

**Recommendations of
Regional Workshop**

on

**WATER AVAILABILITY AND
MANAGEMENT IN PUNJAB**

(December 13-15, 2010)

at

**C.A.S. Department of Geology
Panjab University, Chandigarh**



Organised by :

**National Institute of Hydrology, Roorkee
CGWB, Northwest Region, Chandigarh**

CAS, Dept. of Geology, Panjab University, Chandigarh



Release of the Proceedings of the Regional Workshop WAMIP-2010 during Inaugural session on 13-12-2010.
Left to Right: Dr. S.D. Khobragade, Prof. Naval Kishore, Prof. R.C. Sobti, Dr. Bhishm Kumar, Dr. M. S. Rao

**RECOMMENDATIONS
OF THE
REGIONAL WORKSHOP ON
WATER AVAILABILITY AND MANAGEMENT IN
PUNJAB HELD AT CHANDIGARH
DURING DECEMBER 13-15, 2010**

1. The existing hydro-meteorological data networks need to be strengthened through the establishment of state-of-art equipment. Web-enabled data base management systems for data archiving, storage, and retrieval need to be developed by employing advanced information technology.
2. There is a need to carry out integrated planning and management at basin level with appropriate decision support system for optimal utilization of water resources through multipurpose projects including irrigation, flood control, hydro-power, drinking water supply etc. Inter-basin water transfer schemes wherever needed, may be encouraged.
3. Rainwater harvesting and creation of storages should be encouraged for augmentation of water resources in water stressed areas.
4. Improved flood forecasting systems are required to be developed and implemented for mitigation and management of floods. Flood hazard modeling, flood plain management and dissemination of warning should be integrated into flood management programs.
5. As the various components of hydrological cycle are getting affected by land use changes and anthropogenic influence due to developmental activities, models capable of taking into consideration such changes need to be applied to predict the hydrological response of the catchments.
6. Monitoring of snow and glaciers in the high altitude regions needs to be enhanced by the use of appropriate technology. Hydrological modeling may be encouraged for estimation of snow and glacier melt contributions in the flow of snow fed river systems.

7. Application of isotopic techniques to understand and quantify the various hydrological processes need to be promoted and these may be applied to estimate the snow /glacier melt, rainfall and ground water contributions in rivers. Results of isotopic techniques need to be validated with those from the hydrological models and field data.
8. For optimal ground water development, advanced modeling approaches coupled with judicious management need to be followed.
9. Geo-hydrological survey should be conducted to detect change in quality of surface as well as ground water resources. Quality of all sources of water should be preserved by better regulation and enforcement to protect human health and ecosystems.
10. Appropriate low cost treatment techniques for removal of geogenic and anthropogenic organic pollutants need to be evolved at community level. Best management practices and judicious use of resources would be necessary to solve problems related to soil and water quality degradation.
11. High concentration of pesticides and other non-biodegradable substances are being detected in sources of water. Movement of pollutants needs to be modeled for the purpose of planning and decision making.
12. Sharing of knowledge and dissemination of technology through the participatory approach and capacity building programs utilizing the modern means of communications needs to be encouraged.
13. Besides, field data, remote sensing satellite data, should be analyzed to know the variation of snow cover and land-use change for hydrological modeling and water balance studies.
14. In drought monitoring, different indices developed using satellite data should be used to know the spatial variation of drought in drought vulnerable areas.

SPECIFIC RECOMMENDATIONS

1. There is a need of regulatory measures for controlling the over pumping of aquifer and adoption of technologies like rainwater harvesting through rooftops, surface runoff harvesting through village ponds, artificial groundwater recharge through anicuts, check-dams, injection wells to alleviate the negative impacts on the ground water regime in the affects parts of Punjab.
2. Intensive agriculture is prevalent in many districts of Punjab State like, Amritsar, Jalandhar, Ludhiana and Muktsar districts of Punjab. Therefore in order to reduce the water need for the present practices of agriculture, modern irrigation technologies, particularly sprinkler and drip irrigation, which increase water use efficiency should be practiced. If required, the change in cropping pattern can be considered from crops requiring higher irrigation crops that require low irrigation.
3. Keeping in view, the declining groundwater levels in the central and few other parts of the Punjab, the alternate option for irrigation like exploitation of deeper aquifers etc., should be considered.
4. Punjab State Agriculture Department along with Punjab Agriculture University should carry out R & D work to find out that how much water can be saved if we apply possible combination of water saving techniques in different agroclimatic zones in Punjab.
5. A continuous fall in rainfall pattern has been observed in all the districts in Punjab State in past years, since 1997. Therefore, Cloud Seeding operations for rainfall enhancement as demonstrated over Rain Shadow Region of Andhra Pradesh can also be tried in Punjab duringhaving comparatively low rainfall.
6. In areas having high salinity in groundwater due to water logging reasons like in, Muktsar district it is recommended to use saline water mixed with fresh water for achieving good crop production.

7. To uplift the socio- economic status of the farmers in the salinity affected region should be trained on salt tolerant crops.
8. Groundwater information system may be developed through integrating the information related to the availability of groundwater and water quality for providing the same to the farmers and other users, in Punjab.
9. Contaminants like Arsenic, Selenium, Pesticides and other heavy metals have been reported in ground water in various parts of the Punjab States. Therefore, there is an urgent need to look into the causes of this pollution and to take up all possible remedial measures by the concerned agencies
10. There is a need to constitute a taskforce comprising of senior level experts from the Punjab Agriculture Department, Panjab Agriculture University, Ludhiana, CAS, Panjab Univeristy, Punjab Water Resource Department, CGWB and National Institute of Hydrology, Roorkee to look into the water related problem in Punjab State and to suggest the suitable solutions.
11. As a water saving measure, shifting transplanting of rice to mid-June and beyond, and cultivating short duration varieties of rice can be promoted. During intervention period after wheat, short duration crops like, Summer Moong and Mash can be introduced.

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Panel Discussion and Valedictory Session on 14-12-2010. Left to Right: Prof. N.K. Tuli, Dr. Bhishm Kumar, Sh. S.C. Dhiman, Dr. M. S. Rao

