



Assessing supply vs. demand-driven changes in water scarcity

Peter Greve (1), Ted I. E. Veldkamp (1,2), Taher Kahil (1), and Yoshihide Wada (1)

(1) IIASA, Water Program, Laxenburg, Austria (greve@iiasa.ac.at), (2) Institute for Environmental Studies (IVM), VU Amsterdam, Netherlands

Water scarcity, a critical environmental issue worldwide, impacts a wide-range of socio-economic sectors. Anticipated increases in water scarcity will pose substantial challenges to households, farmers, and industries in order to secure a sufficient supply of water in the coming decades. To facilitate an adequate policy-making that addresses the mounting water scarcity problems, a thorough assessment of uncertainties and characteristics of projected changes in water scarcity are of great interest to decision-makers and stakeholders in the water sector. Here we assess global water scarcity projections following feasible combinations of Shared Socioeconomic Pathways (SSPs) and Representative Concentration Pathways (RCPs) for the first half of the 21st century. We identify - alongside trends in average water scarcity - changes in the uncertainty range and drivers of anticipated water scarcity conditions. Our results show that average water scarcity and the associated range of uncertainty are generally on the increase worldwide, including many major river basins. In ca. 4/5 of the global land area that is prone to water scarce conditions (including most semi-arid regions), these increases are dominated by climate change and associated trends in water supply. In other regions, and especially those regions projected to show large relative increases in water scarcity (up to a doubling), water scarcity changes are more likely driven by anticipated changes in human water use. Based on this results, management options to address water-policy challenges and needs in impacted regions are discussed. We further assess the relative importance of sector-specific changes in water demand (domestic, industrial, agricultural sector), that could in particular help to facilitate additional and more targeted adaptation strategies.