



Short Communication

Cause and Solution of the Present Water Crisis in India

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Abstract

Ground water is the most reliable fresh water resources in the world. Irrigation is the largest single user and also polluter of ground water. More than 70% of the ground water exploited every year in the world is used for irrigation. Presently the water use efficiency in India is about 30 % for surface water and 55 % for ground water. The study area of western part of Chhattisgarh state is underlain by hard rock. The yield of aquifer is as high as 18 litre per second. It is intensely cultivated area with bore well irrigation. There is decline of water level leading to drying of dug wells in some of the area and decrease in discharge of the bore wells. The overdependence on ground water for irrigation must be checked. A holistic and interdisciplinary approach at water related problems is needed to check the declining water level in different parts of the country.

Keywords: Ground water, Resources, Bore well, Discharge, Quality, Sustainable.

Introduction

The three largest user of ground water in the world are India, USA and China and more than 25% of the ground water withdrawal in the world is from India. Groundwater withdrawal from deep fractures has converted rain-fed agriculture to a multi-crop type of agriculture, and additional fallow areas have also been brought under cultivation. More than 70% of the ground water exploited every year in the world is used for irrigation. Presently the water use efficiency in India is about 30 % for surface water and 55 % for ground water¹. Presently, 27 million bore wells are working in India, of which > 50 % are located in hard-rock areas, meeting a major part of irrigation demands, besides catering for > 75 % of rural domestic water supply which is increasing each day². In 2010 percentage of irrigated land in India was about 35%. Per capita availability of ground water is decreasing day by day and also degradation in water quality. There is decrease in ground water recharge because of climate change with more intense rainfall event for shorter period. In high rising buildings in urban areas there is indiscriminate exploitation of ground water.

Study area: The study area is central part of India in the state of Chhattisgarh. The area is underlain by hard rock formation. The area falls in the Mahanadi basin and Seonath sub-basin. Rainfall is uneven and highly erratic. As the aquifer is high yielding bore well irrigation is very common. It is an intensely cultivated area leading to ground water decline.

Materials and Methods

Field study was carried out in the study area. Well inventory of both dug wells and bore well were carried out. Different data

were collected from PHED, agriculture and water resources department. To assess the ground water draft pattern interaction were made with farmers.

Results and Discussion

India is a diverse country physio-graphically, hydro-geologically and also from climate point of view. Though the average annual rainfall in India is about 1120mm it is highly variable with highest at Cherapunji 11777mm and in western in Rajasthan it is 313 mm³. There has been a steady increase in the irrigation potential from groundwater, the use of which has gone up from 6.5 mha in 1951 to 35.38 mha in 1992. The contribution of groundwater to total food grain production of the country is significant, as more than 50 % of the irrigated area is using groundwater and in several districts it is more than 80 percent⁴.

As per latest assessment by Central Ground Water Board (2011), out of the 6607 ground water assessment units such as blocks/mandalas/taluks/firkas 1071(16.2%) are overexploited, 217(3.3 %) are critical, 697(10.5 %) are semi-critical, 4530(68.6 %) are safe, 92(1.4 %) are saline. The annual ground water draft of the country as on March, 2009 was 243 bcm. The largest use in irrigation sector is 231 bcm (about 91 %). Haryana, Punjab, Delhi, Western Uttar Pradesh are the overexploited states⁵. But presently water scarcity is rising in Maharashtra, Karnataka, and Chhattisgarh because there is indiscriminate use of ground water for irrigation.

Presently ground water is treated as a private property and owned by the land owner. Ground water resource is still governed by the old "The Indian Easement Act, 1882"⁶. Ground water management is the responsibility of state government,

stakeholders / common people who are using the water and govt. agency working in water sector. In some states there is subsidized electricity for irrigation to encourage marginal/poor farmer and to boost agricultural production. For drinking water security at many places solar energy based drinking water scheme is implemented⁷. As a result there is huge ground water draft in rural area also and there is imbalance between draft and recharge.

In Chhattisgarh there is common practice of filling of pond from bore well water (Figure-1). This is an unscientific practice and as a result there is decline in ground water level. It was introduced some year back because in some drought year the surface water body got dried and no water was available for domestic animals. Summer paddy and sugarcane is cultivated without taking care availability of ground water. See the burning example of Latur in Maharashtra (Figure-2). Water is pumped from low discharge bore wells and collected in an artificial pond. Because of this practice in those area there is indiscriminate exploitation of ground water for irrigation purpose. This unscientific practice is widespread; as a result there is decline in ground water level as well as drying of dug well and rivers. Due to application of fertiliser and pesticide for agriculture there is degradation of water quality. Also due to decline in water level some of the hand pumps have gone dry as a result replaced by submersible pump. But particularly in rural areas when there is no electricity people face lot of problem for drinking water. So the proverb has also to be modified with time: 'Jal Hi Jivan, Bijli Ke Sang'.



Figure-1

Filling of pond from bore well water in Chhattisgarh

Conclusion

Every problem has its own solution. First and foremost solution is new law has to be formulated and implemented for effective management of ground water. Ground water should be used as a common pool resource rather than a private property. Roof top rainwater harvesting should be mandatory in urban area having

roof area of more than 100 square metre and integrated watershed management programme has to be implemented watershed wise. More area should be brought under assured surface water irrigation by Increase efficiency in canal command areas, ensure water reaches tail ends which will reduce dependence on ground water. The local age old practice of traditional water harvesting should be renovated and people must be encouraged. Local resources such as spring should be used in hilly area. Wastage of water has to be stopped. Most of the water tapes in rural area waste water by running tapes. Reduce-Reuse-Recycle is the need of the hour. Need to ensure change in cropping pattern by moving from water intensive crops and demand side management of ground water such as drip and sprinkler irrigation has to be implemented. Andhra Pradesh Farmers Managed Ground Water System (APFMGS) is the successful example of demystifying science for sustainable development and community based management of ground water which can be also be replicated in other parts of India⁸. Pricing of water can ensure its efficient use and reward conservation which can be implemented through Water Users Association (WUAs). Integrated Water Resources Management (IWRM) taking river basin/sub-basin as a unit should be the main principle for planning, development and management of water resources. It is a joint responsibility of Government, stakeholders and govt. agencies dealing with ground water for management of ground water. Any ground water management activities can only be successful by involving the stakeholders, who actually uses the ground water.



Figure-2

Collection of low discharge bore wells water in a artificial pond which is later used for irrigation in Maharashtra

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