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# Shimla Water Crisis Symptomizes a Greater Malaise

**Harish K Thakur**

**Abstract:** ***Water, the most precious natural resource on earth, worries the world now. The rapidly growing population and the changing climate have adversely affected the water cycles world over. A 2014 survey of 500 major world cities revealed that every fourth city was under 'water stress'. Shimla, the capital of Himachal Pradesh this summer underwent a serious water crisis when people had to que up in lines for water at a supply which was as late as 8 to 10 days intervals. The current paper tries to explore the reasons behind the water crisis that alarms of a greater problem in the future.***

**Keywords:** Precipitation, Riverbank Filtration, MLD, Deforestation

## 1. Introduction

Water, the most precious natural resource on earth, worries the world now. The rapidly growing population and the changing climate have adversely affected the water cycles world over. A 2014 survey of 500 major world cities revealed that every fourth city was under 'water stress'. The UN endorsed projections estimate that by 2030 the demand for drinking water would exceed the supply by 40%. Cape Town, Sao Paulo, Bangalore, Beijing, Cairo, Jakarta, Moscow, Istanbul, Mexico, London and Tokyo are the cities which are overpopulated and are faced with the problem of fresh water. A Water Aid Report 2016 has declared India among the worst countries in the world for the number of people (about 63 million) without safe water.

**A Regional View**: The north Indian states like Punjab, Haryana, Himachal, Uttarakhand and Delhi are under severe drinking water stress. The crisis is two pronged - shortage of water supply and quality of water. In the north-western zone the water resources primarily comprise of surface water (mainly hill states) and ground water (chiefly plains). The region was once full of rivers and ground water but due to changing climatic conditions, increased population, expanded agriculture sector the situation has changed significantly.

A perusal of the temperature recorded in the North-Western Himalayan region in the twentieth century reveals that an increase of about 1.6° C has been registered. The gross rise in the mean air temperature during 1980-2002 period in north western Himalayas as a whole was about 2.2 $^{0}$C. So far as the climate change and precipitation variation in the region based on precipitation data from 1866-2006 is concerned, no change in winter precipitation was observed but significant decreasing trend in the monsoon precipitation was captured (Bhutiyani 2007:537).

Punjab and Haryana largely rely for drinking water supply and irrigation on the groundwater resource. Punjab had more than 14 lakh tube wells with thousands more sanctioned. However, due to excessive exploitation the level of groundwater is depleting year after year with the development of 'dark zones' where recharging becomes more difficult (TOI April 14, 2017). In Haryana there are about 8 lakh tube wells but the ground water has been declared unfit for consumption because of concentration of nitrate or fluoride by Central Ground Water Board. About 11 districts of Southern and Western Haryana are severely affected (CGWB 2016). Besides this the water level has gone down almost two times over the years. The average rate of decline over the last 38 years has been about 20 cm per year (Singh and Amrita). While Haryana supplies polluted water to Delhi with high Ammonia content for which it has been reprimanded by court the Sutlej-Yamuna Link project strains the ties between Haryana and Punjab and the three governments have been locking horns over the issues.

National Rural Drinking Water Programme (NRDWP) was started by UPA Government in 2013 to allocate funds to states and Union Territories for providing safe drinking water. Punjab has been complaining against the centre about the inadequate grant of funds 38.30 core in 2017-18 as compared to neighboring Haryana which received 54.84 crore (43% more) allocation even after having less land under cultivation (TOI Nov 14, 2017). A sum of Rs. 23,050 crore has been approved by Government of India for the programme for the Fourteenth Finance Commission (FFC) period 2017-18 to 2019-20.[1] An imminent conflict over water among states (earlier for irrigation) is visible as water scarcity has mapped out the future issues and challenges quite significantly. If we consider the water supply to Delhi and Jaipur, the high density population cities, the management by Delhi Jal Board (DJB) and Jaipur Water Supply and Sewerage Board (JWSSB) is under scrutiny. The two have failed to meet the required supply of 820 MGD and 462 MLD with a deficit of 80 MGD and 90 MLD respectively in 2017.

While the hill states of Himachal and Uttrankhand are sources of water to other states the case of Uttrakhand is unique as 90% of its population is fed by about 2.6 lakh water springs. But the increased temperature in the north-western Himalayan zone and a decline in the rate of precipitation have caused a fall in water of springs. Due to continued deforestation for projects like road construction, or to meet fuel and fodder demands of local communities, it was found that discharges of about 500 water supply sources including springs, streams, ponds etc. have reportedly reduced by more than 50%. Climate change will further amplify reduction of local water resources. Dehradoon,

Nainital and Massourie are facing consistent shortage in recent years. The state government has been working on Riverbank Filtration (RBF)[2] technique as a permanent solution to ensure pure drinking water from rivers (UNDP Report 2018).

**Shimla water Crisis:** In Himachal Pradesh the water crisis in Shimla is not new. But in the current summers when 200 to 300 litres of water is being supplied at a single water connection after 8 to 10 days, the problem showed symptoms of a greater malaise and reflects the sheer failure of state governments to meet the needs of a growing city and the suburbs. In 2016 too Hepatitis A had claimed many lives caused by supply of contaminated water. However, this time the administration has failed completely to anticipate and meet the rising water demand of the city. For the first time the schools have been closed for a week and hoteliers in Shimla are appealing to the tourists to cancel their reservations on account of shortage of water that has a stupendous distribution gap beyond 6 to 9 days. The chief sources of water in Himachal Pradesh are surface water (46.69%), Traditional Sources (25.31%), ground water (19.71%) and other sources (6.25%). (See Fig. 1). More than 90% water used in Shimla is surface water drawn from rivers, rivulets, springs etc. Some of the prime factors behind the current water crisis could be underlined as follows.

**Water Sources in H.P. 2016**

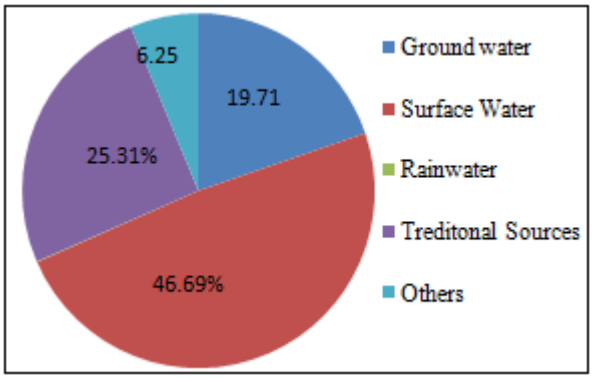



**Figure 1:**
**Source**: Compiled from Directory of Water Resources in Himachal Pradesh

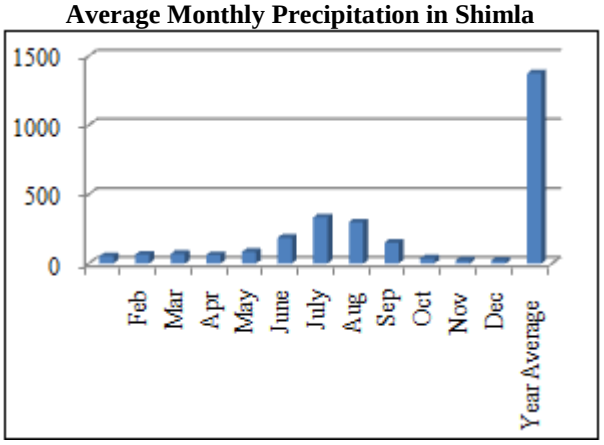
**Changing Demography and Poor Optimization**: As per 2011 census the population of Shimla city is 169578 lakhs and if the adjacent areas (about 16 water supply zones) and floating population (tourists and commercial commuters) are also included it is around 2.85 lakh that requires a supply of 41.58 MLD (Million Liters per Day) @ 140 lpcd. However the supply is just 33 MLD with a shortage of about 8 MLD. During summers on account of weather variations of the past and the instantaneous reasons the deficiency fluctuates up to 15 to 20 MLD. Gumma, Ashwini Khad, Churat, Giri and Seog are the chief sources of water in Shimla. It is shocking that although the overall installed capacity at these sources is about 65 MLD while the demand is only 41 MLD, yet the actual supply of water is far less (about 33 MLD) and the chief reasons are poor maintenance of pipelines, water reservoirs and consistent leakage and theft issues. The Water Supply Department of MC Shimla has a staff of 1 Engineer, 2 Assistant Engineers, 5 Junior Engineers, 1 Draughtsman 1 Surveyor, 2 Superintendents and ministerial staff with and 60 plumbers which is inadequate to efficiently manage and ensure the water supply (MC Shimla: web).

## 2. The Climatic Changes

The temperature of the state has been rising over the decades and this has adversely affected the water resource and weather system. From 1995 to 2007 a decrease of 17% has been registered in rainfall which has further declined in the ensuing years. The snowfall period has been consistently shrinking and the geographical proximity of Shimla to the plains has caused faster increase of temperature of the city as compared to Leh and Srinagar since 1991. A decrease in precipitation and snow both are on a rise with snow pattern in Shimla decreasing at 4 cm per year and the snowfall pattern over Satluj catchment at 3.8 cm per year. Increasing temperatures recorded from various stations reveal that the temperature is increasing at a rate of 0.09 at Kalpa, 0.13 at Shimla, 0.10 at Dharamsala, 0.09 at Sunder Nagar, 0.06 at Bhuntar (The Statesman).

The weather of Shimla over the decades has consistently variated in rains and snow. The average rainfall of Shimla has been constantly declining for the last two decades from 1374.6 between 1971 to 2010 to 1068.1 mm in 2017-18. In the year 2018 the early months witnessed a drought kind of situation followed by short spells of rains in March and April that is insufficient for the rainwater seepage and consequent availability of water at different sources. Most of the water springs and wells (Bauris) are now either completely dry or provide a meager quantum of water not even adequate to meet the requirements of villages around. The problem is taking catastrophic shape with the rural areas of Shimla too facing acute shortage of water.

**Average Monthly Precipitation in Shimla**




**(1971 to 2010 (Fig. 2)**
**Source**: Compiled from India Meteorological Department, Ministry of Earth Sciences, Govt. of India, New Delhi.

**Shimla Rainfall Statistics- 2013 to 2017**
(Fig. 3)

| Shimla Rainfall Statistics- 2013 to 2017 | | | | | | |
|---|---|---|---|---|---|---|
| **2013** | | | **2015** | | **2017** | |
| Month | Rainfall (millimeter) | Deviation | Rainfall (MM) | Deviation | Rainfall (MM) | Deviation |
| Jan | 96.9 | 40 | 54.4 | -21 | 119.5 | 73 |
| Feb. | 188.3 | 168 | 109.6 | 56 | 19.9 | -72 |
| March | 71.4 | -11 | 148.7 | 86 | 59.7 | -25 |
| April | 24.8 | -49 | 70.5 | 46 | 77.5 | 60 |
| May | 25.4 | -61 | 30.6 | -53 | 118.9 | 83 |
| **June** | **225.5** | **115** | **87.3** | **-17** | **146.1** | **40** |
| **July** | **133.2** | **-41** | **299.4** | **32** | **189.2** | **-17** |
| **Aug.** | **157.5** | **-17** | **199.3** | **5** | **183.3** | **-3** |
| **Sep** | **60.0** | **-47** | **41.3** | **-64** | **126.8** | **12** |
| Oct. | 21.2 | -35 | 15.1 | -54 | 0.0 | -100 |
| Nov. | 9.9 | -29 | 11.1 | -20 | 2.4 | -83 |
| Dec. | 12.9 | -54 | 21.4 | -25 | 24.8 | -12 |
| Total | 1017.0 | | 1088.7 | | 1068.1 | |

**Source**: Compiled from CRIS, Indian Meteorological Department, Ministry of Earth Sciences, New Delhi.

Fig.2 shows the average monthly and yearly rainfall between 1971 and 2010. However the monthly and yearly rainfall average from 2013 to 2017 as shown in Fig. 3 reveals a sharp decline in the rate that has stabilized around 1050 mm. Therefore, the gap between the rising population and available water resources is sharply widening on account of adverse weather system.

**Development Drive with Weak Regulations**: Shimla has witnessed almost a threefold construction drive since 1980 and the open spaces of the hills and the suburbs have been transformed into concrete jungles that affect the necessary precipitation and water retention during the rains. The state government has failed to evolve a stringent retention policy and regulation of the construction of new structures with the periodical relaxations given on the increased public pressure and electoral gimmicks.

**Increased Inflow of Tourists:** Since Shimla is country's one of the busiest tourist point the pressure on basic amenities is always high. In 2015 the state registered a hike of 7.5% in total tourist inflow as the number increased from 1.63 crore in 2014 to 1.75 crore. In 2017 up to September the state registered 1.53 crore tourists (Statesman23-12-2017). The number of foreign tourists also increased from 3.89 lakh to 4 lakh. Shimla city also recorded an increase of domestic tourists from 31.93 in 2014 to 32.61 lakh in 2015. 1.56 lakh foreign tourists also visited Shimla during this period. The tourist arrival has been rising constantly over the years thus leading to an increased demand of water.

**Deforestation and Forest Fires:** Shimla has in the past witnessed deforestation on account of building of roads, structures, power lines, power stations, water lines, treatment plants, sales of private land and encroachments etc. The loss of forest has affected the water cycle of the city. The report of HP State Forest Department recorded 121 fire cases in Shimla in 2016-17 that affected 743 hectares of natural and planted area (HP Forest Department web). In April and May 2018 several fire cases (due to public negligence, lightening or grass requirements of villagers) were registered in Tutu, Jutogh, Ghanahatti, Sanjauli, Summerhill, Shoghi, Dhalli etc. that also caused rise in temperature of the city and affected natural water sources.

## 3. Suggestions

A drastic mapping requires to be done to explore new sources of water especially rivers like Sutlej, Pabbar, Giri. Some serious work on capitalization of available resources and optimization of current infrastructure, pipelines, reservoirs, treatment plants and pumping stations is essential. The Koldam lift scheme that will supply about 104 MLD thus eliminating the deficiency till 2050 AD was launched in 2014. But the scheme has yet to be operative because of failures of government to meet certain conditions laid by World Bank such as to constitute a special body under Chief Secretary, start a pilot project on metered-water supply system in Sanjauli and Totu etc. before flagging a loan of Rs. 810 crore for the scheme. The current crisis partially owes to the sluggishness of the governments (just DPR prepared till date) over this scheme. The state government is 4 years late in constituting a special body under the Chief Secretary as demanded by the World Bank to get a loan for the Rs 810 crore Kol Dam lift drinking water scheme.

Administration also failed in anticipating the crisis for which tankers could have been scheduled well in time. It was only after High Court's intervention that Chief Secretary was asked to supervise water distribution. The government has to be on toes while executing the generation, supply and distribution plans of water. If statistics are to be relied the installed capacity of the city exceeds the demand side yet the supply in deficit brings into question the maintenance of water reservoirs, pipelines and distributing agencies. The water theft and illegal connections have to be penalized sternly. The shortage of staff and proficient engineers has to be covered. The industrial and infrastructural built up plans, deforestation and forest fires have also played havoc with the water resources which require to be regulated. Innovative technologies have to be applied, recycling of waste water followed and a social consciousness about water crisis to be floated severely among the citizens to mitigate the problem. Solar desalinating of the sea water (especially for coastal states) that consumes less energy could be experimented to meet the future shocks, which are definitely in the course.

## 4. Notes

1UPA government under its Bharat Nirman programme started National Rural Drinking Water Programme (NRDWP) for ensuring safe and adequate drinking water supply to rural areas through hand-pumps, water lines etc. Three erstwhile programmes: Accelerated Rural Water Supply Programme (ARWSP); Swajaldhara and National Rural Water Quality Monitoring & Surveillance (NRWQMS) were merged to form this scheme.

2 RBF (Riverbank Filtration) is a methodology to secure naturally-filtered ground water from aquifers which are hydraulically linked to lakes or rivers. With the process of RBF the surface water is placed under a combination of

physical, chemical and biological processes like dilution, filtration and bio-degradation which considerably enhances the water quality. RBF also undermines the bacteria and viruses present in water.

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