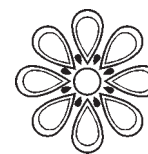




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REACHING THE UNREACHED: CHALLENGES FOR THE 21<sup>ST</sup> CENTURY

## Safe drinking water in Punjab — challenges

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WATER IS VITAL to life, maintenance of ecological balance, economic development and sustenance of civilisation. Planning and management of water resources and its optimal use are a matter of urgency for most countries of the world, and even more so for India with a huge population. Even in Punjab State of India, growing population and expanding economic activities exert increasing demands on water for varied needs - domestic, industrial, agricultural etc. On the other hand, quality of water resources is getting degraded with increasing urbanisation and industrialisation. In the present paper, an attempt has been made to highlight the problems of drinking water supplies which the state may face during the 21st century.

Punjab state covers an area of about 50362 sq.km. and is located in the northern part of India. The state has 17 districts, a sub-tropical, sub-humid continental monsoonal climate and experiences south easterly summer monsoon. The total rainfall has an average of 95-100 cm in sub-mountainous districts i.e. Ropar, Gurdaspur and Hoshiarpur and 33-43cm in South-Western districts. The state has three major rivers i.e. Sutlej, Beas and Ravi. Ghaggar is another river which drains the state and vanishes into THAR desert of Rajasthan. The state has a favourable hydrogeological set up with the result groundwater occurs as one of the important resource and is being tapped for irrigation and public health water supplies for providing drinking water. In the South-Western portion of the State, drinking water supply is provided by surface water through a canal net work which in turn receives water from the major rivers of the state. In the central and northern districts of Punjab, drinking water supply is provided through public health tubewells which generally tap the shallow as well as deep aquifer system of area. The quality of both surface water in the rivers and groundwater is getting deteriorated due to industrial water pollution, pollution due to disposal of municipal waste water and also due to increasing use of agrochemicals, fertilizers etc. A brief resume of status of river water quality problems and groundwater quality problems is discussed below.

### Quality of river water

Pollution of the rivers in the state has been progressively increasing over a time due to industrialisation and urbanisation etc. There are more than 1350 small and medium scale water polluting industries in the state. Punjab pollution control board (PPCB), Patiala has been monitor-

ing quality of river water in the state since 1986 under the Govt of India scheme MINAR (Monitoring of India National Aquatic Resources). According to the study of PPCB (1995), the quality of river Sutlej at Nangal (in the upstream area) is good with sufficient high dissolved oxygen and well bufferal pH which favour occurrence of diverse photo and zoo-plankton. The water quality can be designated as a 'A' category (designated best use - drinking water source without conventional treatment but after disinfection). As the river flows downwards, its quality degrades due to addition of pollutants and the quality category becomes 'C' (it can be used for drinking only after conventional treatment and disinfection). It is also not fit for bathing. The quality further degrades to 'D' category (pH between 6.5 and 8.5, dissolved oxygen 4 mg/1 or more) as Budha Nallah from Ludhiana disposes industrial waste waters and domestic sewage (about 10296 kg/day) into the river. Due to degradation of quality, there is no fish in the river upto 20km downstream of Ludhiana.

The quality of river Beas on entering the Punjab State is generally 'A' category. It falls to 'D' category immediately after it receives the industrial and domestic waste of Mukerian and Goindwal Industrial Complex. Water quality is lowered mainly due to high count of coliform. The quality of Ravi river is maintained at 'A' category due to less human and industrial activity and water is well oxygenated and relatively free from organic load.

The quality of river Ghaggar is mostly of 'D' category throughout the course. The virtual absence of life in the river water indicates that the pollution load received by it is much more than its rejuvenating capacity.

From the above status, it is clear that in Punjab there is a need to control pollution of river waters. Currently only 20-35 per cent of industrial effluents are treated but there is hardly any treatment of municipal sewage which are major carriers of water borne pathogens. These issues, if unattended, will pose major problems to provide safe drinking water during 21st century specially in S.W. parts of the state where drinking water supply is canal based.

### Quality of groundwater

Groundwater is one of the important sources of providing drinking water as well as irrigation supplies. Groundwater in the central districts (Kapurthala, Jalandhar, Ludhiana, Patiala and Sangrur) on one hand is getting depleted at 20cm/year (Singh 1992), on the other hand the quality is getting deteriorated fast due to indus-

trial and agricultural activities. Groundwater of top phreatic aquifer is getting degraded due to industrial effluents which are disposed off without treatment. The groundwater in Ludhiana city has high concentration of hexavalent chromium, cyanide, nickel etc. (Singh et.al. 1993). Groundwater in Amritsar city shows high pH, TDS, total hardness and nitrate. Groundwater in Ropar district is locally polluted at Toansa and Nangal due to disposal from highly polluting industries (Anonymous, 1995). Groundwater from shallow hand pumps shows high TDS (8697 mg/1), high total hardness (1616 mg/1) and high fluoride concentration (over 1.5 mg/1). Groundwater from Patiala district also shows locally high TDS. At other places, detailed investigations have not been carried out to establish the effect of industrial effluents and agricultural activities on shallow groundwater system. It is important to protect the fresh groundwater which is the source of drinking water supplies in central and northern districts.

### Conclusions

Surface and groundwater resources provide drinking water supply in the state of Punjab. The south-western district of the state are served by surface water whereas central and northern districts of the state receive drinking water supplies from tubewells which tap shallow and deeper aquifer system. Quality of surface water is getting deteriorated due to waste disposal, municipal waste waters and surface runoff containing agro-chemicals from agricultural fields. From over 8000 small and medium scale industries, 1350 are highly water polluting. There is a need to check industrial water pollution by implementing strictly the pollution control laws. River action plan

for cleaning of Sutlej river which has been prepared by Govt of Punjab needs to be implemented without any delay. In addition, environment Bulletins regarding status of water quality need to be regularly published in leading newspapers to bring out awareness in people. Mass awareness programmes need to be taken up in association with non-government organisations and voluntary organisations by organising camps in different cities to appraise the industry about their responsibilities to protect the quality of water. Strict control on the disposal of untreated effluents around industries needs to be enforced. The above measures with peoples participation would certainly help to protect the quality of fresh surface and groundwater to provide safe drinking water in the state which is likely to be one of the challenges for water management in the 21st century.

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