

ABSTRACT VOLUME

World Water Week in Stockholm

September 5–11, 2010



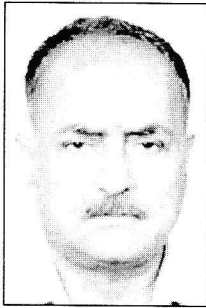
*Responding to Global Changes:
The Water Quality Challenge –
Prevention, Wise Use and Abatement*

Published 2010 by
Stockholm International Water Institute, SIWI
Drottninggatan 33
SE-111 51 Stockholm
Sweden

Design and production by Britt-Louise Andersson, SIWI.
Edited by Jakob Ericsson and Ingrid Stangberg.



Printed by Litografia Alfaprint, Sundbyberg, Sweden.
The printing process has been certified according to
the Nordic Swan label for environmental quality.



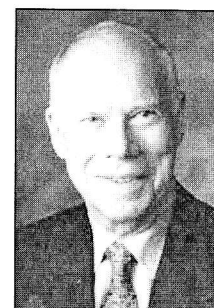
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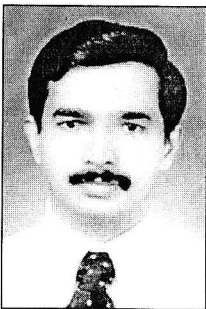
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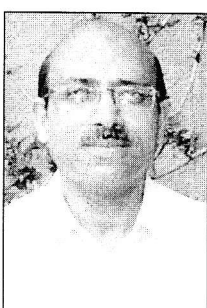
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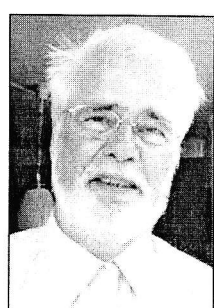
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Workshop 5 Poster



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Workshop 5 Poster



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Workshop 2 Poster



Dr. J-O. Drangert
Workshop 4 Poster

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Over-Abstraction of Ground Water and Increasing Threat of Pollution: Is Farmers' Livelihood at Stake? – A Case Study in India

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Keywords: livelihood, environmental refugees, artificial recharge of aquifer, effluent treatment, community management of water

Introduction/Problem Identification

Introduction

India is a vast country supporting 17% of the world's population, with barely 4 % of world's water resource. Ground water occupies a pivotal role fulfilling the water needs of more than 60 % of the population. Therefore, it is important to preserve the quality and quantity of available ground water for sustainable development and for ensuring security of livelihood.

Problem

Depletion of aquifer regime due to over-abstraction and increasing threat of pollution caused by industrialization have led to surfacing of harmful fluorides, salt and ingress of sea water converting the farm land unsuitable for cultivation of any crops. Consequently, farmers have been forced to move out to eke their livelihood in the nearby urban areas as daily labourers. These environmental refugees who are displaced from their natural environment have faced a daunting future causing significant economic, socio-cultural, and political consequences in the urban areas.

Analysis/Results and Implications for Policy and/or Research

Analysis

In the context of the above problem, a survey has been carried out in the villages of Minjur Panchayat Union, North Chennai, South India to find out the extent of threat to the livelihood of the farmers and to analyse the factors that are responsible for over-appropriation that led to the degradation of ecosystem. Agriculture has provided livelihood source to more than 60% of Indians giving them food, employment and income. Negligence, encroachment and poor maintenance of surface water storage structures such as lakes and ponds have reduced the catchment area. This has led to the rainfall runoff and consequent drying up of irrigation systems. The area that was once fertile, blooming with cultivation of crops has become a barren land now, cultivating nothing.

Faster rate of ground water utilization has led to a fall in the recharge capacity of tube-wells and consequent intrusion of sea water from the Bay of Bengal which lies 8 kilometers away. Over-exploitation of ground water, most of which has become hard water due to ingress of sea water, has not only resulted in the deposit of harmful fluorides and salt on the top soil, but also affected the cultivation of crops. Besides anthropogenic activities, many industries in North Chennai which is 9 km. away have been dumping their industrial waste and discharging their untreated effluents in the waterways causing point and diffuse sources of pollution threatening the ecosystem.

The ground water sample taken in 2008 showed an increasing trend in the electrical conductivity (EC) above 3000 mic s/cm, Ph value at 13, TDS at 4000, alkalinity at 300 mg/l, sodium at 450mg/l, sulphate at 500mg/l chloride at 640 mg/l and nitrate at 180 mg/l pointing out that the ground water has become unsuitable for human consumption as per the parameters laid down by World Health Organisation.

Discussion of Results

Absence of surface irrigation has forced the farmers to use more ground water because it is a 'democratic resource' available to any farmer who has access to a pump set. Farmers can get as much water as they need, when and where they want it from pump sets since electricity is supplied free of cost to all farmers. In addition, ground water use is dependent on demand for water and not on supply of water. The study shows that demand – pull factors such as demographic change, economic growth and new agricultural techniques had the significant relationship with increasing abstraction of ground water. The crops have wilted on account of heavy saline nature of groundwater contaminated by sea water. More than this, the villagers have faced health complications and have to spend money not only on their health care but also on buying good quality water for their domestic needs. At the village level, the shrinking water potential has led to pollution of ground water, water lordism among rich landlords and widening inequality.

Implications for Policy and Research

To stem the tide, the Government should adopt volumetric pricing of electricity for all farmers with out exemption. In addition to monitoring, the existing laws should be strictly enforced among the pollution causing industries for the installation of effluent treatment plants. Adoption of improved irrigation such as micro irrigation, drip irrigation, and sprinkler irrigation along with fertigation techniques would allow farmers to boost their yields up using only one-third the water they would use with full irrigation. Such strategies could provide the much needed lift to the farmers' livelihoods paving way for a direct relationship between access to water and access to food and food security.

In the existing scenario of competing demand for water, greater awareness and efforts are needed to balance it with the exploitation of ground water so as to make it compatible with environmental conservation. Adoption of sustained rainwater harvesting programme, effective community management for the use of available surface and ground water resources through formation of Water Users Associations, construction of percolation tanks, artificial recharge of water in aquifers for blocking ingress of sea water in coastal areas, conservation through watershed development programme, Integrated Water Resource Management (IWRM), periodic maintenance of water storage and other irrigation systems, and water use efficiency through proper irrigation management are some of the most effective ways in breaking the vicious circle of over appropriation of ground water, increasing pollution, poverty and other challenges to farmers livelihood.

Conclusion

Hence, the above water management strategies along with pollution abatement and prevention practices, if implemented properly will not only help farmers to reverse the water degradation trend contributing to economic growth and improving human and environmental health but also will ensure security of their livelihood in their villages.