Revival of hill towns through rainwater harvesting

Indira Khurana and Sarvagya Srivastava

This is the story of how by simply capturing rain, it was possible to revive business in a 117 year old low budget hotel, the Grand Hotel, in the hill town of Shimla, Himachal Pradesh, India.

Shimla, a hill town at 7200 feet in the Western Himalaya is the capital of the state of Himachal Pradesh. It was the summer capital of the British and was named as the 'Queen of Hills.' Since India got its Independence in 1947, it is a popular location for tourists escaping the long summer months. If one escapes to Shimla, one is sure to meet at least one friend there.

The grand Hotel was constructed in the 1890s by Chevilier Peliti as a towering at a prime location, with a view of snow capped mountains on one side and plains on the other. It was one of the two luxury hotels established in India which was then acquired by the Government 1942 for government officers so that they could stay here at low and affordable rates.

No longer grand

Up to the 1960s, Grand Hotel's prime location and low cost made it a favorite hotel for government officials.

By the 1970s, the hotel began to lose its charm due to shortage of water availability. The hotel also began to show signs of ageing. With water begin scarce interest in maintaining the hotel began to decline. By the time the 1990s came around, the municipal water supply was at its minimal and the hotel had to rely on tanker supply, which itself was a problem since vehicles were forbidden to ply on the road. Only those who found no other place to stay would land up at Hotel Grand.

In the late 1990s, an idea began to take shape: Why not tap rain to meet water requirements of the hotel? Shimla had an annual average rainfall of around 1200 mm, which was fairly evenly spread throughout the year in addition to snowfall in winters. The hotel had a campus of 7.5 acres.

At this stage several questions arose: Would the rain be enough? Where would it be stored? What is the quality of the rain? And answers began to emerge. Calculations indicated that this meant that there was a potential to capture 36 million liters of rain annually. There were 140 suites in the hotel and presuming that at full occupancy there would be 4 persons per suite, the annual requirement was 25.50 million annually. Thus, even if 70 per cent of the rain was captured, it would be enough to meet all water requirements.

Where will the rain be stored?

The answer lay in sub-surface storage solutions. The Central Ground Water Board declared that 'underground options are not possible.' However in depth research and interaction with older residents revealed otherwise. The people recalled that there was a natural water resource had existed at the bottom of the hill that had dried out about 50 years back. If one looked at the barren hill slope above the hotel, there was a patch of green along the hill slope indicating that there was some underground source of water that kept the vegetation alive. An underground shallow aquifer was located at 250 feet after drilling a bore well. The storage capacity was estimated and found satisfactory.

Capturing rain

It was decided to construct rooftop rainwater harvesting systems and capture the rain falling on the rooftop and paved area by diverting this through surface channels/ pipes into two 100,000 liter sub-surface storage tanks and use this for emergency situations such as fire and other low quality uses.

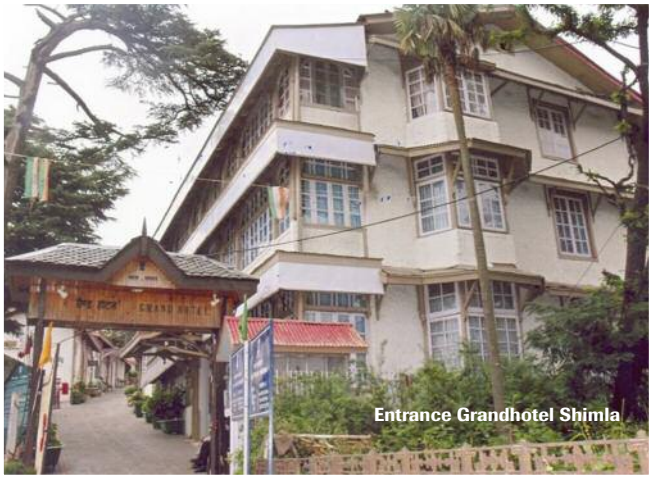
The runoff or overflow from these tanks was led to constructed terraces along the hill slope to allow percolation for recharging the aquifer. This percolation was facilitated by 5-6 m depth recharge pits and filling with boulders and plantation to retain runoff. The water from this aquifer is pumped and used.

Raining results

These efforts soon began to offer fruit. Since 2000, there is no water scarcity for the hotel which has disconnected itself from the municipal supply. As of August 2007, water is available throughout the day for the 140 suites. The water quality has been tested and found to be potable, though chlorination is done. The soil medium through which the water percolates before reaching the aquifer acts as an effective filtration mechanism. Even artificial waterfalls have been constructed to add to the aesthetic value.

Restoring the hotel

Once the water supply was assured, efforts were made to restore and rehabilitate the hotel buildings and to modernize these 110 year-old structures which were crumbling down due to age, wear and tear of material used in the constructions and also due to slippage of earth below the foundation due to erosion caused by free flowing rain water and blocked/broken sewerage system. After channelising the rain water flow, the problem of erosion was stopped and the buildings were re-stored and retrofitted to given them a new lease of life. While doing the restoration work care was taken to ensure that original features of the building and the architecture from outside were retained. The inside was modified to have modern comforts and luxury. The toilets, some of which are as large as bed rooms of 10'x12', were renovated after laying new plumbing and using modern fittings. The interior of the rooms were enhanced aesthetically and these were furnished restoring the original wooden furniture and by adding new furnishing. Today the Grand Hotel is such a place in Shimla where every visitor wants to stay. Accommodation is difficult to get in summer months, unless planned well in advance. Other offices such and residential complexes have also installed rainwater harvesting systems to meet their partial or complete water demands. These include the Central Government Office Complex, the National Academy of Audits and Accounts and the Benlow residential complex.


Entrance Grandhotel Shimla

Simple solutions

Solutions to problems are often simple as is demonstrated in the above example:

- Hilly and mountainous areas have good rainfall but are rarely able to take advantage of it
- Simple rainwater harvesting solutions can meet all water needs, reduce costs and drudgery. Makes life easy for residents as well.
- Rainwater harvesting can lead to economic benefits such as increased tourism and business.
- Spreading information about the value of rain is important.
- Training for masons, plumbers, engineers and architects would help in installing effective and durable rainwater harvesting solutions.

This work was done by Sarvagya Kumar Srivastava when he was posted as Superintending Engineer, Central Public Works Department, Shimla.
Dr Indira Khurana is currently Director, Policy and Partnerships, WaterAid India.
For further details contact Sarvagya K. Srivastava, at sarvagyas@hotmail.com or Indira Khurana at indirakhurana@wateraid.org

Cost benefit analysis

- In 2000 cost of water supply:
  Rs 700 (12 Euros) per tanker of 1000 liters
- Water available now:
  70,000 per day or 2.1 million liters per month:
  Rs 1.47 million (26,000 Euros) based on tanker cost.
  In addition it would be impossible to get this much water from tankers since vehicular traffic is not permitted.
- Cost of installation of system:
  Rs 0.9 million (16,000 Euros)
- Thus cost recovery in one month
- Current costs are of pumping only

Is the rain enough?

Calculations proved encouraging

- Rain that falls on Grand Hotel estate:
  36,000 kilolitres or 36 million liters
- Number of suites: 140
- Daily water requirement: 70,000 per day or 25.50 million liters annually (500 liters for a family of 4)
- Thus, even if 70 per cent of this rain is stored, water needs are met