

“Managing Water Scarcity in a Tourist City: A Case Study of Shimla”

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Introduction

One area where the emphasis on the modern world is somewhat different from the pre industrial era is the need to make safe drinking water and sanitation available in copious quantities for large urban clusters and mega cities which are fast growing in number and size.

“As urban centers increasingly grew across the world during 19th and 20th centuries, the European idea of public funded authorities managing municipal water supply and sewerage found acceptance everywhere with the costs of this being met by the concerned grants via cross subsidies and other available monetary resources since water was viewed as a public good and the requirement of safe drinking water as a basic need was recognized. But today arguments are being put forward supporting the need to price water and free the government of the responsibilities of ensuring safe and adequate water supply” (Hooja and Hooja, 2007). The problem associated with urban water supply has increased substantially during the last five decades. Among other things for the first time in history, half of world’s population is living in towns and cities.

According to Uitto and Biswass 2000; ‘By the year 2025 it is estimated that more than two third of the world’s population will be urban dwellers. While the fastest growth of cities is taking place in the developing world, urbanization is a global phenomenon, closely related to environmental issues. The rapid growth of urban centers placed tremendous stress on the environment and caused formidable problems of social and institutional change, infrastructure development and pollution control. Water is one of the key resources for sustainable urban development. It is needed for virtually every human endeavor from house hold use to agriculture, industries & leisure. Water is also important in the development of eco system. Therefore, provision of sufficient water and preventing pollution of water are formidable tasks. Because of the rapid growth of world population, mass consumption and increased pollution, among other factors, the availability of drinking water per capita is shrinking. It is believed that 40% of the world’s inhabitants currently have insufficient supply of fresh water for maintaining even minimal hygiene. According to Mallin Falkenmark (2000), 100 liters of water per day per capita is minimum requirement to maintain good health which is not fulfilled in many cities in India. The present study

is an attempt to understand the extent of water crisis in Shimla and the efforts made to find out gap between demand and supply of water for domestic use in the study area.

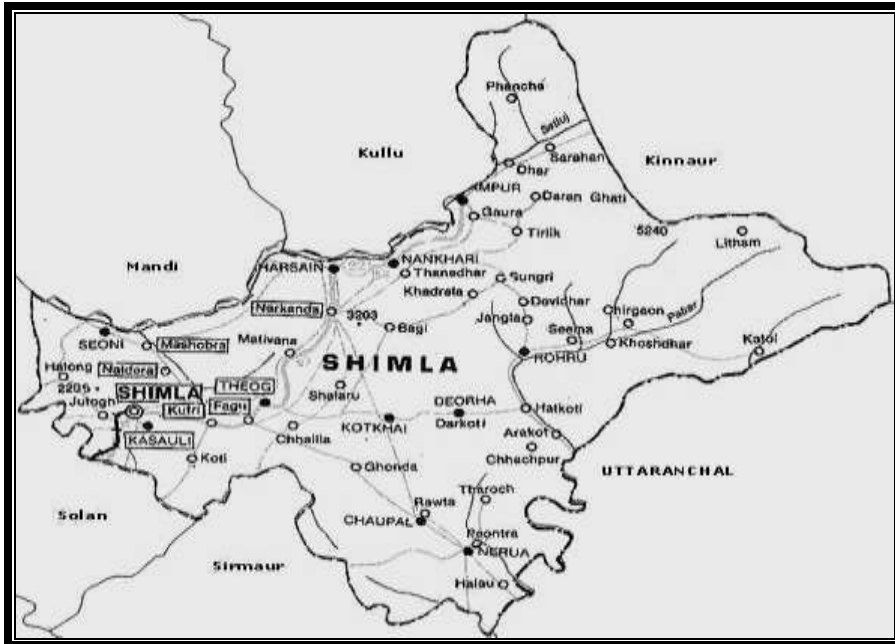
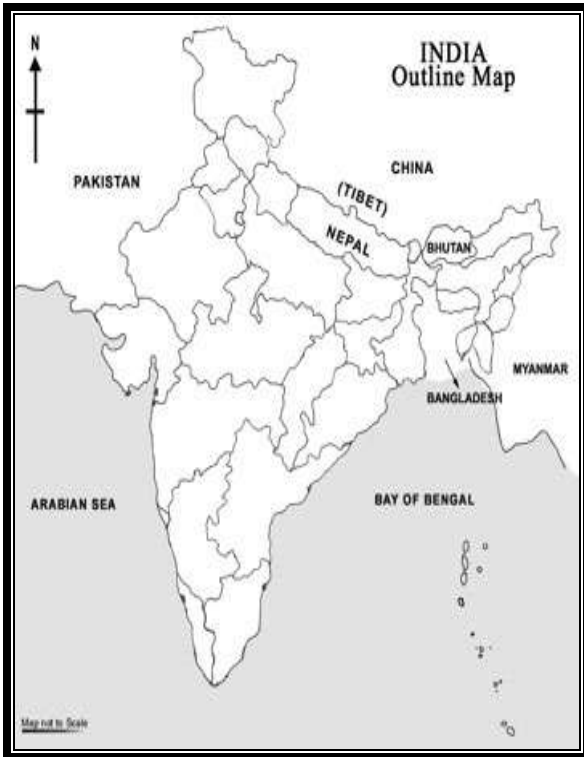
About Study Area

Shimla, originally called Shimla is the capital city of Himachal Pradesh. In 1867, Shimla was declared the summer capital of the British Raj in India. A popular tourist destination, Shimla is often referred to as the 'Queen of Hills', Located in the North West Himalaya at an altitude of 2397.59 meters. The city of Shimla, draped in forest of pine, rhododendron and oak experiences pleasant summer and cold snowy winters. The city is famous for its buildings styled in architecture of colonial era. Shimla is connected to the city of Kalka by one of the longest narrow gauge railway route still operating in India. Shimla is approximately 115 kms. away from Chandigarh, the nearest major city and 365 kms. from New Delhi the National Capital. There are no bodies of water near the main city and the closest river Sutlaj is about 21 kms. away.

The climate of Shimla is predominantly cold during winters and moderately warm during summer. Monthly precipitation varies between 415mm and 24mm in November and in July. The average total annual precipitation is 152cms. Snow fall usually take place in the month of Dec., Jan. and Feb. The people of the city of Shimla are facing acute shortage of water although the average annual precipitation is significant (153cms.) mainly due to steep sloping areas and lack of natural water reservoirs. The population of the city is 1, 42,161 (Indian census, 2001) along with a floating population of 75000 is attributed to service industries.

The administrative responsibility of the city of Shimla rests with Shimla Municipal Corporation. Established in 1851, the Shimla Municipal Corporation today has an elected body contains 27 councilors of which 3 are nominated by Government of H.P.

Map 1 -Location Map Of The Study Area



Focus of the study

1. To study the trend of water availability for domestic use in the study area.
2. To identify gap between the minimum requirement & the water available for domestic use.
3. To identify the level of awareness about rainwater harvesting in the study area.

Sources of data collection & methodology

The present study is based on both Primary & Secondary data sources.

(A) Secondary Sources

1. Shimla District Gazatteer.
2. Website-Shimla Municipal Corporation.
3. Reference Books

(B) Primary Sources

Primary data was collected with the help of a questionnaire. A Sample Survey of 60 households from different localities in Shimla was selected for collecting the information. Other relevant data was obtained by interviewing the municipal officials such as Deputy Mayor of the city of Shimla and local people, on the situation of municipal water supply.

Table-1 Sample Design

Sr.No.	Name of the Location	No. of households surveyed	No. of persons interviewed
1	Church Area	8	1
2	Mall Road	12	1
3	Bauluganj	15	1
4	Summer Hill	6	1
5	Railway Station Area	4	1
6	University Campus	9	1
7	Indian Institute of Agri. Research	3	2
8	Jakuba Temple Area	3	1

- Method**
1. Random samples were collected of household for collecting primary data.
 2. The data has been compiled and analyzed using appropriate statistical methods.

The study focuses on availability of water in the city of Shimla. The efforts are also taken to find out relationship between growth of the population and amount of water supply over the period. The analysis of data is confined to the years between 1981 and 2001 in order to obtain the overall picture of water supply in the city of Shimla. The

major approach to the study is quantitative that includes application & use of appropriate statistical techniques.

Results and Discussion

1. Population Growth (1951-2001)

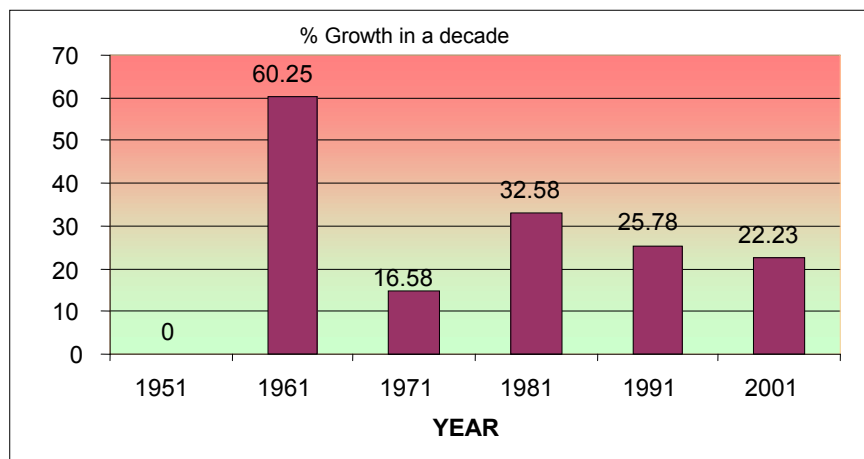
Population of the region is an important element to determine water demand. By keeping the significance of demographic study in this context, the population data of Shimla was collected for 1951 to 2001 and population growth trend is observed.

Table-2 Shimla – Population Growth (1951-2001)

YEAR	POPULATION	DECADAL GROWTH RATE (%)
1951	18,345	-
1961	46,150	60.25
1971	55,320	16.58
1981	82,054	32.58
1991	1,10,560	25.78
2001	1,42,161	22.23

(Source: Shimla District Gazetteer, Population Census)

Fig- 1 Shimla – Population Growth (1951-2001)



(Source-table-2)

The above table no.2 depicts the decadal population growth rate of population in Shimla from 1951-2001. The decadal growth of population is 60.25% in 1951-61 to 22.23 % in 1991-2001. This continuous growth of population has created tremendous pressure on available natural resources including water. The city was planned for a population of 16,000 but today it carries more than 200,000 on an average putting pressure on its scarce natural resource ‘Water’.

The population of Shimla has increased more than 7 times in just 50 years. Growth of tourism and related services are the major factors responsible for the alarming growth of population in the region.

The city of Shimla has nearby 450 hotels. Scarcity of water during peak season is a major problem for hotel industry. As a result of many tourists now prefer Manali. This has adverse effect on the tourism industry of Shimla. Manali has relatively more water besides other attraction of Rotang pass at 13,050 feet high, which is just 60 km from Manali where hill tops are covered a blanket of snow.

2. Major Sources of water:

Rainfall is the prime source of water. In order to understand the seasonal variation in water supply in the study area it is essential to know about patterns of rainfall. The average annual rainfall in Shimla is about 153 cm. however maximum amount of rainfall is concentrated in the month of June to September which receives 77.12 % of annual rainfall. During summer season (Mach - May) the region experiences acute shortage of water.

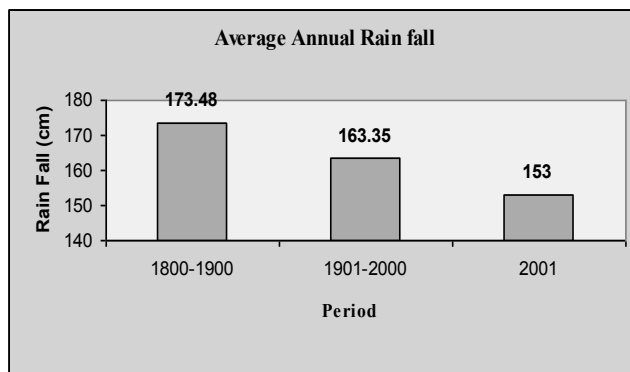
-It is interesting to know about variation in annual rainfall in study area.

Table 3 Average Annual Rainfall

Year	Annual Rainfall (cms)
1800-1900	173.48
1901-2000	163.35
2001	153

(Source-Shimla Dist Gazatte 1904,1936)

Fig 2 Average Annual Rainfall (in cm)



(Source-Shimla District Gazatte 1904,1936)

The above table (Table 3) shows average annual rainfall from 1800 to 2001. It has been clearly observed that mean annual rainfall is decreasing constantly in the study area. This clearly indicates an increasing situation of future water crisis.

Population has increased over the time period whereas the annual rainfall is decreasing, thus creating a major gap between demand and supply of water for domestic and other uses. According to Manmohan Singh, Director of the Meteorological Department, 11 of the districts in the state of Himachal Pradesh received deficit rainfall and snowfall in the year 2009. Besides, the state also experienced a relatively warm and dry winter in this period.

Another probable reasoning is the relationship of snow time that has reduced the supply of water in the region from melting of snow.

Table 4 Distribution of Percentage Deficiency of snowfall in the year 2008-09

S.N.	District	% Deficiency
1	Bilaspur	82
2	Solan	78
3	Kinnaur	67
4	Kangra	61

(Source: IMD, Shimla)

The city of Shimla and its nearby areas received just 15 cm of snowfall during February 11 and there was no snow before or after that, is a matter of great concern.

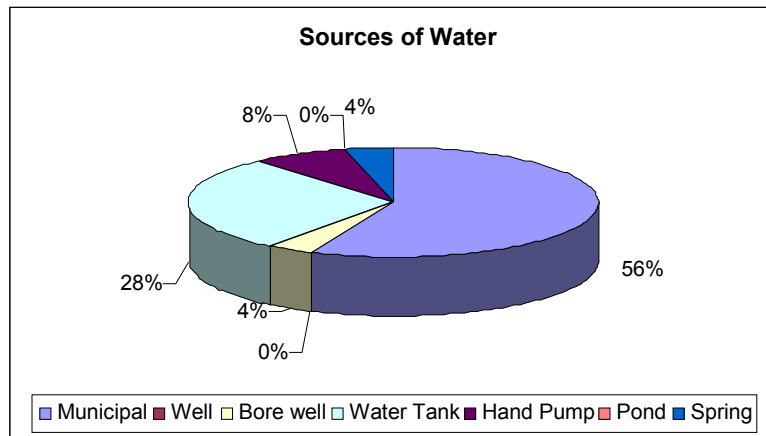
3. Sources of Water for Domestic Use

Table 5 – supply of water for domestic use

Sources	No. of households	Percentage
Municipal	60	56.6
Well	-	-
Bore well	4	3.78
Water Tanker	30	28.30
Hand Pump	8	7.55
Pond	-	-
Spring	4	3.77
Total	106	100

(source – based on primary survey)

Fig. 3 Supply of water for domestic use



(Source – based on primary survey)

In Summer Hill most of the people are depended on the Municipal Corporation for water but Municipal’s water supply is very irregular. However during water crisis the local residents seek water through water tankers which constitutes 28.30% of the total water supply.

Water Scarcity has turned it into a business opportunity for few enterprising locals who fill in water from local areas and sell it at Rs 10 – Rs 15 a pot to the residents of the water scarcity area as also to hotel industry. Moreover others sources of water such as bore well, hand pump, pond, spring together constitutes only 15.1% probably due to the relief that is steeply sloping where surface run off is faster.

Table 6 Projects Undertaken by Municipality for Water Supply

Source	Project Capacity (in Kilolitre)	Supply (in Kilolitre)
R. Guma	18-19 Lac	14 Lac
R. Ashwani Khad	09-10 Lac	03-04 Lac
R. Churat Nall	05 Lac	02 Lac
R. Chaid	4.5 Lac	1.5 Lac
Total Capacity/ Supply	36-38 Lac	20-21 Lac

(Source: Municipal Corporation – Shimla. 2008)

It is evident from Fig. no.3 that Municipal water supply is the major source of water supply for local residents. How ever (see table 6) the data from Municipal Corporation, Shimla shows that water supply is not so far possible because the entire major water reservoir. According to Harish

Janartha, Deputy Mayor of Shimla, there is a fifty percent shortage in the daily total requirement of 42 Lac kilolitre (May 2nd 2008,-7.37 pm, ICT by admin.), during peak period.

A. N. Sharma (Municipal Commissioner of Shimla) reports that the water requirement of the city is more than 45 million liters per day, but it receives a supply on only 37 million liters. The civic body is stressed water on alternate days to the residents of the area. Frequently, water shortage conditions are faced by local populations as noted in the field survey.

“The water storage is such acute proportion the children have remained without bathing. The tanker comes once in four or five days. There is a lot of water problem. It has been going for the past five years” said Surajlal, a resident.

“We all are facing a severe water problem here. Tankers that come here are quite small and not sufficient enough. They should either ensure an equal water supply through the taps or deploy tanker on a regular basis. This is the ninth consecutive day without water” added Raksha, and the resident.

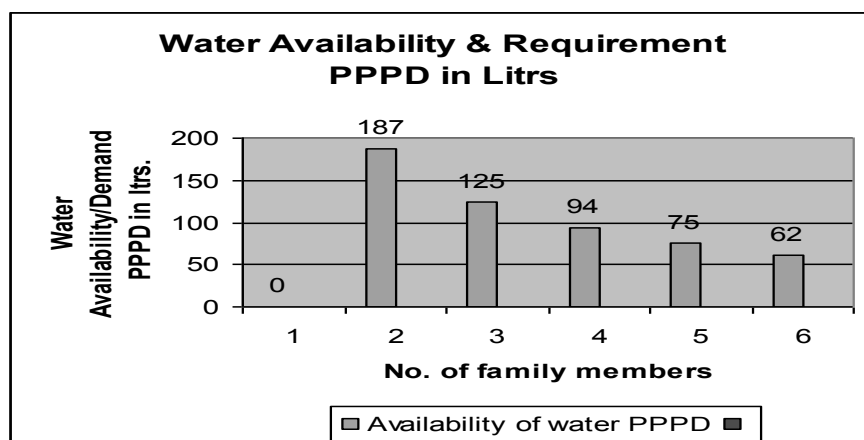
4. Water Availability per person and number of family members

Table 7 Relationship between No. of family members per household and water availability PPPD*

No. of Family Members per household	Frequency	Water availability PPPD* (in Ltrs.)
1	-	-
2	04	187
3	14	125
4	20	94
5	16	75
6	06	62
Total	60	

(Source – based on field survey)

Fig. 4 Relationship between no. of family members and water availability PPPD*



(Source – based on survey) * Water availability per person per day

The above Table (Table-7) shows relationship between number of family members and water availability per day per person. The data itself clearly shows that average water availability per person decreases with increase in no. of family member – out of surveyed 60 families only 33% people get sufficient water for domestic use when as 67% people get very less share of water than their requirement. This clearly indicates threats to hygienic condition for the families having more than 3 family members. The Shimla is also confined with irregular Municipal water supply and lack of local sources of water.

5. Trend of water availability per day per capita (2001-2009)

Water availability and consumption determines health and hygiene conditions. In order to understand the trend of health status of people related with water supply, the data related to water availability has been collected and tabulated

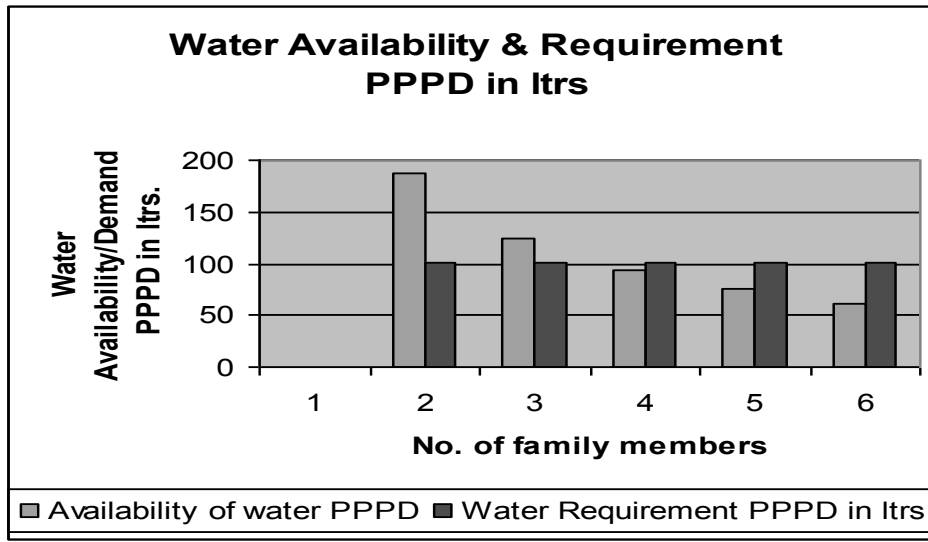
Table 8 - Availability of Water Per Person Per Day in Liters (2001-2009)

No. of Members in the Family	Current water supply(lpcd)	Requirement according to the norms	Surplus/Deficit (lpcd*)
2	187	135	52
3	125	135	-25
4	94	135	- 41
5	75	135	-60
6	62	135	-73

lpcd* - liters per day per capita

(Source Field Data)

Fig. 5 Relationship between Water Supply and Minimum Requirement PPPD*



(Source Field Data)

6. Water Literacy- Awareness about RWH

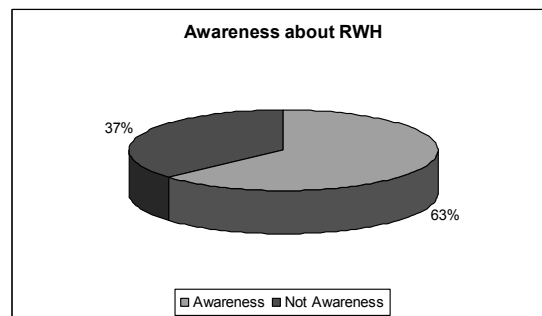
One of the significant measures to cope up with the problem of water crisis is awareness among the dwellers. In order to identify the level of awareness among the dwellers in the study area, the data related to awareness about RWH has been compiled and tabulated as under table 9.

Table 9 Awareness about Rainwater Harvesting

Awareness about RWH	No. of Respondent
Yes	38
No	22
Total	60

(Source- based on primary survey)

Fig. 6 Awareness about Rainwater Harvesting



(Source- based on primary survey)

The above pie chart (fig.8) shows that nearly 68% of the total respondents are not aware of the concept of rainwater harvesting, whereas only 32% of people are aware about it. It would be very interesting to know whether those people who are aware of RWH, actually use rainwater-harvesting methods. It is found that out of 38 respondents (aware of the concept of rainwater harvesting) only 06 respondents have implemented this technique to avoid future water shortage. This implies the need for further awareness and promotion to implementation of rainwater harvesting methods.

Major Findings

- It is found that the average annual Rainfall is decreasing with time in the study area
- The population of study area is increasing at a faster pace along with floating population
- The relationship between population and rainfall is found inverse
- The availability per person per day decreases with increase in no. of family members
- Out of the surveyed families 84.9 % families depend upon Municipal Water Supply and water tankers
- The data related to awareness about Rain Water Harvesting shows that 63% respondents are aware and 33% are not aware which implies the need of attention is to be given to increase water literacy
- Out of surveyed 30 families only 3 families have implemented Rain Water Harvesting methods in their home which is negligible.

Suggestive Measures

The city of Shimla is facing acute shortage of water for Domestic use as a result of population growth, decreasing rainfall, lack of awareness, unwise use of water etc. In order to assure adequate water supply and to avoid future water crises in the study area, following recommendations are made: -

- College/university students in association with NGO's can organize water literacy programme.
- Media can play major role in this concern.
- Construction of small check dams and creation of water reservoirs.
- Towards Blue Revolution – Management of fresh water through optimization of use.
- Installation of water meters and rationing system.

- Removal of subsidies on water.
- Promotion for construction of Rainwater Harvesting plants with monetary support from local Municipal Authorities.
- Reduce, recycle, and reuse of water.
- Abating water contamination problems- since fresh water is a limited and scare resource, its pollution by human activity is not desirable.
- It is therefore calls for urgent attention to deal with pollution problem.

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