J Hum Ecol, 39(3): 255-259 (2012)
PRINT: ISSN 0970-9274 ONLINE: ISSN 2456-6608 DOI: 10.31901/24566608.2012/39.03.09

Water Conservation, Management and Safe Drinking Water in the Villages of Karnataka State

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KEYWORDS Water. Sources. Water Borne Diseases. Water Management Practices

ABSTRACT The importance of water is next to oxygen in living beings, particularly human beings. Human body consists of two-third of water and every day one must replace five percent of it. The present research is planned to study the water resources, its quality and its management in the rural areas of Karnataka state. Five villages, namely Nigadi, Hebballi, Nayakana Hulikatti, Kavalageri and Uppinbetageri in Dharwad taluka were selected for the study. Twenty families from each village were randomly selected thus making the total sample to 100 households. A structured interview schedule was used for data collection on sources of water, storage and consumption methods and safety measures used for potable water. Majority of respondents used tap water (91 per cent) as the principle source for domestic purposes, and it was available free of cost. Bore wells were the subsidiary source of water to majority of the respondents. More than 80 per cent of the respondents reported that the water management activity was very time demanding for domestic purposes. Highest percentage of respondents (80 per cent) opined that the bore well water used for domestic purposes was clear, but hard and it was undesirable for drinking. At community level, chlorination was done for drinking water sources as reported by 72 percent respondents. All the respondents were aware of water saving tips like the taps should be closed after using, surroundings of the water source should be kept clean and consume water after filtering or boiling.

INTRODUCTION

Water, the elixir of life! Alas, today this phrase remains a misnomer. The importance of this elixir of life is known to one and all. People in several parts of India face an immense challenge to meet the basic needs of water (Delhi Greens). The crisis is not due to the lack of fresh water as such, but the availability of adequate quality water at the right place and time to meet basic needs. The importance of water is next to oxygen as the human body has two-third of water and every day one must replace five percent of it.

World Health Organization has recommended 135 litre / capita / day. Safe drinking water supply and basic sanitation are vital human needs for health and efficiency. Every year diseases and death, particularly of children and drudgery of women, are directly attributable to lack of quality water in adequate quantity. Every year more than five million human beings die from illness linked to unsafe drinking water and sanitation (Delhi Greens).

Improved access to safe water supply and appropriate sanitation can enhance the economic status, mainly through saving large amounts of people's time, money and energy. It is a matter of concern that despite the progress made with water supply, the level of water-related sickness continues to be high. As high as 70-80 per cent of illnesses are related to water contamination and poor sanitation (Delhi Greens). Main diseases associated with water contamination are diarrhoea, ascariasis, dracunculiasis, hookworm, schistosomiasis, trachoma, typhoid, paratyphoid, bacillary dysentery, cholera, poliomyelitis, etc. These diseases consume a lot of time and money for medical attention and medicines. In India, the economic burden due to morbidity and mortality from these diseases is staggering. The resources saved by improved water supply and sanitation can be used in many economically productive or educational activities (Delhi Greens).

During the last few decades the national policies have shown increasing emphasis on both rural and urban water supply and sanitation (Delhi Greens). In terms of physical progress, the achievements have been remarkable. In rural context, however, unfortunately these efforts have not been seen to be converted into health benefits and water borne diseases continue to be the dominant cause of morbidity and mortali-

ty in many parts of the country. The reasons are fairly very obvious, though water is being supplied; its potability is not being ensured. The lack of Water Quality Surveillance in these areas is acutely brought into focus during the episodes of waterborne epidemics (Delhi Greens).

The present research was planned to study the water resources, their quality and their management in the rural areas of Karnataka state with the following specific objectives, so that appropriate educational measures can be planned for water conservation and management for the rural population.

Objectives

1. To study the sources of water available and used by the rural families in the selected villages.
2. To study the quality of water used by rural households as assessed by them for various purposes.
3. To study the various sanitation measures taken at community level and domestic level.
4. To assess the awareness and knowledge level of rural respondents on water usage.

MATERIAL AND METHODS

Five villages, namely Nigadi, Hebballi, Nayakana Hulikatti, Kavalgeri and Uppin Betageri in Dharwad taluka were adopted under the All India Coordinated Research Project on Home Science to study the resource management practices adopted by the rural families. Twenty families from each village were randomly selected covering all socio-economic strata thus making the total sample to 100 households in the villages during 2007-08.

An interview schedule developed under the Project was used for data collection on source of water, storage and consumption methods and safety measures used for potable water covering the above mentioned objectives. The information was collected from both men and women of the selected families in an informal atmosphere by explaining each question in the local language. The data are presented in the frequency and percentage form.

RESULTS AND DISCUSSION

Information pertaining to principle and subsidiary sources of water is presented in Table 1. Majority of respondents used tap water (91 per cent) as the principle source, and it was available free of cost to majority of the families (54 per cent), while 37 per cent of the selected respondents paid money for water. Nearly 82 percent of the respondents used bore well water as a subsidiary source and 11 percent of respondents used it as a principle source. The bore well water was freely available to 93 percent families. Similar observations are made by Anu and Singal (1996), that is, respondents used community taps (48.33 per cent), hand pumps (46.66 per cent) and wells (36.66 per cent) as sources of drinking water in their study on sanitary facilities available in rural areas of Haryana state. A survey conducted by Government of India (2005) revealed that taps were the major source of drinking water for as many as 77 per cent of rural households in Tamil Nadu, 60 per cent in Karnataka, 58 per cent in Gujarat and 54 per cent in Andhra Pradesh.

Table 1: Principal and subsidiary sources of water (N=100)

Water	*Principal source (%)*	*Subsidiary source (%)*	*Availability*	
			Free (%)	*Purchased (%)*
Taps	91.00	-	54.00	37.00
Wells	-	-	-	-
Bores	11.00	82.00	93.00	-
Irrigation channels	-	-	-	-
Tanks	-	-	-	-
Any other	-	-	-	-

Table 2 shows the various water sources and their usage in the adopted villages. More than 90 percent of the respondents used bore well water (93 per cent) and tap water (91 per cent) for domestic purpose. Tap water was sufficiently available for 88 per cent of the respondents whereas very less percentage of respondents told that the availability of tap water was insufficient (2 per cent) and surplus by 1 per cent of the respondents. The bore well water was sufficiently available to all the respondents for domestic purpose. Only 16 and 7 per cent of the families used bore well water and tap water for animals respectively and it was sufficient for use.

Table 2: The various water sources and their usage in the adopted villages (N=100)

Purpose	*Sources of water (%)*			*Availability status (%)*					
	Taps	*Wells*	*Bores*	*Insufficient*		*Sufficient*		*Surplus*	
				Taps	*Bores*	*Taps*	*Bores*	*Taps*	*Bores*
Agriculture	-	-	8.00	-	5.00	-	3.00	-	-
Domestic	91.00	-	93.00	2.00	-	88.00	93.00	1.00	-
Animal	7.00	-	16.00	-	-	7.00	16.00	-	-
Poultry	-	-	-	-	-	-	-	-	-
Caste occupations	-	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-	-
Brick	-	-	-	-	-	-	-	-	-
Any other	-	-	-	-	-	-	-	-	-

Table 3: Purpose and time demand on water resources in the adopted villages (N=100)

Purpose for which water is used	*Time Demand*				
	Very demanding >120litre	*Demanding 90-120litre*	*Moderately demanding 60-90litre*	*Less demanding 30-60litre*	*Very less demanding <30litre*
Agriculture	8.00				
Domestic	86.00	14.00			
Animal	3.00	1.00	3.00	9.00	
Poultry					
Caste occupations					
Construction					
Brick					
Any other					

5-Very demanding, 4-Demanding, 3-Moderate, 2-Less demanding, 1-Very less demanding

Bore well water was used by 8 per cent of the respondents for agriculture purpose and it was insufficient to 5 per cent of the respondents and for 3 per cent of the families it was sufficiently available. Similar results were revealed in the survey conducted by Government of India (2005) that 89 per cent of households got sufficient drinking water in rural and urban areas. A study by Deshpande et al. (2007) revealed that the main problem perceived was scarcity of water by 81.6 per cent, especially in summer.

Table 3 explains the purpose and time demand on water resources in the adopted villages. As per Table 3, about 86 per cent of the respondents reported that the water management activity was very much time demanding for domestic purposes with water requirement of more than 120 litres in a day followed by 14 per cent expressing it as demanding activity which required water for 90-120 litres per day. For agriculture purpose only 8 per cent of them reported that the water management activity was very much time demanding (120 litres /day). Only 9 per cent respondents expressed that it was less demanding in animal related activities with water requirement of 30-60 litres in a day. This was followed by moderately demanding and very demanding activity with the water requirement of 60-90 litres and more than 120 litres per day respectively. Only 1 per cent of the respondents expressing that water management activity was demanding (90-120 litres/day) activity for animal related activities. Deshpande et al. (2007) was also made similar observations that on an average, it took 1.25 hrs. per day to collect water in more than half (58 per cent) of the households.

Quality of water as perceived by the respondents was presented in Table 4. Only 8 per cent of respondents used bore well water for agriculture purpose and only 3 per cent said that it was desirable for consumption and 5 per cent of the respondents expressed that it was undesirable for consumption. Bore well water was hard water as expressed by all (8 per cent) the users in agriculture purpose. Highest percentage of respondents (93 per cent) said that the bore well water used for domestic purpose was clear, but

Table 4: Quality of water available in the selected villages as assessed by the selected sample (N=100)

Purpose	*Water*		*Turbidity*		*Desirability*		*Hardness*	
	Source	*Clear*	*Turbid*	*Sedimented*	*Desirable*	*Un-desirable*	*Soft*	*Hard*
Agriculture	Bore	8.00			3.00	5.00		8.00
Domestic	Tap	91.00			91.00		91.00	
	Bore	93.00			33.00	60.00	12.00	81.00
Animal	Tap	7.00			7.00		7.00	
	Bore	9.00				9.00		9.00
Poultry								
Caste occupations								
Construction								
Brick								
Any other								

81 percent expressed that it was hard and 60 per cent reported the bore water they use was undesirable for drinking. Only 33 per cent said that the bore water they use was desirable for drinking purpose. All 91 per cent respondents using tap water for domestic purposes reported that the water is clear, desirable for drinking and soft. Similar observation is made by the 7 per cent respondents who use tap water for animal activities. Nine per cent respondents opined that the bore well water used for animal purposes was clear but undesirable for human consumption and hard. Srikanth (2009) revealed that iron, hardness and salinity impart on unpalatable taste to water, making it unfit for drinking. Hardness is mainly caused by the presence of carbonate, bicarbonate, chloride and sulphate salts of calcium and magnesium in water.

Table 5 presents the awareness of the respondents about different sanitation measures taken at community level and domestic level. At community level, chlorination was done for drinking water sources as reported by 72 per cent respondents, followed by cleaning of water tanks as reported by 25 per cent respondents. Majority of the respondents filtered the water by using a clean cotton cloth (82 per cent) as sanitary measure at domestic level and about 30 per cent of them reported that they were adopted boiling of water for safe drinking purpose. The study conducted by Adhikari (1998) reported that 86 per cent of the families boiled the water and only 14 per cent of the families filtered it with lime or alum before use for drinking purposes. Filtration by cloth or plastic sieve was only water purification method known and practiced by the households of Palwa village in the study conducted by Deshpande et al. (2007) which supports the results of present study.

Table 5: Awareness about different sanitation measures taken at community level and domestic level in the selected villages (N=100)

S. No.	*Sanitation measures taken*	*Yes*	*No*
	Community Level		
1.	Chlorination	72.00	28.00
2.	Filtering	1.00	99.00
3.	Cleaning tanks	25.00	75.00
	Domestic Level		
1.	Filtering	82.00	18.00
2.	Boiling	30.00	70.00
3.	Using water purifiers/ Aqua guards	0	100
4	Sedimenting	0	100
5	Indigenous methods (specify)	0	100

Awareness and knowledge on the tips to save water for domestic and agriculture consumption are depicted in Table 6. All the respondents were aware of the first tip that is, 'taps should be tightened after using'. More than 80 per cent of the respondents were aware of the tips like 'surroundings around the water source should be kept clean' (89 per cent) and 'consume water after filtering or boiling' (84 per cent). About 65 per cent were aware that 'the use of leaked pipes should be avoided' and only 12 per cent were aware that 'digging pits or repairing tanks for rain water storage is essential'. Among the known respondents maximum respondents used these water management tips in their daily life. Almost 94 per cent respondents practiced the tightening of tap after usage. Consuming water after boiling or filtering and keeping the surroundings of water source clean were practiced by 75 and 74 per cent respondents respectively. About 50 per cent respondents avoided the use of leaked pipes. Only 12 percent respondents used the water from kitchen can be diverted to kitchen garden.

CONCLUSION

Majority of the respondents used taps as principal source of water and bore wells as subsidiary source of water for domestic purpose and reported that water was sufficiently available. The clear and soft tap water was desirable which was accepted by more than 90 per cent of the respondents for domestic purpose. But the bore water was clear, but undesirable for consumption and hard as noticed by maximum respondents. At community level, chlorination was done for drinking water. Majority of the respondents filtered the water as sanitary measure before collecting for domestic use. All the respondents were aware of basic tips for saving water and were practicing most of the water management tips in their routine life. Access to safe drinking water depends not only on the water source but also on quality and storage practices. Sufficient quantity of water is required to get rid of pathogens and maintain sanitation. Thus, the perceived problem of insufficient water also demands attention. This study highlights the need for education of rural masses in methods of water purification, storage of water and conservation of rain water for better living.

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