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Drinking Water and Sanitation in Rural Madhya Pradesh: Recent Initiatives and Issues

Keshab Das

Gujarat Institute of Development Research

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Gujarat Institute of Development Research
Gota, Ahmedabad 380 060

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Abstract

This paper presents a brief account, based primarily on available secondary sources, of the current status of drinking water supply and sanitation in rural Madhya Pradesh. With a discussion on the lopsided geohydrological attributes of water availability and shortages, a regional analysis of issues of access, quality of water and sustainability has been attempted. A short discussion on the poor sanitation coverage of rural households also forms part of this paper. In addition to the statal role in enhancing the availability of water resources (through harvesting, for instance), a particularly disturbing aspect of unreliable database concerning the water and sanitation sector has been underscored.

Acknowledgements

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Keywords **:** Rural drinking water supply, Rural sanitation, Madhya Pradesh

JEL Classification **:** R58, O18

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Abbreviations Used

ARWSP	Accelerated Rural Water Supply Programme
CGWB	Central Ground Water Board
CRSP	Central Rural Sanitation Programme
CSS	Centrally Sponsored Schemes
FC	Fully Covered
ForWaRD	Forum for Watershed Research Policy Dialogue
IDWSSD	International Drinking Water Supply and Sanitation Decade
IEC	Information, Education and Communication
IHHL	Individual Household Latrine
IWRM	Integrated Water Resource Management
LPCD	Litres per Capita per Day
NADEP	Naryan Devrao Pandri Pandey
NC	Not Covered
NSS	National Sample Survey
O&M	Operation and Maintenance
PC	Partially Covered
PHED	Public Health and Engineering Department
RGNDWM	Rajiv Gandhi National Drinking Water Mission
TSC	Total Sanitation Campaign
VWSC	Village Water and Sanitation Committee

Drinking Water and Sanitation in Rural Madhya Pradesh: Recent Initiatives and Issues

Keshab Das[♣]

1. Introduction

Since the observance of the International Drinking Water Supply and Sanitation Decade (IDWSSD) during 1981-90, there has been a growing awareness about and concern over the poor access to these basic services in most of rural India. So far as water for drinking and domestic purposes is concerned the conventional emphasis has been on the availability, quality and sustainability of freshwater. The major and persisting reasons for the crisis have been identified as the excessive demand for water coming up from a large, growing and often urban population; depleting groundwater levels due to mindless exploitation; causing contamination to or polluting water bodies; mismanaging waste water; neglect of protecting and/or promoting water harvesting systems; and poor policy and its implementation. A particularly disturbing aspect of statal intervention has been the presentation and compilation of utterly unrealistic and unreliable database on the nature and extent of coverage of rural habitations, which showed surprisingly massive achievements contrary to field reality.[1]

A much more disappointing scenario was that of rural sanitation which continued to remain in the sphere of inaction, as according to the Census of India 2001, as low as 22 per cent of households had access to some form of sanitation. During the World Summit on Sustainable Development, one of the Millennium Development Goals had been set to reduce the uncovered population by 50 per cent by the year 2015. India, nevertheless, declared to achieve the goal by 2007 and the government launched the Total Sanitation Campaign (TSC) in 1999. The TSC, forming part of the sectoral reforms process, was restructured from the earlier Central Rural Sanitation Programme (CRSP), launched in 1986, which failed to make much headway.

Even as the rural drinking water supply and sanitation provisioning are activities those come under the 'State Subjects', both have been supported in the states through what are called centrally sponsored schemes (CSS). Despite the central guidelines, such schemes carry the vestiges of state administration and local political culture and, hence, it is often the nature of

♣ Keshab Das (keshabdas@gmail.com) is Professor, GIDR, Ahmedabad.

[1] Much before the current concern by the government over what it terms as 'slippage' of coverage status, detailed critique of the problematic classification and serious flaws in the official statistics on the status of water availability in habitations have been provided in Das (2001) and also in Das and Kumar (1996 and 1997).

functioning of these schemes (along side individual state's own efforts) that determine the performance and achievement of the sub-sector. It is an irony that whereas central government figures would indicate a near-complete coverage, particularly, in case of rural drinking water supply individual state situation could be most disappointing. Similarly, state level analysis of the status and progress of these basic services can bring out a range of issues that would provide important clues for policy intervention.

It is with this broad context that this paper attempts to review, from a policy perspective, the status and performance of rural drinking water supply and sanitation in Madhya Pradesh. In so doing, it identifies issues related to water availability, quality, sustainability and role of government functionaries at different levels. Similarly, though briefly, it looks into the status of sanitation in the state and discusses factors responsible for the poor coverage. Suggestions have been made underscoring the need to ensure sustainability in the provisioning and usage of drinking water and sanitation in rural Madhya Pradesh. The paper is based solely on available secondary data, literature review and discussions with concerned officials and functionaries from both government and civil society organisations; no village surveys have been undertaken for the study.

2. Geohydrological Dimensions of Madhya Pradesh

Centrally located, the state of Madhya Pradesh accounts for a large geographical area (9 % of the country's total landmass) and 6 per cent of the country's population. Eventually, the density of population is comparatively low and the habitations are sparsely located. Following the carving out of the state of Chhattisgarh in 2000, the total number of districts in Madhya Pradesh has been reduced to 45 from the previous 61. The National Sample Survey (NSS) has grouped the 45 districts under six main regions as shown in Table 1.

As per the *Census 2001*, the total population of the state is 60.35 million and in spite of a steady increase in the level of urbanisation, about three-fourths of the state population live in rural areas. The percentage of population belonging to the Scheduled Castes and Scheduled Tribes is as high as 35 per cent. Even as agriculture contributes about 44 per cent of state income, it remains the main source of occupation, wherein 78 per cent of the workforce is directly engaged.[2] Madhya Pradesh is among the most backward and poverty stricken states of the country with 38.3 per cent (2004-05) population falling below poverty line.

[2] http://www.mp.nic.in/agriculture/

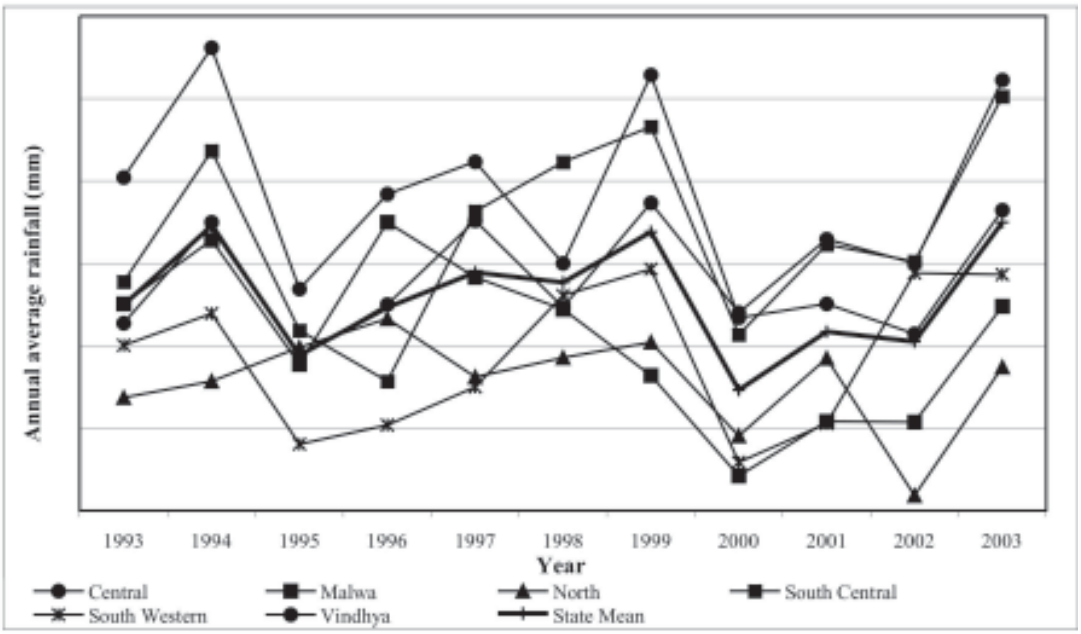
Table 1: NSS Region wise Distribution of Districts in Madhya Pradesh

NSS Region	Name of the Districts
Vindhya	Chhatarpur, Panna, Tikamgarh, Rewa, Satna, Shahdol, Umariya, Sidhi
South Central	Jabalpur, Katani, Narsinghpur, Balaghat, Mandla, Dindori, Seoni, Chhindwara
Central	Bhopal, Raisen, Sehore, Vidisha, Sagar, Damoh
South Western	Betul, Hosangabad, Harda, Khandwa, Khargone, Badwani
Malwa	Rajgarh, Indore, Dhar, Jhabua, Ujjain, Ratlam, Mandsaur, Neemch, Dewas, Shajapur
Northern	Gwalior, Datia, Guna, Shivpuri, Morena, Sheopur, Bhind

Source: http://www.mospi.gov.in/nsso_4aug2008/web/nsso/fod/fod_home/nss_regions.pdf

Madhya Pradesh has distinct regional variation in terms of physiography, rainfall and climatic conditions. The hill ranges running across the plateau have subdued topography. The Satpura range (southern part) and the Vindhyan (central part) are separated by Narmada. The Malwa plateau (west) and the Bundelkhand region form the high ground and are dissected by large number of northerly flowing rivers.

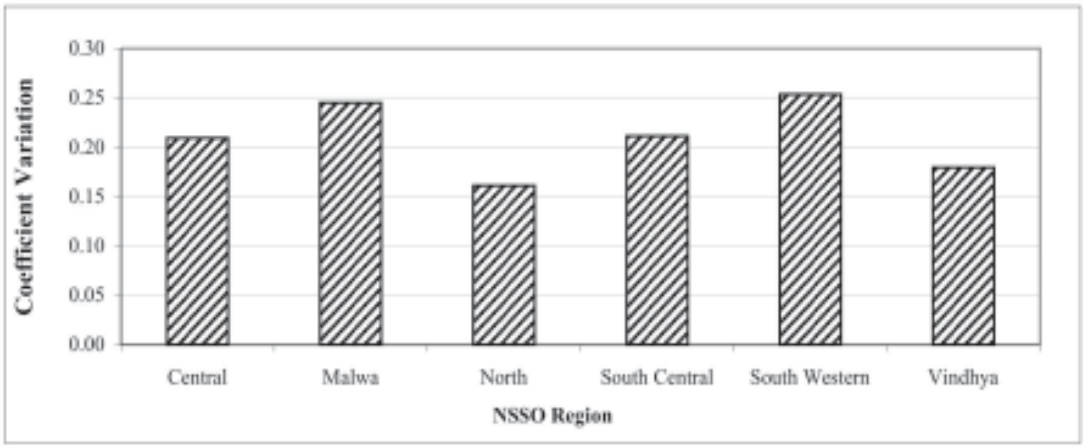
Figure 1: Regional Variation in Rainfall in Madhya Pradesh, 1993-2003



Source: http://www.mp.nic.in/agriculture/rain.htm.

The region experiences a tropical climate with four seasons in a year: a) summer (March - June); b) monsoon (July - September); c) post monsoon (October-November); and d) winter (December – March). The temperature varies between 8-12°C in winter and 42°C in peak summer. About 90 per cent of the rainfall occurs from the southwest monsoon between the months of July and September. The rainfall ranges from 60 cm to 212 cm in different regions of the state with an annual average of 104 cm.

Figure 2: Region-wise Fluctuation in Rainfall in Madhya Pradesh, 1993-2003



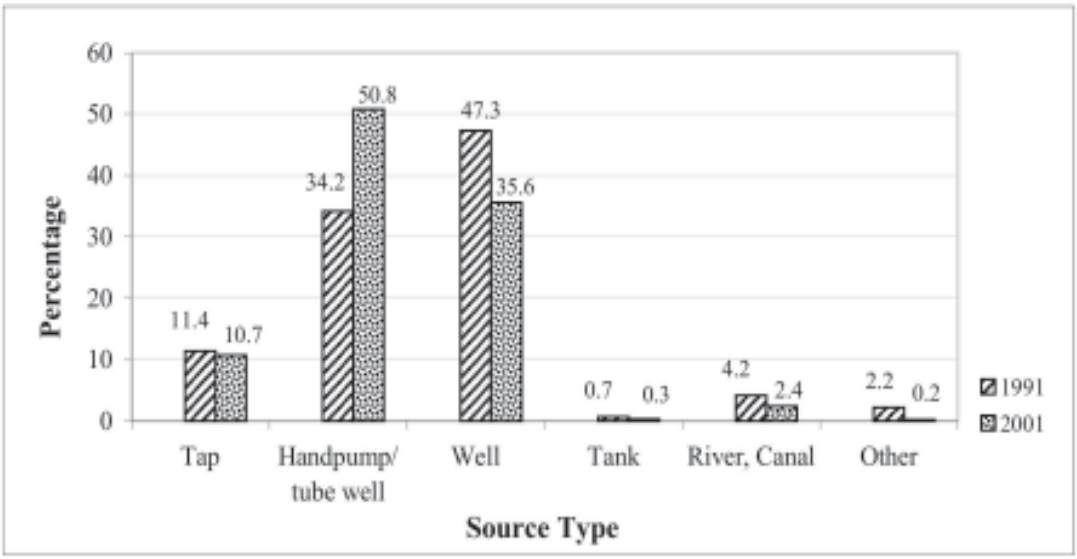
Source: http://www.mp.nic.in/agriculture/rain.htm

Rainfall increases as it moves from north and west towards east. The highest rainfall occurs in the Chhindwara district in the southeast. The rainfall records pertaining to the decade 1993-2003 show that the state had adequate rainfall, i.e., above 75 per cent of the average rainfall, though with considerable variation (Figures 1 and 2). However, on a longer time frame, 22 districts have been declared as drought-prone for quite a long period. South Western and Malwa regions show maximum fluctuation in rainfall. It shows a steady decline in Malwa.

3. Status of Rural Water Supply

Though Madhya Pradesh is endowed with five major rivers, *viz.*: Ganga, Godavari, Narmada, Mahi and Tapi, it depends almost exclusively on groundwater (99 %) for drinking purpose (Khanna and Khanna, 2005). Overexploitation of groundwater can be seen in many parts of the state, which could be due to the increasing use of handpumps and tubewells (Figure 3). This has led to depletion of groundwater level and the present groundwater status in half the districts comes under semi-critical, critical and over exploited category (Scott, 2005). Nevertheless, there are a few districts where groundwater level has improved over time as shown in Table 2.

Figure 3: Distribution of Rural Households by Source of Drinking Water



Sources: Government of India (1997 and 2003)

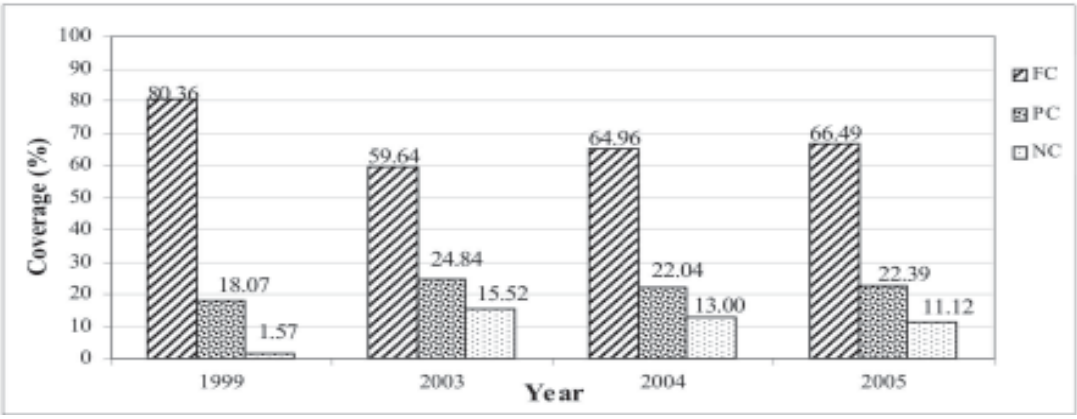
Table 2: Decrease in the Sources Affected by Low Groundwater Level, 2005

District	Handpumps with low water level (percentages)	
	January 2005	June 2005
Indore	14.81	9.89
Ujjain	19.40	12.44
Ratlam	22.92	6.43
Mandsaur	25.49	18.16
Neemuch	16.76	16.76

Source: PHED, Bhopal and http://www.mpphed.org/pipwater.asp

Unlike the national figures for water supply coverage, Madhya Pradesh data reflects a negative trend in water supply coverage. A comparison of PHED data for the years 1999 and 2005 shows an increase in not covered (NC) and partially covered (PC) habitations. The share of NC habitations has increased from 1.57 per cent to 11.12 per cent, whereas, the share of fully covered (FC) habitations has declined from 80.36 per cent to 66.49 per cent during this period (Figure 4). A description of the criteria used to classify habitations as NC, PC and FC has been provided in Appendix 1.

Figure 4: Coverage of Habitations in Rural Madhya Pradesh, 1999-2005



Source: PHED, Bhopal

The district wise data for April 2005 reveals that in some of the districts the coverage is so poor that less than 50 per cent habitations get access to 40-lpcd of water supply. Shajapur (27.84) in the western region is the worst in terms of coverage (Table 3). Furthermore, districts like Datia (31.14), Tikamgarh (20.53) and Umaria (30.83) have more than 20 per cent NC habitations. A major decline in FC habitations is found in Jhabua, Dhar, Khandwa and Rajgarh districts (between April 1999 and April 2005). These are the districts already known for their water shortage and over-exploitation of groundwater (Table 4).

Table 3: Water Supply Coverage in Rural Madhya Pradesh, 2005

No.	District	Total Habitations	Number			Percentage		
			FC	PC	NC	FC	PC	NC
1	Bhopal	747	503	242	2	67.34	32.40	0.27
2	Raisen	1969	1211	688	70	61.50	34.94	3.56
3	Sehore	1271	1023	184	64	80.49	14.48	5.04
4	Rajgarh*	2418	1163	1031	224	48.10	42.64	9.26
5	Vidisha	2058	1291	710	57	62.73	34.50	2.77
6	Betul	2546	1456	704	386	57.19	27.65	15.16
7	Hoshangabad	1347	1293	19	35	95.99	1.41	2.60
8	Harda	889	675	153	61	75.93	17.21	6.86
9	Indore*	1073	483	580	10	45.01	54.05	0.93
10	Khandwa	1469	835	589	45	56.84	40.10	3.06
11	Dhar	6322	4273	1307	742	67.59	20.67	11.74
12	Jhabua	9372	6105	1913	1354	65.14	20.41	14.45
13	Khargone	4046	2618	765	663	64.71	18.91	16.39

...contd.

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No.	District	Total Habitations	Number			Percentage		
			FC	PC	NC	FC	PC	NC
14	Barwani	5382	3758	1017	607	69.83	18.90	11.28
15	Ujjain*	1489	645	715	129	43.32	48.02	8.66
16	Ratlam*	1638	536	1023	79	32.72	62.45	4.82
17	Mandsaur*	1236	513	608	115	41.50	49.19	9.30
18	Neemuch*	1189	396	650	143	33.31	54.67	12.03
19	Dewas	1513	776	558	179	51.29	36.88	11.83
20	Shajapur	1092	304	750	38	27.84	68.68	3.48
21	Gwalior	1192	766	406	20	64.26	34.06	1.68
22	Datia	1079	592	151	336	54.87	13.99	31.14
23	Guna	3980	2760	923	297	69.35	23.19	7.46
24	Shivpuri	2116	1473	485	158	69.61	22.92	7.47
25	Morena	3958	2831	455	672	71.53	11.50	16.98
26	Sheopur	917	562	276	79	61.29	30.10	8.62
27	Bhind	1887	1452	325	110	76.95	17.22	5.83
28	Sagar*	2230	1053	985	192	47.22	44.17	8.61
29	Chhatarpur	1964	1484	293	187	75.56	14.92	9.52
30	Panna	1758	1064	466	228	60.52	26.51	12.97
31	Tikamgarh	2017	1281	322	414	63.51	15.96	20.53
32	Damoh	1450	1189	179	82	82.00	12.34	5.66
33	Jabalpur	1685	1277	328	80	75.79	19.47	4.75
34	Katni	1510	1092	284	134	72.32	18.81	8.87
35	Narsinghpur	2151	1718	69	364	79.87	3.21	16.92
36	Balaghat	3770	3157	344	269	83.74	9.12	7.14
37	Mandla	3860	2586	767	507	66.99	19.87	13.13
38	Dindori	3818	2151	1106	561	56.34	28.97	14.69
39	Seoni	2586	1874	633	79	72.47	24.48	3.05
40	Chhindwara	4482	3302	811	369	73.67	18.09	8.23
41	Rewa	8531	6668	562	1301	78.16	6.59	15.25
42	Satna	5044	3201	1377	466	63.46	27.30	9.24
43	Shahdol	6117	4658	504	955	76.15	8.24	15.61
44	Umaria	1914	1241	83	590	64.84	4.34	30.83
45	Sidhi	7090	4599	1909	582	64.87	26.93	8.21
	Total	126172	83888	28249	14035	66.49	22.39	11.12

Note: * Districts with less than 50 per cent FC habitations.

Source: PHED, Bhopal, 2005

Table 4: Districts with Decrease in the Number of FC Habitations during 1999-2005

Decrease in FC villages	Name of the district
> 600	Rajgarh (919), Khandwa (1086), Dhar (1538), Jhabua (3507)
500-600	Shajapur, Sagar, Seoni
400-500	Ratlam, Shahdol
300-400	Ujjain, Shivpuri, Jabalpur, Umaria
200-300	Raisen, Vidisha, Betul, Indore, Mandsaur, Neemuch, Panna

Source: http://www.mp.nic.in/des/scmp2000/scmpT141.htm.

Many of the regions in the state suffer from high incidence of fluoride, nitrate, salinity and iron contents in groundwater and its spread has been on the rise (Table 5).[3] Further, it can be comprehended from Table 6 that a number of drinking water sources (here, handpumps) are affected by chemical content.

Table 5: Incidence of Chemical Contamination of Potable Water Sources

Chemical content	Sources affected (No.)	Villages affected (No.)
Fluoride	7925	4115
Nitrate	N.A.	121
Salinity	1683	620
Iron	1544	929

Source: PHED, Bhopal (January 2005)

Table 6: Districts with High Incidence of Handpumps with Water Quality Problem

District	Number of handpumps with water quality problem
Dhar	523
Jhabua	1093
Shajapur	551
Damoh	332
Chhindwara	473

Source: PHED, Bhopal (June 2005)

[3] Documents of the Central Ground Water Board, Bhopal

4. Issues Concerning Rural Drinking Water Supply

Though the state government has been proactive in addressing the gaps in habitation coverage, availability of clean and safe drinking water in rural regions has remained a challenge over the past few decades. Majority of the problems can be attributed to a host of factors including the growth of population, over-exploitation of groundwater and neglect of existing water resources, particularly water harvesting structures. Some of the main issues have been discussed here.

4.1. Adequacy and Usability of Database

As per the data available with the PHED, there has been a rise in the PC+NC habitations from about 20 per cent in 1999 to 34 per cent in 2005. This rise could be due to problems like low water level, deterioration of quality of water and mechanical and structural problems as breakage and non-repair of water supply infrastructure including non-functioning taps, standposts, leaking water tanks, etc. In fact, as on June 2005, a total of 29868 (8.87 %) handpumps were out of order and 1703 (21.32 %) water supply schemes were not functioning that were implemented by the state PHED. Data from the same department (PHED) provide ambiguous figures on the total number of villages and habitations for the two time points as shown in Table 7. The seasonal variation in the availability of water is not reflected in the data presented by the PHED.

Table 7: Increase in Total Number of Villages or Habitations by Source

Source	Year	Total Villages	Total Habitations
http://www.mp.nic.in/des/scmp2000/scmpT141.htm	1999	111,780*	-
PHED, Bhopal, 2005	2005	-	126,172

Note: * Figure does not include districts that were earlier part of Madhya Pradesh

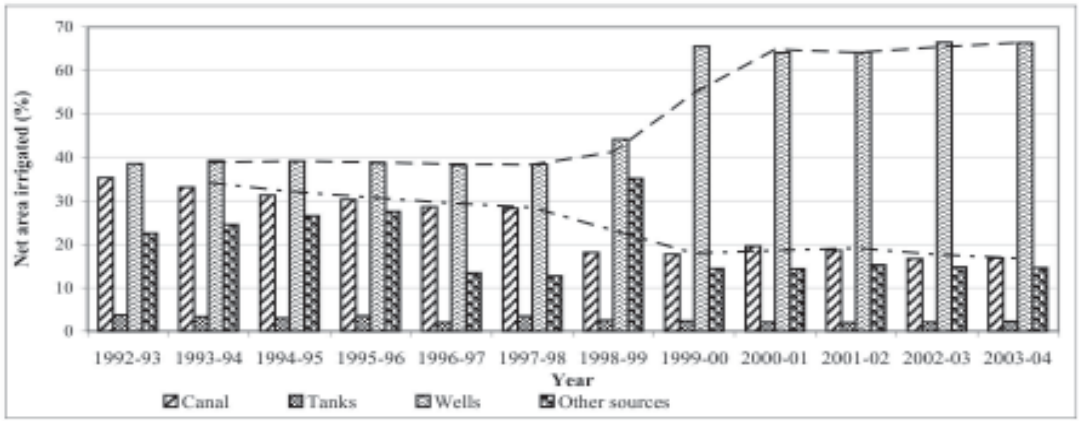
Moreover, different agencies follow different norms to assess the source and availability of water supply (e.g., PHED and the *Census*). This not only restricts the possibility of comparative analysis, but leads to misrepresentation of actual grassroots situation and misdirection of policy interventions.

4.2. Overexploitation of Groundwater

Overexploitation of groundwater is another important issue that threatens the sustainability of existing sources. A comparison of 1991 and 2001 *Census* data on source of drinking water in rural households shows an increase in the use of handpumps and tubewells from

34.2 per cent to 50.8 per cent (Figure 3). In case of irrigation also a sudden rise in use of wells can be seen since the year 1998-99 (Figure 5)

Figure 5: Net Area Irrigated by Source



Source: Commissioner, Land Records and Settlements, Gwalior, Madhya Pradesh.

In 34 districts (of the total 45), the groundwater status has been reported to be semi-critical, critical or overexploited. In terms of geographical spread, the problem is acute in the western region where the rainfall is also low. Data from the Central Ground Water Board (CGWB) show continuous decline in the groundwater level, which has been a cause of concern. As per *Census* 2001 data, Indore, Dhar, Jhabua, Ujjain, Ratlam, Sheopur and Dewas are the districts with more than 70 per cent of their drinking water sources as handpumps or tubewells Government of India (2003). Another reason for the growing water shortage in the state is that 21 districts - concentrated mainly in Malwa, South Central and Vindhya regions - fall under the basaltic region where groundwater recharge rate is very low.

It is important to note that in a fairly large part of the state, the groundwater level has not declined to a critical level, say, as between January 2004 and 2005. This rather encouraging fact of low rate of groundwater overexploitation can plausibly be linked to IWRM efforts and large scale watershed development initiatives taken up in earnest in the state, especially in the dry belts. A groundwater act, however, is in the process of being finalised.

4.3. Water Quality and Health Related Issues

In addition to the inadequate availability, water quality affected by the excess presence of fluoride, nitrate, salinity and iron has been emerging as a major problem in the state. Following are some of the districts identified by the CGWB as having problems in water quality (Table 8).

Table 8: Districts Affected by Water Quality Problems in Madhya Pradesh

Water quality problems	Districts affected
Fluoride contamination	Jabalpur, Jhabua, Shivpuri, Dhar, Seoni, Shajapur and Chhindwara
High nitrate content in groundwater	Chhindwara, Sagar, Sheopur, Shivpuri, Vidisha and Rajgarh
High salinity	Bhind district in general and in localized areas i Shajapur, Sagar, Ratlam, Ujjain, Vidisha, Chhatarpur and Sheopur
Iron content in the groundwater	Shahdol, Umaria, Sehore

Source: PHED, Bhopal (June 2005)

Of these, fluoride and nitrate contamination needs immediate attention as these negatively impact health. The Health Department surveys also revealed significant number of cases of fluorosis and water-borne diseases all over the state.

Human-made factors are also equally responsible for the deteriorating water quality. Contamination of water occurs due to poor construction and maintenance of handpumps, open defecation practice, washing of clothes or bathing near water sources and increasing use of fertilizers in the farms. Awareness regarding health impacts of poor quality of water is missing among the villagers; for them the taste and colour of water are almost the sole criteria for deciding on its quality. Poor infrastructure for water quality testing has further accentuated the situation. Due importance requires to be given to quality aspects while addressing the coverage part.

4.4. Institutional and Departmental Lacunae

Lack of proper inter-departmental coordination and communication as between those dealing with drinking water and sanitation, irrigation, water resources management and health, etc. has given rise to dysfunctionality in managing water supply for rural areas. Projects have also suffered due to disruption in the fund flows caused due to stoppages at various hierarchical levels. A holistic approach to water supply seems to be missing, which, consequently, has reduced the overall efficiency of the concerned state apparatus.

Studies indicate that schemes designed and executed by the engineering departments tend to overlook problems specific to a particular source, region and their hydrological or topographical aspects (Agarwal *et al*., 2001: 298). This is so as most of the activities are often target based and not concerned with the performance *after* implementation. The need

for revising the existing approach focusing on follow-up monitoring and local specificities cannot be overstated.

A specific problem relating to the water supply schemes remains the functional ambiguity that has encouraged divided attention by the department. The coexistence of both the supply-driven schemes as, for instance, the Accelerated Rural Water Supply Programme (ARWSP) and the *Swajaldhara* (the demand-driven programme introduced in 2002) represents such lack of clarity at the implementation level. The departmental capacity for promoting information, education and communication (IEC) activities was lacking. As a result, villagers were not made aware in advance about the purpose of the demand driven programme (or approach) and were not convinced about their participatory role and the need to make financial contribution towards the new scheme. In short, they felt alienated from the *Swajaldhara* programme. This implied that the basic purpose of community participation was lost. The communication and information gap between the policy maker and the end users continues.

Moreover, drinking water resources management is not covered by any formal policy or legal framework in Madhya Pradesh (Scott Wilson, 2005: 34). There is no control over external factors affecting water supply sources reflecting a gross neglect of quality and maintenance aspects. Renewed emphasis on sustained policy efforts towards the revival and/or modernisation of traditional water harvesting structures is an essentiality if future demand has to be addressed. Broad-basing watershed infrastructure in the state needs no underscoring.

5. *Swajaldhara:* The Financial Constraint

In the case of *Swajaldhara*, poor management caused a substantial amount of funds remaining unutilised in the depository accounts. Data obtained from the state PHED show that the actual expenditure for the schemes has been approximately 50 per cent of the total funds released by the government. Even the number of schemes that are completed and fully functional is quite small (Table 9).

Secondary sources suggest that delays were usual in releasing funds from the state to the zilla parishads and then to each subsequent level. The timings of releasing the instalments are also not followed as per the guidelines; this has adversely affected the implementation of *Swajaldhara* in the state.

Table 9: Financial Progress of *Swajaldhara*

Year	Allocation (Rs. Lakhs)	Funds released (Rs. Lakhs)	Total expenditure (Rs. Lakhs, %)	Schemes completed (*Aatmarpit*)
2002-03	563.85	481.13	278.44 (51.65)	34 (2)
2003-04	840.54	447.27	305.45 (68.29)	166 (42)
2004-05	966.49	724.54	NA	NA

Source: PHED, Bhopal (June 2005)

At the village level, people were not aware of the concept of 10 per cent capital contribution and they compared it with the supply driven schemes that were running parallel without any component of user charges. Hence, collection of the contribution from the villagers became a problem and it depended on the person or institute's ability to collect the amount. In many cases, the partial capital contribution was made by the contractor; this was in total violation of the whole concept of participatory approach. Inability to maintain the accounts was also an issue in many cases where the Village Water and Sanitation Committees (VWSCs) were lacking in capability and infrastructure. In programme guidelines, no distinction is made for tariff between house connection and community standpost and handpump. Hence, it was held that until the minimum (40 lpcd) coverage of water supply is achieved, house connection should not be encouraged. In most cases, the operation and maintenance (O&M) cost had not been estimated properly; many of the schemes failed due to poor O&M. Moreover, though there is near total dependency on groundwater resources for rural drinking water supply, no appropriate legislation has yet been formulated at the state level despite both the supply and demand driven approaches in place, treating sustainability of groundwater a critical concern.

6. Rural Sanitation

As per the *Census* 2001, a staggering 91 per cent of rural households did not have access to any form of toilets and 89 per cent did not have a bathing unit. Among those who had toilets, 43.45 per cent had pit latrines and only 29.34 per cent had water closet latrines. Districts with the lowest sanitation coverage include Sidhi (2.4 %) followed by Shahdol, Rewa, Dindori and Sheopur. The maximum coverage was found in Indore (25 %), Narsimhapur (23.6 %), Hoshangabad (21.5 %) and Harda (20.5 %) districts. Nevertheless, the real problem with such *Census* data is that these neither indicate anything about the nature of *actual* use of the toilets nor the prevalence of biases based on region, caste and community (Khanna and Khanna, 2005: 20).

As far as drainage is concerned, only 20 per cent of the rural households had wastewater outlets within the house and 90 per cent of them are connected through open drainage. Datia is the district where the highest proportion (50 %) of the households was connected to a drainage system. The coverage in other districts had been much less; in Jabhua district only 5 per cent of the households had some drainage facility. The PHED data also show that implementation of new schemes had been extremely poor and only a small fraction of total sanctioned schemes under the TSC had been constructed. It seems that though the funds are available, the skills needed for implementation are lacking.

The most important reason for the failure of the TSC in the Madhya Pradesh can be identified as the poor level of community awareness regarding sanitary and hygienic practices. It was surmised during the discussions with the PHED officials that the provision of the facilities *per se* had not helped much in the use and propagation of rural sanitation. Effective IEC remains an essential part of the TSC towards ensuring a change in knowledge, attitude and practice in the rural population. Unless people are aware and fully convinced about the drawbacks of open defecation, adopting modern toilets could be a daunting proposition.

Participation by the local community is also important while deciding upon the appropriate hardware technology for the toilets. The local context becomes important, especially, in areas with acute water shortage. Despite problems associated with managing Community Sanitation Committees, these may still be considered as alternatives to individual household latrines (IHHLs) in these difficult regions. Studies also suggest that a very low level of awareness prevails regarding solid and liquid waste disposal in the villages and even TSC has not given due emphasis to the same. Construction of NADEP[4] pits and open drains has been taken up in some villages under TSC, but the efforts need to be scaled up.

7. Concluding Observations

The recognition of causes of the crisis in the drinking water sector leads one to think beyond the sub-sectoral constraints *per se* and to search for larger contexts within which the crisis subsists or grows. It is understood that the pristine source of water remains common for a

[4] This is a compost method developed by Naryan Devrao Pandri Pandey. A brick structure measuring 10'x6'x3' is prepared with holes in the side walls to ensure adequate supply of air during composting. The brick tank is filled with farm wastes, soil and cow dung and water is added to maintain moisture between 60-75%. A tank is filled with soil, 16-18 qtls, farm wastes 14-16qtls, dung 1-1.2qtls. Water is added to moisture the material and upper layer is plastered with soil and dung mixture. After 75-90 days of composting, microbial culture of Azotobacter, Rhizobium and phosphate solubilizing bacteria are added into the mixture. Compost becomes ready for use within 110-120 days. One tank provides about 2.5-2.7 t of compost sufficient for one hectare land.

variety of uses for domestic use, livelihood pursuits and also for the livestock. The problematic of *managing* water is *not*, in fact, as it is made out to be by a section of the concerned practitioners, donor agencies and scholars, a choice *between* the supply-led and demand-driven approaches, or, a foregone conclusion that the former has failed miserably and the latter is *intrinsically* efficient. Central to the issue of managing the resource there remains a clear distinction between water used for consumptive or domestic purposes and for productive purposes. If one classifies these two types of uses as basic and economic, respectively, then in an otherwise socio-economically skewed or fragmented society, the former entails *everyone* to have access to clean potable water as a right, to be ensured by the state. In that case, if a supply-led provisioning has been inadequate or irregular or biased (based on locality, caste or community) as much as a demand-driven strategy excludes a certain population on the criterion of affordability, both need correction.

Beyond the approaches to *provisioning*, arises a complex question regarding the right over the source, whether surface or groundwater. It is in here that much of local context and the macro legal or institutional framework become significant. In most part of the Indian rural society where the water economy, particularly, that for the groundwater, functions in a highly informal, unorganised and discrete manner, conditions essential for the organised water industry to work *efficiently* are difficult to implement. The informality refers to a range of issues including denial of access based on caste and class identity to overexploitation of groundwater for solely private productive use.

In case of Madhya Pradesh, the aforesaid issues are observable in addition to the fact that statal efforts at enhancing the *supply* of water *per se* have been very limited. Even the absence of laws providing for curtailing excessive withdrawal of groundwater has acted against the interest of better and wider access of the resource. Further, the lack of usable and reliable database on the coverage and related aspects has been a cause of concern. The scenario of rural sanitation in the state leaves much to be desired in terms of the massive intervention that is needed to raise the coverage from a deplorable 9 per cent to achieving what may be termed a situation of open-defecation-free state.

Appendix: 1

The Rajiv Gandhi National Drinking Water Mission (RGNDWM) has fixed norms for providing potable drinking water to rural population, which are used to assess the number of rural habitations covered under water supply. These norms are applicable to the entire country, irrespective of the regional variations in the availability of water based on the climatic and geographical factors. Based on this, the state PHED conducts a survey of rural habitations every year, which partly reflects the impacts of government investments in this sector. Habitations are categorised under three main headings:

Fully Covered (FC): Habitations with a private or public drinking water source that is safe (i.e., without quality problems such as excess salinity, iron, fluoride, arsenic or other toxic elements or biological contamination), adequate (i.e., 40 litres per capita per day (lpcd) for 250 persons or less) and accessible to all, within 1.6 km of the habitation (or 100 meter elevation in hilly areas).

Partially Covered (PC): Habitations with a private or public drinking water source that is safe, accessible to all and within 1.6 km in plains (or 100 meter elevation in hilly areas) but with a capacity of less than 40 lpcd.

Not Covered (NC): A habitation with no private or public drinking water source that is safe, adequate, accessible to all, and within 1.6 km of the habitation (or 100 meter elevation in hilly areas).

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Gota, Ahmedabad - 380 060. Gujarat, India
Tel: 91-2717-232623/366/368
Fax: 91-2717-242365
Email: gidr@gidr.ac.in
Website: www.gidr.ac.in