Status and Performance of Public Health Services

Dr. S. Puttaswamaiah

Abstract:

Availability of BPH services is an indicator of the quality of life and also achievement of the government in providing health related services. An examination of access and coverage of households and habitations with water supply and sanitation facilities, status of morbidity related to waterborne and vector related diseases reveals a large gap in services that remains to be bridged. The present paper attempts to examine status of public health services in India.

Key Words: Public health services, water borne diseases, water supply and sanitation

1. Backdrop

Availability of BPH services is an indicator of the quality of life and also achievement of the government in providing health related services. Increase in the coverage of households/habitations with safe drinking water supply, sanitation facilities, decrease in the incidence of waterborne and vector borne diseases illustrate the positive impact of the efforts of the service providers. An examination of access and coverage of households and habitations with water supply and sanitation facilities, status of morbidity related to waterborne and vector related diseases reveals a large gap in services that remains to be bridged.

2. Drinking Water Supply

Safe drinking water is an essential requirement for life, which depends upon the availability of adequate quantity of water from unpolluted sources, which households can access. People depend upon different types water bodies, like tap, well, tube well, tanks, ponds, lakes, rivers, canals, springs and others, for drinking water. The Census 2001 data show that tube well/ hand pump is the major source of drinking water, followed by tap water connection. About 41 per cent of the households depend on tube well or hand pump, while nearly 37 per cent of the households have tap water supply, and the rest are collecting water from other sources (Table 2.1). The percent of households provided with tap water has been increasing over the years. In 1981 about 23 per cent of households were connected with tap water, while the proportion increased to over 32 per cent in 1991 and nearly 37 per cent in 2001. The same trend also applies to the coverage of households with the access to tube wells. The rural-urban differences highlight the poor coverage in rural areas.

Table 2.1: Percent of Households by Source of Drinking Water									
Type of Source	1981			1991			2001		
	Total	Rural	Urban	**Total**	Rural	Urban	**Total**	Rural	Urban
Tap	**23.03**	10.29	63.24	**32.26**	20.6	65.06	**36.7**	24.3	68.7
Well	**51.71**	61.63	20.4	**32.23**	38.00	15.91	**18.2**	22.2	7.7
Tubewell/Handpump	**15.16**	16.21	11.82	**30.04**	34.9	16.32	**41.3**	48.9	21.3
Tank, Pond, Lake, River, Canal, Spring	**6.69**	8.31	1.6	**3.33**	4.27	0.66	**2.7**	3.5	0.7
Others	**3.41**	3.56	2.94	**2.14**	2.17	2.04	**1.2**	1	1.5

Source: Census - 1981, 1991, and 2001

The same data is presented in an aggregated form for the states in Table 2.2 where we use a broader definition of safe drinking water sources. The proportion of households with safe drinking water supply, defined as households sourcing water from tap, borewell, tubewell, has increased from 38 per cent in 1981 to 79 per cent in 2001. Improvement in the coverage of households with safe drinking water supply is more impressive in rural India, where the proportion of such households rose from a low 26.5 per cent to 73 per cent between 1981 and 2001. Across the states almost all states have shown impressive performance in providing safe drinking water sources to households. We should, however, note that this data unfortunately does not reveal information on the quantity of water supplied or its quality.

Table 2.2: Distribution of Households having Safe Drinking Water Sources* (per cent)									
States	1981			1991			2001		
	Total	Rural	Urban	**Total**	Rural	Urban	**Total**	Rural	Urban
A. P.	**25.89**	15.12	63.27	**55.08**	48.98	73.82	**80.15**	76.85	90.16
Bihar	**37.64**	33.77	62.36	**58.76**	56.55	73.39	**86.59**	86.11	91.23
Gujarat	**52.41**	36.16	86.78	**69.78**	60.04	87.23	**84.09**	76.87	95.40
Haryana	**55.11**	42.94	90.72	**74.32**	67.14	93.18	**86.06**	81.13	97.31
Karnataka	**33.87**	17.63	74.4	**71.68**	67.31	81.38	**84.55**	80.52	92.12
Kerala	**12.20**	6.26	39.72	**18.89**	12.22	38.68	**23.39**	16.88	42.84
M. P.	**20.17**	8.09	66.65	**53.41**	45.56	79.45	**72.55**	61.51	88.55
MHR	**42.29**	18.34	85.56	**68.49**	54.02	90.5	**79.82**	68.42	95.36
Orissa	**14.58**	9.47	51.33	**39.07**	35.32	62.83	**64.19**	62.88	72.32
Punjab	**84.56**	81.8	91.13	**92.74**	92.09	94.24	**97.60**	96.91	98.88
Rajasthan	**27.14**	13	78.65	**58.96**	50.62	86.51	**68.18**	60.45	93.52
T. N.	**43.07**	30.97	69.44	**67.42**	64.28	74.17	**85.55**	85.29	85.91
U. P.	**33.77**	25.31	73.23	**62.24**	56.62	85.78	**87.81**	85.46	97.16
W. B.	**69.65**	65.78	79.78	**81.98**	80.26	86.23	**88.53**	86.99	92.29
All India	**38.19**	26.5	75.06	**62.3**	55.54	81.38	**77.92**	73.23	90.01

Source: Census, 1981, 1991 and 2001
Note: * = Safe drinking water sources include tap, well and tube well

When measured in terms of habitations covered by drinking water schemes, the most recent data available suggest more impressive performance. Information pertaining to the coverage of rural habitations with

adequate drinking water supply across the states is presented in Table 2.3. The percent of habitations covered with adequate drinking water supply (40 litres per capita per day (lpcd)) has increased sharply over the period of the 1990s. During 2003 (November) over 93 per cent of the habitations were provided with adequate water supply.

Table 2.3: Habitations with Full Coverage of Drinking Water Supply (Rural)

States	1996-97	1999-00	Total Habitations - 1999	2003	Total Habitation - 2003
Andhra Pradesh	56	69	69732	96.40	69732
Bihar	89	100	204811	100.00	105340
Gujarat	73	89	29976	96.77	30269
Haryana	95	96	6733	100.00	6745
Karnataka	62	59	56617	81.22	56682
Kerala	15	20	8921	65.54	9763
Madhya Pradesh	54	93	157901	99.91	109489
Maharashtra	45	64	83333	81.66	85930
Orissa	80	98	113651	91.14	114099
Punjab	30	62	11399	67.53	13449
Rajasthan	53	61	86082	46.49	93946
Tamil Nadu	56	83	66631	78.36	66631
Uttar Pradesh	76	98	274209	88.21	243508
West Bengal	67	70	79036	100.00	79036
All India	70	83	1396543	93.50	1,422,293

Source: Data are collected from the Website of the Department of Drinking Water Supply, Government of India
Note: * = as on 27 November 2003

States of Bihar, West Bengal, Haryana, Madhya Pradesh, Gujarat and Andhra Pradesh have reported impressive performance by covering more than 95 per cent of the habitations. But, the coverage of habitats is poor particularly in Rajasthan, Punjab, and Kerala, which have less than 70 per cent of habitations covered with adequate drinking water supply (in the case of Kerala, caution is needed in interpreting data, as the households may have their own sources of water supply). In the case of Rajasthan, the drinking water supply system has been extended to only about 46 per cent of the habitations with adequate drinking water supply[1]. The wide coverage of households/habitations today has been possible because of the investments made by the governments in drinking water supply schemes over the years. Both the Central and State governments have assigned priority to provision of safe drinking water supply and to fulfil this goal greater financial resources are being allocated through budgetary provisions. The considerable improvement in the development of infrastructure for the supply of water in both rural and urban areas needs to reach the ultimate consumers of

[1] The data show a rise in the number of habitations in the year 2003 over the figures for 1999.

water. The available data from Census and other government sources suggest that although 93 per cent of rural habitations were fully covered by safe drinking water sources in 2003, only 73 per cent of rural households had access to these services in 2001. In other words, significant population in the rural areas is yet to have access to what we now recognise as 'safe' sources of drinking water.

3. Sanitation Services

Table 2.4: Percent of Households Having Toilet Facilities

Census- Year	Total	Rural	Urban
1991	23.7	9.48	63.85
2001	36.4	21.9	73.70

Source: Census - 1991, 2001

Sanitation is another essential public health service. While inadequacy of sanitation and hygiene in public places is a wide-open fact, the wide spread inadequacy at the household level needs to be highlighted. Just over 36 per cent of households were reported to have toilet facilities during 2001 (Table 2.4). There is wide disparity of sanitation services across rural and urban areas, as only about 22 per cent of rural households have toilet facilities, whereas the proportion is 75 per cent among the urban households. During the 1990s construction of household toilets has increased significantly. But, still the coverage is not satisfactory as over 78 per cent of rural households lack the facility.

Information on availability of sanitation services like household latrines and households without drainage connection for wastewater outlet (Table 2.5) shows a dismal picture of the level of services across the states. Availability of household latrines varies significantly across states, from about 15 per cent of households in Orissa to 84 per cent in Kerala. Provision of household latrines is very low in Orissa (15 percent), Bihar (19 per cent), and Madhya Pradesh (24 per cent). There is a wide disparity in availability of household latrines across the rural and urban areas too. However, the number of households with latrine facility has increased considerably between 1991 and 2001. In Haryana, Kerala and Punjab large number of households have constructed latrine facility. The performance is not impressive in Orissa, Maharashtra, Bihar and Rajasthan in terms of creating latrines at the household level.

Drainage facility is another important sanitation service contributing to maintenance of health, hygiene and environment. But, this crucial service is highly inadequate in the country (Table 2.5), as over 53 per cent of the households do not have drainage connection to carry safely the wastewater out. This means that all these households discharge wastewater into open ground or streets. This causes stagnant water pools around the habitations providing place for mosquito breeding and of other vectors.

Table 2.5: Level of Sanitation Facilities Available across the States (per cent)

States	Households with Latrine Facility						Households with No Drainage Connection for Wastewater Outlet		
	Census-1991			Census-2001			Census-2001		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Andhra Pradesh	18.4	6.62	54.6	32.99	18.15	78.07	48.44	58.57	17.71
Bihar	11.75	4.96	56.54	19.19	13.91	69.69	61.95	65.14	31.39
Gujarat	30.69	11.16	65.71	44.60	21.65	80.55	61.16	86.35	21.71
Haryana	22.45	6.53	64.25	55.50	71.34	19.34	23.20	28.28	11.59
Karnataka	24.13	6.85	62.52	37.50	17.40	75.23	48.77	64.61	19.03
Kerala	51.28	44.07	72.66	84.01	81.33	92.02	80.28	84.01	69.11
Madhya Pradesh	15.07	3.64	53.00	23.99	8.94	67.74	65.81	80.16	24.07
Maharashtra	29.56	6.64	64.45	35.09	18.21	58.08	39.20	58.86	12.42
Orissa	9.81	3.58	49.27	14.89	7.71	59.69	79.26	85.15	42.51
Punjab	33.18	15.79	73.23	56.84	40.91	86.52	17.84	21.92	10.23
Rajasthan	19.57	6.65	62.27	29.00	14.61	76.11	63.49	76.83	19.81
Tamil Nadu	23.13	7.17	57.47	35.16	14.36	64.33	54.89	72.64	29.98
Uttar Pradesh	18.02	6.44	66.54	31.43	19.23	80.01	29.51	35.01	7.62
West Bengal	31.51	12.31	78.75	43.71	26.93	84.85	69.24	84.09	32.86
All India	23.7	9.48	63.85	36.41	21.92	73.72	53.60	65.82	22.13

We point finally to the problem of flies, mosquitoes and foul odour- all a result of inadequate sanitation. The 1998 National Sample Survey on water supply, sanitation and hygiene estimates that about 65% of the households experience the problem of flies, 85% of the households experience the problem of mosquitoes and 40% suffer foul odour in environment. More, importantly, far greater proportion of households experienced an increase in the problem in the past five years as compared to the proportion of households who noticed a reduction in the problem.

The situation with respect to sanitation is dark. Even the basic amenity of a toilet is not available on the premises for over 60 per cent of the households in 2001. The situation with respect to access to drainage is even worse. These indicators are a major pointer to the policy initiatives needed if India hopes to achieve better living conditions for its billion plus population.

4. Water Related and Vector borne Diseases

The third area of basic public health services that are of preventive and non-clinical nature is the direct effort of the Department of Health in vector control and efforts to ensure safety of food supply chain. There are no good sources of information on these activities. The impact of poor public health effort indeed would be the

high incidence of waterborne, vector borne, communicable diseases. Waterborne and vector related diseases, normally, dominate the morbidity pattern in a developing nation, where the BPH services are of poor quality. Most of the waterborne diseases (diarrhoea, amiebiosis, cholera, Typhoid, etc.,) and vector borne diseases (Malaria, Filaria, etc.,) are caused due to lack of or inadequate safe drinking water supply, poor sanitation, lack of cleanliness and hygiene in both houses and public

Table 2.6: Incidence of Waterborne Diseases in India

Year	Diarrhea	Cholera	Malaria	Viral Hepatitis	Japanese Encephalitis	Dengue Fever
Total Number of Incidence of Diseases						
1996	6623195	3901	2552961	103792	1425	NA
1997	5875575	2124	2219792	110902	2387	850
1998	7396921	5278	1854955	86446	2048	366
1999	NA	2446	1882357	NA	3244	773
2000	NA	2890	2054656	135218	2269	440
2001	NA	NA	NA	127377	1617	2695
Incidence of Diseases per Lakh Population						
1996	702	0.41	271	11.00	0.15	NA
1997	613	0.22	231	11.56	0.25	0.09
1998	759	0.54	190	8.87	0.21	0.04
1999	NA	0.25	190	NA	0.33	0.08
2000	NA	0.29	204	13.44	0.23	0.04
2001	NA	NA	NA	12.47	0.16	0.26

Source: Indiastat.com
Note: NA = Not Available

places. As these diseases are closely associated with the absence of the above basic facilities, burden of the illness will be more on poor people, who naturally cannot afford these services by themselves. Information presented in Table 2.6 shows the magnitude of incidence of water-borne diseases in India in the recent years. The incidence of diarrhoea is high followed by Malaria. While during 1998 over 750 persons per lakh population suffered from diarrhoea, 190 persons suffered from Malaria. The number of people suffering from the diseases shown in the table has fluctuated over the period.

Incidence of selected waterborne and vector related diseases across the Indian states is shown in Table 2.7. Taking all the states together 74 lakh cases of diarrhoea were reported

Table 2.7: Incidence of Waterborne and Vector Related Diseases in the States

	Diarrhoea			Malaria						Viral Hepatitis				
States	1996	1997	1998	1995	1996	1997	1998	1999	2000	1996	1997	1998	2000	2001
No. of cases in Lakhs														
A. P.	12.91	14.51	18.53	0.98	1.28	1.30	1.19	1.29	8.06	0.28	0.24	0.19	0.28	0.25
Bihar	NA	NA	NA	0.87	1.05	0.75	1.15	1.32	NA	NA	NA	NA	NA	NA
Gujarat	2.39	2.12	2.07	1.91	1.44	1.60	1.01	0.64	0.36	0.05	0.04	0.03	0.04	0.04
Karnataka	6.64	6.01	6.75	2.86	2.19	1.81	1.19	0.97	1.09	0.06	0.04	0.06	0.25	0.26
Kerala	6.11	5.64	5.51	0.12	0.12	0.08	0.07	0.06	0.03	0.12	0.19	0.15	0.06	0.05
M. P.	3.36	4.49	4.79	4.84	6.01	4.52	4.75	5.28	1.95	0.12	0.12	0.05	0.07	0.03

MHR	6.02	8.02	10.99	3.69	3.17	2.05	1.66	1.38	0.81	0.07	0.21	0.11	0.41	0.40
Orissa	7.47	7.47	7.93	3.70	4.59	4.22	4.78	4.83	4.96	0.26	0.22	0.18	0.14	0.07
Punjab	1.35	NA	1.96	NA	0.36	0.28	0.05	0.01	0.00	0.02	NA	0.02	0.02	0.05
Rajastan	1.65	1.80	2.12	2.51	3.01	2.73	0.76	0.53	0.36	0.02	0.02	0.01	0.02	0.03
T. N.	1.41	0.71	0.47	0.92	0.81	0.72	0.64	0.56	0.43	0.01	0.02	0.01	0.02	0.02
U. P.	13.96	2.58	5.65	1.05	1.69	1.34	1.12	0.99	1.04	0.00	0.00	0.03	0.01	0.02
W. B.	2.97	5.40	7.20	NA	0.88	1.55	1.32	2.27	1.45	0.02	0.02	0.02	0.06	0.06
Total	66.23	58.76	73.97	23.44	25.53	22.20	18.55	18.82	20.55	1.04	1.11	0.86	1.35	1.27
Incidence per Lakh Population														
A. P.	1758	1954	2467	135	174	175	158	170	1048	38	32	26	36	32
Gujarat	514	449	432	416	309	338	210	132	72	11	8	6	8	8
Karnataka	1317	1175	1302	574	434	355	229	185	206	13	9	12	47	49
Kerala	1936	1770	1713	38	37	26	23	19	9	38	60	47	17	14
M. P.	440	578	605	645	787	581	600	655	237	16	16	7	8	4
MHR	680	894	1211	422	358	229	183	150	88	7	23	12	45	43
Orissa	2133	2112	2221	1067	1309	1192	1338	1341	1367	76	64	51	39	20
Punjab	589	NA	838	0	156	119	23	5	2	9	NA	7	8	20
Rajasthan	321	345	398	499	586	522	144	98	65	5	3	2	3	5
T. N.	233	116	77	154	133	119	104	91	69	1	3	1	3	3
U. P.	865	157	335	66	105	81	67	58	59	NA	NA	2	1	1
W. B.	388	697	917	NA	115	200	168	286	180	3	2	3	7	8
Total	691	603	747	248	277	235	199	200	201	11	12	9	13	12

Source: Indiastat.com; Data on Malaria for the year 1995 and Bihar are collected from the India Health Report (Misra et al 2003)
Note: NA = Not Available; in the case of Haryana data on incidence of diseases is not available for any of the above years

during 1998. In fact, the incidence of diarrhoea though declined from its level in 1996 to 1997, it increased again in 1998. Across the states more cases were reported from Andhra Pradesh, followed by Maharashtra, Orissa and others. However, incidence of diarrhoea per lakh population is also high in West Bangal, Karnataka, Kerala and Madhya Pradesh. Diarrhoea accounts for around 34 per cent of the mortality in India (Misra 2003).

The incidence of Malaria, a vector borne disease, is varying from year to year although the peak level of 1996 has not been breached until 2000. However, this aggregate pattern of declining incidence is not seen across the states. Andhra Pradesh has experienced a sharp increase in the number of cases of Malaria, from 0.98 lakh to 8.06 lakh between 1995 and 2000. Incidence of Malaria is almost constant around 4.5 lakh cases per year in Orissa during 1995-2000, while it declined in states like Karnataka and Maharashtra.

5. Status of Basic Public Health Services in Karnataka

This section provides information on the sources of drinking water at household level, number of habitations with adequate drinking water supply, availability of sanitation facilities, and level of waterborne diseases in Karnataka.

5.1. Sources and Level of Drinking Water Supply

Access to and availability of safe drinking water sources is an important aspect in the provision of drinking water supply. If more households depend upon drinking water sources like tank or pond or other unsafe sources, it indicates the non-availability of safe drinking water sources. Table 2.8 reveals that in Karnataka nearly 59 per cent of the households have tap water connection, followed by hand pump with over 17 per cent. The Census categorises tap, tube well and hand pump as safe drinking water sources, showing over 84 per cent of the households as having access to safe drinking water sources. But, it is difficult to make this point, as no information on the quality of water is available. Further, in the state over 15 per cent of the households depend upon wells and other sources for drinking water. The rural-urban break up of information shows that about 20 per cent of the rural households are yet to be covered with safe drinking water sources. Tap water connection, which is considered as one of the safe sources of drinking water, has been provided to only about 48 per cent of the rural households in the State. It is significant to note that the availability of safe drinking water sources to households in the State is higher than that at the all India level, in both rural and urban areas. Although the performance of the state in providing drinking water sources is good as compared to that at all India, much is yet to be accomplished to provide safe and adequate quantity of drinking water supply to the rural and urban population.

Table 2.8: Percent of Households by Principal Source of Drinking Water (2001)

Source of Drinking Water	Karnataka			All India		
	Total	Rural	Urban	Total	Rural	Urban
Tap	58.89	48	78.43	36.70	24.30	68.70
Handpump	17.11	23	6.19	35.70	43.20	16.20
Tubewell	8.56	9	7.51	5.60	5.70	5.10
Well	12.40	16	6.48	18.2	22.20	7.70
Others	3.04	4	1.40	3.90	4.50	2.20
Safe Drinking Water Sources						
Tap, Hand Pump, Tube well*	84.56	80	92.13	78	73.2	90

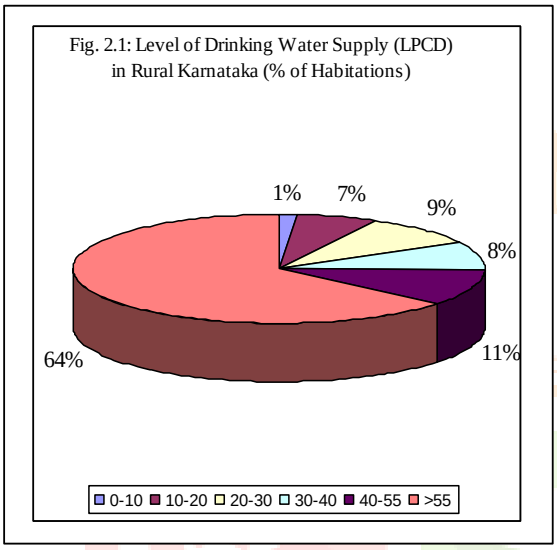
Source: Census 2001

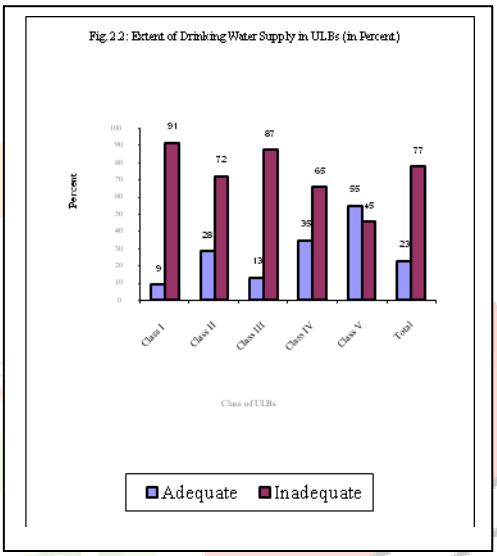
Note: Others include Tank, Pond, River, Canal, Springs and any other Census classification

How many habitations have been provided with adequate quantity of drinking water supply in the state? Every individual requires a minimum quantity of water per day for keeping his life and to maintain hygiene for good quality life. The World Bank and Government of India has proposed that each individual in rural area should get a minimum of 40 litres per capita per day (lpcd), it varies from 70 to 135 lpcd in urban areas depending upon population. The Karnataka Government has adopted the norm of providing 55 lpcd of water supply in rural areas, and 70 to 135 lpcd in urban areas, and the efforts are oriented towards achieving this goal. In the State about 64 per cent of the 56682 rural habitations have been covered with adequate drinking water

supply by the end of 2001 (GoK 2002) as shown in Fig. 2.1. However, over 36 per cent of rural habitations in the State are yet to be provided with adequate level of drinking water supply. The problem is also acute in urban Karnataka, as over 77 per cent of the 224 urban areas in the State are suffering from inadequate drinking water supply (Fig. 2.2).

It is alarming that *all* classes of ULBs have less than desired quantity of drinking water supply. All this indicates that the provision of drinking water supply to households is a critical issue in the State.





5.2. Sanitation Services

Sanitation facilities, which are crucial for maintaining hygiene and good health, are still inadequate. In Karnataka over 62 per cent of the households do not have toilet facility in their house (Table 2.9), which means these people are practising open-air defecation, a cause for environmental pollution and source of disease. The problem is worse in rural areas as over 82 per cent of households lack latrine facility. In terms of lack of latrine facilities Karnataka's position is not better than that at all India level, although Karnataka is considered to be a medium developed state. Information on the type of drainage connection of households for wastewater outlet also reveals a dismal picture of inadequate sanitation facilities in both Karnataka and India. While in Karnataka nearly 49 per cent of the households do not have connection to drainage, at the all India level it is 53 per cent. This indicates that most of the houses let their wastewater to the streets or open places. The problem is more acute in rural areas than in urban areas, as over 64 per cent of the rural households have no drainage connection, whereas it is only 19 per cent among the urban households. Lack of drainage connection for wastewater outlet creates stagnant water pools, which is a source of breeding of mosquitoes and other vectors.

Table 2.9: Per cent of Households with sanitation facilities (2001)						
Sanitation Services	**Karnataka**			**All India**		
	Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
Type of latrine within the house						
Pit latrine	13.38	9.48	20.70	11.5	10.3	14.6
Water closet	18.64	4.67	44.86	18	7.1	46.1
Other latrine	5.48	3.25	9.67	6.9	4.5	13
No latrine	62.50	82.60	24.77	63.6	78.1	26.3
Type of connectivity for waste water outlet						
Closed Drainage	17.26	4.28	41.64	12.5	3.9	34.5
Open Drainage	33.97	31.11	39.33	33.9	30.3	43.4
No drainage	48.77	64.61	19.03	53.6	65.8	22.1

Source: Census 2001

The evidence available from a sample survey of households in 1998 reveals widespread problem of flies and mosquitoes in the state. A summary of the findings of this survey (NSSO, 1999) is provided in Table 2.10 for the major four southern states and at the national level. In Karnataka about 61 and 78 per cent of the households have reported that they are facing the problem of flies and mosquitoes, respectively. The problem is more severe in Andhra Pradesh than other states; in fact it is higher than the all India level. Although the

Table 2.10: Households Experiencing the Problem of Insects and Odour									
	Percent of Households Experiencing concern about Problem of			Percent of Households Experiencing Change over Previous 5 Years					
				Increase in			Decrease in		
States	Flies	Mosquitoes	Foul Odour	Flies	Mosquitoes	Foul Odour	Flies	Mosquitoes	Foul Odour
Rural									
Karnataka	62.6	76.7	40.1	29	41.3	15.9	6	4.3	9.5
Kerala	42.4	75.4	11.2	14.3	42.3	3.5	10.4	6.3	8.8
A. P.	72.9	92.6	38.3	37.9	57.6	17.0	5.5	4.9	6.7
T. N.	54.6	80.1	23.0	24.2	42.1	7.3	9.7	8.6	10.7
India	68.5	84.0	36.1	48.3	62.9	22.4	5.2	3.8	7
Urban									
Karnataka	57.5	81.1	50.9	23.8	56.2	26.8	8.9	6.0	8.8
Kerala	37.7	89.0	19.7	12.1	44.5	25.0	11.6	5.2	9.5
A. P.	53.1	86.8	47.6	28.8	55.6	7.6	10.6	6.0	10
T. N.	61.1	82.5	42.3	30.3	47.1	19.2	10.9	6.0	11.5
India	65.8	89.6	50.1	41.6	61.3	30.4	8.6	4.8	9.5
Total									
Karnataka	61.04	78.04	43.40	27.41	45.85	19.23	6.89	4.82	9.29
Kerala	41.27	78.68	13.25	13.77	42.83	8.68	10.69	6.03	8.97
A. P.	67.56	91.03	40.81	35.44	57.06	14.46	6.88	5.20	7.59
T. N.	56.94	80.96	29.95	26.40	43.90	11.58	10.13	7.66	10.99
India	67.80	85.46	39.75	46.55	62.48	24.49	6.09	4.06	7.65

Note: Total is Weighted Average

problem is low in Karnataka compared to all India and also Andhra Pradesh, the problem is still significantly high as large proportion of households facing these problems. Foul odour, a product of lack of sanitation facilities, has been reported by more number of households (43 per cent) in Karnataka. Mosquitoes and foul odour is a major problem in urban areas, while it is flies in rural areas in all the states and also at the national level. We can notice from the table that the percent of households reported that the problem has increased over the previous 5 years is high. This might indicate that the sanitation services that have been created over the years are still inadequate in controlling the problems of flies, mosquitoes and foul odour.

5.3. Water and Vector Related Diseases

Benefits of the provision of basic public health services can be seen in the incidence of diseases, particularly waterborne and vector borne diseases. Table 2.11 shows an increase in the incidence of waterborne and also vector related diseases in the state. While Malaria has not shown declining trend, incidence of other diseases such as gastroenteritis (GE), Japanese Encephalitis (JE), Viral Hepatitis, Typhoid has increased. The increase in the incidence of waterborne and vector borne diseases might be due to the inadequate existence of BPH services.

Table 2.11: Incidence of Water borne and Vector Diseases in Karnataka (No. per '000 population)

Year	Gastroenteritis	Cholera	Malaria	J E	Viral Hepatitis	Typhoid	Dengue Fever
1991	0.384	0.016	NA	NA	0.015	NA	NA
1995	0.404	0.012	NA	NA	0.155	0.222	NA
1996	0.490	0.014	NA	0.004	0.028	0.474	NA
1997	0.496	0.015	3.805	0.009	0.036	0.291	0.005
1998	0.431	0.015	2.450	0.006	0.079	0.502	0.002
1999	0.357	0.003	1.955	0.014	0.096	0.489	0.001
2000	0.617	0.007	2.162	0.009	0.061	0.539	0.003
2001	0.467	0.007	3.863	0.004	0.106	0.652	0.004

Source: Department of Health and Family Welfare, Government of Karnataka
Note: NA = Not Available

6. Relationship between BPH services and Incidence of Diseases

The inadequate quantity and quality of public health services such as drinking water and sanitation facilities cause waterborne and vector borne diseases, is a well known fact. In the above paragraphs we observed that the provision of BPH services is still insufficient and there is no information on the quality of the services provided. Besides, it was also noticed that the incidence of diseases has not declined noticeably and in fact in some states it has increased. Of course programmes can resort to other preventive measures to reduce the

incidence of water borne/vector borne diseases at a household or personal level. In this background an attempt is made to examine whether inadequate sanitation services and incidence of diseases has any relationship by using correlation analysis. The data on incidence of diseases does not belong to the same years as the amenities data but they are reasonably close years. Data on the level of BPH services is obtained from Census 2001. The correlation results between households with lack of safe drinking water sources, no toilet facility and no drainage on the one hand and incidence of diarrhoea, viral hepatitis and malaria on the other has been presented in Table 2.12. Results show that incidence of diarrhoea is more strongly related with lack of safe drinking water sources and lack of access to proper drainage for wastewater outlet at the household level.

Table 2.12: Correlation between BPH Services and Incidence of Diseases

Diseases	Per cent of Households with		
	No Safe Drinking Water Sources (2001)	No Toilets (2001)	No Drainage (2001)
Diarrhoea (1998)	0.388	-0.048	0.26
Viral Hepatitis (2001)	-0.074	-0.002	-0.24
Malaria (2000)	-0.003	-0.017	-0.20

Note: Years in brackets indicate that the data pertains to that particular year

The correlation between poor BPH services and viral hepatitis and malaria shows negative relationship, but the correlation coefficient is small. This might indicate that some other factors are also responsible for the incidence of these diseases. Since we do not have information on the quality of water and other sanitation facilities like existence of stagnant water pools, compost yards nearby habitations, or even the household members' hygiene practices etc., it is difficult to examine the relationship further.

The inadequate provision of safe drinking water supply and sanitation facilities necessitates government role in providing financial resources and technical inputs, to bring these services to all people of the society. All individual households may not be able to undertake the necessary expenditures to create these services by themselves. Moreover, there are clear negative externalities even for those who own such amenities if there are others in the neighbourhood who don't. Hence, government spending is necessary in creating BPH services.

7. Concluding Remarks

This chapter illustrated the current status of BPH services at all India level, across states and in Karnataka. According to the Census 2001 large number of households depends upon tube well/ hand pump for drinking water collection. It is significant to note that the proportion of households covered with piped water supply has been increasing over the years, since piped water supply is considered as one of the safe drinking water sources. However, the data do not reveal information on the quantity and quality of the water supplied at the household level. In the sanitation sector much has to be achieved particularly in rural areas, as around 22

per cent of the households reported to have toilet facility, which is an important mechanism for hygiene. Availability of household latrines varies significantly across states, from about 15 per cent of households in Orissa to 84 per cent in Kerala. Provision of household latrines is very low in Orissa (15 percent), Bihar (19 per cent), and Madhya Pradesh (24 per cent).

Prevention and control of water related and vector borne diseases is another important BPH services. Waterborne and vector related diseases, normally, dominate the morbidity pattern in a developing nation, where the BPH services are of poor quality. The incidence of diarrhoea is high followed by Malaria. While during 1998 over 750 persons per lakh population suffered from diarrhoea, 190 persons suffered from Malaria.

The analysis revealed the provision of BPH services is still insufficient and there is no information on the quality of the services provided. It was also noticed that the incidence of diseases has not declined noticeably and in fact in some states it has increased. The inadequate provision of safe drinking water supply and sanitation facilities necessitates government role in providing financial resources and technical inputs, to bring these services to all people.

References

Census of India (1981) 'Houses, Household Amenities and Assets' Registrar General of India, Government of India, New Delhi.

Census of India (1991) 'Houses, Household Amenities and Assets' Registrar General of India, Government of India, New Delhi.

Census (2001) 'Houses, Household Amenities and Assets' Registrar General of India, New Delhi.

Misra, Rajiv, Rachel Chatterjee and Sujatha Rao (2003), India Health Report, Oxford University Press, New Delhi.

Government of Karnataka, 'Economic Survey', Bangalore.

National Sample Survey Organisation (1999), Drinking Water, Sanitation and Hygiene in India, NSS 54th Round (January-June 1998), New Delhi.