Scarcity of water in India

The research account by Garg and Hassan[1] on water scarcity in India is based on the tables and figures of the Central Water Commission (CWC)[2–4], Central Ground Water Board (CGWB)[5] and National Commission on Agriculture (NCA)[6] which were published during 1976–97. We further noticed that the data from one source were juxtaposed on the data from the other source without considering the assumptions made at the time of preparation of the reports by these organizations at different points of time.

Broadly, the authors[1] have estimated the utilizable water as: (i) Utilizable surface water as estimated by CWC[2,3] = 690 BCM, (ii) Regenerated groundwater according to the estimate of NCA[6] = 450 BCM, (iii) Utilizable groundwater as reported by the authors[1] = 418.54 BCM, (iv) Utilizable water as estimated by the authors[1] (690 – 450 + 418.54) = 658.54 BCM.

It was further stated that 'if the entire utilizable groundwater of 418.54 BCM was to be added to the utilizable surface water flows, then the latter should have been reduced by 450 BCM by the CWC. Therefore, the total utilizable flow should have been estimated as 658.54 BCM (690 – 450 + 418.54) in place of adding 418.54 to 690 BCM. Hence. It is clear that the CWC has overestimated the total utilizable flows to a total of 1110 BCM, which should have been reduced to 658.54 BCM'. To our understanding, the authors[1] have grossly erred in mixing up water availability and water utilization. The regenerated groundwater flow contributes to the water availability.

The regeneration of groundwater depends on many factors, including the level of utilization of the groundwater. Recently, the issue of regeneration of groundwater during the non-monsoon season has been taken into consideration by the CGWB[7] in its estimates. Further, an allocation of 34 BCM has been accounted for natural discharge from the groundwater during the non-monsoon season. The assumption of the authors[1] that a major portion of the replenishable groundwater (433 BCM) gets regenerated as surface water, does not seem to be on firm footing.

Also, the contention of the authors[1] that the quantum of the live storage capacity alone has to be considered as utilizable surface water, is grossly underestimated. There is added utilization of surface water through barrages/weirs (without any storage capacity). In general, the utilization of surface water from reservoirs exceeds the storage capacity as the process of filling up of the reservoirs and release of surface water for utilization is simultaneous during the monsoon season.

The National Commission for Integrated Water Resources Development Plan (NCIWRDP)[8] has estimated the level of utilization of water in India as 629 BCM, against the authors'[1] estimation of 688 BCM. At present, a number of water-storage projects (major, medium and minor) are under construction, which will further add to the utilization of water in the country. The extent of utilization of water depends on many factors, such as availability of suitable sites for development of water resources, techniques available for economic development of resources, etc. The estimation[9] of 1123 BCM as utilizable water in the country has been made keeping in view the relevant factors and thus is reasonable. The utilization level of water may further increase in future through (a) artificial recharge of groundwater to the tune of 36 BCM, and (b) interlinking of rivers for utilizing the surplus water by about 220 BCM.

1. Garg, N. K. and Hassan, Q., *Curr. Sci.*, 2007, **93**, 932–941.
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4. Report, Central Water Commission, New Delhi, 1997.
5. Report, Central Ground Water Board, New Delhi, 1995.
6. Report, National Commission on Agriculture, New Delhi, 1976.
7. Report, Central Ground Water Board, New Delhi, 2006.
8. Report, National Commission for Integrated Water Resources Development Plan, Ministry of Water Resources, New Delhi, 1999.
9. Report of the Working Group on Water Resources for the XI Five Year Plan (2007–12), Ministry of Water Resources, New Delhi, 2006.

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Assessment of groundwater resources

The authors[1] have quoted figures of groundwater resources computed by different organizations at different points of time and using data available from different sources. As the methodologies of computations were not uniform, the figures computed during 1976, 1983–84 and 1995 cannot be mixed up.

The computation of utilizable groundwater resources attempted by the authors cannot be agreed upon as two completely different sets of figures based on different scientific principles (rainfall recharge estimates worked out on the basis of physical observations of water levels/rainfall patterns, and the mathematically projected figures of return flow from applied irrigation worked out from the expected utilization of groundwater resources in 2050) have been juxtaposed.

The latest assessment of dynamic groundwater resources was carried out by the CGWB jointly with State Ground Water organizations and a report was issued in 2006. According to this assessment, the dynamic groundwater resources of the country have been computed as 433 BCM. Keeping 34 BCM for natural discharge, the net annual groundwater availability for the entire country is of the order of 399 BCM. The annual groundwater draft has been computed as 231 BCM and the stage of groundwater development as 58%.

1. Garg, N. K. and Hassan, Q., *Curr. Sci.*, 2007, **93**, 932–941.

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