# Augmentation of groundwater recharge and water quality improvement by water harvesting structures in the semi-arid Deccan

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**The effect of water harvesting structures on groundwater recharge and water quality was evaluated in a watershed situated in a semi-arid region in Andhra Pradesh, India. Two percolation tanks and two check dams with a total storage capacity of 4.209 ha m were selected to assess their effect on groundwater recharge and water quality within the influence zone of the water harvesting structures. Daily rainfall, evaporation and storage depth in structures were measured to quantify percolation. Using rainfall–run-off relationship with antecedent precipitation index as a factor, complete water budgeting was carried out. Results show that the threshold value of rainfall for ensuring 1 mm potential recharge is 61 mm. Potential recharge is only 3% of annual rainfall received. Water quality analysis revealed that except pH, all other water quality parameters like electrical conductivity, sodium adsorption ratio, residual sodium carbonate, total hardness, nitrate and fluoride content reached desirable limits in close vicinity (<100 m) to the water harvesting structures. Increased availability of groundwater led to subsequent over-exploitation in below-normal rainfall years and the number of bore wells increased by three times.**

fers, as recharge rates are generally low in comparison with average annual rainfall or evapotranspiration, and thus difficult to determine precisely[3]. Groundwater recharge may be defined as 'the downward flow of water reaching the water table, forming an addition to the groundwater reservoir'[4]. Reliable estimates of groundwater recharge are needed for a number of reasons, including assessing the surface water–groundwater interactions, total availability of water resources, groundwater vulnerability (for both quantity and quality aspects), and formulation of regional-scale artificial recharge and rainwater harvesting programmes. The National Water Policy-2002 of India states that 'there should be a periodical reassessment of the ground water potential on a scientific basis, taking into consideration the quality of the water available and economic viability of its extraction'[5]. Exploitation of groundwater resources should be so regulated as to not exceed the recharging possibilities, and also to ensure social equity[4]. Climate and soil are the two dominant factors in deciding whether or not a water harvesting system will be possible and economically viable. The hyper-arid zone (P/ETP < 0.3) is too dry for viable run-off farming, whereas the sub-humid zone (P/ETP