

## Towards water security through sustainable management of water resources\*

Water is a major driver of all the processes of the universe. Yet, this resource in the modern era is beset with a myriad of problems pertaining to quality, availability and management. Changing climate adds to the threat of water scarcity in the near future, which now demands radical solutions. Integrated water resource management and sustainable water-use patterns are some of the attractive propositions that may come to the rescue. In this direction, a seminar was held to take stock of the ways water can be sustainably managed in the era of changing climate. The four themes deliberated at the seminar included water as a natural resource, sustainable use of water in industrial and urban sector, sustainable water use in agriculture, and water in health sector.

The deliberations were chaired by Chandi Prasad Bhatt, a well-known environmentalist and social activist assisted by A. S. Raghubanshi (IESD), R. P. Singh (Rajiv Gandhi South Campus, Banaras Hindu University, Varanasi) and Kavita Shah (Organizing Secretary). Bhatt spoke about forest conservation and the Chipko Movement. He acknowledged the rich diversity of the Himalayan flora, highlighting how traditional beliefs of the locals have helped protect the natural resource of that place since ages and catered to the water recharge in the area maintaining the hydrological cycle. He further unfolded the reasons behind the recent calamity in Kedarnath, and

emphasized upon the retreat of glaciers therein. Raghubanshi delineated the environmental history, wherein just an erratic shift in precipitation pattern led to extinction of civilizations. Shah mentioned about the water-usage pattern, its availability status and its unequal distribution in the population, emphasizing proper management of this resource in solving major issues of the Millennium Development Goal and Inter-Governmental Panel for Climate Change guidelines.

India being an agrarian country needs huge amounts of water for irrigation. The country also receives ample rainfall. The seminar acknowledged the applicability of various new techniques in agriculture like xeriscaping, container gardening, mulching, drip irrigation, sprinkler irrigation and micro irrigation, including surface drip, subsurface drip and micro sprinklers, all of which reduce the need of water for irrigation. Development of drought-resistant varieties of vegetables and crops that need minimum water for growth without compromising on the yield seems pertinent to address the food and water security of our country.

Deteriorating quality of water resource due to pollution, however, needs a critical evaluation in present times. The resource is limited and so is the awareness of common man regarding overexploitation of the aquifers. For example, the increasing occurrence of arsenic contamination in groundwater aquifers is a result of overuse of groundwater which creates an anaerobic condition, leading to dissolution of arsenic from the nearby minerals in rocks in the groundwater aquifers as indicated by researchers at IIT (BHU), Varanasi.

The role of aerosols in modifying the hydrological cycle and role of calypso technique for detecting the aspects of

climatic changes and altered weather and precipitation patterns were discussed. Further, the seminar also delineated the use of microalgae for bioenergy production through wastewater or use of nanoparticles. River health assessment protocols used globally were discussed in the Indian context for managing major rivers and water quality therein through bio-indicators and proper monitoring tools by WWF scientists. Several new hazards are being realized due to contaminated water like double-headed sperms in males, leading to sterility or the occurrences of endocrine-disrupting substances, pesticides, heavy metals and microbial toxins in water that are a major threat to the food chain and health.

Use of technology for proper channelization of water was discussed by experts from the industry. To cater to the need for potable water and removal of toxic components, scientists from MNIIIT, Allahabad suggested cost-effective technology intervention at community level and use of new techniques like community filters, terracotta filters or Nalgonda technique that are efficient in treating metal-contaminated waters. Emphasis was laid on the need for groundwater recharge in urban and rural areas through public participation.

Proceedings of the seminar indicated the jeopardized use of water in agriculture and urban sectors, need for minimizing wastage of water and people's participation in managing water resources judiciously and effectively.

---

**Kavita Shah\***, **Ipsita Nandi** and **Nidhi Singh**, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi 221 005, India.

\*e-mail: kavitashah69@gmail.com

---

\*A report on the National Seminar on Sustainable Use of Water Resource Management in an Era of Changing Climate held on 10–11 January 2014 at the Mirzapur South Campus of the Banaras Hindu University, under the aegis of the Institute of Environment and Sustainable Development, Varanasi, India.