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## Improving Water and Sanitation Infrastructure in Rural Punjab

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### Abstract

*Punjab state is rich in water resources but the drinking water supply is facing acute problems. A survey was carried out with the objective to highlight the water supply and sanitation problems in rural households and analyze their socio-economic implications. For this purpose 35 villages were taken from different agro-climatic regions. Apart from serious water contaminations, it is commonly observed that standing water in the village ponds and otherwise is the source of breeding mosquitoes and fleas and ultimately cause of many diseases.*

*The study carried out through RRA revealed that the overall annual average water requirements of water 432 lit/day for scheduled caste and 658 lit/day for other categories. It was 33% higher during summer season and minimum during rainy season. About 7% was used for human drinking and cooking, 45% for washing of cloths & bathing, 43% for livestock purposes and 6% for other purposes such as cleaning of houses and washing of vehicles. The regression analysis carried out for village level data showed that the size of scheduled caste population, livestock number and availability of private assured water supply in the house came out to be the major determinants of water usage.*

*The major source of drinking water was hand pump, which was reported by 71% households. In case of scheduled caste and other households, 60% and 78% depended partly/wholly upon this source respectively. The public hand pump, being an important source in semi-hilly areas accounted for overall only 6% households. Private piped water supply was available with 26% and 33% households and public stand-post as 20% and 6% households belonging to scheduled caste and other categories respectively. Tubewell, canal water, kuhls were reported as some other sources of domestic water. On the farm houses, tubewell is the main source of water supply.*

*A majority of panchayats were willing to undertake the responsibility of O& M of rural water supply if commissioned by the government. By improving water supply expansion of dairy enterprise in terms of number of animals, increase in average milk yield per animal, increase in area under kitchen gardening, lessening of human and animal health hazards increase in employment, income and overall quality of life was specified. Strong public support is needed to improve the drinking water supply and sanitation aspects in rural areas of Punjab.*

### Introduction

The word 'Punjab' is comprised of Persian word *punj* (five) and *pani* (water). Therefore, the Punjab state is the land of five rivers (Satluj, Beas, Ravi, Chenab and Jhelum) and being located at the base of Himalayas is originally rich of water and soil resources. However, with the partition of Punjab in 1947, almost half of water resources were shared by Pakistan Punjab. Within the state, climatic conditions vary widely from one area to the other. The region located at the foothills, viz. part of Gurdaspur, Hoshiarpur and Ropar has higher rainfall and undulating topography. The water table of the area is low

and the soil is rocky. The pumping out of water is costly not only for irrigation but also for domestic use. The south-western districts namely Bathinda, Ferozpur, Faridkot, Mansa, Abohar and part of Sangur depend mainly on canal water because underground water is brackish and thus unfit for irrigation and drinking purposes. The rest area covered under central districts of the state has sweet water but is densely populated and has slum localities. Realizing the severity of the problem, the state government through Public Health Department has identified water scarcity villages, the number of which has steadily increased. The schemes of drinking water supply were commissioned in 16% of total number of 12245 villages in 1980 and subsequently work initiated in 11755 (96%) villages in 2011. Yet the problem of drinking water continues to persist in majority of villages.

Another associated aspect having deep bearing on human health is the sanitation. It is commonly observed that the standing water in the villages in the form of ponds and otherwise is the source of breeding mosquitoes, fleas and a cause of a number of diseases such as cholera, diarrhea, typhoid, malaria etc. The supply of additional water in the absence of suitable drainage system adds to the existing problem of water disposal. Therefore, it was considered important to highlight the intensity of problem, its implications for the society and perceptions of the target population about the institutional arrangements in this connection.

### **Objectives**

The study was carried out to meet the following objectives;

- a. To estimate the availability and requirements of domestic water in the rural Punjab.
- b. To highlight the problems of disposal of waste water and water related sanitation aspects in the area.
- c. To analyze the impact of drinking water supply and sanitation facilities on social and economic life.

### **Methodology**

The socio-economic survey was carried out in Ropar, Patiala and Bathinda districts, representing the three distinct agro-climatic conditions of the state. Due to resource constraints of the researchers, 35 villages representing 11849 water scarcity villages were selected at random. It was considered important to give representation to each area due to which 8 villages from semi-hilly area, 16 from central belt and 11 from south-western belt were selected at random. Data pertaining to the year 2008-09 regarding source of water supply, total quantity of water consumed for different purposes, additional requirements, water related problems, sanitation aspect, possible impact of additional piped water supply, collected through PRA method was recorded separately for scheduled caste and other categories.

The village level demand for water for domestic purposes was regressed against the probable determinants such as percent population of scheduled caste category, livestock number, family income, distance from city centers and availability of assured water supply.

### **Results & Discussion**

#### **Village level information**

The existence of physical impurities, especially in case of canal water used for drinking was severe in the south-western districts. The underground water in canal based schemes in Bathinda district is brackish (containing high concentration of salts). This water was reported to have caused tooth decay, graying of hair and abdominal pains. Some people in semi hilly tracts of Ropar were reported to be suffering from kidney stone. In some villages where water disposal was not appropriate, it was reported that water taste was not good.

In most of the areas the common diseases like Malaria and Diarrhea were reported in the rainy season i.e. July to September. No specific educative programme regarding hygiene was reported in the sample

villages except in four villages where women organizations were operating for imparting health education. In general, some people expressed to have got information on mass media like newspapers, radio, TV etc.

Most of the villages had one pond each. These ponds were used for bathing of animals (60%), for rearing fish (23%), for draining surplus water from the village (48%) and other purposes like washing clothes (6%). Initially, these ponds were situated away from the residential area but now due to expansion of housing, the ponds got into the vicinity.

#### **Household water requirements**

The family size, nearness to the town, caste and occupation were considered to be the major determinants of household water requirements. The average family size was estimated as 6.2 members and it did not vary much across the socio-economic groups. No significant impact of the location of the village on the use of water was noticed as metalled roads connect all the villages. The caste and closely related with it the occupation were the main factors impacting drinking water requirements.

Therefore, separate analysis for scheduled caste and other categories was done.

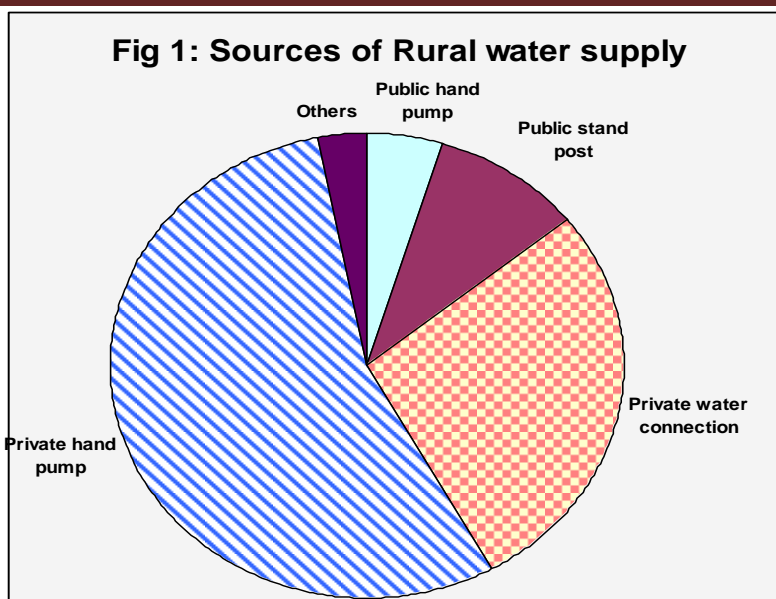
The average number of animals kept by scheduled caste and other households was 4.1 and 4.3 respectively of which 2.3 and 2.9 were milch animals. The scheduled caste households were raising mostly young stock to gain from increase in their prices. The non-scheduled caste households were keeping milch animals mainly to meet the domestic milk requirements. The water requirement for bathing, cleaning of sheds and drinking for the livestock was much higher than directly for human consumption.

#### **Source of drinking water**

As may be seen from Table 1, the major source of drinking water was the hand pump which was reported by 71% respondents of which private hand pump was the dominant source. The community hand pump was still one of the main sources in case of semi-hilly areas where the cost of installation is very high and the people are relatively poor. With the increase in the availability of piped water supply, the dependence on this source increased overtime and during survey about 44% households depended more on private connections and public stand posts. The scheduled caste households had lesser number of private connections and had more dependence on public stand posts. The other sources of water were tube-well, running canal and kuhls.

**Table 1: Source of drinking water (% households)**

S. No.	Source	Scheduled caste	Other households	Overall
1	Public hand pump	6.3	5.2	5.7
2	Public stand post	19.5	6.4	11.1
3	Private water connection	26.2	35.8	32.7
4	Private hand pump	53.7	72.9	65.3
5	Others	3.4	3.5	3.5



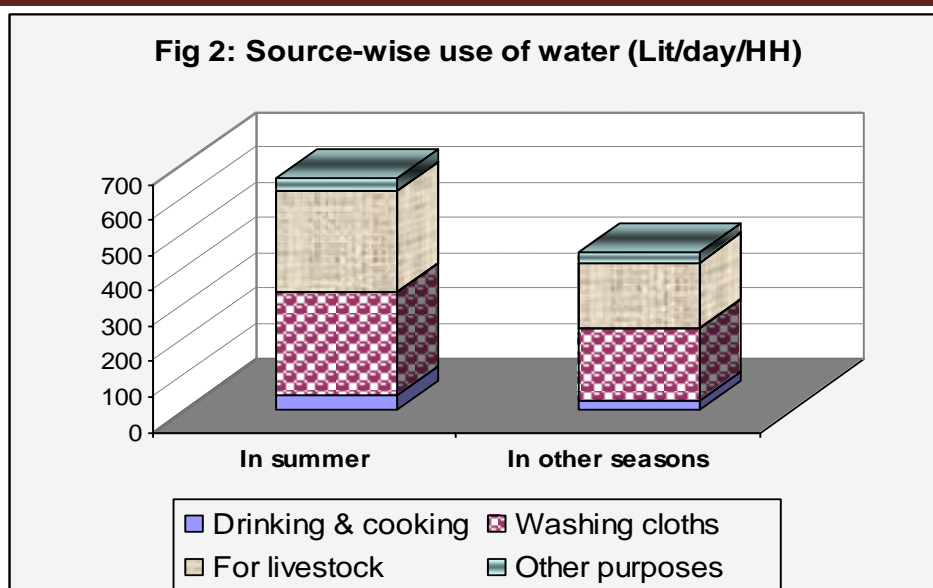
**Present water usage**

The most critical period with respect to availability of water and its requirements is the summer season. As presented in Table 2, the average use of water for different purposes during summer was estimated at 658 lit per day of which 6.8% was used for human drinking and cooking, 44.1% for washing of cloths and bathing of family members, 43.3% for livestock purposes and remaining 5.8% water was used for cleaning houses and vehicles. The overall consumption for a scheduled caste household was 432 lit and for other categories as 781 lit per day. The higher use by the latter category was due to the fact that the number of animals was more and the animals were mostly stall-fed apart from higher use for cleaning houses, washing and bathing purposes. During other seasons, the overall domestic water requirements got reduced by about 33%.

**Table 2; Daily water used per household**

S. No.	Purpose	In summer (lit)	In other seasons (lit)
1	Drinking & cooking	45 (6.84)	27 (6.15)
2	Washing cloths	290 (44.07)	205 (46.70)
3	For livestock	285 (43.31)	187 (42.60)
4	Other purposes	38 (5.78)	26 (5.92)
	<b>Total</b>	<b>658 (100.00)</b>	<b>439 (100.00)</b>

Figures in parentheses indicate percentages



#### Demand for water

The demand for water for household purposes was expected to vary with a number of factors which were regressed against the total requirements (actual usage +additional demand in lit per household per day). The results of regression analysis are given below;

$$Dt = 4.61 + 295.54 * Sc + 0.35 ** Ls + 90.03 Ap * \quad (R^2 = 0.472*)$$

Where \* indicates significant at 0.05 level and \*\* significant at 0.01 level

As may be viewed from the above fitted linear regression equation, the per cent of scheduled caste category population (Sc), Livestock number (Ls) and availability of private assured water supply (Ap) in the house were the major determinants of demand for domestic water.

#### Time saved in fetching water and scope of its utilization

It was observed that 28% and 9% of scheduled caste and other category households respectively had to fetch water wholly and partly from outside for which the average time used was 58 minutes and 37 minutes per day. The respondents reported that this time if saved would be utilized for kitchen gardening, rearing of animals, child care, entertainment and social activities. They expressed that apart from positive effect on human health, there is potential scope of income improvement by about Rs2000 per household through piped water supply in the house through;

- a. Increase in the number of livestock
- b. Improvement in the quality of milk by providing timely and quality water, better animal health.
- c. More stress on kitchen gardening
- d. Better family care, particularly children

#### Role of local government

Amongst the primary welfare functions of the panchayat is to streamline the drinking water supply. The involvement of the panchayat is essential to participate, contribute and share the responsibility of organizing and management of the project. About 89% of the panchayats showed willingness to

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participate and undertake the maintenance of the scheme while the others showed reluctance for not being technical, lack of funds, opposition from within the village groups.

**Summary**

In spite of adequate water availability and fast economic growth achieved, the Punjab state has not been able to provide required drinking water for its population. Project concerning it have been commissioned but still majority of rural people depend upon hand pump as its source and problems associated with quantity and quality of water continue to persist. Drainage of water has also not been properly systematized which is cause of various health hazards. By supply of piped water, respondents felt that apart from health concerns, it would help in accentuating income generating economic activities such as kitchen gardening, dairy farming etc and provide better family care.

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