



## Groundwater use for irrigation – a global inventory

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Irrigation is the most important water use sector accounting for about 70% of the global freshwater withdrawals and 90% of consumptive water uses. While the extent of irrigation and related water uses are reported in statistical databases or estimated by model simulations, information on the source of irrigation water is scarce and very scattered. Here we present a new global inventory on the extent of areas irrigated with groundwater, surface water or non-conventional sources, and we determine the related consumptive water uses. The inventory provides data for 15 038 national and sub-national administrative units. Irrigated area was provided by census-based statistics from international and national organizations. A global model was then applied to simulate consumptive water uses for irrigation by water source. Globally, area equipped for irrigation is currently about 301 million ha of which 38% are equipped for irrigation with groundwater. Total consumptive groundwater use for irrigation is estimated as 545 km<sup>3</sup> yr<sup>-1</sup>, or 43% of the total consumptive irrigation water use of 1277 km<sup>3</sup> yr<sup>-1</sup>. The countries with the largest extent of areas equipped for irrigation with groundwater, in absolute terms, are India (39 million ha), China (19 million ha) and the USA (17 million ha). Groundwater use in irrigation is increasing both in absolute terms and in percentage of total irrigation, leading in places to concentrations of users exploiting groundwater storage at rates above groundwater recharge. Despite the uncertainties associated with statistical data available to track patterns and growth of groundwater use for irrigation, the inventory presented here is a major step towards a more informed assessment of agricultural water use and its consequences for the global water cycle.

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