

# Managing water resources in the hilly area of Uttarakhand: strategy and implementation

## Abstract

Water is essential for sustainable human, species and biotic organism in the earth. Sustainability is only possible when we have better resource management particularly water. A better water management has its multiple linkage in economic development and maintaining ecosystems in the state. In Uttarakhand water management is prerequisite as it is rich with rivers and known as “water bank” state for the other state but for its own requirement the water resources have not been evenly distributed and people had to walk kilometers for potable water. Lack of water management people are suffering badly, natural sources are drying up, which in long run having very significant impact on environment and climate change. So, this paper is focused on better water management for hilly area of Uttarakhand.

**Keywords:** water bank, sustainability, natural resources, hilly area

Volume 2 Issue 6 - 2018

Rajeev Rana,<sup>1</sup> VA Bouri<sup>2</sup>

<sup>1</sup>Assistant Professor, Graphic Era University, India

<sup>2</sup>Principal, Garhwal Central University, India

**Correspondence:** Rajeev Rana, Assistant Professor, Graphic Era University (GEU), Dehradun, Uttarakhand, India, Email [rajeevjeet@gmail.com](mailto:rajeevjeet@gmail.com)

**Received:** September 06, 2018 | **Published:** December 21, 2018

## Origination of problem and understanding

The Himalayan mountain of Uttarakhand are rich source of water dotted with about 10 major river of the country including hundreds of small rivers merging on these major river and significantly contribute as a “Water Bank of Asia” which have huge potentials for state owns economic development including irrigation and better well-being but had been used just about 2% of the total potential.<sup>1</sup> Which have shown a poor water management and its distribution in the entire state as there are severe water shortage, and people particularly women have to walk kilometers for potable water. Thousands of villages not able to get water. So, government target to provide clean and safe drinking water remain a distant dream. The whole issue is not end here but it generates multiple issues as lack of water management natural resources are drying up. Communities are not able to access basic need of water, ponds and potable water sources vanishing so cattle’s and animals dying, and severe effect on environment and climate change over long period. In Uttarakhand hilly area due to lack of water resources a large communities had been affected particularly in villages where water problem are severe in almost all districts like Almora, Pauri, Pithoragarh, Rudrapur, and Chamoli etc.. Due to which farmers are restricted to very limited crops, and severely affected their meal i.e. less food for their communities and less earning and low living. A plenty source of water farmers can grow larger diversity of crops, including in the off-seasons; which helps to feed their communities and encourage their family to stay in hilly area, helps in less migration from hills to urban area in Uttarakhand.<sup>2</sup>

In hilly area of Uttarakhand villages it have seen that Young girls and boys spend hours each day collecting water for their families, which had been degraded their other important activities as they are not at a school to spend their time for learning, instead of collecting water. Also when these children’s after collecting water which is not clean or called dirty water is responsible to spread disease in the communities. Another aspect of water is that to provide enough sources and quality water is essential for cattle’s and livestock husbandry and major livelihood activities including dairy cattle, sheep, beef cattle etc. water is essential nutrients for domestic cattle and intake of water should be increased for the growth of animals, in case of lack of water intake will reduce dry matter and production, studies have found that some domestic cattle and cows are more

sensitive than people are to water quality problems. Water is most common and limiting resource of determining the growth and survival of plants. It can be shown in the way of the yield of crop species and productivity of natural ecosystems with respect to water availability. As plant and tree (forest development) heavily dependent on large amounts of water just to satisfy the requirements of transpiration, a large tree may transpire hundreds of litres of water in a day. Both water and forest have complementary. In hilly area of Uttarakhand large amount of catastrophic wildfires can seriously affect local water supplies. Given that lack of water might have very bad impact on communities-cattle and agricultural in hilly villages which further severely affected migration and in the long run have adverse impact on environment and climate.<sup>3</sup>

## Water management strategy and implementation

The effective water management is itself challenging task, as many strategies has been suggested over the world and implemented but in the hilly area of Uttarakhand communities lives in diverse region that present unique challenges and opportunities, which reflect Beede<sup>4</sup> that no single project and method will work. In the hills water is enough than desert area but not store in particular place or channelizes as it have steeper slopes. So there is need to different approach for better water management strategy and implementation to ensure communities receives safe and sustainable water. There are different best to get water.

## Hand dug well

In case most of the communities in Uttarakhand live near river or in the plain area just below steep mountains they should adopt Hand Dug Well method for good supply of water near the surface of the ground (i.e. a hand dug well is usually the best method with the help of community),<sup>5</sup> to dig the well from 8 to 15 meters deep. Concrete rings are stacked inside the well prevent cave-ins and a filtration system is used along the entire depth of the well shaft. Once complete, the hand dug well is covered with a large concrete cap and a hand pump is installed. This allows the community members to pump clean, filtered, and protected water up from the ground.

## Spring protection development

Often natural springs provide a continual source of water in villages or in local community. Spring water comes from an underground source from which water naturally rises to the surface. Although the water must rise to the surface on its own in order to be classified as natural spring water, we collect spring water at the source. The problem is this should be clean, otherwise contaminated by dirt, bacteria and the people must share the spring with animals. To clean this spring water, the protection system should be developed. The eye of the spring is carefully capped and covered with a large cement protection box.<sup>6</sup> The box protects the water from surface contamination and also contains a natural filtration system of river gravel and sand. The clean, filtered water is then piped to a reservoir where it collects overnight. During the day, the clean water that has been collected is piped to distribution points where community members can collect it. Once it passes through filtration system, it still has all the natural minerals and qualities that give our water its great taste.<sup>7</sup>

## Rainwater harvesting (RWH)

It is traditional method of collecting, storing and distributing rainwater for multiple uses. The collected rain water could be used in different way in by the people like it could be stored for direct use or diverted to groundwater recharge. The rain water is the ultimate source of fresh water. However, rainfall occurs in short periods of high intensity which allowing the rain falling on the surface to flow away fast. The rainwater storage could be done in homes, schools, institutions, and commercial and government premises in the hills, including other space as long as there is a catchment area in the form of a roof or open space to capture the rain.

## Construction of storage tanks

In mountains of the Uttarakhand there are huge capacity of water storage from the small water flow through gorge, catchments, meanders, as in the rainfall of normal seasons there are many waterfalls can be found which may be good sources to fulfill communities need to provide water. Government should build many big tanks at specific distance in a steeper slopes of falling water and through these tanks water could be channelized in local villages through pipelines, which after purification may be used for drinking, dairy cattle's and other domestic cattle, and for agricultural purpose.<sup>8</sup>

## Developing common area water project

This method is helpful for sustainable increase of water in dry season for the purpose of agricultural and horticultural including farm business in the hills. Under this method a very small groups through participatory management approach can develop a project to preserve and enhance natural water resources using common area near to their home or agricultural land, where it has common drainage i.e. rainwater falling within ridgeline could diverted for harvesting and will flow out from the valley.

## To setup institution for water management

To build a better water capacity-building, government should establish and promote education, research and training to the village communities, and update them with new technologies and method for water harvesting management. Water education should be provided

with the help of non-governmental organization to promote awareness and use of clean water.

## The implementation

The water management strategy should be implemented on the basis of dual management with local communities and organizations in the states and village's, there should be active role of local community for managing water resources.<sup>9</sup> The participation of local are essential for efficient utilization of water resources to manage population water demand. Government intervention required to support in term of providing inputs and tanning with staffed of experts in water development management with the help of community and should be frame villages specific policies and strategies for distribution of water. Presently, this level efforts are strongly needed for sustainable water management in relation of forests management, and for sustainable resource management with better coordinating policies between local communities-government and NGO.

## Conclusion

One of the serious concerns is our water-based resources for future, and sustainability of the current need and future water resources management. If states effort are serious in the term of better water management it had multiple impact on states resources, community development, maintain ecological balance and eco-systems and particularly limiting migration form hills to plain in Uttarakhand. As water is essential resources and scarcer, the present issues are how it is managed and should grows in plenty of amount, the attempts should be made to create sustainable freshwater systems.

## Acknowledgments

None.

## Conflicts of interest

Authors declare that there are no conflicts of interest.

## References

1. Adams RS. *Calculating drinking water intake for lactating cows. Dairy reference manual (NRAES-63)*. New York: Northeast Regional Agricultural Engineering Service; 1995.
2. McFarland DF. *Watering dairy cattle. Dairy feeding systems management, components and nutrients (NRAES-116)*. New York: Natural Resources, Agriculture and Engineering Services; 1998.
3. National Research Council, update 2000.
4. Beede DK. Water for dairy cattle. In: Large Dairy Herd Management. HH Van Horn, CJ Wilcox, editors. 1992.
5. Dairy Reference Manual-Third Edition. Northeast Regional Agricultural Engineering Service. NRAES-63. 1995.
6. Policies and strategic options for water management in the Islamic countries, Technical Documents in Hydrology, No: 73. 2003.
7. <http://www.absopure.com/blog/absopure-unfiltered/difference-between-spring-water-and-purified-water>
8. <http://plantsinaction.science.uq.edu.au/content/31-plant-water-relations>
9. <http://www.indiawaterportal.org/>