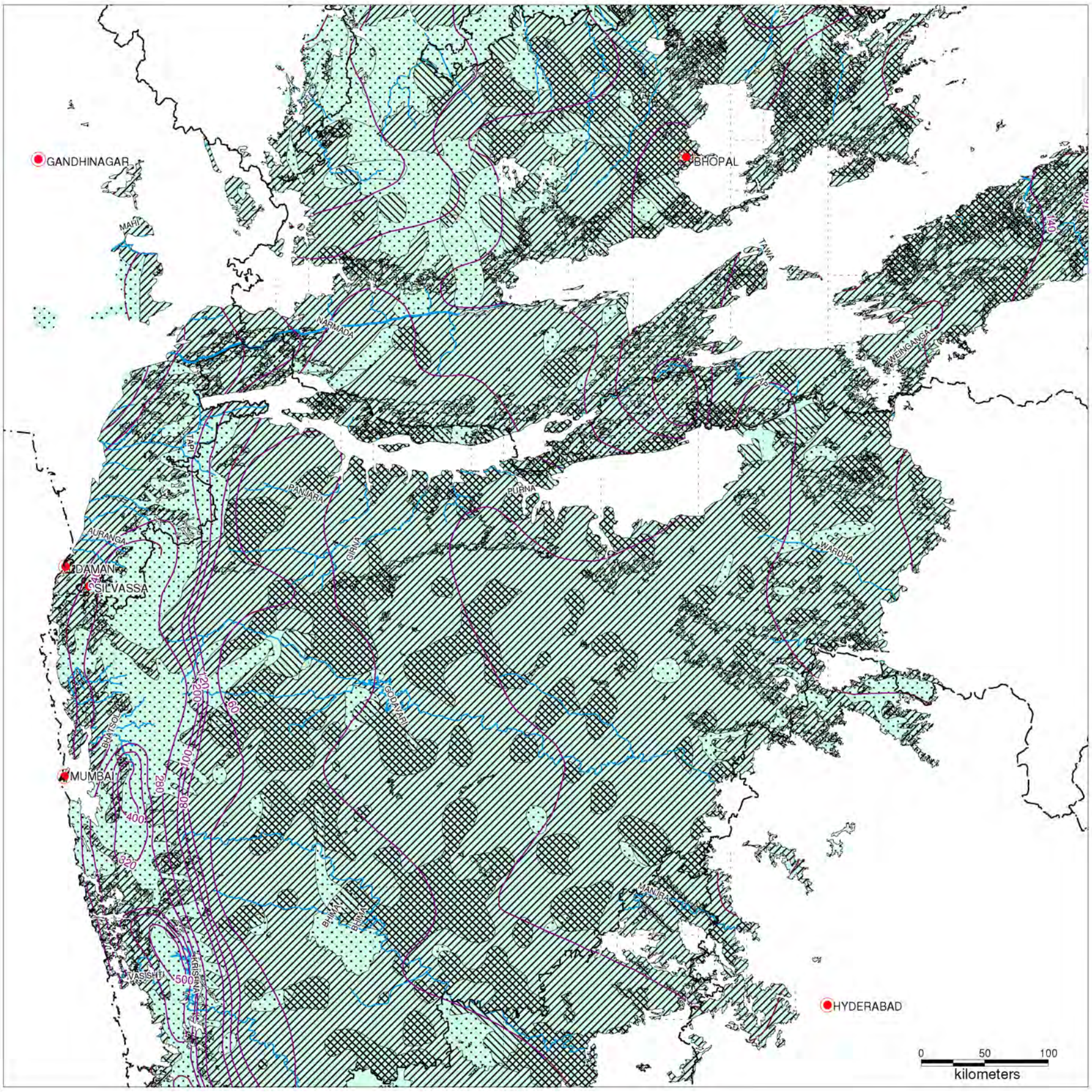
- Banded Gneissic Complex (BG01)

- State Capital
- State Boundary
- Drainage
- 20 Isohyete

Central Ground Water Board
Ministry of Water Resources
Government of India

AQUIFER MANAGEMENT PLAN

(PARTS OF MAHARASHTRA AND MADHYA PRADESH - BASALT AQUIFER)



LEGEND

MANAGEMENT PLAN

- Area Prioritised for Artificial Recharge
- Area Suitable for Development
- Area Suitable for Development with Recharge Measures
- Area Suitable for Water Conservation

AQUIFER

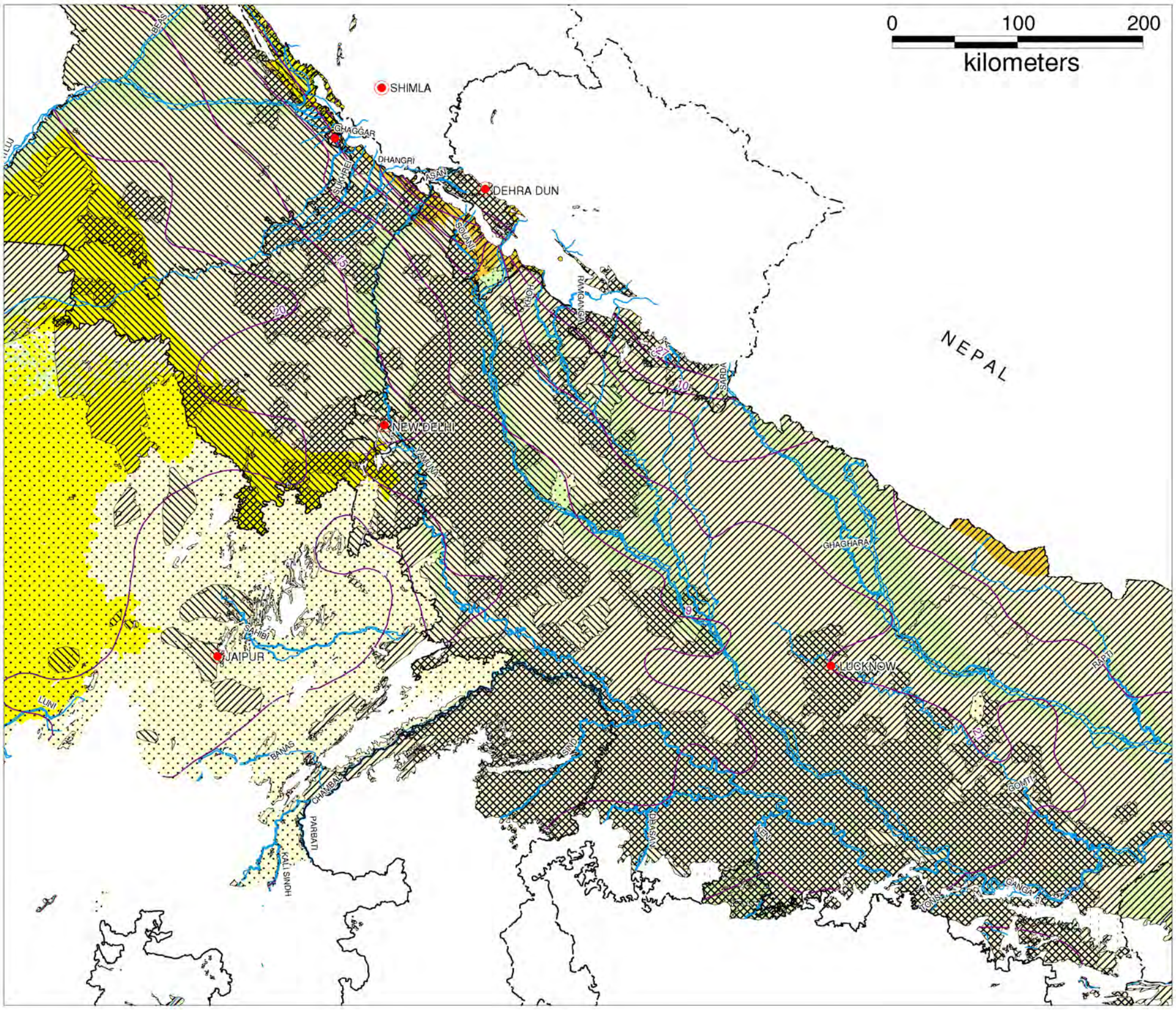
- Basalt (BS01)

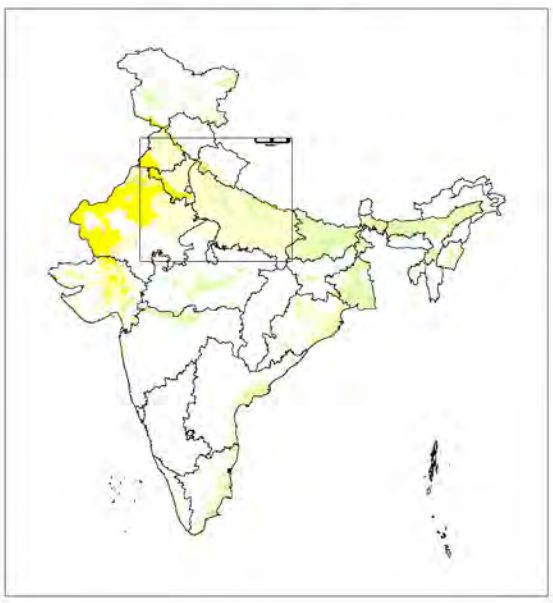
- State Capital
- State Boundary
- Drainage
- 20 Isohyete

Central Ground Water Board
Ministry of Water Resources
Government of India

AQUIFER MANAGEMENT PLAN

(WESTERN INDO-GANGETIC ALLUVIUM AQUIFER)





LEGEND

MANAGEMENT PLAN

- Area Prioritised for Artificial Recharge
- Area Suitable for Development
- Area Suitable for Development with recharge measures
- Area Suitable for Conservation / Recharge

AQUIFERS

- Younger Alluvium (AL01)
- Pebble/ Gravel (AL02)
- Older Alluvium (AL03)
- Aeolian Sand/Silt (AL04)
- Valley Fill (AL06)

- State Capital
- State Boundary
- Drainage
- 20 Isohyete

Central Ground Water Board
Ministry of Water Resources
Government of India

SUITABLE AREA FOR GROUND WATER DEVELOPMENT

(AQUIFER MANAGEMENT PLAN)

0 250 500

kilometers

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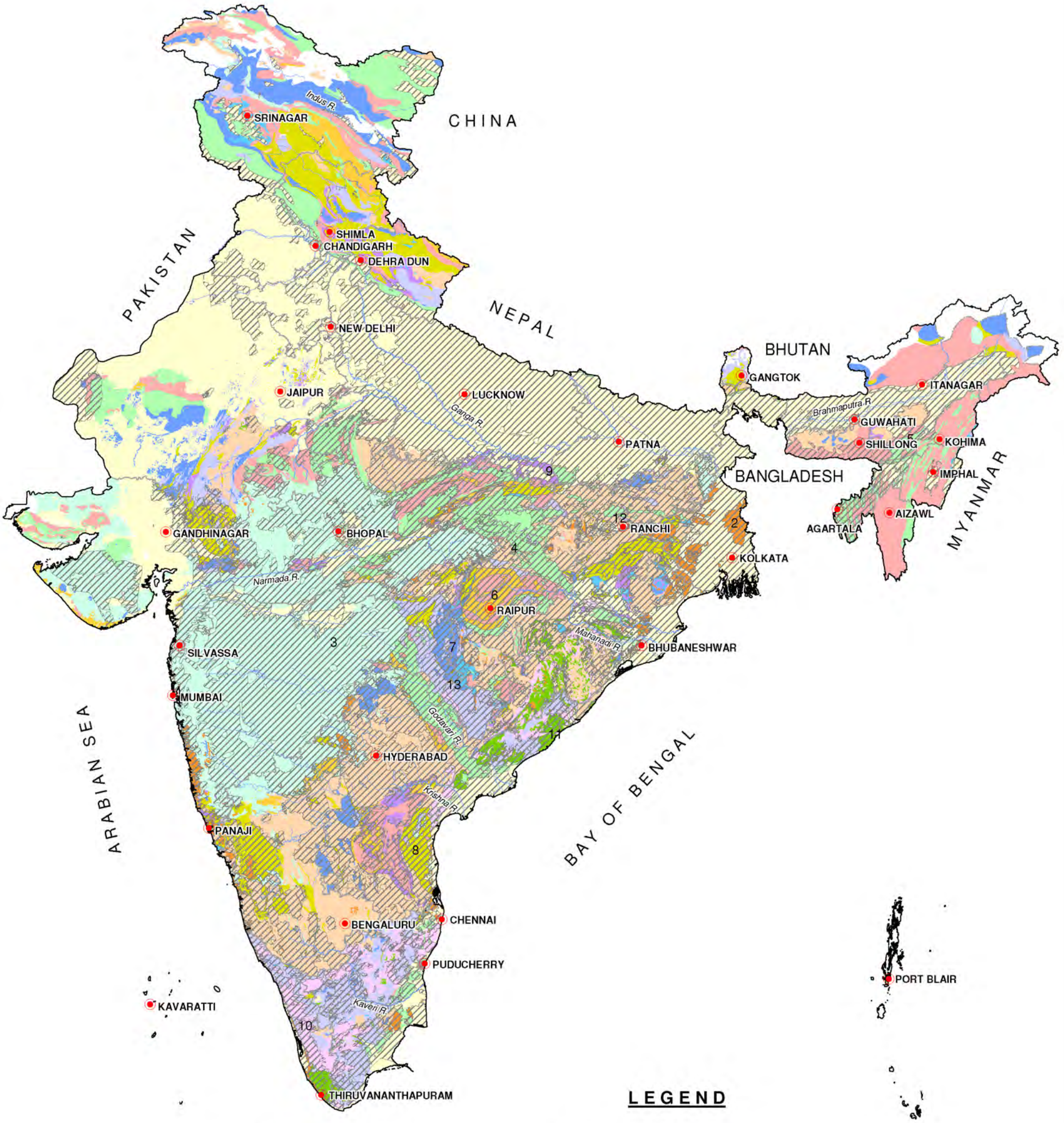


LEGEND

Management Plan

Area suitable for GW development with sustainable measures

Aquifers

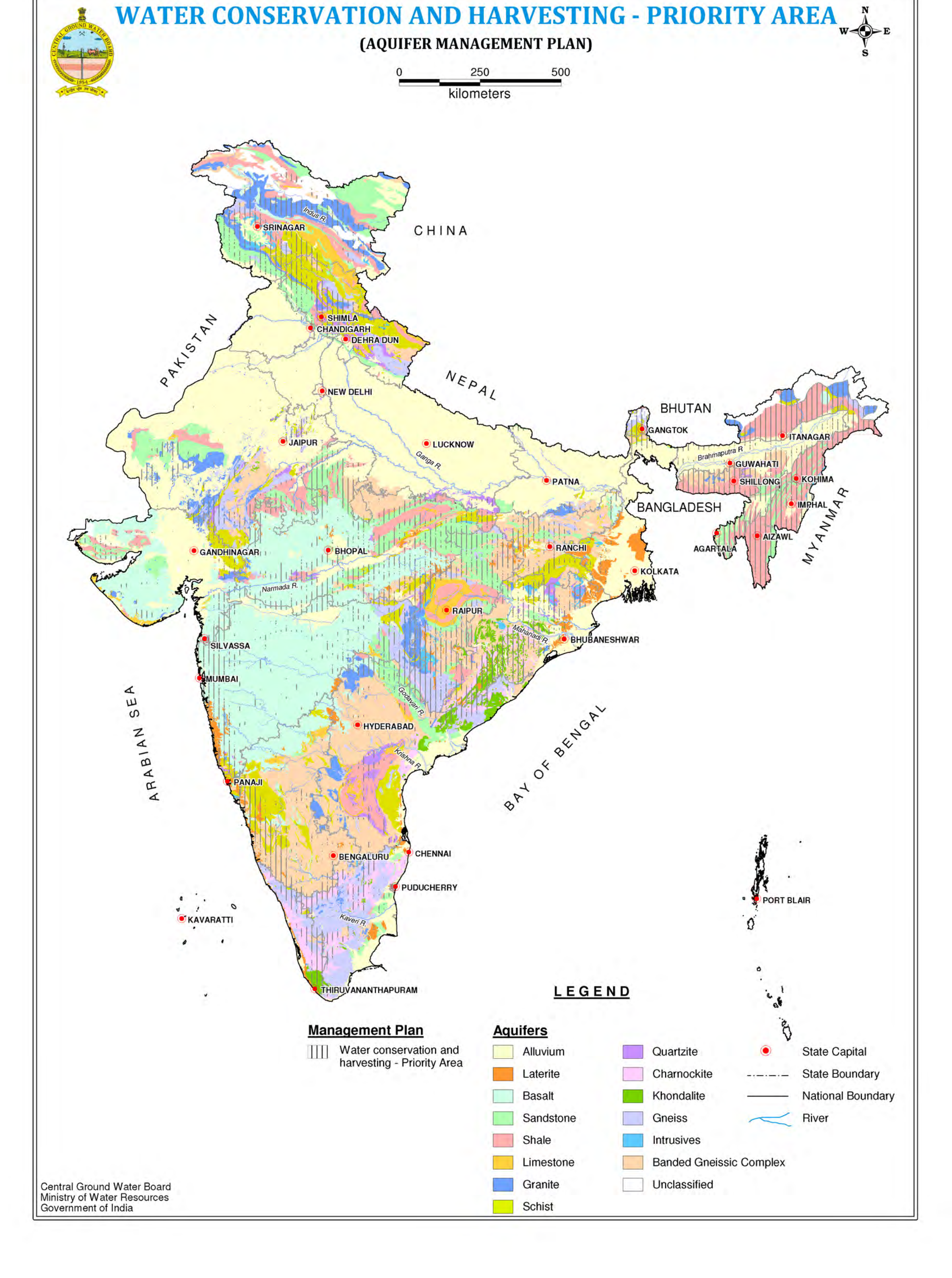
- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

WATER CONSERVATION AND HARVESTING - PRIORITY AREA

(AQUIFER MANAGEMENT PLAN)



LEGEND

Management Plan

- Water conservation and harvesting - Priority Area

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

ARTIFICIAL RECHARGE - PRIORITY AREA

(AQUIFER MANAGEMENT PLAN)

0 250 500

kilometers

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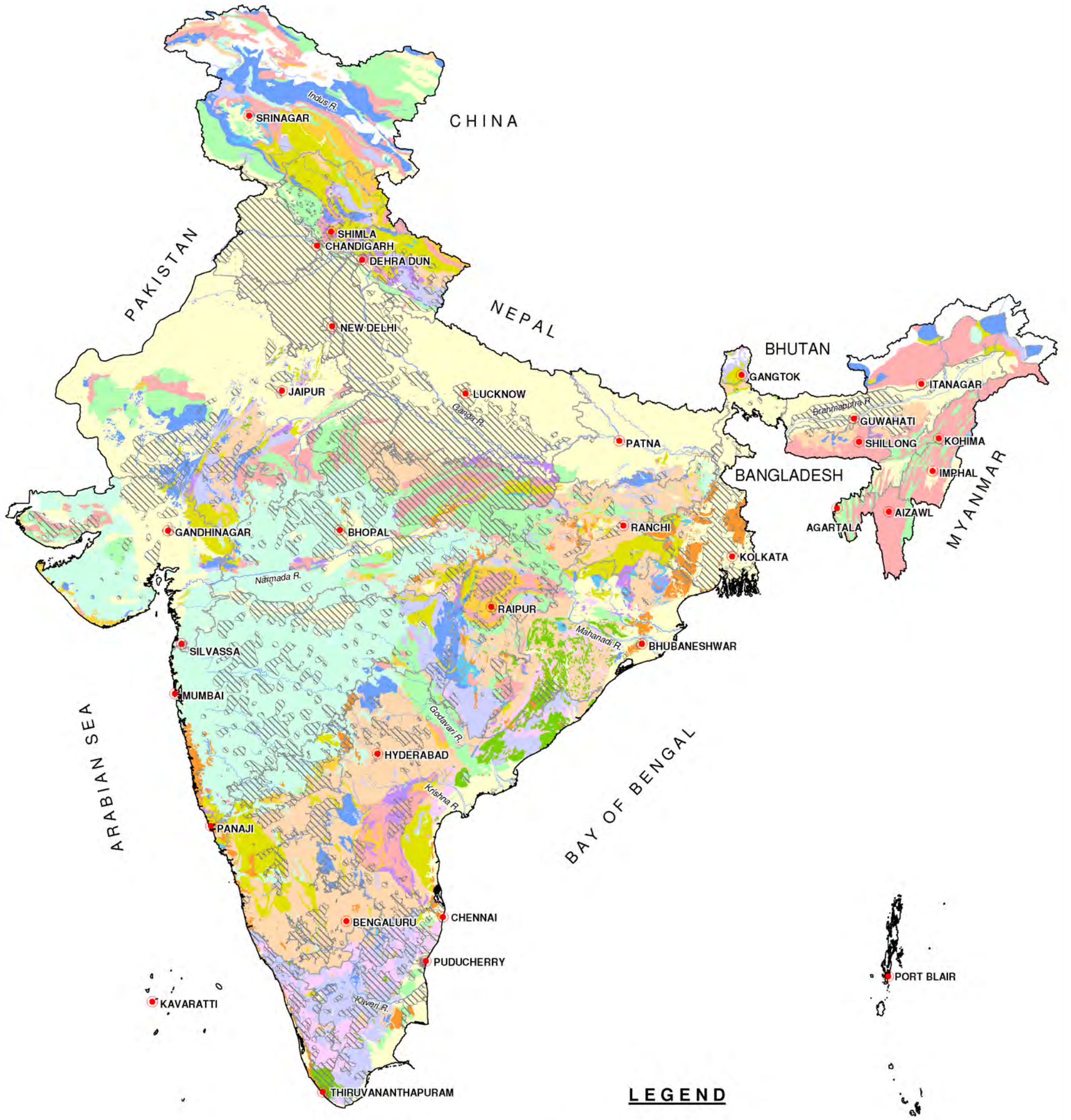


LEGEND

Management Plan

- GW Recharge - Priority Area

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

ANNUAL REPLENISHABLE RECHARGE

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
KOLKATA
RANCHI
GANDHINAGAR
BHOPAL
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR
ARABIAN SEA
BAY OF BENGAL
Indus R.
Ganga R.
Brahmaputra R.
Narmada R.
Mahanadi
Godavari R.
Krishna R.
Kaveri R.

Unit Recharge (m/yr)

- < 0.1
- 0.1 to 0.25
- > 0.25
- 20 Isohyet (cm) (Normal)
- Spring

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

LEGEND

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

(Source: Isohyetes are adopted from IMD Data(Recharge - GW Estimation - 2009; Rainfall from IMD)

INTRUSIVES

N
W E
S

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
PAKISTAN
NEW DELHI
NEPAL
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
SHILLONG
KOHIMA
PATNA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

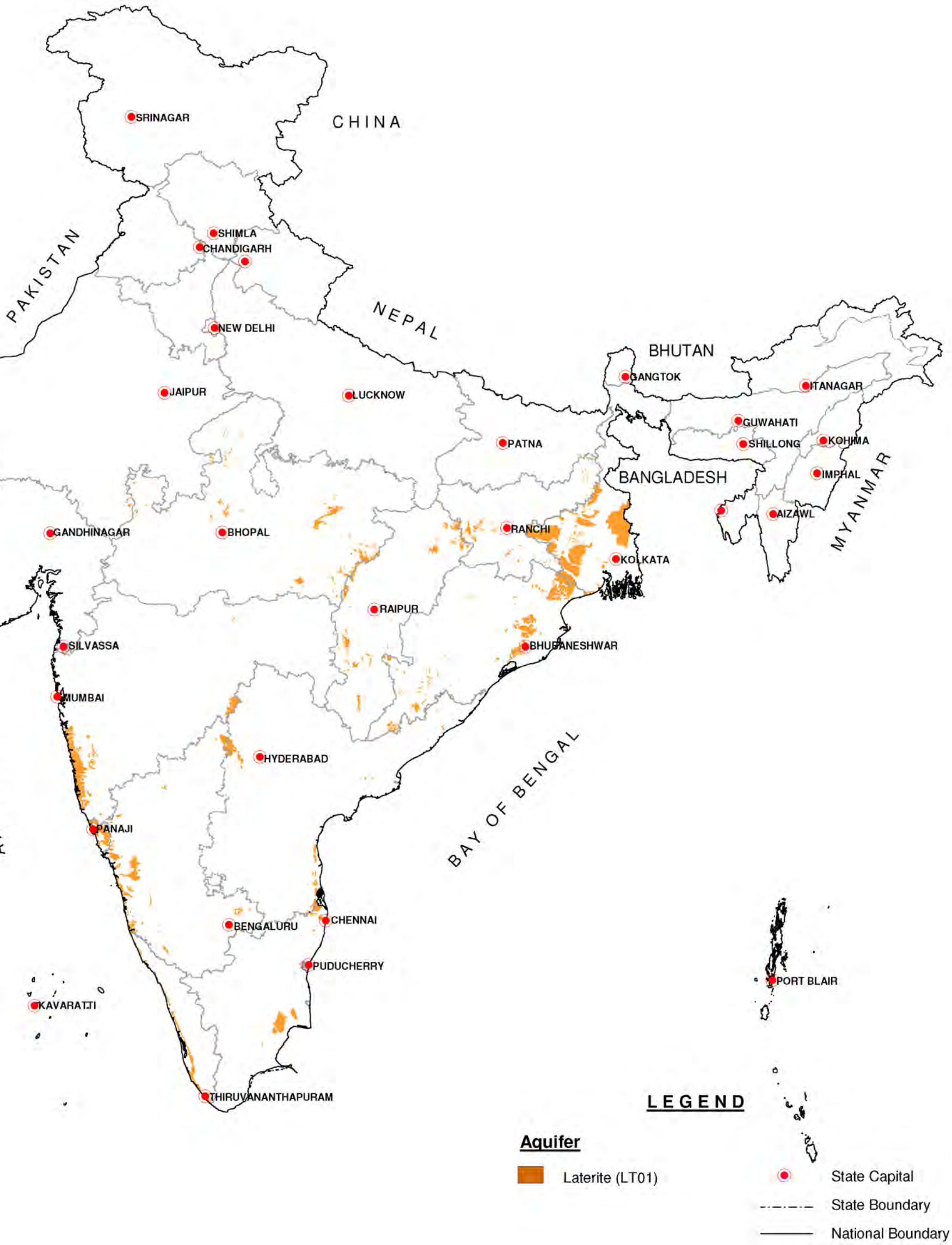
Auifers

- Basic Intrusives (IN01)
- Ultrabasic Intrusives (IN02)
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

LATERITE - AQUIFER SYSTEM

0 250 500
kilometers



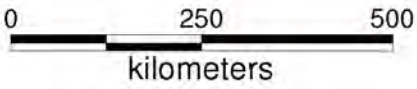
LEGEND

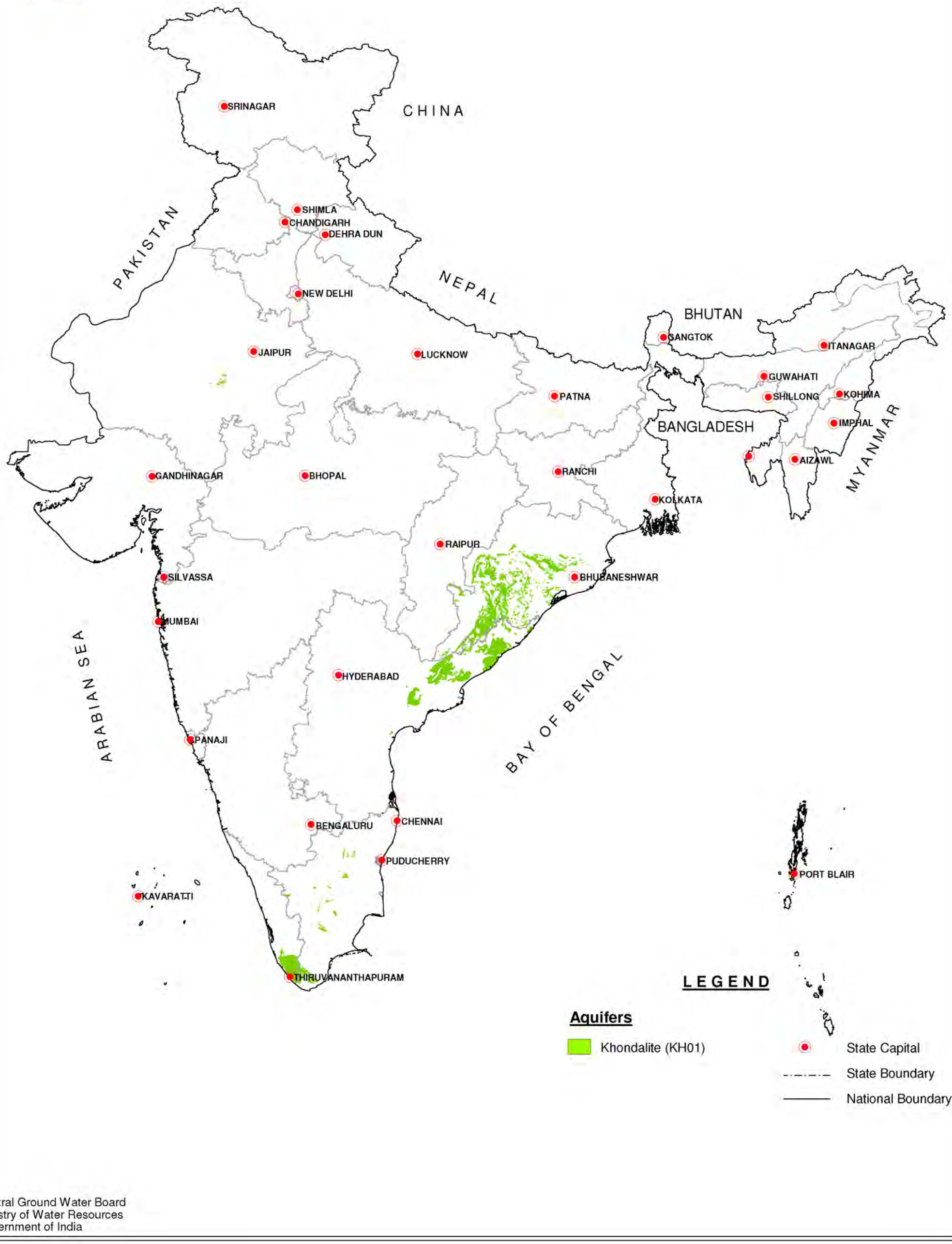
Aquifer

- Laterite (LT01)
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

KHONDALITE - AQUIFER SYSTEM





Central Ground Water Board
Ministry of Water Resources
Government of India

CHARNOCKITE - AQUIFER SYSTEM

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
SHILLONG
KOHIMA
PATNA
IMPHAL
BANGLADESH
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Charnockite (CK01)
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

QUARTZITE - AQUIFER SYSTEM

0 250 500
kilometers

N
W E
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SRINAGAR
CHINA
SHIMLA
CHANDIGARH
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Quartzite (QZ01)
- Quartzite (QZ02)

- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

SCHIST - AQUIFER SYSTEM

N
W E
S

0 250 500
kilometers

SRINAGAR
CHINA
PAKISTAN
SHIMLA
CHANDIGARH
DEHRA DUN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Schist (SC01)
- Phyllite (SC02)
- Slate (SC03)

- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

GRANITE - AQUIFER SYSTEM

N
W E
S

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEW DELHI
NEPAL
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Acidic Rocks (GR01)
- Acidic Rocks (GR02)
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

LIMESTONE - AQUIFER SYSTEM

0 250 500
kilometers

N
W E
S

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
SHILLONG
KOHIMA
PATNA
IMPHAL
BANGLADESH
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Miliolitic Limestone (LS01)
- Limestone/ Dolomite (LS02) (Semi-consolidated)
- Limestone/ Dolomite (LS03) (Consolidated)
- Limestone with Shale (LS04)
- Marble (LS05)

- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

SHALE - AQUIFER SYSTEM

N
W E
S

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEW DELHI
NEPAL
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
SHILLONG
KOHIMA
PATNA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Shale with limestone (SH01)
- Shale with sandstone (SH02)
- Shale, limestone and sandstone (SH03)
- Shale (SH04)
- Shale/Shale with sandstone (SH05)
- Shale with limestone (SH06)

- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

SANDSTONE - AQUIFER SYSTEM

0 250 500
kilometers

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SRINAGAR
CHINA
PAKISTAN
SHIMLA
CHANDIGARH
NEW DELHI
NEPAL
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
CHENNAI
BENGALURU
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

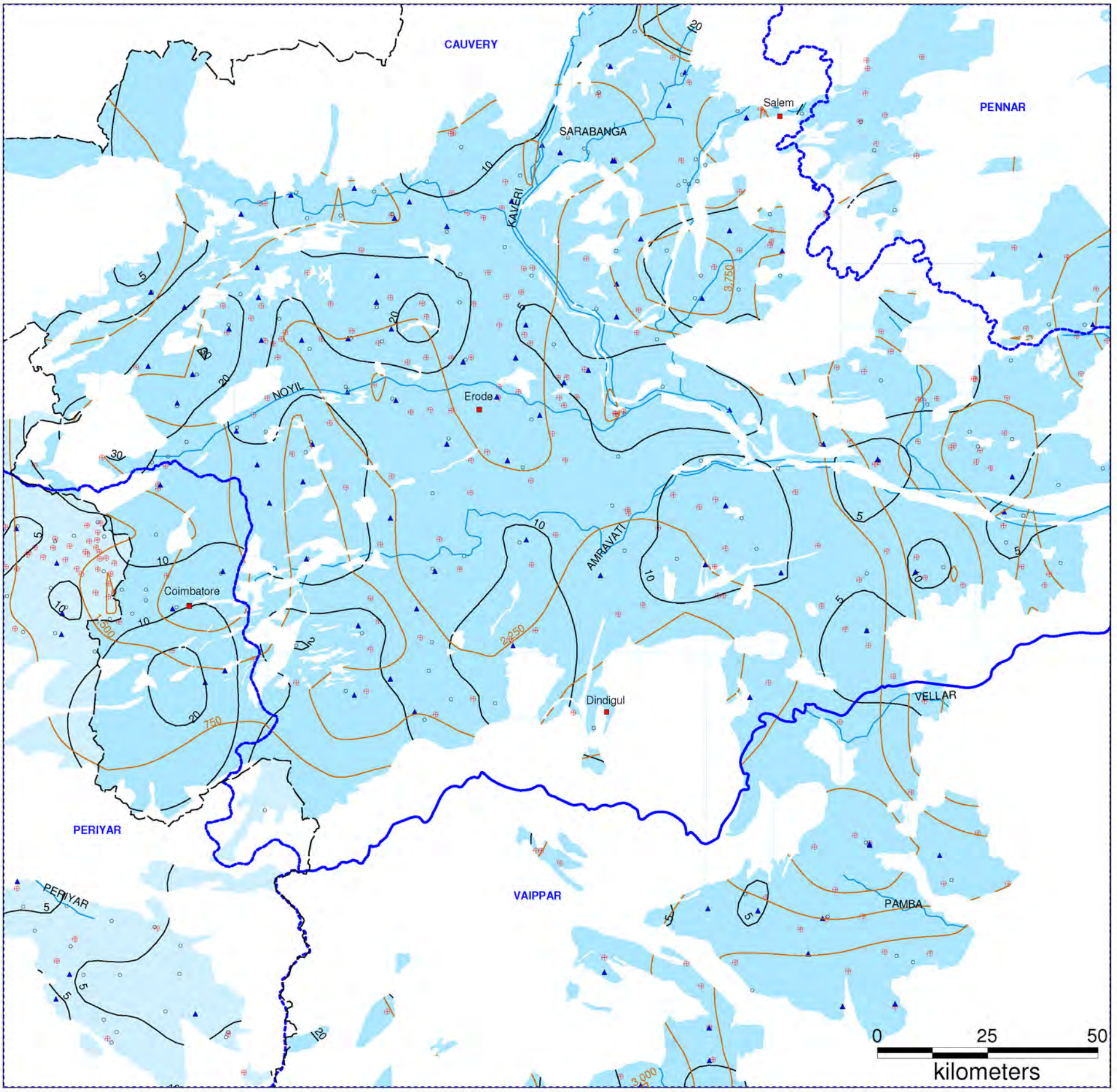
- Sandstone (ST01)
- Sandstone with shale (ST02)
- Sandstone with shale/coal bed (ST03)
- Sandstone with clay (ST04)
- Sandstone (ST05)
- Sandstone with shale (ST06)

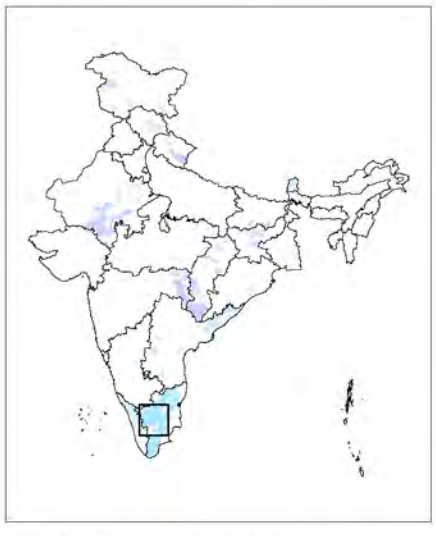
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

GNEISS AQUIFER

(PARTS OF KERALA AND TAMIL NADU)





Central Ground Water Board
Ministry of Water Resources
Government of India

LEGEND

AQUIFERS

- Gneiss (GN02)
- Migmatitic Gneiss (GN03)
- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- State Capital
- State Boundary
- Drainage

GNEISS AQUIFER

(PARTS OF M.P., MAHARASHTRA, CHHATTISGARH AND ANDHRA PRADESH)

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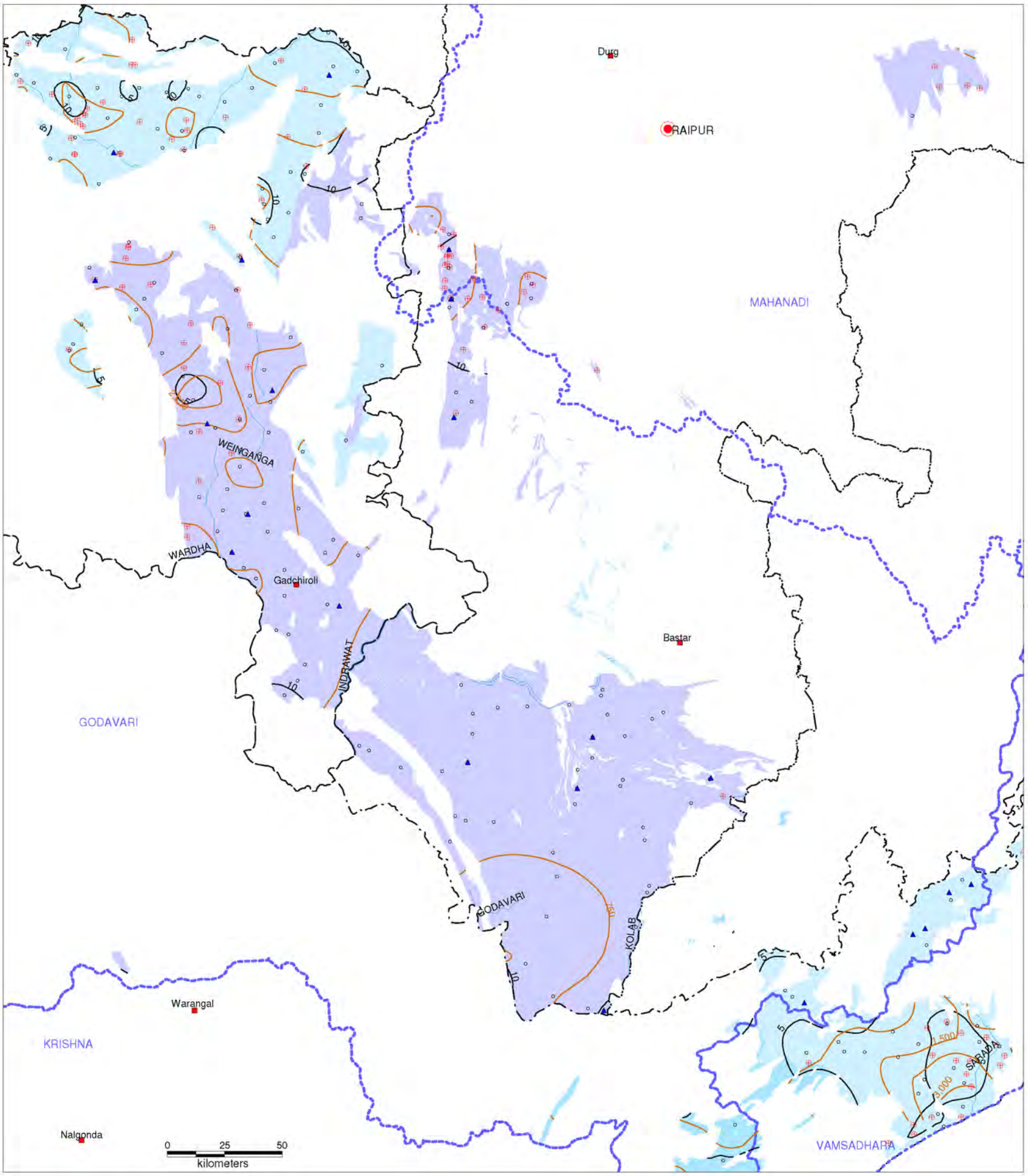


Central Ground Water Board
Ministry of Water Resources
Government of India

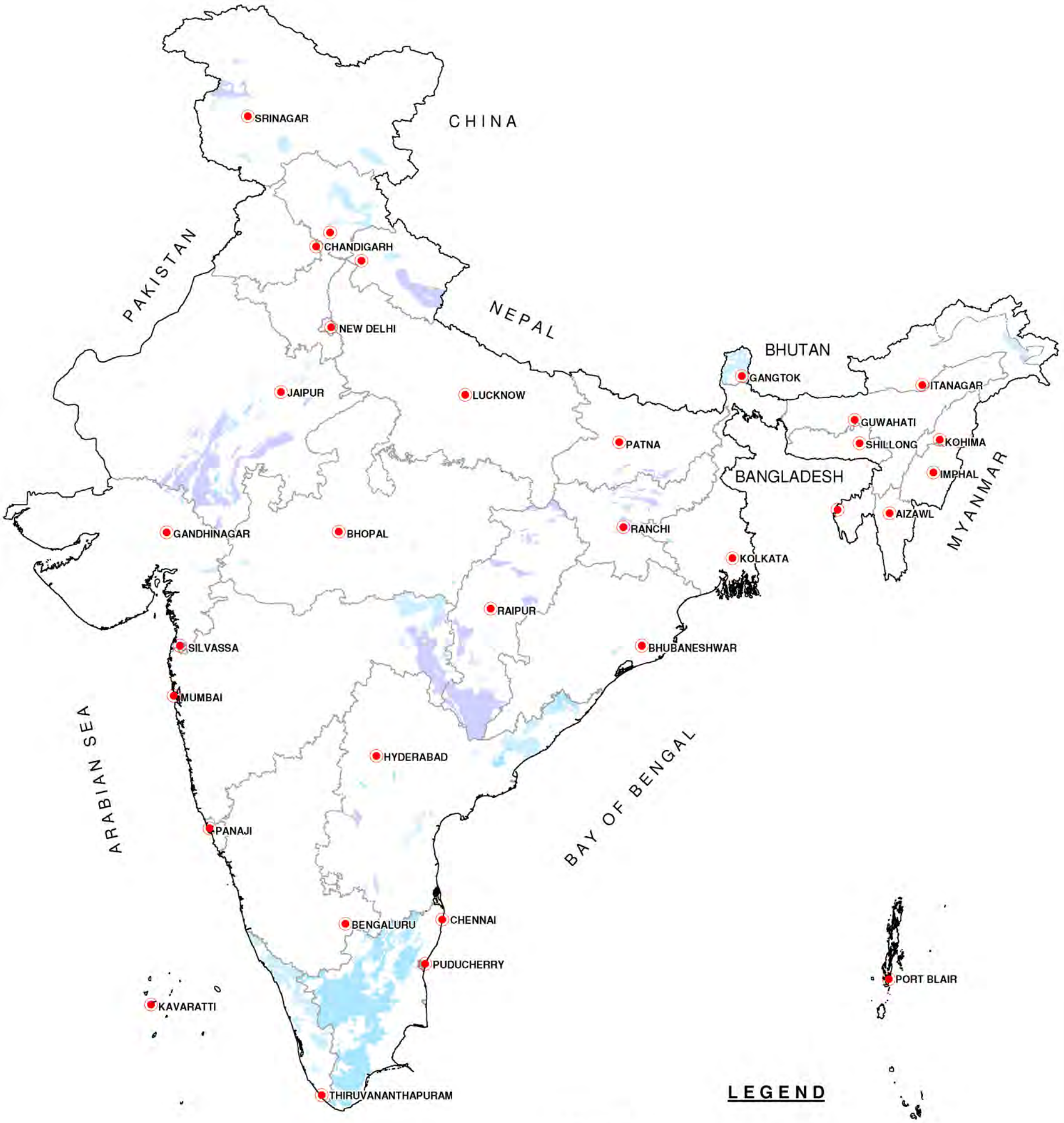
LEGEND

AQUIFERS

- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- Undifferentiated Metamorphics (GN01)
- Gneiss (GN02)
- Migmatitic Gneiss (GN03)
- State Capital
- State Boundary
- Drainage

GNEISS - AQUIFER SYSTEM

0 250 500
kilometers



LEGEND

Aquifers

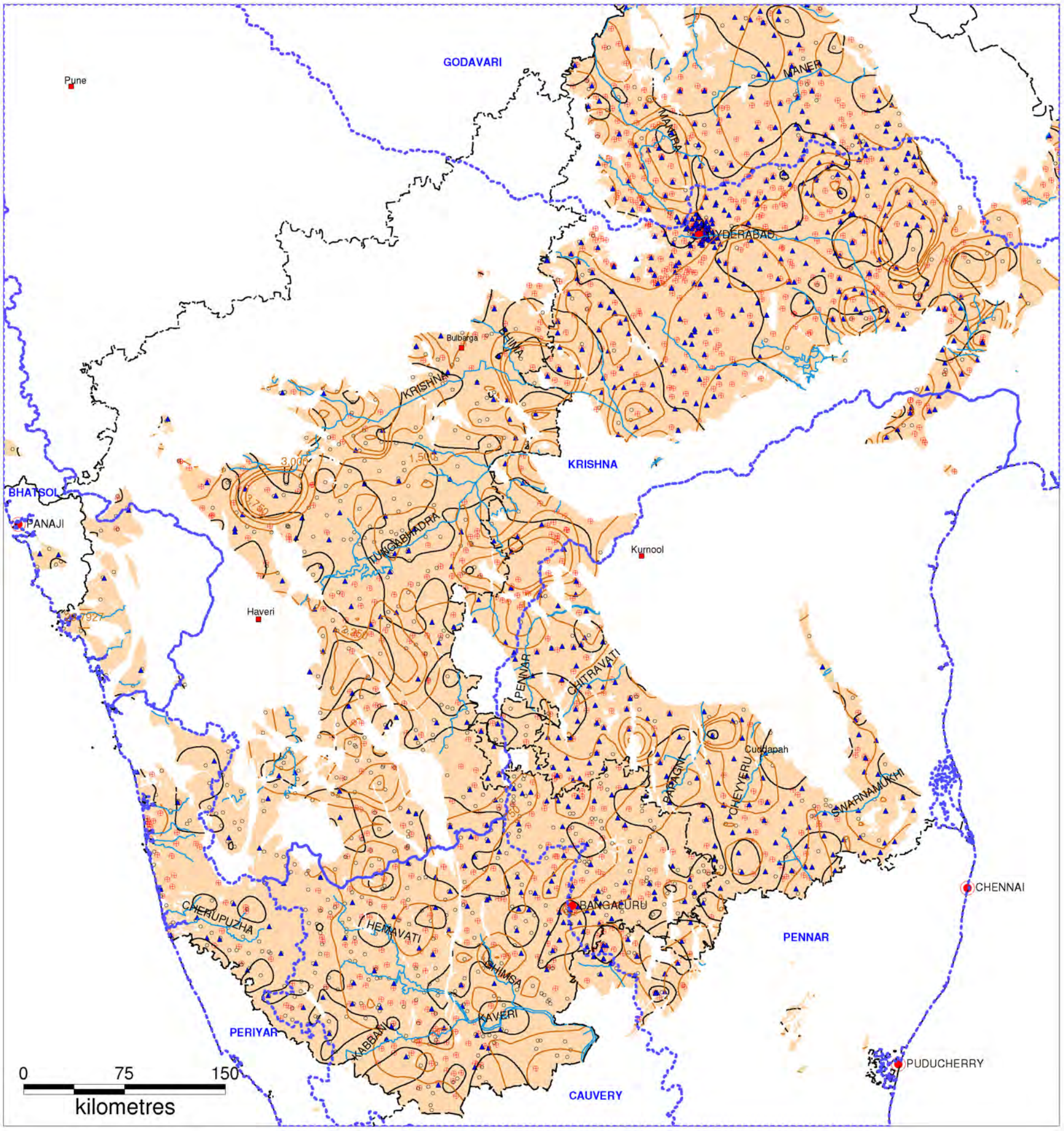
- Undifferentiated Metamorphics (GN01)
- Gneiss (GN02)
- Migmatitic Gneiss (GN03)

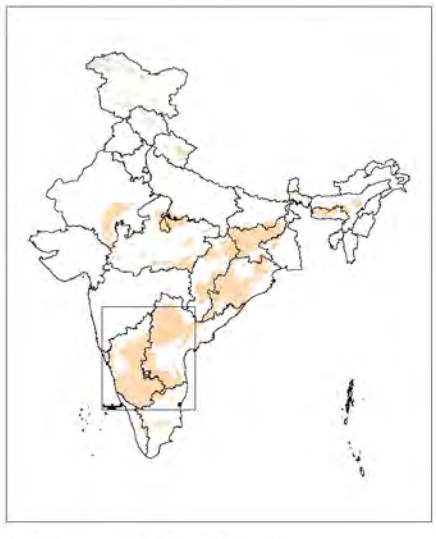
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

BANDED GNEISSIC COMPLEX

(PARTS OF KARNATAKA, TAMIL NADU AND ANDHRA PRADESH)





LEGEND

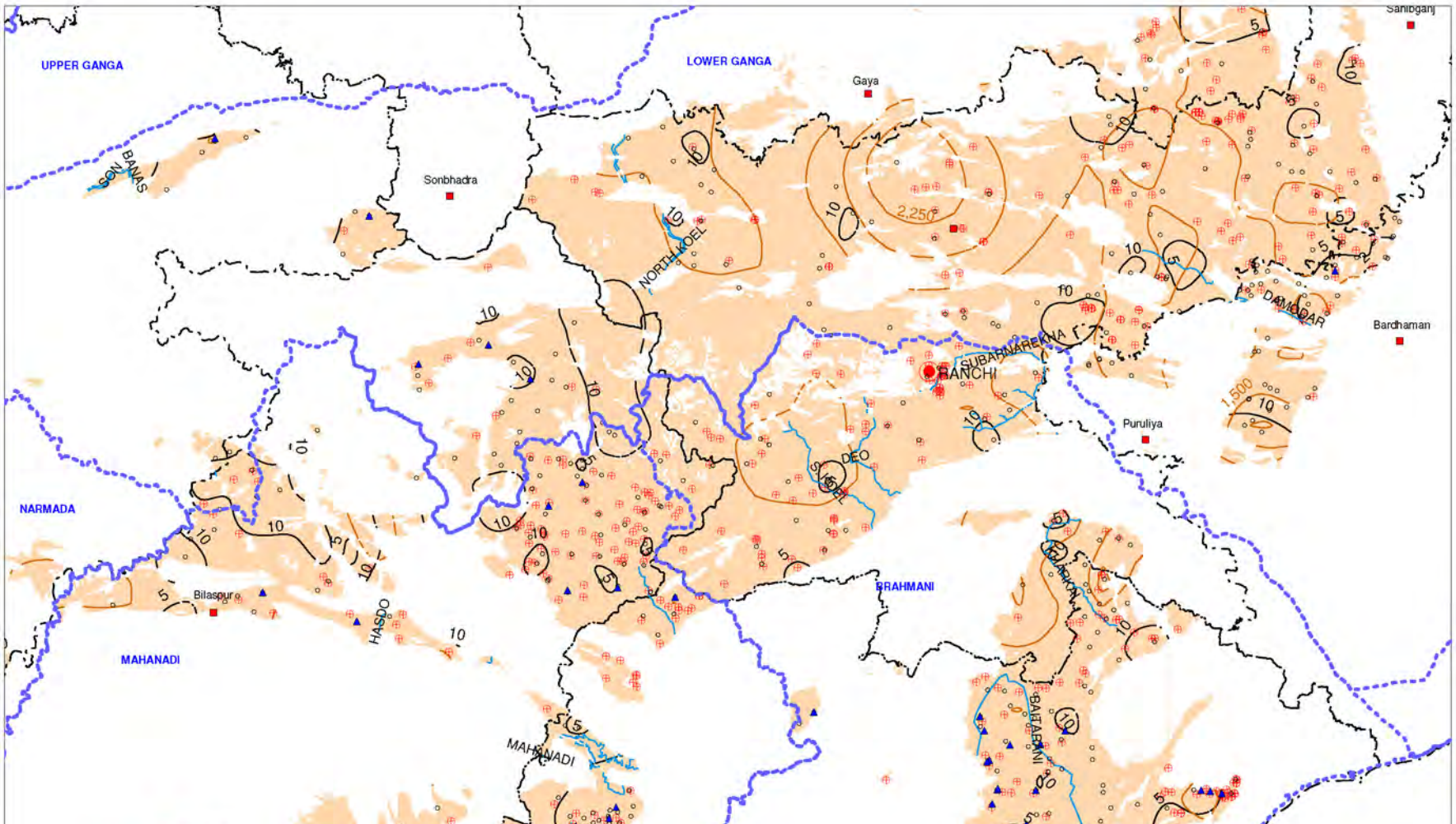
AQUIFER

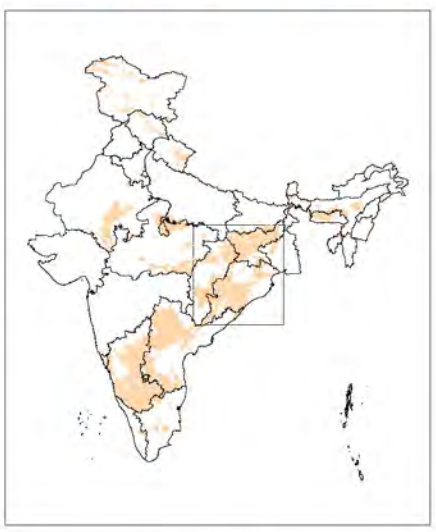
- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- Banded Gneissic Complex (BG01)
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

BANDED GNEISSIC COMPLEX

(PARTS OF U.P, M.P, BIHAR, CHHATTISGARH, ORISSA AND ANDHRA PRADESH)





LEGEND

AQUIFER

- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- Banded Gneissic Complex (BG01)
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

BANDED GNEISSIC COMPLEX

N
W E
S

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Auifers

Banded Gneissic Complex (BG01)

State Capital

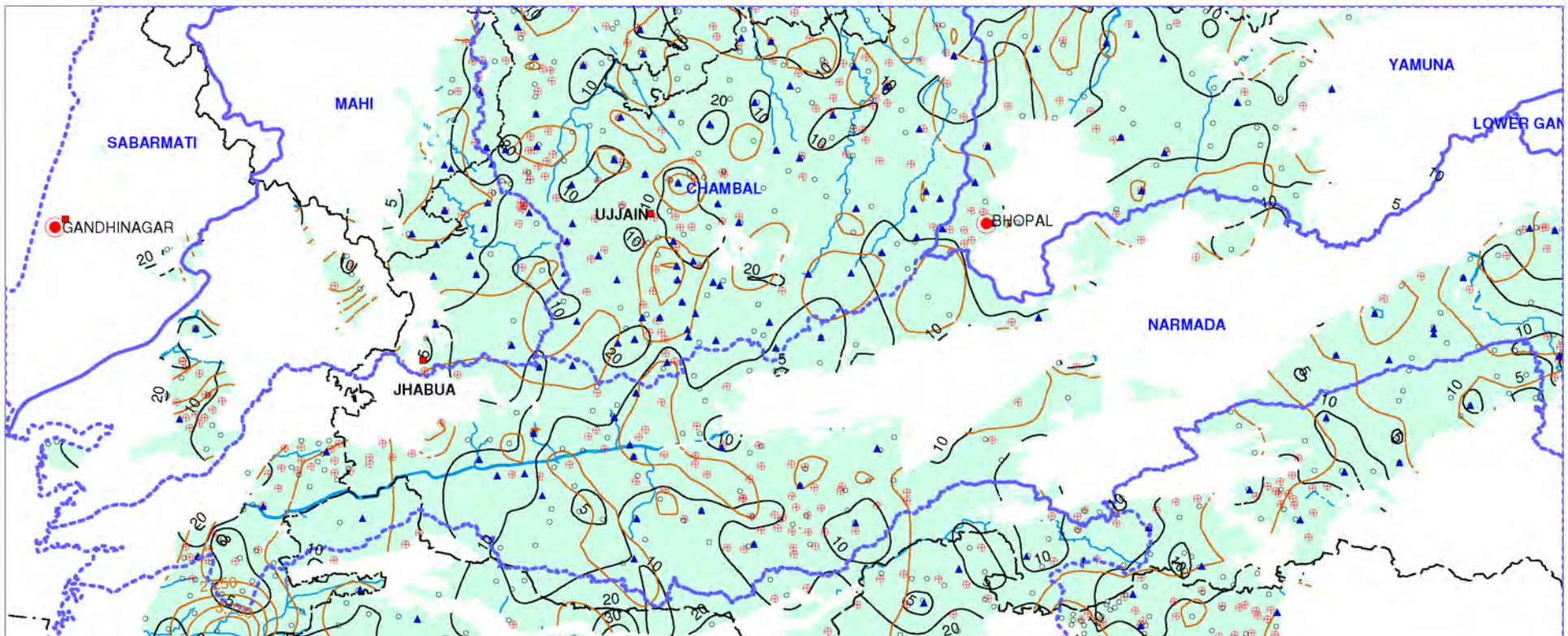
State Boundary

National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

BASALT AQUIFER

(PARTS OF MAHARASTRA AND MADHYA PRADESH)



LEGEND

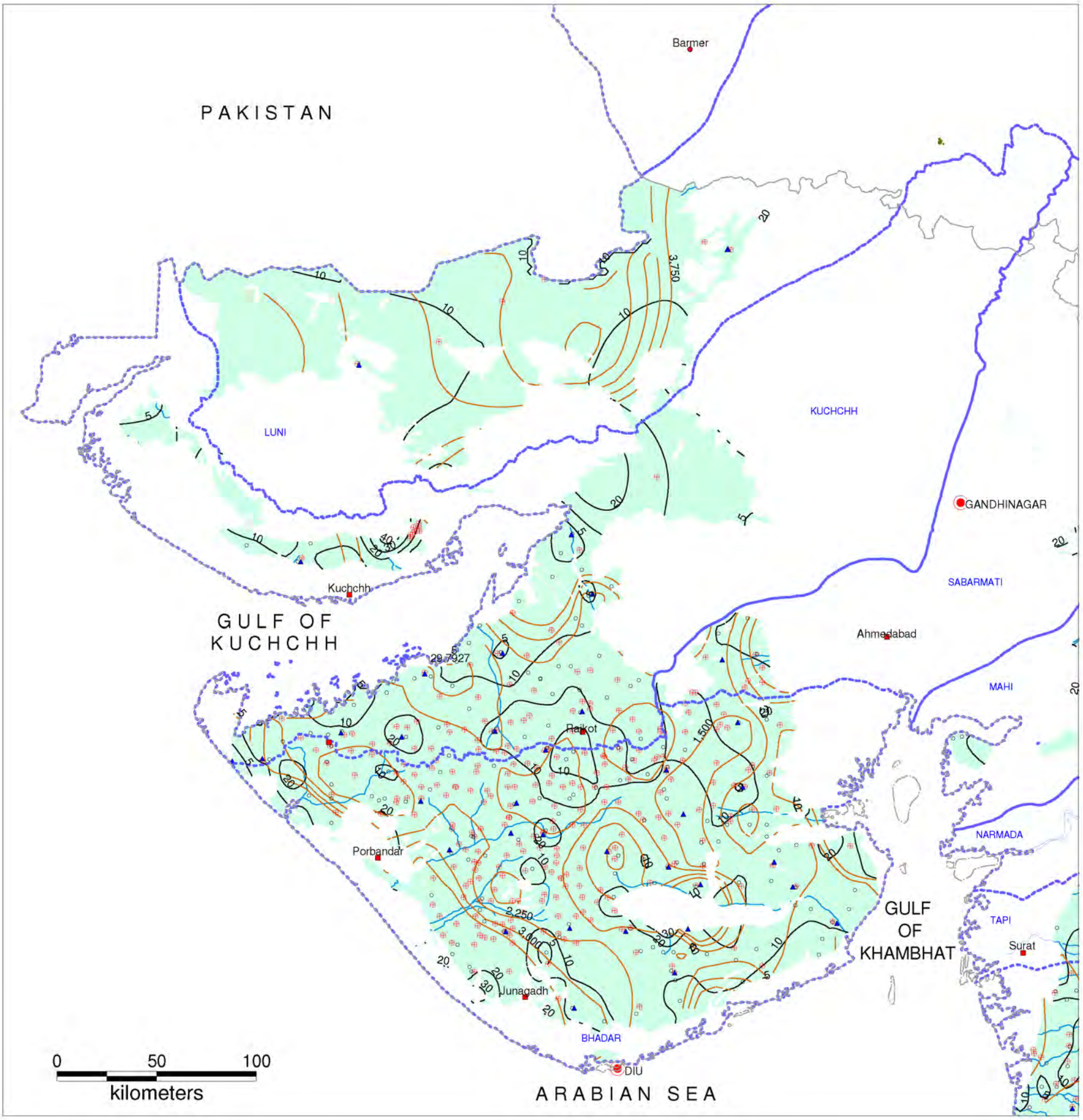
AQUIFER

- Basalt (BS01)
- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

BASALT AQUIFER

(PARTS OF GUJARAT)



LEGEND

AQUIFER

- Basalt (BS01)
- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- Depth to Water Level (m bgl)
- Electrical Conductivity
- Basin boundary
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

BASALT - AQUIFER SYSTEM

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
IMPHAL
BANGLADESH
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

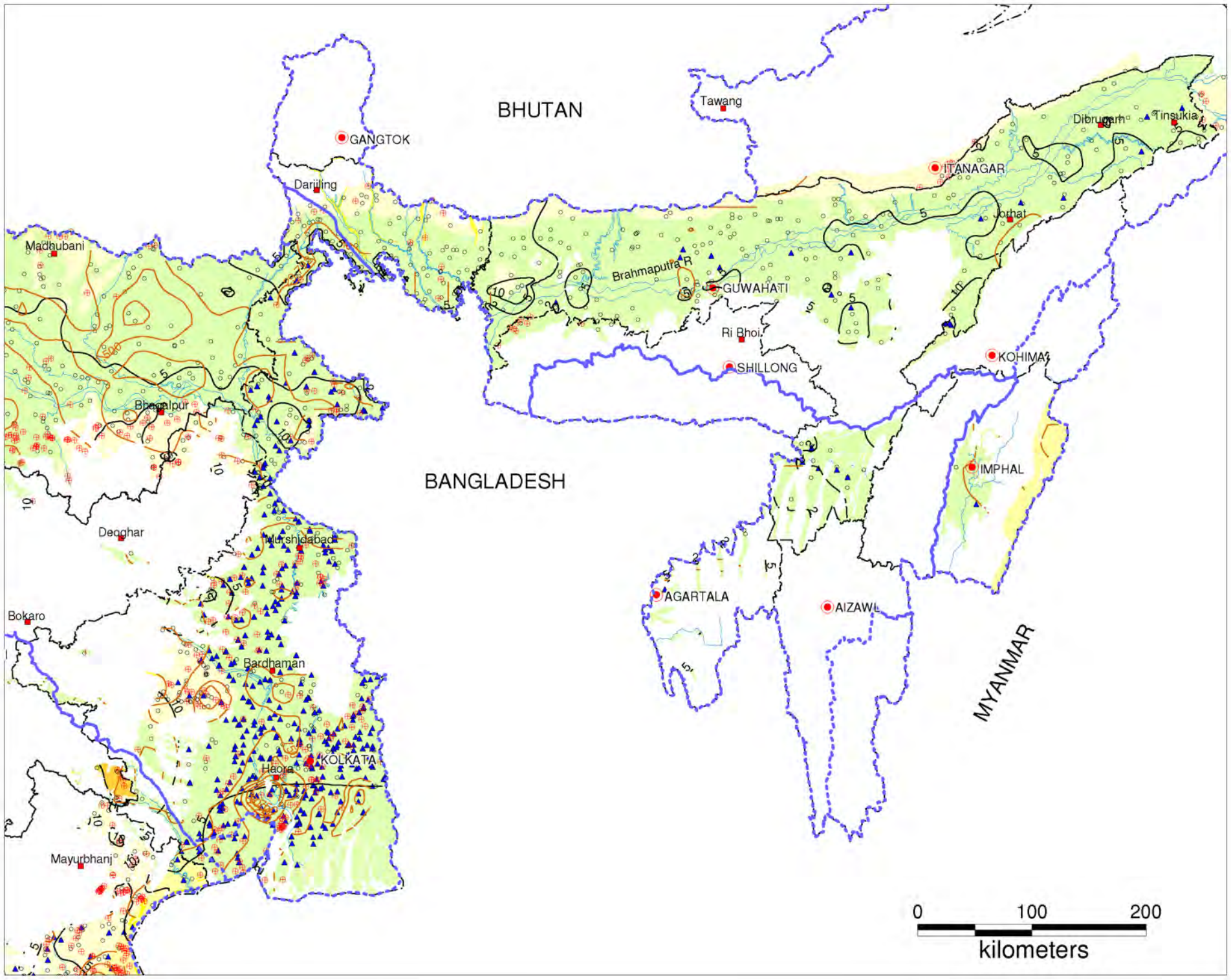
Aquifers

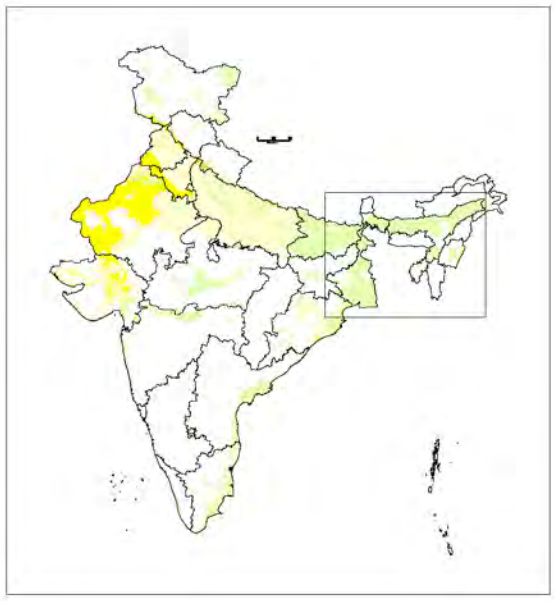
- Basalt (BS01)
- Ultrabasic (BS02)
- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

ALLUVIUM AQUIFER

(PARTS OF EASTERN GANGA - BRAHMAPUTRA PLAIN)





LEGEND

AQUIFERS

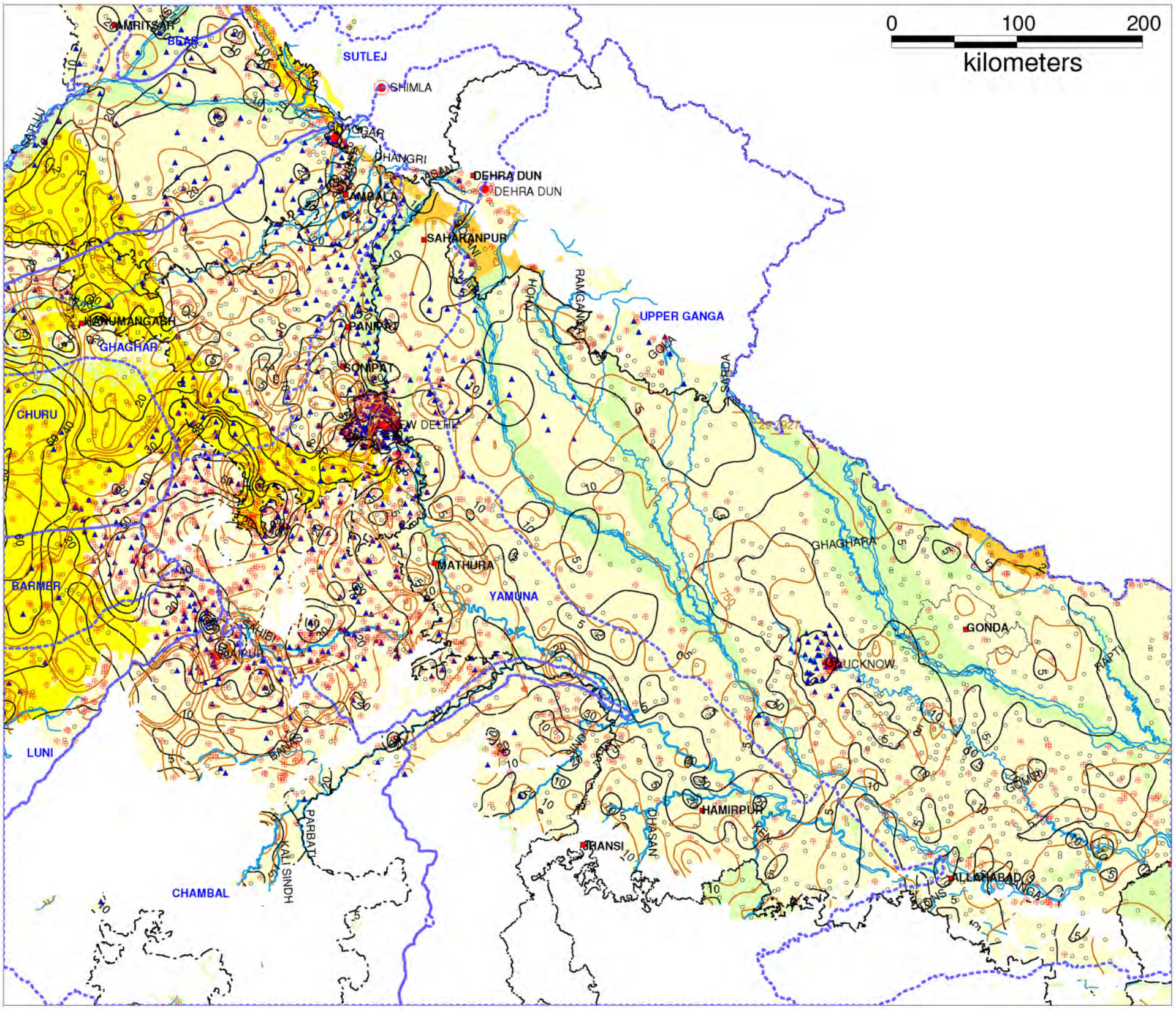
- Younger Alluvium (AL01)
- Pebble/ Gravel (AL02)
- Older Alluvium (AL03)
- Aeolian Sand/Silt (AL04)
- Valley Fill (AL06)

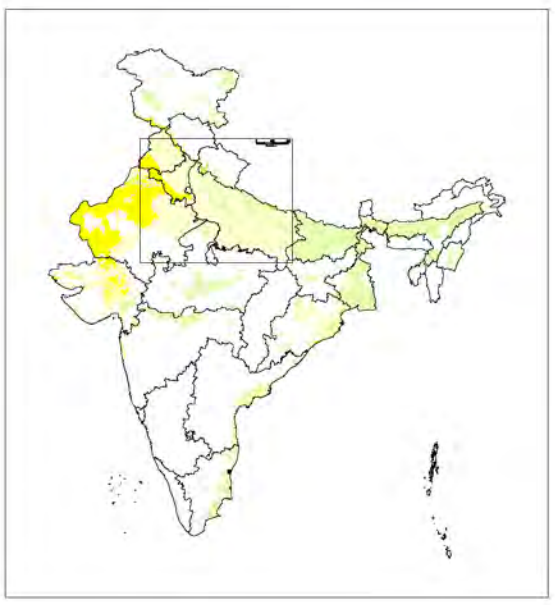
- Major town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

ALLUVIUM AQUIFER

(PARTS OF WESTERN INDO-GANGETIC PLAIN)





LEGEND

AQUIFERS

- Major Town
- Observation Well
- Piezometer
- Exploratory Well
- 20 — Depth to Water Level (m bgl)
- 750 — Electrical Conductivity
- Basin boundary
- Younger Alluvium (AL01)
- Gravel (AL02)
- Older Alluvium (AL03)
- Aeolian Sand/Silt (AL04)
- Valley Fill (AL06)
- State Capital
- State Boundary
- Drainage

Central Ground Water Board
Ministry of Water Resources
Government of India

ALLUVIUM - AQUIFER SYSTEM

0 250 500
kilometers

SRINAGAR
CHINA
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
NEPAL
NEW DELHI
BHUTAN
GANGTOK
ITANAGAR
JAIPUR
LUCKNOW
GUWAHATI
PATNA
SHILLONG
KOHIMA
BANGLADESH
IMPHAL
MYANMAR
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
SILVASSA
BHUBANESHWAR
MUMBAI
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
PORT BLAIR
KAVARATTI
THIRUVANANTHAPURAM

LEGEND

Aquifers

- Younger Alluvium (AL01)
- Pebble/Gravel (AL02)
- Older Alluvium (AL03)
- Aeolian Sand/Silt (AL04)
- Coastal Aquifer (AL05)
- Valley Fill (AL06)
- Glacial Deposits (AL07)

- State Capital
- State Boundary
- National Boundary

Central Ground Water Board
Ministry of Water Resources
Government of India

CATEGORIZATION OF GROUND WATER ASSESSMENT

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGENDS

Category

- Semi-Critical
- Critical
- Over Exploited
- Saline

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

(Source : Dynamic Ground Water Resources of India, 2009)

ARSENIC

(SHALLOW AQUIFER)

0 250 500

kilometers

N

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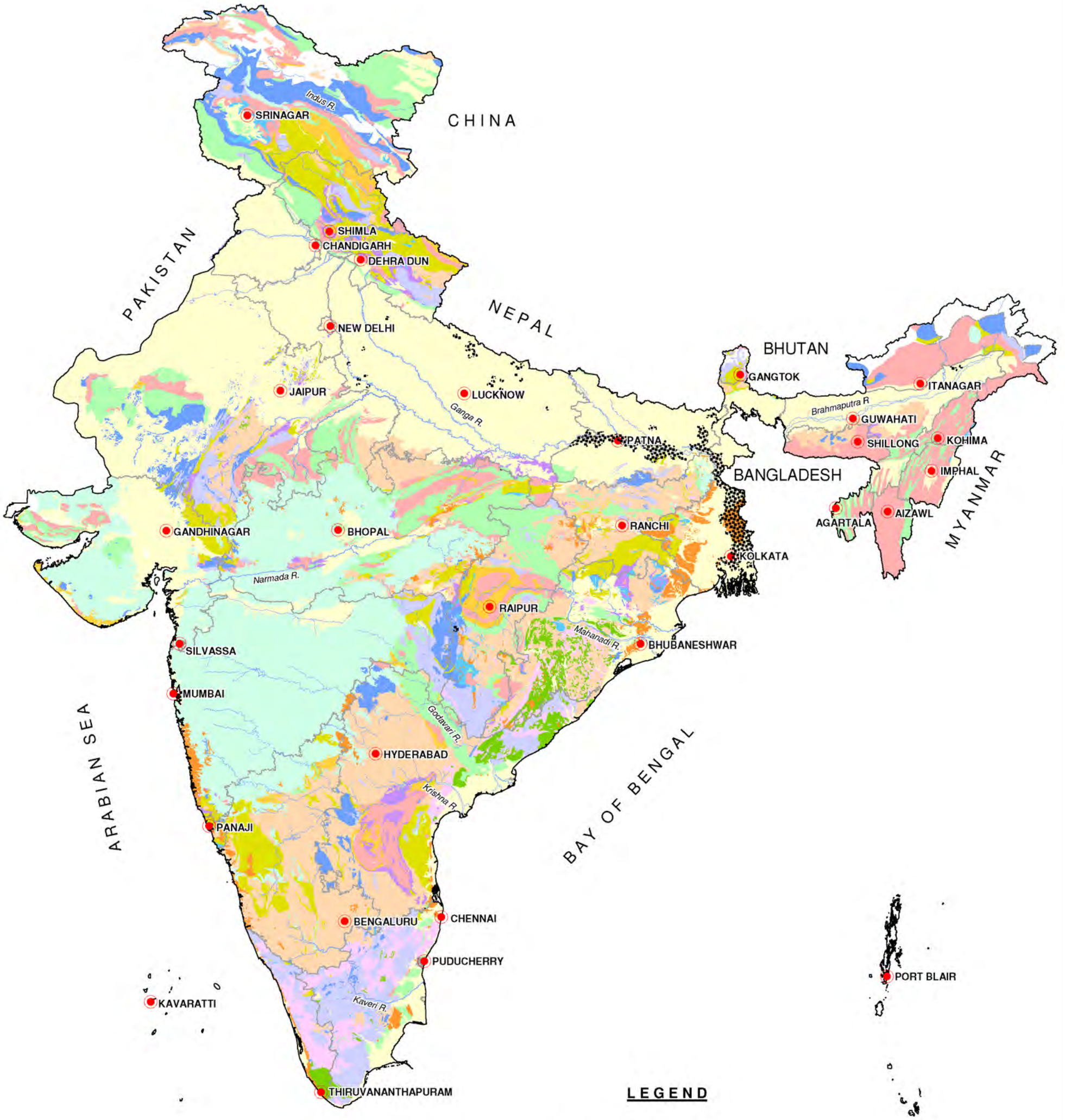


LEGEND

Arsenic > 0.05 mg/l

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

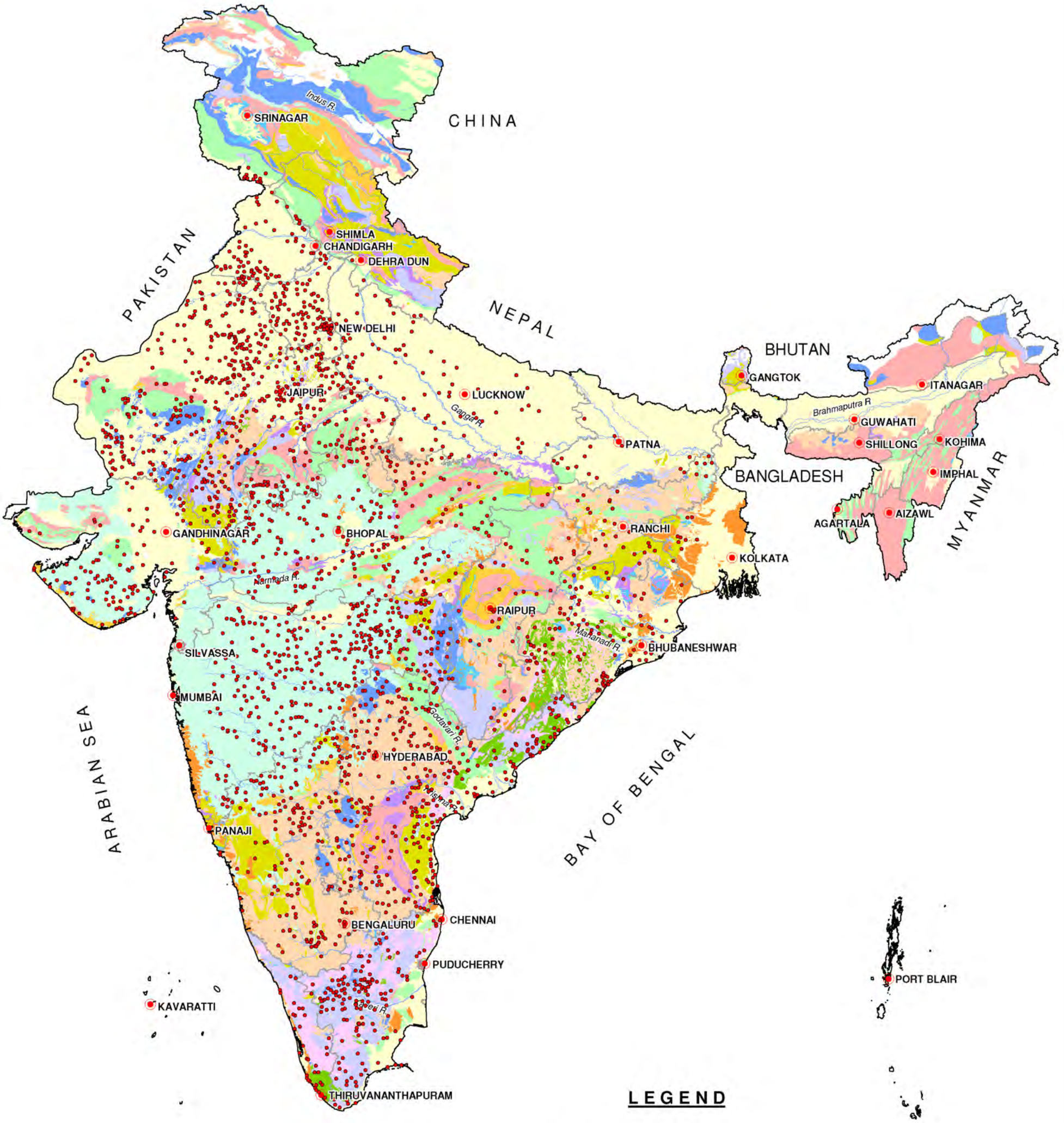
- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

NITRATE
(SHALLOW AQUIFER)

0 250 500
kilometers

N
W E
S



LEGEND

- Nitrate > 45 mg/l

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

FLUORIDE

(SHALLOW AQUIFER)

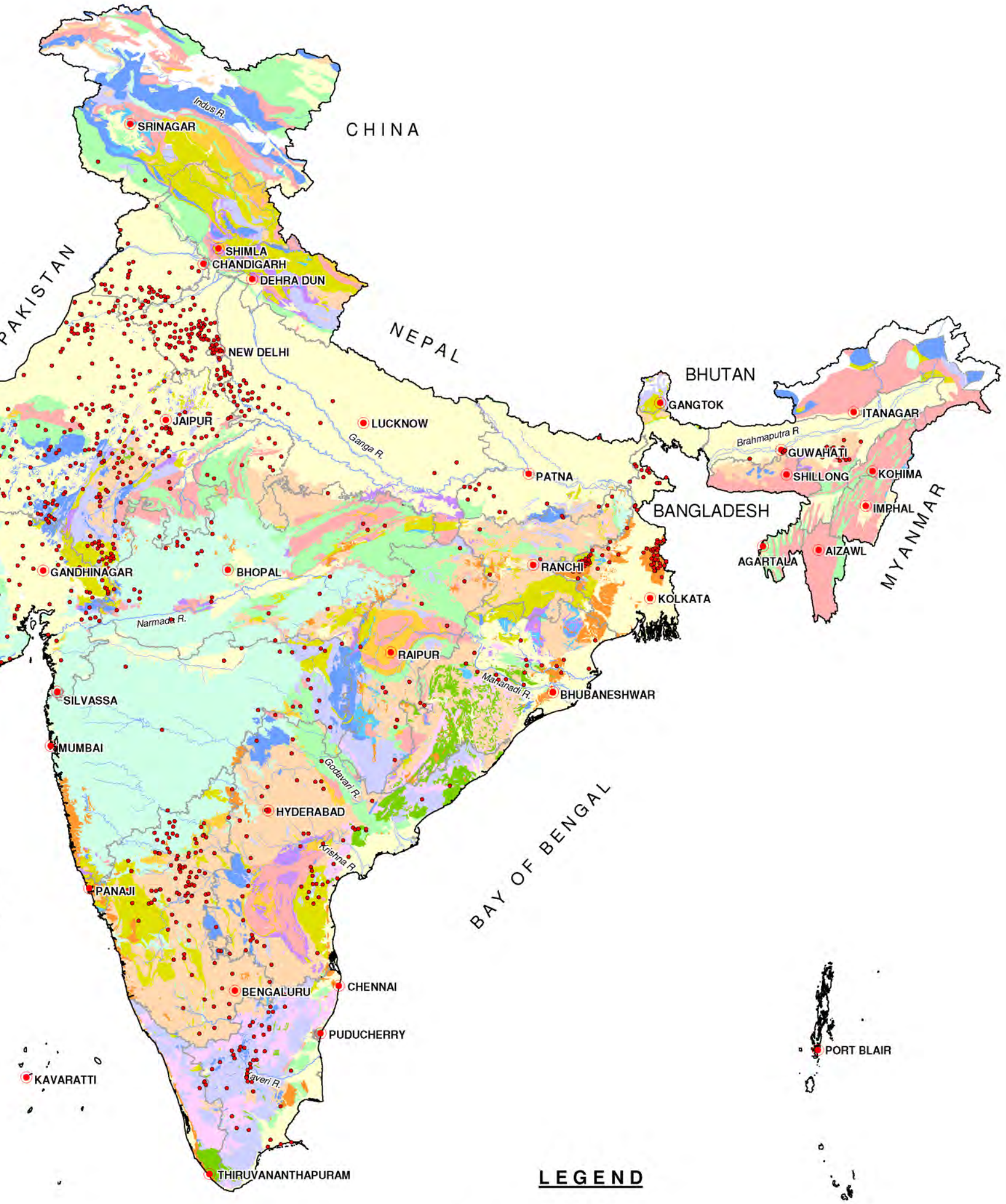
0 250 500

kilometers

N

W E

S



LEGEND

Fluoride >1.5 mg/l

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

ELECTRICAL CONDUCTIVITY

(SHALLOW AQUIFER)

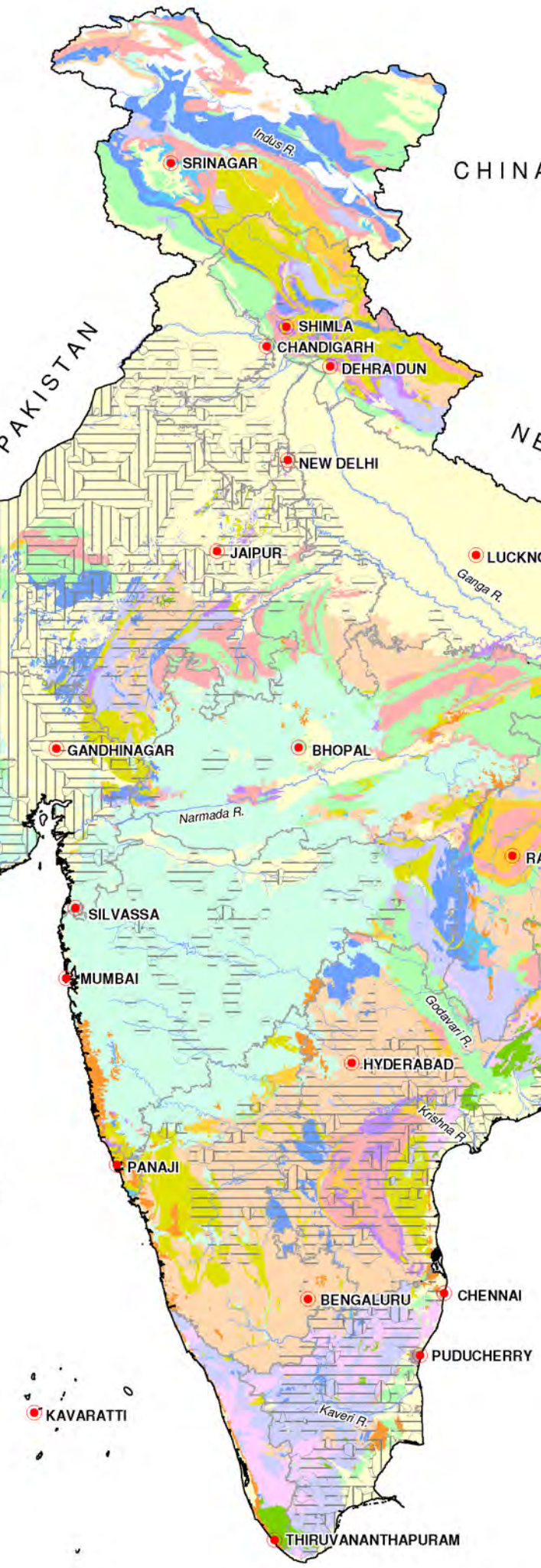
0 250 500

kilometers

N

W E

S



Electrical Conductivity
(micro-siemens/cm)

- < 1500
- 1500-300
- > 3000

LEGEND

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

ELECTRICAL CONDUCTIVITY

(SHALLOW AQUIFER)

0 250 500

kilometers

N

W E

S

Electrical Conductivity
(micro-siemens/cm)

- < 1500
- 1500-3000
- > 3000

LEGEND

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
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- Unclassified

- State Capital
- State Boundary
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Central Ground Water Board
Ministry of Water Resources
Government of India

YIELD POTENTIAL

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
NEW DELHI
SHIMLA
CHANDIGARH
DEHRA DUN
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
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KOLKATA
RANCHI
BHOPAL
GANDHINAGAR
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R.
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGEND

Yield Potential (lps)

- < 1
- 1 - 25
- 25 - 40
- > 40

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
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- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

WATER TABLE ELEVATION

(2011)

0 250 500

kilometers

N

W E

S

CHINA

PAKISTAN

NEPAL

BHUTAN

BANGLADESH

MYANMAR

SRINAGAR

SHIMLA

CHANDIGARH

DEHRA DUN

NEW DELHI

JAIPUR

LUCKNOW

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KOHIMA

IMPHAL

AIZAWL

AGARTALA

RANCHI

KOLKATA

GANDHINAGAR

BHOPAL

RAIPUR

BHUBANESHWAR

SILVASSA

MUMBAI

HYDERABAD

PANAJI

BENGALURU

CHENNAI

PUDUCHERRY

KAVARATTI

THIRUVANANTHAPURAM

PORT BLAIR

Indus R.

Ganga R.

Brahmaputra R.

Narmada R.

Mahanadi R.

Godavari R.

Krishna R.

Kaveri R.

ARABIAN SEA

BAY OF BENGAL

LEGEND

50 Water Table Contour (m amsl)

Ground water flow direction

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

State Capital

State Boundary

National Boundary

River

Central Ground Water Board
Ministry of Water Resources
Government of India

DEPTH TO WATER LEVEL

(POST-MONSOON DECADAL MEAN 2002-2011)

0 250 500

kilometers

N

W E

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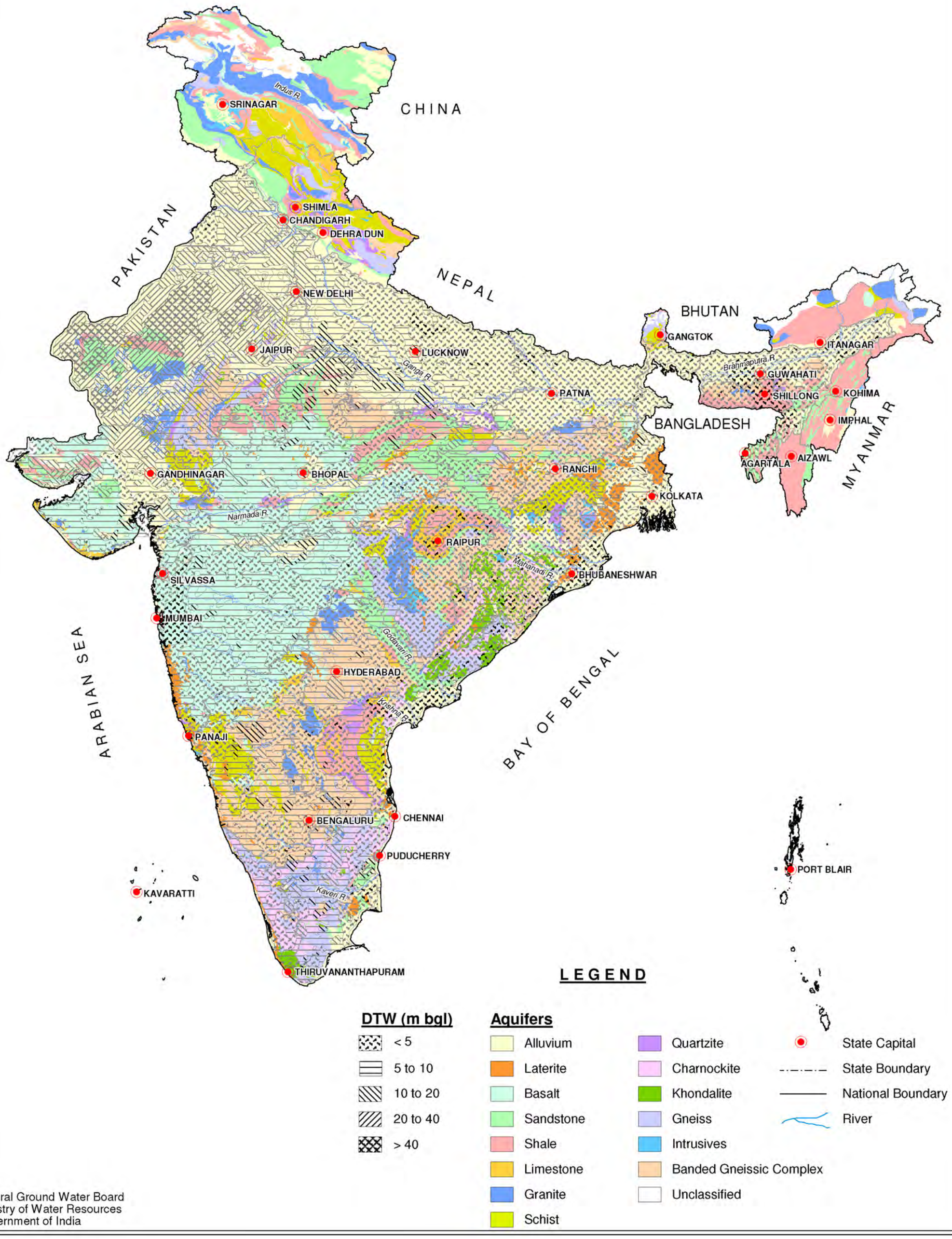

LEGEND

DTW (m bgl)

- < 5
- 5 to 10
- 10 to 20
- 20 to 40
- > 40

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
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- River

Central Ground Water Board
Ministry of Water Resources
Government of India

DEPTH TO WATER LEVEL

(PRE-MONSOON DECADAL MEAN 2002- 2011)

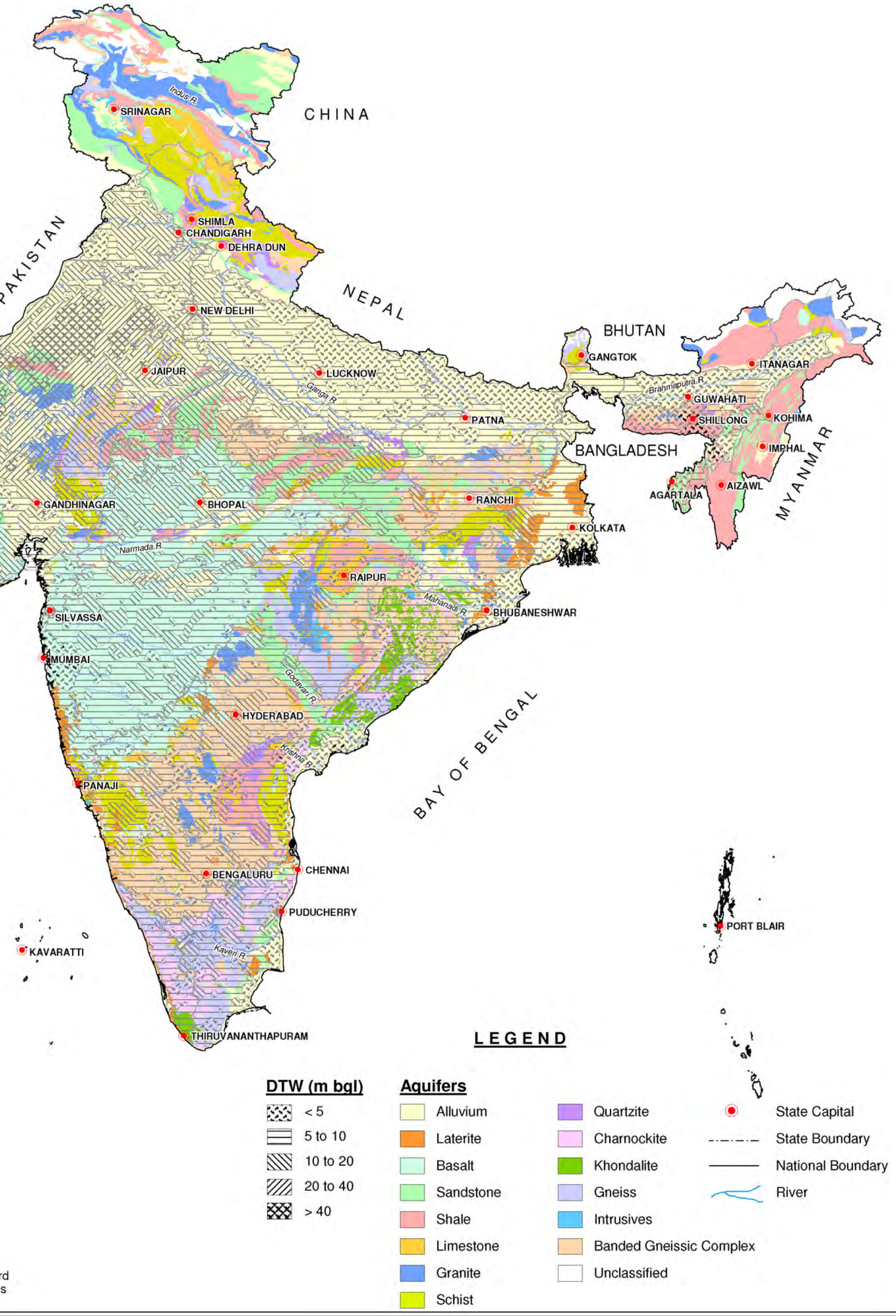
0 250 500

kilometers

N

W E

S



LEGEND

DTW (m bgl)

- < 5
- 5 to 10
- 10 to 20
- 20 to 40
- > 40

Aquifers

- Alluvium
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- Schist
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- Khondalite
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- Intrusives
- Banded Gneissic Complex
- Unclassified

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- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

DEPTH TO WATER LEVEL

(POST-MONSOON 2011)

0 250 500

kilometers

N

W E

S

CHINA

PAKISTAN

NEPAL

BHUTAN

BANGLADESH

MYANMAR

SRINAGAR

Indus R.

SHIMLA

CHANDIGARH

DEHRA DUN

NEW DELHI

JAIPUR

LUCKNOW

Ganga R.

PATNA

GANGTOK

ITANAGAR

Brahmaputra R.

GUWAHATI

SHILLONG

KOHIMA

IMPHAL

AIZAWL

AGARTALA

GANDHINAGAR

BHOPAL

RANCHI

KOLKATA

Narmada R.

RAIPUR

Mahanadi R.

BHUBANESHWAR

SILVASSA

MUMBAI

Godavari R.

HYDERABAD

Krishna R.

PANAJI

ARABIAN SEA

BAY OF BENGAL

BENGALURU

CHENNAI

PUDUCHERRY

Kaveri R.

KAVARATTI

THIRUVANANTHAPURAM

PORT BLAIR

LEGEND

DTW (m bgl)

- < 5
- 5 to 10
- 10 to 20
- 20 to 40
- > 40

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

DEPTH TO WATER LEVEL

(PRE-MONSOON, 2011)

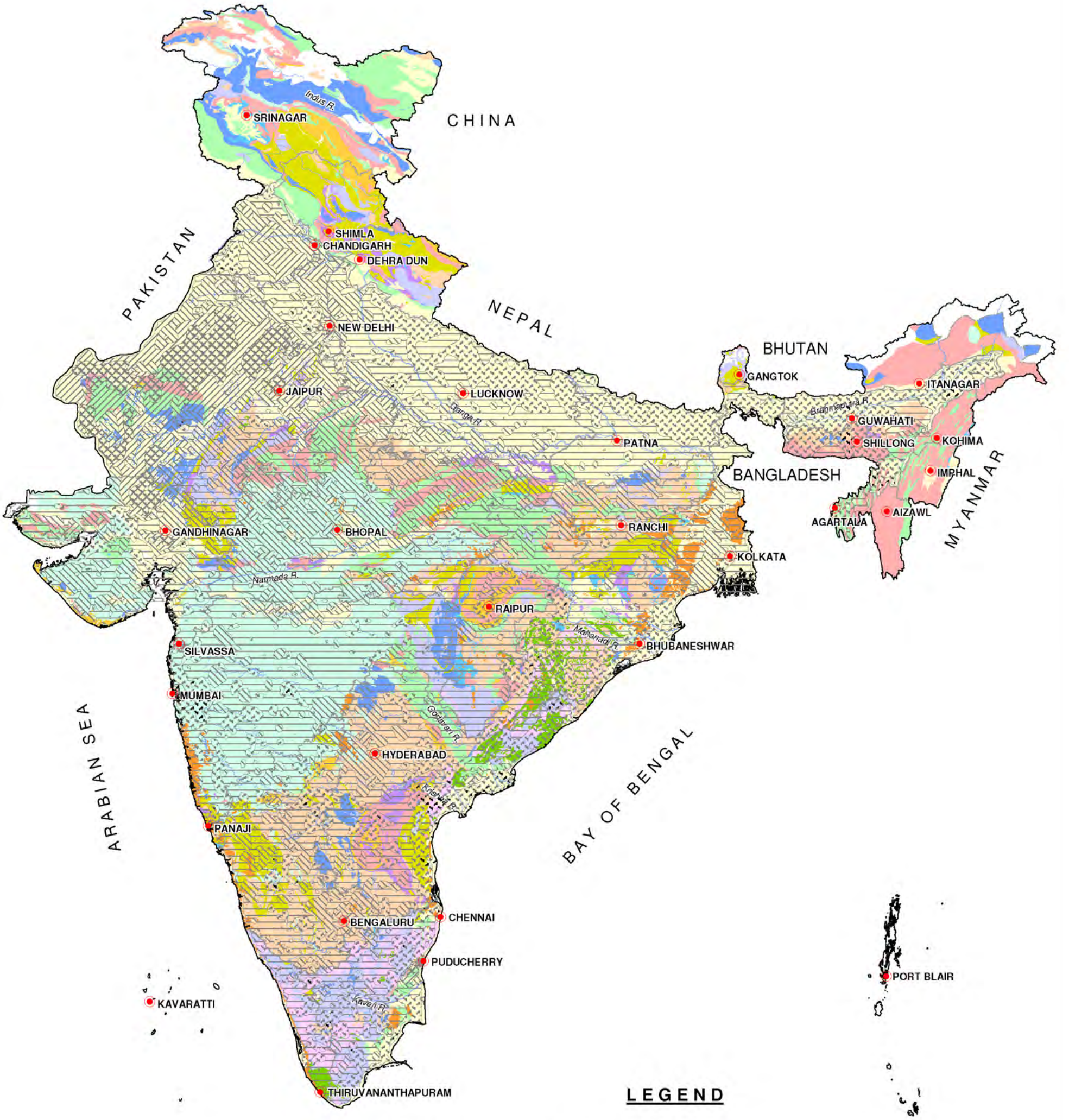
0 250 500

kilometers

N

W E

S



LEGEND

DTW (m bgl)

- < 5
- 5 to 10
- 10 to 20
- 20 to 40
- > 40

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

GROUND WATER OBSERVATION WELLS

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
RANCHI
KOLKATA
GANDHINAGAR
BHOPAL
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
CHENNAI
BENGALURU
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R.
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGEND

- Dug wells
- Piezometers

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

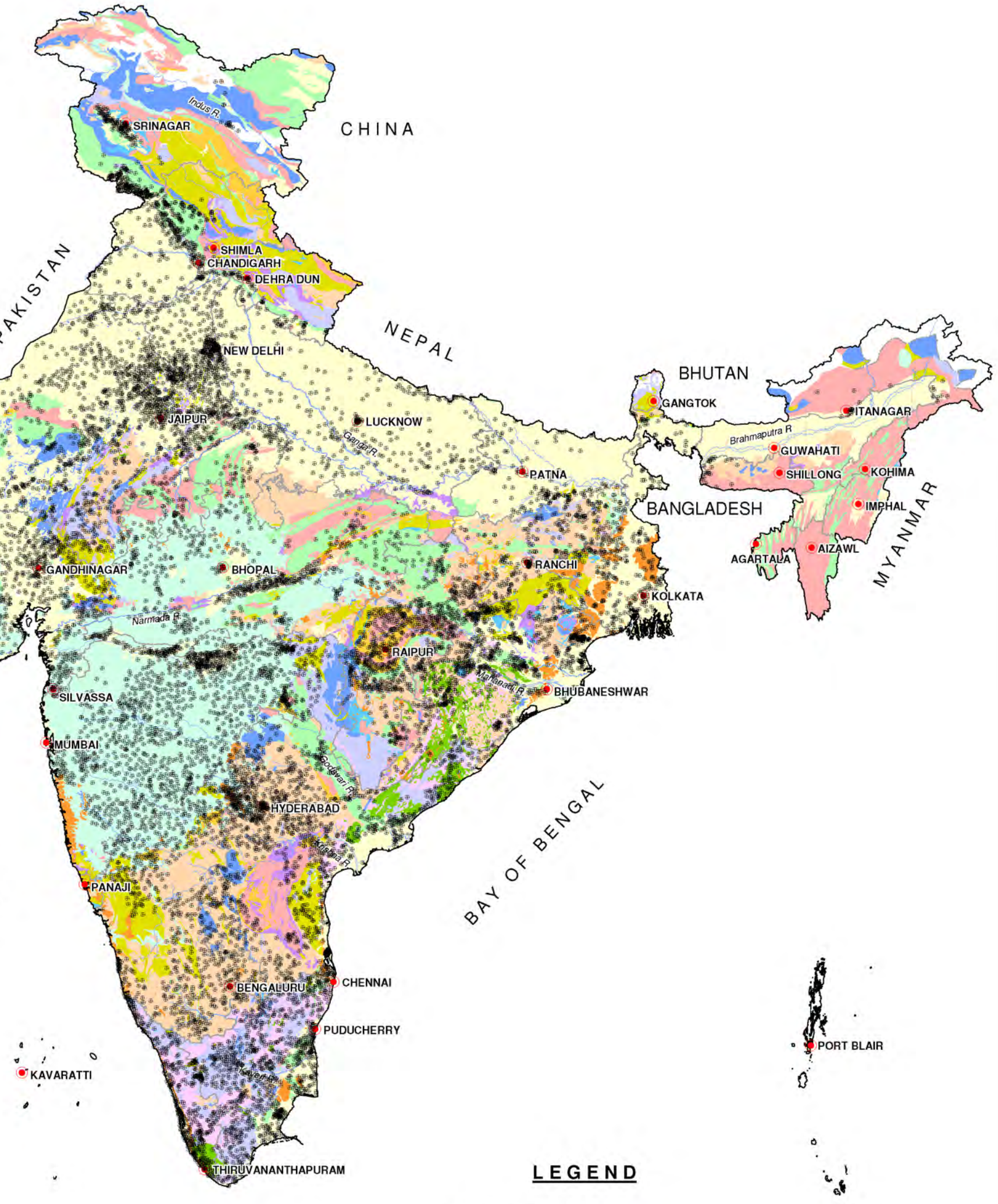
- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

GROUND WATER EXPLORATORY WELLS

N
W E
S

0 250 500
kilometers



LEGEND

⊕ Exploratory Tubewells / Borewells

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

RIVER GAUGE AND DISCHARGE SITES

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

SRINAGAR
NEW DELHI
SHIMLA
CHANDIGARH
DEHRA DUN
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

LEGEND

Gauging and Discharge Site
Basin Boundary

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

State Capital
State Boundary
National Boundary
River

Central Ground Water Board
Ministry of Water Resources
Government of India

Source: CWC, Statistical Handbook, 2011

AQUIFERS - RIVER BASINWISE

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

KURA-QUSH
INDUS
Indus R.
JHELUM
SRINAGAR
CHENAB
RAVI
BEAS
SUTLEJ
SHIMLA
CHANDIGARH
DEHRA DUN
GHAGHAR
NEW DELHI
CHURU
BARMER
JAIPUR
YAMUNA
UPPER GANGA
LUCKNOW
Ganga R.
PATNA
LUNI
CHAMBAL
LOWER GANGA
KUTCH
GANDHINAGAR
BHOPAL
RANCHI
SABARMATI
NARMADA
Narmada R.
KOLKATA
BRAHMANI
BHADAR
MAHANADI
RAIPUR
TAPI
Mahanadi R.
BHUBANESHWAR
SILVASSA
GODAVARI
MUMBAI
VAMSADHARA
Godavari R.
HYDERABAD
KRISHNA
Krishna R.
PANAJI
PENNAR
BENGALURU
CHENNAI
CAUVERY
PUDUCHERRY
PERIYAR
Kaveri R.
KAVARATTI
VAIPPAR
THIRUVANANTHAPURAM
GANGTOK
BRAHMPUTRA
ITANAGAR
Brahmaputra R
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
IMPHAL
SURMA
AIZAWL
AGARTALA
PORT BLAIR

LEGEND

Basin Boundary

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

POPULATION DENSITY

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

LEGEND

Population Density
(Pers/Sq. Km)

- 0 - 250
- 250 - 500
- 500 - 1000
- 1000 - 5000
- > 5000

Aquifers

- Alluvium
- Laterite
- Basalt
- Sandstone
- Shale
- Limestone
- Granite
- Schist
- Quartzite
- Charnockite
- Khondalite
- Gneiss
- Intrusives
- Banded Gneissic Complex
- Unclassified

- State Capital
- State Boundary
- National Boundary
- River

Central Ground Water Board
Ministry of Water Resources
Government of India

(Source : Census of India, 2011)

PARLIAMENTARY CONSTITUENCIES

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

SRINAGAR
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AIZAWL
AGARTALA
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

LEGEND

Constituency Boundary

Aquifers

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State Capital
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MAJOR AQUIFERS

0 250 500
kilometers

N
W E
S

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BAY OF BENGAL

SRINAGAR
NEW DELHI
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PATNA
GANGTOK
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GUWAHATI
SHILLONG
KOHIMA
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AGARTALA
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGEND

State Capital
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PRINCIPAL AQUIFER SYSTEMS

0 250 500
kilometers

N
W E
S

CHINA
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
MYANMAR
ARABIAN SEA
BAY OF BENGAL

SRINAGAR
SHIMLA
CHANDIGARH
DEHRA DUN
NEW DELHI
JAIPUR
LUCKNOW
PATNA
GANGTOK
ITANAGAR
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
AGARTALA
AIZAWL
GANDHINAGAR
BHOPAL
RANCHI
KOLKATA
RAIPUR
BHUBANESHWAR
SILVASSA
MUMBAI
HYDERABAD
PANAJI
BENGALURU
CHENNAI
PUDUCHERRY
KAVARATTI
THIRUVANANTHAPURAM
PORT BLAIR

Indus R.
Ganga R.
Brahmaputra R
Narmada R.
Mahanadi R.
Godavari R.
Krishna R.
Kaveri R.

LEGEND

Aquifers

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RIVER BASINS

N
W E
S

0 250 500
kilometers

QURA-QUSH
INDUS
Indus R.
SRINAGAR
JHELUM
CHINA
CHENAB
RAVI
BEAS
SUTLEJ
SHIMLA
CHANDIGARH
DEHRA DUN
PAKISTAN
GHAGHAR
NEPAL
NEW DELHI
CHURU
BARMER
JAIPUR
YAMUNA
LUCKNOW
UPPER GANGA
Ganga R.
LUNI
CHAMBAL
PATNA
LOWER GANGA
BHUTAN
GANGTOK
BRAHMPUTRA
ITANAGAR
Brahmaputra R
GUWAHATI
SHILLONG
KOHIMA
IMPHAL
IMPHAL
BANGLADESH
SURMA
AIZAWL
AGARTALA
MYANMAR
KUTCH
GANDHINAGAR
BHOPAL
RANCHI
SABARMATI
NARMADA
Narmada R.
KOLKATA
BRAHMANI
BHADAR
MAHANADI
RAIPUR
TAPI
Mahanadi R.
BHUBANESHWAR
SILVASSA
BHATSOL
GODAVARI
MUMBAI
VAMSADHARA
Godavari R.
ARABIAN SEA
HYDERABAD
BAY OF BENGAL
KRISHNA
Krishna R.
PANAJI
PENNAR
BENGALURU
CHENNAI
CAUVERY
PUDUCHERRY
PERIYAR
Kaveri R.
KAVARATTI
PORT BLAIR
VAIPPAR
THIRUVANANTHAPURAM

LEGEND

- State Capital
- State Boundary
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- River Basins

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