

WATER BALANCE STUDIES IN A CANAL IRRIGATED AREA OF  
PUNJAB FOR ESTIMATION OF GROUND WATER RESOURCE

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**ABSTRACT**

Proper planning and management of ground water resource requires the greater understanding of the behaviour of water table in relation to recharge and discharge components over a basin. In the present study the ground water potential of south western Punjab has been estimated through water balance studies using historical data of nine years (1974-75 to 1982-83).

Gross recharge to ground water is estimated as a sum of recharge from rainfall, canal distribution system, canal irrigated areas and areas irrigated by wells. The norms adopted by the Water Resources Directorate, Punjab are used for estimating the contribution of these components. The net recharge to ground water is estimated by subtracting the evaporation from water logged areas, ground water draft and subsurface outflow from the gross recharge. The subsurface outflow from study area to the adjoining area is obtained through detailed water balance studies. The net annual recharge thus obtained is used to compute the equivalent

rise in the water table level. This is compared with the observed rise/fall in the area.

The study reveals that average annual gross recharge to ground water reservoir is about 35 per cent of total water input; namely rainfall, irrigation from canals and wells to the area. Recharge from rainfall, canal seepage and return flow from irrigated areas is 20.0 21.6 and 58.4 per cent of gross recharge respectively. This amount gets redistributed in various forms such as ground water pumping, sub surface inflow/outflow, evaporation from water logged area and the resulting change in storage. On an average about 36 percent of the gross average annual recharge to the area goes unutilised as sub surface outflow from the area. The average annual increase in ground water storage is 42136 ha-m. This amounts to 0.42 m rise in water table over the gross command area. Hence, sufficient scope exists for increase in ground water exploitation subject to quality of ground water.