

Groundwater externalities of large, surface irrigation transfers: insights from the Godavari–Krishna river link, India

**BHARAT R. SHARMA¹, SYLVAIN MASSUEL², K. V. G. K. RAO³
& JEAN-PHILIPPE VENOT⁴**

1 *International Water Management Institute, New Delhi office, NASC Complex, Pusa, New Delhi 110012, India*
b.sharma@cgiar.org

2 *CSIRO Land and Water Division, Private Bag 5, Wembley 6913 WA, Australia*

3 *Indwa Technologies, Hyderabad, Andhra Pradesh, India*

4 *International Water Management Institute, PMB CT 112, Cantonments, Accra, Ghana*

Abstract The Krishna basin in South India is a fast closing basin. Consumptive water use, mainly for agriculture, accounted for 90.5% of the basin net inflow. The adjoining Godavari basin is comparatively water rich and it is planned to transfer 5325 million m³ of Godavari waters to Krishna through P-V Link. Such a transfer should make the groundwater-irrigated area more sustainable, a part of the remaining rainfed area will come under irrigation and current benefits shall increase by 65%. MODFLOW results showed groundwater recharge increased by 28% due to supplement irrigation return flow. Annual estimated seepage from the main system was estimated at 183 million m³ per year leading to an average water table rise of 1.83 m. This is also likely to affect 16% of the command with water logging. Integrated planning of surface and groundwater resources and a scientific demand management through optimization of cropping systems have the potential to effectively harness the benefits of the river linking initiative.

Key words inter-linking of river basins; groundwater modelling; groundwater externalities; water-logging; Krishna-Godavari basin, South India