



A review of groundwater recharge under irrigated agriculture in Australia

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Quantification of recharge under irrigated agriculture is one of the most important but difficult tasks. It is the least understood component in groundwater studies because of its large variability in space and time and the difficulty of direct measurement. Better management of groundwater resources is only possible if we can accurately determine all fluxes going into and out of a groundwater system. One of the major challenges facing irrigated agriculture in Australia, and the world, is to reduce uncertainty in estimating or measuring the recharge flux. Reducing uncertainty in groundwater recharge under irrigated agriculture is a pre-requisite for effective, efficient and sustainable groundwater resource management especially in dry areas where groundwater usage is often the key to economic development. An accurate quantification of groundwater recharge under irrigated systems is also crucial because of its potential impacts on soil profile salinity, groundwater levels and groundwater quality. This paper aims to identify the main recharge control parameters thorough a review of past field and modelling recharge studies in Australia. We find that the main recharge control parameters under irrigated agriculture are soil type, irrigation management, watertable depth, land cover or plant water uptake, soil surface conditions, and soil, irrigation water and groundwater chemistry. The most commonly used recharge estimation approaches include chloride mass balance, water budget equation, lysimeters, Darcy's law and numerical models. Main sources and magnitude of uncertainty in recharge estimates associated with these approaches are discussed.