

Chapter 17

Rural Water Supply and Sanitation in Karnataka

17.1 Major Priority

1. Karnataka State has a population of 527 lakhs according to the 2001 census, out of which the rural population accounts for 348 lakhs or 66%, of the total. According to the department of Rural Development & Panchayath Raj, the rural population is spread out over 56,682 habitations including 27,066 revenue villages and 29,616 hamlets and extensions. Provision of safe and adequate drinking water to all the households in the rural areas has been a major priority with the Government of Karnataka for several years.

2. According to the national norms for supply of drinking water (water for all domestic purposes) a daily supply of 40 litres per capita (40 lpcd) is considered the minimum requirement of people in rural areas. In the hot DDP (Desert Development Programme) districts- like Bellary, Raichur and Bijapur a minimum of 70 lpcd is taken as the norm including the requirement of water for some livestock. Further, this water should be safe for drinking, free from bacterial and chemical contamination as per detailed standards specified for the purpose. The norms also require that the supply should be available within 500 mtrs. of the place of residence of inhabitants of a village. The conference of Chief Ministers on Basic Minimum Services held in 1996 resolved to adopt 55 lpcd as the minimum service level for rural areas. However, the Government of India have stipulated that the higher level of supply should be aimed at after a state has attained the earlier norm of 40 lpcd in all the villages. In Karnataka, the State Government's Strategy Paper 2000-05 on Rural Water Supply and Sanitation adopts 55 lpcd as the norm for rural water supply throughout the state and 70 lpcd for the DDP districts.

3. In Karnataka, ground water extracted through deep bore wells is the main source of water supply in the rural areas. A typical Piped Water Supply Scheme draws water from one or more deep bore wells through electric pumps and has storage & distribution facilities like overhead tanks, public stand posts etc., A Mini Water Supply Scheme also draws water in a similar manner but has no distribution facilities and water has to be collected from small cisterns into which the water is pumped.

4. According to the Strategy Paper 2000-05, the following criteria are adopted for providing different water supply schemes to villages;

1	Habitations with a population of less than 500 in plains and less than 350 in hilly areas	Bore wells with hand pumps at the rate of one bore well per 100 population
2	Habitations with a population of more than 500 and less than 1000 in plains and more than 350 and less than 700 in hilly areas	Mini Water Supply Schemes
3	Habitations with a population of more than 1000 in plains and more than 700 in hilly areas.	Piped Water Supply Schemes.

5. It is seen that in most larger villages (with more than 1000 population), Piped Water Supply Schemes coexist with a number of bore wells with hand pumps and often with one or more Mini Water Supply Schemes. Similarly, bore wells with hand pumps are also provided in many villages which have Mini Water Supply Schemes.

6. In most parts of the State, as in many other States, ground water is generally free from bacterial and mineral contamination when it is tapped from deep aquifers through bore wells. Since bore wells can be drilled within the villages or close to habitations, the cost of pumping and conveying water to the habitations is minimal. Therefore, in Karnataka over 97 % of the rural water supply schemes depend upon groundwater, and drilling of bore wells for supply of water through Piped Water Supply (PWS) Schemes, Mini Water Supply (MWS) schemes and bore wells fitted with hand pumps has been the strategy followed during the last twenty years.

17.2 Present Level of Water Supply

7. The State has invested over Rs.1398.76 crores from 1991 to 2001 to create facilities for water supply in the rural areas. This along with the investments made in the earlier years (mainly in the eighties) has resulted in the installation of 14095 Piped Water Supply Schemes, 17022 Mini Water Supply Schemes, and 1.71 lakh bore wells with hand pumps as at the end of March 2001. Over the last ten years besides spending Rs. 1398.76 crores under the State's own Minimum Needs Programme and the Centrally Sponsored Accelerated Rural Water Supply Programme, the State has also implemented four externally aided Rural Water Supply and Sanitation Projects. The World Bank aided Integrated Rural Water Supply and Sanitation Project covered 1104 villages in sixteen districts at a total cost of Rs.515.06 crores. The Netherlands Assisted Water Supply and Sanitation Project covered 201 villages of five districts in Northern Karnataka (Belgaum Division) at a cost of Rs.82.56 Crores. Two projects taken up with DANIDA assistance at a total cost of Rs.77.05 Crores have also been implemented in 1218 villages spread out in four districts of the State. A second project with the assistance of the World Bank called 'Jal Nirmal' having an outlay of Rs.1035.37 Crores has been taken up for implementation in the year 2001 to provide water Supply and Sanitation in 2100 Villages of eleven districts in the Northern Karnataka region (covering all the districts to the north of the Tungabhadra River). The following table gives details of the coverage of various externally aided projects and the investments made under the Minimum Needs Programme and the Accelerated Rural Water Supply Programme.

Table 17.1: Expenditure on Rural Water Supply Schemes and number of taluks and villages covered under externally aided projects, districtwise

Sl.No	District	Expenditure (Rs. in Crore) on RWS under MNP & ARWS since 1990-91	Taluks and villages covered under						
			World Bank aided IRWS Projects		Netherlands Assisted IRWS Projects		DANIDA assisted RWS Projects		
			Tq.	Vlg.	Tq.	Vlg.	Tq.	Vlg.	
1	Bangalore (U)	58.02	--	--	--	--	--	--	--
2	Bangalore (R)	61.05	8	66	--	--	--	--	--
3	Chitradurga	60.54	--	--	--	--	5	376	--
4	Davanagere	22.16	3	48	--	--	--	--	--
5	Kolar	71.02	--	--	--	--	4	553	--
6	Shimoga	59.77	7	48	--	--	--	--	--
7	Tumku	81.82	10	97	--	--	--	--	--
	Bangalore Division	414.38	28	259	--	--	9	929	--
8	Bagalkote	15.00	--	--	5	31	3	237	--
9	Belgaum	106.50	10	102	--	--	--	--	--
10	Bijapur	63.29	--	--	5	41	2	52	--
11	Dharwad	68.61	--	--	5	38	--	--	--
12	Gadag	10.97	--	--	4	33	--	--	--
13	Haveri	14.20	--	--	7	58	--	--	--
14	Uttara kannad	56.64	--	--	--	--	--	--	--
	Belgaum Division	335.21	10	102	26	201	5	289	--
15	Chamarajanagar	16.50	4	30	--	--	--	--	--
16	Chickamagalore	45.42			--	--	--	--	--
17	D.Kannada	76.68	5	55	--	--	--	--	--
18	Hassan	58.36	8	96	--	--	--	--	--
19	Kodagu	34.07			--	--	--	--	--
20	Mandya	64.68	7	88	--	--	--	--	--
21	Mysore	83.77	7	76	--	--	--	--	--
22	Udupi	14.10	3	24	--	--	--	--	--
	Mysore Division	393.58	34	369	--	--	--	--	--
23	Bellary	57.86	7	72	--	--	--	--	--
24	Bidar	47.09	5	94	--	--	--	--	--
25	Gulbarga	75.63	10	100	--	--	--	--	--
26	Koppal	18.61	4	64	--	--	--	--	--
27	Raichur	56.40	5	44	--	--	--	--	--
	Gulbarga Division	255.59	31	374	--	--	--	--	--

Sl.No	District	Expenditure (Rs. in Crore) on RWS under MNP & ARWS since 1990-91	Taluks and villages covered under					
			World Bank aided IRWS Projects		Netherlands Assisted IRWS Projects		DANIDA assisted RWS Projects	
			Tq.	Vlg.	Tq.	Vlg.	Tq.	Vlg.
	Bangalore Division	414.38	28	259	--	--	9	929
	Mysore Division	393.58	34	369	--	--	--	--
	Belgaum Division	335.21	10	102	26	201	5	289
	Gulbarga Division	255.59	31	374	--	--	--	--

	North Karnataka	590.80	41	476	26	201	5	289
	South Karnataka	807.96	62	628	--	--	9	929
	Karnataka state	1398.76	103	1104	26	201	14	1218

Source : Rural Development and Panchayat Raj Department.

8. It can be seen from the above table that North Karnataka accounts for 42% and South Karnataka for 58% of the total expenditure incurred in the State for Rural Water Supply under MNP and ARWS since 1990. Similarly, number of villages benefited from externally aided projects in North Karnataka accounts for only 24% as against 76% of villages belonging to South Karnataka. There is a need to reduce regional imbalances by bringing expenditure level par with that in South Karnataka.

9. According to information furnished by the department of Rural Development and Panchayathi Raj, 41,081 habitations or over 72% of the rural habitations in the State have more than 40 lpcd of water supply. *However, the above claim appears to relate to the pumping and distribution capacity created through various water supply schemes rather than the actual service provided to the villagers.* According to a study of the actual working of the rural water supply schemes conducted by the department of Economics & Statistics in the year 2001, 62% of the rural habitations have less than 40 lpcd water supply and 43% experience shortage of water during the summer months. The district wise distribution of water supply schemes of various categories and habitations having more than 40 lpcd water supply according to the capacity created is given in the table below:

Table 17.2: Coverage of habitations under different schemes and number of habitations with less than 40 LPCD and habitations with more than 40 LPCD, districtwise

Sl. No	District	No. of	No. of	No. of	Habitations	Habitations
		P.W.S.	M.W.S.	B.W.S.	with > 40 lpcd	with < 40 lpcd
1	Bangalore (U)	444	978	5546	474	671
2	Bangalore (R)	557	828	9459	2811	285
3	Chitradurga	392	615	4842	1093	411
4	Davanagere	335	576	5160	899	265
5	Kolar	765	1243	9909	3265	536
6	Shimoga	577	629	8219	3643	1065
7	Tumku	733	1344	12542	3563	1637
	Bangalore Division	3803	6213	55677	15748	4870
8	Bagalkote	440	536	2538	478	222
9	Belgaum	1271	964	9986	864	788
10	Bijapur	452	538	6029	616	480
11	Dharwad	457	331	2660	199	195
12	Gadag	387	297	2892	268	68
13	Haveri	472	462	4942	496	179
14	Uttara kannad	443	480	5941	4962	808
	Belgaum Division	3922	3608	34988	7883	2740
15	Chamarajanagar	549	561	6141	305	506
16	Chickamagalore	538	491	6672	2907	374
17	D.Kannada	558	413	4731	1810	1335
18	Hassan	654	825	10849	2778	1602
19	Kodagu	161	258	3951	129	409
20	Mandya	349	835	7751	1527	420
21	Mysore	704	685	5552	1680	203
22	Udupi	369	257	5508	2317	1157
	Mysore Division	3882	4325	51155	13453	6006
23	Bellary	557	788	7035	681	322
24	Bidar	383	443	4224	708	151
25	Gulbarga	788	908	9534	1027	942
26	Koppal	378	307	4521	605	139
27	Raichur	382	430	4591	976	431
	Gulbarga Division	2488	2876	29905	3997	1985

Sl. No	District	No. of	No. of	No. of	Habitations	Habitations
		P.W.S.	M.W.S.	B.W.S.	with > 40 lpcd	with < 40 lpcd

	Bangalore Division	3803	6213	55677	15748	4870
	Mysore Division	3882	4325	51155	13453	6006
	Belgaum Division	3922	3608	34988	7883	2740
	Gulbarga Division	2488	2876	29905	3997	1985

	North Karnataka	6410	6484	64893	11880	4725
	South Karnataka	7685	10538	106832	29201	10876
	Karnataka State	14095	17022	171725	41081	15601

Source: Rural Development and Panchayat Raj Department.

10. From the above, it can be seen that South Karnataka and North Karnataka respectively account for 55% and 45% of the total number of piped water supply schemes, and 38% and 62% of the schemes implemented in case of each Mini Water Supply and Borewell Water Supply projects. The percentage of habitations served with less than 40 LPCD is more or less equal in both the regions.

17.3 Functionality of Water Supply Schemes

11. While the coverage of rural water supply schemes in terms of the capacities created is impressive due to a number of factors many of the water supply schemes not providing the full measure of the service intended. The Department of Rural Development and Panchayathraj had a verification of the 'functionality' of the rural water supply schemes carried out in 1998-99, which revealed that about 6% of the Piped Water Supply Schemes, 7% of the Mini Water Supply Schemes and 21% of the Bore wells with Hand pumps were not in working condition at the time of verification. The above exercise however, did not assess the actual level of performance of the schemes, which were in working condition. The study commissioned by the High Power Committee (HPCFRR) into the functionality of the rural water supply schemes has on the basis of a sample survey concluded that 19% of the Piped Water Supply Schemes, 15% of the Mini Water Supply Schemes, and 13% of bore wells with hand pumps were not working regularly. A district wise comparison of the findings of the two studies is furnished in the following table: -

Table 17.3: Percentage of Rural Water Supply Schemes which are not functioning / functioning regularly

Sl. No.	District	P.W.S.		M.W.S.		B.H.P.	
		Not Functioning	Not regular	Not Functioning	Not regular	Not Functioning	Not regular
1	Bangalore	2	17	3	15	30	33
2	Bangalore (R)	7	30	14	9	20	8
3	Chitradurga	1	7	2	0	14	0
4	Davanagere	6	4	10	8	39	0
5	Kolar	2	6	3	6	27	33
6	Shimoga	6	27	4	25	9	0
7	Tumkur	3	12	5	14	17	3
8	Chamarajnaragar	10	12	7	20	15	0
9	Chickmagalore	2	39	4	18	5	7
10	D. Kannada	8	49	9	55	17	93
11	Hassan	9	71	9	23	12	39
12	Kodagu	9	15	11	31	5	5
13	Mandya	4	22	3	17	12	0
14	Mysore	3	29	6	0	8	0
15	Udupi	2	19	8	0	9	0
16	Bellary	25	11	3	13	28	12
17	Bidar	10	3	5	4	21	29
18	Gulbarga	-	14	10	11	21	8
19	Koppal	19	10	3	56	34	0
20	Raichur	19	7	18	6	33	0
21	Bagalkote	7	14	16	11	29	
22	Belgaum	10	25	14	11	20	0
23	Bijapur	-	21	14	43	20	0
24	Dharwad	4	41	-	11	59	0
25	Gadag	0.6	33	11	0	40	0
26	Haveri	6	19	8	24	43	27
27	U. Kannada		100	9	17	7	47

- Source:** 1. Study on Functionality of Infrastructure Facilities 2001 conducted by the Directorate of Economics and Statistics, Karnataka.
2. Study on verification of functionality done by Rural Development and Panchayat Raj Department, 1998.

12. A number of factors are responsible for the non-functionality of Rural Water Supply Schemes. The important among them are:

- a) Non availability of power supply for operating water supply schemes to the designed duration on a daily basis;
- b) Poor quality of maintenance of the water supply schemes by the panchayaths;
- c) Low level of participation of the user communities in the operation and maintenance of the facilities; and
- d) Poor quality of planning and execution of water supply schemes;

13. Among these, irregular and inadequate power supply restricts the operation of the Piped and Mini Water Supply Schemes in the larger habitations to only a part of their capacity resulting in inadequate supply of drinking water. This often forces the Panchayaths to go in for further investments in sinking bore wells with hand pumps or creation of additional capacities to pump more water within a short duration. Poor operation and maintenance of water supply schemes is also common due to inadequate resources available for maintenance. While the State Government gives pro rata annual grants to panchayaths for maintenance of water supply schemes of various categories (Rs.8000 per Piped Water Supply Scheme, Rs.3500 per Mini Water Supply Scheme and Rs.600 per Bore well with hand pump) this is not always adequate particularly in the case of larger habitations and in areas where frequent breakdown of power supply results in the pumping machinery going out of order. Collection of user charges to meet the cost of operation and maintenance, even though accepted as a policy, is yet to be enforced in most villages. Therefore, the functionality of water supply schemes is an issue, which is to be given as much importance as the creation of additional capacities.

17.4 Sustainability of Groundwater Sources

14. Since the inception of Rural Water Supply Programmes in the State ground water has been selected as the main source for water supply schemes throughout the State. This has been done due to the easy availability of ground water of acceptable quality in most villages. This made it possible to provide water supply at comparatively low cost as the groundwater obtained from bore wells in most cases did not require any treatment, and as it was available in or near the rural habitations there was very little expenditure on conveying it to the places of supply. On the other hand, surface water sources like rivers and tanks involved huge capital expenditure on intake structures and pipelines besides requiring treatment facilities to render water safe for human consumption. Thus, only in areas where the groundwater sources within a reasonable distance do not yield adequate water of acceptable quality the Rural Development Engineering Department (formerly the Public Health Engineering Department) recommends projects based on surfaces sources.

15. The above situation, however, is undergoing a change due to the increasing dissatisfaction of people in many areas with water supply schemes based on ground water sources. This is mainly caused by the fact that groundwater sources have tended to fail or 'dry up' within a short period requiring the drilling of new sources frequently. Besides necessitating additional investments, the failing sources also cause interruption in water supply for long periods. The water table in most districts of the State is progressively going down in recent years due to unregulated pumping of groundwater through irrigation bore wells. There have also been few attempts at promoting recharge of sources of groundwater through manmade structures like check dams, bandharas, and recharge wells. The overexploitation of groundwater has reached critical levels in many taluks of the State with 21 taluks being classified as 'dark' areas (with over 85 % exploitation) and 22 taluks being classified as grey areas (with over 65% to 85% exploitation). The following table shows the status of ground water exploitation in the taluks considered as critical blocks according to the Department of Mines and Geology.

Table 17.4: Status of Ground Water Development of the Taluks which are considered as Critical Blocks

Sl. No	District	Dark Taluks > 85 %	Grey Taluks > 65 to 85%	Intermediate Taluks > 50 to 65 %
1	Bangalore (Urban)	1. Anekal 2. Bangalore North 3. Bangalore South	1. Doddaballapur 2. Ramanagar	
2	Bangalore (Rural)	1. Channapatna 2. Devanahalli 3. Hosakote		
3	Belgaum	1. Chikkodi 2. Hukkeri	1. Athani 2. Bailhongal	1. Belgaum 2. Gokak 3. Raibagh 4. Soundathi
4	Bellary		1. H.B. Hally	1. H. Hadagali 2. Kudligi
5	Bidar		1. Bidar	1. Humnabad
6	Bijapur	1. Indi	1. Bagewadi 2. Bijapur	1. Mudhol 2. Jamkhandi 3. Sindhagi
7	Chitradurga		1. Challakere 2. Chitradurga	1. Hiriur 2. Jagalur 3. Molakalmuru
8	Dakshina Kannada	1. Bantwal 2. Sulya	1. Belthangadi	1. Puttur
9	Hassan	1. Channarayapatna	1. Arasikere	
10	Kolar	1. Chikkaballapur 2. Kolar 3. Malur	1. Chintamani 2. Gowribidanur 3. Mulbagal 4. Sidlaghatta 5. Srinivasapur	1. Bagepalli 2. Bangarper 3. Gudibande

Sl. No	District	Dark Taluks > 85 %	Grey Taluks > 65 to 85%	Intermediate Taluks > 50 to 65 %
11	Koppal		1. Kushtagi	1. Koppal 2. Yelburga
12	Tumkur	1. Gubbi 2. Madhugiri 3. Tiptur 4. Tumkur 5. Turuvekere	1. Koratagere 2. Kunigal 3. Sira	1. Chikkanayakanahalli 2. Pavagada
13	Davangere			1. Davangere 2. Channagiri
14	Bagalkot			1. Bagalkot
15	Chamarajanagar	1. Kollegal	1. Chamarajanagar	1. Yelandur
16	Haveri			1. Hirekerur 2. Ranebennur 3. Haveri
17	Gadag			1. Naragund

Source: Director, Mines & Geology.

16. The progressive depletion of groundwater sources in the State mainly due to exploitation of this source for irrigation makes it necessary to consider surface water based water supply schemes as the long term solution to the problem of rural water supply in many dry areas of the State. Needless to say that such an approach would call for heavy investment of resources in the sector, particularly in the dry and backward areas over the next ten to fifteen years.

17.5 Water Quality: Fluorosis and Other Issues

17. A more serious, and extremely urgent, dimension of the problem relates to the quality of ground water in many parts of the State. Testing of all ground water in many parts of the State. Testing of all groundwater sources for quality has recently been undertaken by the Rural Development Engineering Department (RDED) between 1999 and 2001 as part of a massive exercise involving over 2 lakh samples drawn from all public sources of rural water supply in the State. These tests have revealed that 20929 habitations are facing quality problems, namely excess fluoride in 5822 habitations, excess iron in 6629 habitations, excess nitrate in 4077 habitations and brackishness in 4401 habitations. Considering the total number of habitations in the state, (i.e. 56682) 37% of the habitations are facing quality problems. While excessive salts and minerals make water brackish and hard, the presence of fluoride beyond 1.5 parts per million is known to cause fluorosis, a condition which results in serious and often non-reversible adverse effects on health including discolouration of teeth, deformation of skeletal bones, and premature ageing. The widespread prevalence of fluorosis is already noticeable in several taluks like Bagepalli in Kolar district, Pavagada in Tumkur district, Mundrgi in Gadag district and parts of Gulbarga taluk. While a detailed analysis of the results of the RDED survey is yet to become available, preliminary indications suggest that drinking water sources in large areas of the districts of Kolar, Tumkur, Chitradurga, Bellary, Gadag, Koppal and Gulbarga have a high level of fluoride

concentration which poses a serious threat to the health and well being of the rural population in these areas.

18. In areas which are known to have serious quality problems relating to ground water, it is necessary for the State to immediately consider provision of water from surface water sources like rivers and tanks, albeit at a relatively high cost. According to information furnished by the Department of Rural Development and Panchayath Raj 50 taluks in the State have high fluoride content in 5 to 30 per cent of the sources of drinking water whereas another 25 taluks have more than 33 per cent of the sources with excess fluoride. These taluks include Kudligi and Siruguppa in Bellary district Kushtagi in Koppal district, Bagepalli and Gudibande of Kolar district and Afzalpur, Aland, and Chittapur of Gulbarga district in which the incidence of fluoride is most widespread.

19. The 17.1 Annexure shows taluks which have high level of fluoride in sources of drinking water categorised as those with (a) scattered occurrence of fluoride (upto 5% of sources), (b) common occurrence of fluoride (6 % to 30% of sources) and widespread occurrence of fluoride (30% and above). Alternatively these taluks may also be treated as moderately affected, severely affected, and most severely affected areas.

20. Technology for removal of fluoride from water is available though it imposes some additional costs. Wherever the incidence of fluoride is in isolated villages such technology should be used for treatment of water. In taluks where the occurrence of fluoride is as high as to affect more than 30 per cent of the sources of drinking water, it is necessary to consider designing special water supply schemes based on safe surface sources. This intervention is urgently called for in the taluks mentioned above in the category of most severely affected areas. As the Draft Water Resources Policy published by State accords the highest priority to using water for drinking purposes surface sources based water supply schemes should be taken up using rivers, canals, Minor Irrigation tanks etc., without any further delay lest the health of the people in the villages be adversely affected on a permanent basis. Similar interventions are also called for in the districts of Dharwar, Raichur, Bellary, and Koppal where a large number of sources are affected by brackishness (high content of salts) in water as shown in Annexure 17.2.

21. It is of some significance to note that among the 30 taluks which are in the category of most severely affected areas in terms of the occurrence of fluoride 23 are classified as backward taluks according to the Comprehensive Composite Development Index developed by the Committee. Similarly 15 out of 25 taluks severely affected by the occurrence of brackishness in ground water are also classified as backward. Even in terms of the functionality of the Rural Water Supply Schemes, there is a great degree of correlation between the backwardness of a district, and high morbidity of water supply schemes as seen in Annexure 17.1 & 17.2. It is therefore evident that many of the backward taluks in the State need to be given special assistance over and above their normal entitlement of development assistance from state / central Government in order to ensure basic facilities like adequate and safe drinking water for the people.

17.6 Financial requirements for Rural Water Supply

22. In order to achieve the goal of providing 55 LPCD water supply in all villages and providing water as per norms to all quality affected habitations, by the year 2005. The requirement of funds as worked out by the Rural Development Panchayat Raj Department, Government of Karnataka for Master Plan period (i.e, 2001-2005) is as follows.

Table 17.5: Financial Requirements for Rural Water Supply

Item category		Amount required (Rs. in Crore)
1	Upgrading all partially covered habitations to a minimum of 55 lpcd supply level	1481.90
2	Providing water as per norms to all quality affected fully covered habitations	1162.07
Total		2643.97

Source : Rural Development and Panchayat Raj

23. The Govt. of Karnataka proposes to meet the cost in a five year master plan period as follows:

Table 17.6: Sources to meet the financial requirements

Item category		Amount required (Rs. in Crore)
1	State [MNP] and Central [ARWS] Sector grants (Rs.2240 million per year)	1200
2	WB assistance for the follow-on project	1000
3	GOI Sector Reforms Projects	200
4	Other Externally Aided Project (DANAIDA, etc)	100
5	Capital Cost sharing by the user community	150
Total		2650

Source : Rural Development and Panchayat Raj

24. User community contribution @ 10 % capital cost is considered only for item no 2, 3 & 5. Additional user community contribution at the end of master plan period when the sector reforms agenda is extended to entire state is expected to meet the costs of additional requirements / shortfalls, if any. At the end of the master plan period, it is expected that the norms of coverage and quality of water supply shall be achieved by adopting a demand responsive approach together with partial capital cost sharing and 100% O & M cost financing by user community.

25. The HPC recommends that about 60% of the total investment in each year for the initial 3 years be spent for implementation of rural water supply schemes in North Karnataka, so as to reduce disparities in water supply in the regions.

17.7 Rural Sanitation

26. Poor sanitation reflects on socio-economic development in rural area. It is one of the most visible signs of backwardness of villages. Sanitation is critical to health and well being which are an important criteria in measuring human development. Promotion of rural sanitation which is a relatively recent phenomenon in the state and country is a significant component in the strategy for rural development. Early initiatives in the field of rural sanitation focused mainly on two aspects i.e, construction of village and storm water drains and provision of community toilets. Though Gram panchayats or Taluka Development Boards / Taluka Panchayats initially shouldered the responsibility of implementing the above activities, their efforts remained sporadic and did not materialize much due to paucity of funds available with them. Thus, access to sanitary latrines remained at a low level in rural areas of the State with only 6.9% of households in the villages having the facility according to 1991 census. Districtwise information is furnished in the following Table.

Table 17.7: Percentage of Rural households having access to toilets

Sl. No.	District	Percentage of rural households having access to toilets
1	Bangalore Urban	18.82
2	Bangalore Rural	6.02
3	Belgaum	4.25
4	Bellary	3.34
5	Bidar	2.66
6	Bijapur	1.34
7	Chikmagalur	14.34
8	Chitradurga	4.47
9	Dakshina Kannada	20.12
10	Dharwad	8.28
11	Gulbarga	2.17
12	Hassan	5.75
13	Kodagu	24.9
14	Kolar	7.05
15	Mandya	6.18
16	Mysore	5.3
17	Raichur	1.92
18	Shimoga	10.07
19	Tumkur	4.27
20	Uttara Kannada	11.92
	State	6.85

Source: Census 1991

27. The districts which have got access to toilets less than the State percentage are Bangalore (rural), Chitradurga, Davanagere and Tumkur districts in Bangalore Division, Hassan, Mandya, Mysore and Chamarajnar districts in Mysore division, Belgaum, Bagalkot districts in Belgaum division, Gulbarga, Bidar, Bellary, Raichur and Koppal districts in Gulbarga division.

17.8 Central Rural Sanitation Programme (CRSP)

28. This programme was taken up at the instance of Government of India in 1985-86 so as to address the issue of rural sanitation in a systematic manner. The focus of the programme was mainly on construction of sanitary latrines, based on Twin Pit Pour Flush (TPPF) Type advocated by the UNICEF, at the household level. Under the provision of programme, subsidy to households below the poverty line (BPL) was given upto 80% of the cost of a sanitary latrines. Similar grants were made available to Panchayats for Construction of Community latrines, particularly for women. In Karnataka, Zilla Panchayats and Gram Panchayats made very significant efforts to implement CRSP, particularly in villages whose water supply position was comfortable. The UNICEF provided both financial assistance and technical guidance. While the CRSP succeeded in making the panchayats focus on latrine sanitation as felt need of people; it could not make a major shift due to certain limitations. The allocation of funds from the Central Government was meagre as compared to the demand. Further, the subsidy was available to BPL families for whom latrine was not a priority. Thus, CRSP resulted in creating only a limited impact in the field of latrine sanitation, with only 1.19 lakh households being assisted under the programme from 1985-90 to 1994.-95.

17.9 Nirmala Grama Yojana (NGY)

29. The Nirmala Grama Yojana was introduced in the State in 1995-96 under the NGY, the Grama Panchayats were made responsible for motivating rural households to build TPPF latrines. Each gram panchayat was encouraged to motivate about one hundred households a years so as to cover over 5 lakh latrines per year in the State. A cash subsidy of Rs. 2000/- per household is given to BPL household and Rs.1,200 to non-BPL household. The launch of NGY has proved a spectacular breakthrough in rural sanitation.

30. Since inception of the programme to the year 1999-2000, in all 753464 rural latrines were built at a total cost of Rs.9170.71 lakhs in the State.

31. Besides, construction of substantial number of household latrines in rural areas is undertaken as part of the Integrated Rural Water Supply and Environmental Sanitation Project funded by the World Bank which is being implemented in 16 districts. Nearly 89,000 latrines have been built under this project since 1993 till August 2000.

17.10 Total Village Sanitation

32. Total village sanitation programme with a focus on promoting integrated sanitation in the villages, represent a major expansions of the scope and dimension of the states efforts to promote rural sanitation in an unprecedented scale. The main problem to be

addressed in this program include the safe disposal of human excreta, sullage and storm water drainage, removal of manure heaps from the vicinity of welling houses, paving of internal roads and streets and providing improved chullas to enable rural households to do their cooking in a smoke free atmosphere.

17.11 Financial Requirements for Rural Sanitation

33. Keeping the above factors in view, the State can realistically aim at a sanitation services coverage of about thirty percent of rural population in a period of five years commencing from the year 2000-01 which would be the first phase of the programme. At the end of the first phase in 2005-06 the State will have about fifty percent of the rural population with access to rural latrine sanitation. This figure is arrived at, taking into account more than ten percent of the population who have already access to sanitation at present, and ten percent of the population would acquire these facilities by their own efforts without any investment from the State. Thus is about 30 to 33 percent of rural population (about 12 millions) have to be provided with sanitation services at per capita cost of about Rs.1500, the total investment would be of the order will have to be made in about 6000 villages of about 2000 population as an average. This would also mean that the total sanitation package could be implemented at least in one village in every gram panchayat in the State.

34. Even though on the face of it, the programme of total village sanitation looks ambitious, the level of investment proposed about Rs.360 crores per year is both feasible and necessary. It is possible to mobilize about 15 percent of these investments from the communities and gram panchayats and the remaining 85 percent needs to be funded by the government (with the assistance of about Rs.160 crores obtained from the HUDCO). The HPC recommends that about 60% of the total investment of Rs.1,800 crore be kept for implementation of the programme in North Karnataka.

Annexure 17.1

Occurance of Fluoride above 1.5 ppm in sources of drinking water in Rural Areas

Sl. No.	District	Taluks with scattered Occurance (upto 10% sources)	Taluks with common occurance (10 to 20% sources)	Taluks with widespread occurance (above 20% sources)
1	Bangalore (R)	Devanahalli (0.00)	Ramanagar (11.83)	
		Hoskote (1.85)	Magadi (13.54)	
		Doddaballapur (2.46)		
		Nelamangala (4.04)		
		Channapatna (4.75)		
		Kanakapura (6.43)		
2	Bangalore (U)	Bangalore (S) (8.18)	Anekal (101.14)	
			Bangalore (N) (19.94)	

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Sl. No.	District	Taluks with scattered Occurance (upto 10% sources)	Taluks with common occurance (10 to 20% sources)	Taluks with widespread occurance (above 20% sources)
3	Bellary		Sandur (11.44)	Hospet (25.20)
				H.B. Halli (30.50)
				Hadagali (36.38)
				Bellary (37.50)
				Kudligi (57.79)
				Sirguppa (68.67)
4	Bagalkote	Mudhol (2.92)	Badami (12.22)	
		Jamakhandi (3.09)	Bagalkote (17.12)	
		Hungund (3.69)	Bilagi (18.77)	
5	Bidar	Humnabasd (0.41)		
		Bhalki (0.43)		
		Basavakalyan (0.43)		
		Aurad (1.78)		
		Bidar (6.51)		
6	Chamarajnar	Chamarajnar (0.26)		
		Gundlupet (0.35)		
		Kollegal (1.94)		
7	Chickmagalur	Chickmagalur (0.18)		
		Mudigere (0.22)		
		Sringeri (0.29)		
		Narasimhrajpur (0.57)		
		Kadur (0.87)		
		Koppa (1.10)		
		Tarikere (1.62)		
8	Chitradurga	Holalkere (8.78)	Molkalmur (11.62)	Chitradurga (22.85)
			Hosadurga (11.92)	
			Challakere (18.75)	
			Hiriyur (19.37)	
9	Gadag	Gadag (2.18)	Shirahatti (16.67)	Ron (30.55)
				Naragund (30.67)
				Mundargi (35.48)
10	Hassan	Arakalgod (0.08)	Arasikere (18.03)	
		Belur (0.09)		
		Alur (0.11)		
		Hassan (0.88)		
		Holenarasiura (0.88)		
		Channarayapatna (1.50)		
11	Kodagu	Somvarpet (0.04)		
		Virajpet (0.10)		
12	Koppal			Gangavathi (24.00)
				Yelburga (32.13)
				Koppal (48.40)
				Kushtagi (53.89)

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Sl. No.	District	Taluks with scattered Occurance (upto 10% sources)	Taluks with common occurance (10 to 20% sources)	Taluks with widespread occurance (above 20% sources)
13	Kolar	Srinivasapura (0.32)	Bangarpet (19.67)	Gudibande (43.66)
		Chintamani (0.41)		Bagepalli (47.39)
		Kolar (1.13)		
		Mulbagil (1.53)		
		Gowribidnur (2.02)		
		Chickballapur (6.57)		
		Malur (9.51)		
14	Mandya	Nagamangala (0.49)		
		Pandavapura (1.16)		
		Malavalli (3.32)		
		K.R. Pet		
		Srirangapatna (3.70)		
		Maddur (5.89)		
		Mandya (6.57)		
15	Shimoga	Shimoga (0.17)		
		Soraba (0.41)		
		Shikaripur (1.63)		
		Sagar (2.32)		
		Hosanagara (2.51)		
		Thirhahalli (3.94)		
16	Raichur	Deodurg (2.17)	Manvi (10.50)	Sindhaur (26.14)
		Raichur (8.33)		Lingasugur (29.56)
17	Haveri	Hanagal (0.12)	Ranebennur (15.26)	
		Byadagi (0.95)		
		Savanur (6.12)		
		Hirekerur (9.26)		
18	Gulbarga	Shorapur (1.85)	Yadgiri (10.91)	Jevargi (36.26)
				Gulbarga (37.47)
				Afzalpur (64.77)
				Aland (71.43)
				Chincholi (75.32)
				Chittapur (94.51)
19	Davanagere	Honnali (4.21)	Davanagere (15.48)	Jagalur (32.00)
		Chennagiri (6.51)		Harappanahalli (32.43)
20	Mysore	H.D. Kote (2.13)		Harihar (46.43)
		Nanjangud (2.91)		
		Mysore (4.62)		
		T. Narasipur (5.29)		

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Sl. No.	District	Taluks with scattered Occurance (upto 10% sources)	Taluks with common occurance (10 to 20% sources)	Taluks with widespread occurance (above 20% sources)
21	Belgaum	Belgaum (0.13)	Gokak (10.19)	
		Raibagh (0.25)	Ramdurga (12.96)	
		Khanapur (0.70)		
		Bailahongal (0.99)		
		Hukkeri (3.18)		
		Soundatti (5.43)		
		Chikkodi (5.85)		
		Athani (6.01)		
22	Udupi	Kundapur (0.36)		
		Karkala (0.46)		
23	D. Kannada	Mangalore (0.11)		
24	Tumkur	Kunigal (0.13)	Kortagere (16.02)	Madhugiri (34.58)
		Tiptur (0.57)		Pavagada (65.52)
		Turuvekere (3.31)		
		Sira (4.34)		
		C.K. Halli (7.05)		
		Gubbi (7.21)		
		Tumkur (8.94)		
25	Bijapur	Bijapur (0.36)	B. Bagewadi (10.78)	Muddebihal (48.40)
		Indi (3.47)		
		Sindagi (4.37)		
26	Dharwad	Kalghatagi (0.36)		
		Hubli (2.65)		
		Dharwad (6.85)		
		Navalgund (7.14)		
27	Uttara Kannada	Kumta (0.16)		
		Yellapur (0.18)		
		Honnavar (0.21)		
		Bhatkal (0.29)		
		Haliyal (0.69)		
		Karwar (1.46)		
		Joida (3.03)		

Annexure 17.2

List of Taluks (districtwise) affected by Brackishness in drinking water sources

Sl. No.	District	Taluks with less than 10% sources with brackish water	Taluks with more than 10% but less than to 20% sources with brackish water	Taluks with more than 20% sources with brackish water
1	Bangalore (R)	Magadi (0.32)		
		Devanahalli (0.51)		
		Ramanagar (1.38)		
		Kanakapura (1.48)		
		Dodaballapur (1.50)		
		Nelamangala (4.04)		
		Channapatna (6.59)		
		Hoskote (8.77)		
2	Bangalore (U)		Bangalore (S) (12.18)	
			Bangalore (N) (14.77)	
			Anekal (18.91)	
3	Belgaum	Khanapur (0.70)	Bailahongal (11.01)	Athani (22.26)
		Belgaum (1.95)	Ramadurga (12.17)	
		Hukkeri (2.86)	Gokak (13.91)	
		Soundatti (3.79)		
4	Bellary	Hadagali (8.15)	Kudligi (18.24)	Sandur (20.11)
				H.B. Halli (20.44)
				Hospet (20.73)
				Bellary (32.14)
				Siriguppa (48.67)
5	Bidar	Basavakalyan (0.65)		
		Humnabad (1.62)		
		Bhalki (3.20)		
		Bidar (3.67)		
		Aurad (5.98)		
6	Bijapur		Sindagi (13.61)	Muddebihal (21.76)
			Indi (19.12)	B. Bagewadi (23.58)
				Bijapur (25.84)
7	Bagalkote		Hunagund (10.34)	Jamakhandi (23.09)
			Bilagi (13.65)	
			Bagalkote (16.49)	
			Mudhol (18.83)	
			Badami (19.07)	
8	Chamarajnar	Gundlupet (0.26)		
		Kollegal (2.26)		
9	Chickmagalur	Tarikere (0.74)		
		Kadur (3.05)		
		Chickmagalur (4.73)		

Continued...

Sl. No.	District	Taluks with less than 10% sources with brackish water	Taluks with more than 10% but less than to 20% sources with brackish water	Taluks with more than 20% sources with brackish water
10	Chitradurga		Molkalmur (14.53) Challakere (15.32)	Chitradurga (20.49) Hiriyur (21.63) Holalkere (24.25) Hosadurga (30.92)
11	D. Kannada	Mangalore (0.26)		
12	Davanagere	Honnali (5.43) Chennagiri (7.52) Harihar (9.43)	Harapannahalli (10.71) Jagalur (17.14) Davanagere (19.33)	
13	Dharwad	Kalghattagi (4.80)	Dharwad (10.48) Hubli (12.12)	Navalgund (52.23) Kundagol (25.95)
14	Gadag	Mundargi (7.53) Shirahatti (9.84)	Gadag (18.56)	Ron (22.72) Naragund (25.33)
15	Gulbarga	Chincholi (0.18) Aland (0.61) Sedam (0.79) Chittapur (1.27) Gulbarga (1.61) Jevargi (1.98) Shorapur (3.69) Shahapur (5.64) Afzalpur (6.78) Yadgiri (9.21)		
16	Hassan	Alur (0.55) Hassan (1.04) Belur (1.47) Arakalgod (2.12) Arasikere (5.33) Channarayapatna (5.71) Holenarasipura (6.18)		
17	Haveri	Byadagi (3.81) Hirekerur (4.63) Ranebennur (7.98)	Shiggaon (18.94)	Savanur (35.90)
18	Kolar	Siddlagatta (3.05) Bagepalli (4.37) Chintamani (4.52) Bangarpet (5.03) Chickballapur (5.66) Srinivasapura (5.78) Malur (5.91) Gudibande (6.34) Gowribidanur (6.70)	Kolar (10.45) Mulbagal (11.44)	

Continued...

Sl. No.	District	Taluks with less than 10% sources with brackish water	Taluks with more than 10% but less than to 20% sources with brackish water	Taluks with more than 20% sources with brackish water
19	Koppal		Gangavathi (13.63)	Koppal (22.70)
			Kushtagi (15.19)	
			Yelburga (19.00)	
20	Mandya	Pandavapura (7.71)	K.R. Pet (10.37)	Maddur (22.75)
		Nagamangala (8.92)	Malavalli (12.20)	
			Srirangapatna (17.48)	
			Mandya (19.24)	
21	Mysore	H.D. Kote (1.12)	T. Narasipur (10.39)	Hunsur (21.05)
		Periyapatna (5.53)	Mysore (13.63)	
			Nanjangud (14.17)	
			K.R. Nagar (18.55)	
22	Raichur	Deodurg (7.17)	Raichur (10.59)	Sindhanur (27.84)
			Lingasugur (16.41)	Manavi (28.72)
23	Shimoga	Shioga (9.34)		
		Bhadravathi (9.95)		
24	Tumkur	Tumkur (1.31)	Sira (10.93)	Madhugiri (37.63)
		Turuvekere (2.08)	C.K. Halli (11.79)	
		Gubbi (4.02)	Kunigal (12.51)	
		Kortagere (4.26)	Tiptur (14.89)	
			Pavagada (18.44)	
25	Udupi	Udupi (0.06)		
		Kundapur (0.06)		
26	Uttara Kannada	Haliyal (0.46)		
		Sirsi (0.54)		
		Honnavar (0.64)		
		Ankola (0.90)		
		Kumta (1.46)		
		Bhatkal (2.06)		
		Karwar (4.37)		
		Mundagod (4.97)		
		Joida (7.93)		