



Sustainability of Traditional Drinking Water Sources in Himachal Pradesh

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ABSTRACT

Water is a marvellous and unique substance which is very essential for life on earth. Water has been regarded as an essential commodity since time immemorial, and all the ancient civilizations settled and developed close to a source of water. But the steady increase in human population, widespread technological modernization, and new and unsustainable lifestyle have invited calamity in the form of water scarcity. This paper examines the traditional water resources in the Indian state of Himachal Pradesh, which is blessed with varied and bountiful natural water resources such as baories, wells, khads, nalas, nawns, chhrudus, khatries, etc. However, this study has revealed that about 18% of the traditional water resources are in disuse, many of them dying a natural death due to poor maintenance, non-repair and the availability of modern facilities such as hand pumps and piped water supply. The study also reveals that the water in 60% wells, 55% baories and 36% khatries is contaminated and not fit for human consumption. There is an urgent need to develop policies and programmes for the revival of the traditional water resources, so as to combat the problem of increasing water scarcity.

INTRODUCTION

Water is a vital component of our life support system. However, it has been utilized indiscriminately under growing pressure for human consumption and economic activities. This has raised all-round concern about its sustainable use that has to be looked at in terms of both quantity and quality.

Water is fundamentally an important resource because it is essential for survival; because its use underlies all agriculture and industrial processes; and because it cannot be technologically substituted for. Industrialization and the accompanying urbanization have not only polluted the water-courses, but also created a growing demand for large quantities of protected water for public and for the industries. This coupled with growing population and non-availability of adequate facilities for proper treatment of water, has resulted in the use of available waters, often, not pure, for human consumption, resulting in health hazards. Himachal Pradesh state has a traditional, social and cultural heritage of conservation and judicious use of water that helped the people to survive over the centuries against all odds of the environment. Various water harvesting structures and techniques like baories, dug well, khatries, ponds, choes, springs, etc. were practiced to suite particular site conditions. A unique system of khatries was followed in some parts of the state for judicious use of rain water harvesting.

Though, the piped water supply has been provided to almost every habitation, the level of service delivery is far from satisfactory besides mounting operation and maintenance cost. There is heavy

misuse of water by the public residing near the storage tanks and the tail-enders are the major sufferer. They hardly get a few buckets of water during summer months and at that time they have no option but to bring water from traditional drinking water sources. Since most of the drinking water sources have been polluted, people using this water suffer from waterborne disease (Sharma 2004). Many instances of water pollution have recently been reported in newspapers of the region (Amar Ujala 2002) and Dainik Bhaskar (2002). Severe pollution of traditional drinking water sources of Hamirpur district has been reported (Sharma & Sharma 2003). Severe pollution of Hathli stream in Himachal Pradesh has been reported by Sharma et al. (2003). The Council of Science Technology and Environment, Himachal Pradesh has recently conducted a study in Shimla district and pointed out that the traditional drinking water sources of the area are severely polluted (SCSTE 2005). The main water sources in this region are springs, infiltration galleries, dug wells, baories, khatries, bore wells, streams and rivers. The spring resources are free from pollution, however, the water is highly alkaline and hard (Sharma & Sharma 2002). The water in small streams flowing near the towns has been reported to be highly polluted due to sewage and domestic wastewater discharge entering these streams (Sharma et al. 2003). A study of 22 villages in Kangra district has shown 20% of the traditional water resources are in disuse (Kanwar et al. 2008)

As there is dearth of literature on traditional drinking water resources of Himachal Pradesh, the present study was undertaken to assess the present status of traditional drinking water sources of Hamirpur and Bilaspur district in Shiwalik Himalayas.

MATERIALS AND METHODS

Himachal Pradesh (literally the 'snowy mountain state') is located in the extreme northwest of India, almost at the extremity of the large, densely populated region of Asia. The region is influenced by the southwest monsoon. Himachal Pradesh is known for the natural beauty of its forests, rivers, valleys, hills, and is rich in natural resources. The state is divided into four zones - low-hill subtropical, mid-hill submontane, high-hill subhumid, and high-hill temperate dry (Kanwar et al. 2006).

The present study was conducted in the Hamirpur and Bilaspur districts, which lie in the mid-hill submontane zone of the state. In order to prepare a detailed account regarding the use of traditional water resources for domestic purposes, a list of panchayats was prepared with the help of Rural Development Department of Himachal Pradesh. It was considered worthwhile to select 22 panchayats of Hamirpur district and 12 panchayats of Bilaspur district for conducting the sanitary survey and for collecting other details of the traditional drinking water sources.

A questionnaire-based survey, along with informal discussions with key informants and village elders was used to gather information regarding the construction, use, maintenance, and various other aspects related to the traditional water resources. Extensive field trips were undertaken along with the respondents, in order to determine the present status of the water resources. Local people were also interviewed to solicit their opinions/views regarding the declined use of traditional water resources, as well as to document the traditional rules laid down for their use and maintenance. The data were tabulated and analysed using simple percentages.

Traditional water resources of Himachal Pradesh: A variety of traditional water sources are used for domestic use in different parts of Himachal Pradesh. Among these, the major traditional source of drinking water is the baories and wells, while the kuhl, khads, khatries and nalas are used for other purposes (washing clothes, bathing, watering, livestock, etc.). The type, size, and structure of these traditional water sources could vary with the intended use. Those meant only for drinking water are

generally smaller, sometimes covered, and have steps leading down to the water. This ensures that people could only collect water manually in small quantities to meet their individual or family's needs. Three different water sources used in this region for household purposes are described below.

Baudi or Baori or Baoli: This is a deep stone-walled pit dug in an area where water percolates naturally through the ground. A baori is circular or square in shape, with the walls gently sloping towards the pit in the centre. Baori is constructed mainly around a natural water spring. It is an age-old traditional drinking water source in lower region of Himachal Pradesh. A big size Baori is called Noun or Nawn. Water is collected in a small shallow receptacle. Baori is generally covered with a roof but sometimes may be without roof. The outlet from Baori is through a narrow hole fixed with a pipe or nallah outside. Some baories are open at the front. The entire village normally constructs it and community participation and utilization of this water are main features. It is a unique method of water extraction and storage in the villages. Generally, temples of lord Shiva have been constructed near these baories (Sharma 2006).

The baories are often like a rectangular or square tank with stairs. When these baories are full of water then the water can take out from the top but when there is lowering of water during summer, people have to go down through stairs to take water. The baories are mostly constructed with stones, bricks, concrete and sometimes are kutcha or not lined.

Dug well: An open well is a well of relatively large diameter, varying from 2 to 10 m. It is dug into ground to tap water only from the top pervious strata. The depth of an open well is usually limited to 30 m. The greater depth is not economically feasible. The open well may be lined or unlined. In a lined well, the entry of water into the well is from the bottom and not from the sides. The open well generally penetrates 5 to 8 m below the water table, so that minimum infiltration head (or drawdown) of 3 to 5 m is available even in a dry year. The discharge from open well is generally limited to 2 to 5 litre per seconds.

Khatries: Khatries are unique cave like structures constructed to store water in some areas of Himachal Pradesh. These Khatries are mainly found in Bomson and Mewa area of Hamirpur district, Sarkaghat area of Mandi district and some parts of Changer area of Kangra district.

These Khatries are generally constructed under the ground floor of a house or in the courtyard of the house. Sometimes, these are also constructed away from the houses and are protected with door and locking arrangement. These are constructed in the conglomerate rocks. The average size of the Khatrie is 3.6 m × 3.0 m × 2.5 m. The depth of Khatries varies from 2.0 m to 5.0 m. Each house has one or two Khatries to store rainwater. The water is used for washing clothes, utensils and to cater the cattle demand.

There are two types of Khatries, one for animals and washing purposes, in which rain water is collected through gutter and down pipes and the other type is used for human consumption in which rain water is collected by seepage through rocks.

Interestingly, the Khatries are owned by individuals as well as by a community, the former being more common. There are Government Khatries as well which are maintained by the Gram Panchayat (Sharma 2006).

Springs: Free flowing water from spring is also potential traditional source of water in the villages.

RESULTS AND DISCUSSION

The study has shown that there are 7528 traditional drinking water sources in Hamirpur district

(Table 1). The total number of traditional drinking water sources in Bilaspur district is 1069 as indicated in Table 2. The main findings of the study are as under.

- The study has shown that there are number of traditional drinking water sources in this Himalayan belt. The main traditional sources for the drinking water in Hamirpur area are wells, baories and khatries, and in Bilaspur area are Baories, wells, springs and unlined wells.
- 18% wells in Hamirpur and 28% in Bilaspur area are not being used to draw water for drinking purposes. Similarly 23% baories in Hamirpur and 5.2% in Bilaspur area are not in use i.e., their water is not used for drinking purposes.
- The water in 60% wells, 55% baories and 36% khatries is contaminated and not fit for human consumption.
- Though the piped water supply had been provided to almost every habitation, the level of service delivery is far from satisfactory besides mounting operation and maintenance cost. There is heavy misuse of water by the public residing near the storage tanks and the tail-enders are the major sufferers. They hardly get a few buckets of water during summer months and at that time they have no option but to bring water from traditional drinking water sources. Since most of the drinking water sources have been polluted, people using this water suffer from waterborne diseases.
- People have no option but are forced to bring water from traditional sources, when there is no supply from piped water supply scheme due to power failure, breakdown of machinery or disruption in pipelines.
- Baories, dug wells, step wells, khatries and springs are the traditional water harvesting structures that have been used as source of drinking water in this region over the centuries. In many villages these systems have fallen into disuse with the spread of piped water supply. However, traditional water systems are not without problems. The size of catchments limits the quantity of water collected. The water demand has risen many times. It is sometime not possible to meet the demand of the villagers from the local sources.
- Traditional drinking water systems have passed the test of time and are suited to the specific environment in which they have evolved. They worked efficiently in different social, economic, demographic and political environment.
- Traditional water harvesting systems definitely have more relevance in areas where water scarcity is acute or where groundwater is too deep to obtain it cheaply. However, in some areas a supplementary source may be necessary. Traditionally, in these areas people have developed cultural practices which encourage judicious use of water but now these practices are dying. Water conservation education needs to be encouraged.

RECOMMENDATIONS

If development of water sources has to be sustainable, equitable and community based, traditional systems have to be rejuvenated and developed.

The revival of traditional sources is necessary because these are local spot sources near the habitations, water does not have to be pumped from far off distance, no energy is required to lift water, minimum maintenance is needed and the sources can be easily cleaned and disinfected. People have a sense of belongingness to the sources.

Table 1: Abstract of traditional drinking water sources in Hamirpur district.

S.No.	Name of Dev. Block	No. of Traditional Drinking Water Sources			
		Baoris	Wells	Khatriies	Total
1	Nadaun	512	419	-	931
2	Hamirpur	197	68	-	265
3	Sujanpur	203	43	652	898
4	Bamson	176	337	3215	3728
5	Bhoranj	221	385	31	637
6	Bijhari	282	787	-	1069
	Total	1591	2039	3898	7528

Table 2: Abstract of traditional drinking water sources in Bilaspur district.

S.No.	Name of Dev. Block	No. of Traditional Drinking Water sources				
		Baories	Wells	Kutchu wells (Surha)	Spring	Total
1	Ghumarwin	109	13	-		122
2	Jhanduta	409	246	17		672
3	Sadar Bilaspur	182	41		52	275
	Total	700	300	17	52	1069

Though a vast sum of money has already been spent on piped drinking water supplies, these have not been an unequivocal success. A revival of traditional drinking water sources is essential.

Revival of traditional systems will have to take into account the State's ecological diversity. Imposing some technology in the varied regions of the state will be unsuccessful. The relevance of each technology in its local context must be addressed.

The issues involved in the revival of the traditional systems are intricate and interlinked planning for their revival must be ecosystem-specific and location specific. The control of these systems must lie with the people and the system must be based on the needs and capacities of the people so as to ensure their sustainability.

There is indeed a strong case for a major effort at renewing and improving the traditional local systems. This can quite easily be fitted into the employment guarantee scheme and other schemes of land and water management.

There are several technical problems also. People demand greater reliability from their drinking water systems. But technology can definitely solve some of these problems. For instance, modern techniques like, sand filled reservoirs, groundwater recharge structures, check dams and groundwater dams are possible alternatives. Effort should be made to develop groundwater recharge structures in droughtprone areas of the State.

Attempt to restore traditional systems must be based on a clear understanding of whether the conditions for their restoration are today present or not and whether it is or it is not possible to adopt to these. The knowledge base of the user communities must be utilized as they have first hand knowledge and experience which no expert can match, for example, construction of khatries in some parts of the State.

SUGGESTIONS

For sustainable development of drinking water sources the following measures are suggested.

- To meet the water demand of increasing population, urbanization and industrialization the traditional water systems must be re-examined, reinvestigated and preserved.
- These sources must be cleaned regularly and disinfected periodically and be kept free from contamination.
- Where there are chances of contamination particularly in baories and wells, these must be covered with roof and protected with netted doors.
- Periodic monitoring of water quality must be ensured to check the deterioration in their quality.
- People participation and environmental education are pivotal and need to be encouraged.
- Persons involved polluting/destroying the water sources must be severely penalized and sentenced to rigorous imprisonment for six months.
- Multidisciplinary research on traditional water sources of the entire State is required.
- A comprehensive list of all the local sources with exact location needs to be compiled and all sources to be properly categorized.
- A wide body of realistic data of all groundwater sources need to be collected.
- The water quality of all the traditional sources must be monitored regularly and database needs to be developed.

Water is major force in socioeconomic growth of the region. If the development of water sources has to be sustainable, equitable and community based traditional systems have to be rejuvenated, developed and preserved.

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