

Research Paper :

Availability and management of water at household level in Jaipur city

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ABSTRACT

The study presents the availability and management of water at household level in the walled city (old city) of Jaipur, Rajasthan. The study also throws light on the effect of selected variables on the consumption of water. The study reveals that the majority of households were dependent on Municipal tap connections and water was available for 2-3 hours once in a day in a very erratic manner. The mean water availability was 350 litres per household per day with standard deviation of 18.97. The households with private bore wells had more availability of water. The consumption of water was found to be 66 litres per person per day. Besides, 60 per cent of households were not adopting any means of water conservation. The family income and type of family were found to be affecting the household water consumption. The study emphasizes the dire need to take corrective action at various levels.

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Water, a gift of nature, is a prime necessity for human survival and sustenance of civilization. Water is required for almost all human activities. At household, it is consumed for numerous purposes such as drinking, cooking and for sanitation. Water, the need of life, is posing a serious challenge on account of an increasing demand due to population rise, rapid urbanization, economic development and change in life style. Estimates reveal that by 2020, India's demand will exceed all sources of water supply (ADB Review, 2006-2007). Water is the most vital natural resource and is becoming scarce. The situation is very grim and alarming and calls for collective and collaborative efforts to conserve it for human survival. The scarcity of water leads to social conflicts and tension and also hampers development.

The state of Rajasthan is the largest and driest state in the country covering an area of 34.27 million hectares, which is more than 10 per cent of the total geographical area of the country and having 5.4 per cent of the nation's population. However, it has less than 2 per cent of the water resources of the country. The livestock population is as high as 18.7 per cent of the country's livestock population. The position is depicted in the following Table 1.

The study attempted to find out the availability and management of water and also to understand the differential water consumption at the household level. The hypothesis of the study was that there will be no difference in the consumption of water in the households in respect of family income, family type, education of women and the number of taps in the house.

Table 1 : Geographical area of Rajasthan

State parameter	Per cent share in nation's parameter
Area	10.40
Population	5.40
Livestock	18.70
Cultivable area	13.88
Surface water	1.67
Ground water	1.70

(Source: Report of Expert Committee on Integrated Development of Water Resources, June, 2005)

Area of the study :

Jaipur, the capital of Rajasthan and a major tourist destination was selected for the study. It is one of the fastest growing cities of India. In the city, while the demand for water is increasing due to multifarious reasons, its availability is decreasing. Ramgarh Lake, situated 34 kms from the city, which was once the major source of surface water, has dried up now. Due to the unavailability of surface water, Jaipur has to depend on ground water resulting in lower water table. In fact, the city is facing an acute shortage of water.

METHODOLOGY

Population and sampling :

The city is divided into two parts, namely walled city and outer city. The walled city, which is the old city, was selected as the study area due to the following reasons:

- Acute water scarcity,
- Dense population,
- Low water table, i.e. 20-40 metres,

- Depleting water sources.

One ward of the walled city was randomly selected. The ward had 3,645 households with a population of 16,850 persons. The list of households was obtained from Jaipur Development Authority. A sample of 150 households was drawn from this list by systematic random sampling technique.

Households are the prime unit of water consumption and women are the custodian of households. The relationship between water and women is life itself. From daybreak to sunset, women deal with water in bathing, cooking and washing (Francis, ADB Review, 2006-2007). Hence, women of the households were taken as respondents.

Tools and techniques of data collection:

Both primary and secondary data were used for the study. Secondary data were obtained from the records of Ground Water Board, Jaipur, Jaipur Development Authority, Public Health and Engineering Department and Census Office. The primary data were collected through validated and pre-tested semi-structured interview schedules developed for the purpose.

FINDINGS AND DISCUSSION

The results obtained from the present investigation are presented below :

Household profile:

The household provides shelter to the occupants while water gives life. It is the lifeline of the house: almost every chore at household needs water. The productivity and efficiency of its members, especially women, suffer when water services are poor in the households. As the type of household could have a direct bearing on the consumption of water, the profile of the sampled households was studied.

Nearly three fourth of repondents (72 per cent) were from general caste. Almost a similar percentage (74.7 per cent) belonged to medium sized (5-8 members) families. More than half (52 per cent) had a monthly family income of above Rs 20,000. Four fifth (79.3 per cent) of the women were housewives. About half (54.7 per cent) had an education of Secondary or Senior Secondary level. Majority of the households (50.7 per cent) had two wheelers whereas 16 per cent had both two wheelers and four wheelers and the same percentage had no vehicle. Besides, 16 per cent of households possessed livestock.

Water management :

For the present study, water management refers to

the availability, storage, consumption and conservation of water at household level. The following paragraphs cover these different aspects.

Availability of water:

It was found that as many as 83 per cent of the sampled households had Municipal water supply in the form of tap connections in their houses whereas only 13 per cent had their own bore wells. The remaining 4 per cent of households were fetching water from Municipal community taps. Madari (2007) also reported that 77 per cent of households in the cities of Sholapur and Gulbarga were dependent on tap connection for water supply.

The Municipal water supply was for 2-3 hours per day in a very erratic manner causing inconvenience to inmates, especially women. The women mitigate this situation by investing their own time, energy and money that could be better spent if the proper Municipal water supply was in place. Besides, a few were forced to get paid water tankers during summers. The cost of a water tanker was Rs. 200-250 /1000 litres.

As far as the daily availability of water is concerned, it was noted that mean daily supply of water per household was 350 litres with standard deviation of 18.97. A little more than half (52.7 per cent) received 300-500 litres and one fifth received 500-700 litres of water per day and the remaining received less than 300 litres. It was observed that the households with own bore wells were found to be having more access to water. These households were affluent in terms of household resources. It seems that affordability and accessibility goes hand in hand as far as water is concerned.

Storage of water:

The study reveals that the Municipal water supply was only for 2-3 hours per day. As water is required to perform various household chores from dawn to dusk, its storage is utmost necessary to provide water security to the inmates throughout the day. The adequate and proper storage of water not only enhances the water security but also maintains its quality. Wide variation was observed in the manner in which water was stored at the households.

Households employed multiple methods for storing water used for drinking. The most popular method was an earthen pot called Matka followed by buckets, either of plastic or metal. To maintain the quality of water, the vessel in which the water was stored was cleaned. The frequency of cleaning was daily in respect of 30 per cent of the respondents while less than half (47.3 per cent) cleaned the vessels once in two days.

The quality of water is a matter of great concern. As poor quality of water leads to waterborne diseases, the respondents adopted different methods of purification of water. Only one-tenth of them boiled water before use, while the majority used plain cotton cloth for filtration and one-sixth had water filter at their disposal. The remaining respondents informed that no method of purification was generally used.

At the households, water is also required and stored for purposes like bathing, washing clothes and utensils and other allied activities. As the quality of water is not a big issue to perform these household chores, the major means adopted for storing water were cement tanks followed by plastic tanks and buckets. Underground tanks were used by a very few households (6 per cent).

Water consumption :

In the households, water is used by one and all throughout the day. It has become most precarious resource to be used economically. Its consumption depends on availability, characteristics of the households and also habits of inmates relating to use of water. The present investigation depicts that there was a wide variance prevailing as far as water consumption per household is concerned.

It was observed that the households consumed between 200-600 litres of water daily. The mean water consumption was found to be 327 litres with standard deviation 101.78. Among the various activities, washing of clothes and utensils were found to be the most intensive water consuming activities. The activities like cleaning of house, cleaning of vehicles and watering of plants consumed relatively less water. An attempt was also made to calculate the per capita water consumption and it was found to be 66 litres per capita per day (lpcd).

According to Bureau of Indian Standards (BIS) 135 lpcd water is needed to lead a hygienic existence. It is clear that consumption of water is much lower and just

half of what is recommended. A similar finding was shown by Shaban and Sharma (2007) that the average per capita water consumption (92 lpcd) in Indian cities is far lower than the norms of BIS. Compared internationally, Indian cities consume less water. For example, domestic water consumption is 130 lpcd in Munich, 156 lpcd in Amsterdam and 162 lpcd in Singapore (Down to Earth, 2005). It was seen that only 24 households (16 per cent) were having livestock and on an average consumption of water on them was 17 litres per day.

Differential water consumption :

Water consumption of each household is different. It depends on various factors. In the present study the consumption of water was analysed in relation to the income of the family, educational level of respondents, family type and number of water taps available at the household. One-tailed ANOVA test was used for the purpose. The results are given in the Table 2.

The calculated value of F is more than the table value of F, in case of family type and family income. Hence, there is a statistically significant effect of the type of family (nuclear or joint) as well as family income on consumption of water. Further, as the calculated value of F is less than the table value in respect of number of taps and level of education, the number of taps in a household and the level of education had no significant effect on the consumption of water.

The effect of income of the family on the consumption of water could be explained by the fact that richer families could afford private bore wells and also purchase water whenever required. As regards type of family, sharing of many household chores would have resulted in lesser consumption of water as compared to nuclear families. As the joint families are now yielding to nuclear families, the pressure on water resources is increasing to alarming proportions.

Table 2 : Water consumption of each household

Sr. No.	Independent variables	Dependent variables	Source of variance	Degree of freedom	Sum of squares	Variance	F Ratio	Table value of F at 5 per cent
1.	Monthly income of family	Consumption of water	Between sample Within sample	$V_1=4-1=3$ $V_2=16-4=12$	1603.25 1482.5	534.44 123.54	4.236*	3.49
2.	Education	Consumption of water	Between sample Within sample	$V_1=4-1=3$ $V_2=16-12=4$	1587.25 2010.5	529 167.54	3.17**	3.49
3.	Number of taps	Consumption of water	Between sample Within sample	$V_1=4-1=3$ $V_2=16-4=12$	1464.65 2115	488.25 175.25	2.77**	3.49
4.	Type of family (nuclear and joint)	Consumption of water	Between sample Within sample	$V_1=4-1=3$ $V_2=16-4=12$	1502.12 1404.05	499.051 12.51	4.126*	3.49

* Significant ** Non significant

Conservation of water :

The conservation of water is need of the hour. Every drop of water is needed to be conserved for the present as well as future generations. The sole purpose of conservation of water is to make it available for the future use. It can be achieved by minimizing its consumption. The right practices of use of water helps in saving water. Therefore, this aspect was also made a part of the study.

The data in this regard reveal that nearly 60 per cent (59.3 per cent) of the households were not adopting any means of water conservation while one fourth (26 per cent) were reusing the water, whenever it was possible. It was reported that after washing clothes, water was reused by them for cleaning the house and similarly, after washing vegetables and fruits, the water was reused in watering plants. About one tenth of households (13.3 per cent) reported that they consumed water very economically. They were conscious of the fact that it is a very valuable resource and getting scarce. Rain water harvesting was adopted by a negligible percentage of households (1.3 per cent).

Conclusion :

Water, the lifeline of every household, had a wide variance in terms of its management and conservation. The affluent families had more access to water by having private bore wells. The per capita daily consumption of water was found to be just half of the recommended amount of water needed to lead a hygienic human existence by BIS. Low consumption of water is due to the fact that the study area never had water in abundance. Therefore, people of the area are in the habit of using less water. Secondly, there is limited supply of water by the Municipality. Hence there is no choice but to lead life with the available water. Drinking water needs to be stored in a much better way as merely cotton cloth filter is not sufficient. Every year, thousands of people fall prey to water borne diseases. Although the Municipality treats water for certain prescribed norms before supplying for consumption purposes, yet during distribution, it may get

contaminated. Hence, second treatment is inevitable at household level to make it safe for drinking. Although practices relating to consumption of water are satisfactory, yet there is scope for improvement. Rainwater harvesting needs to be propagated in a big way. After all, water is a precarious natural resource and is required for the survival of man kind and cannot be produced but can only be conserved and managed.

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