



## **More efficient irrigation may compensate for increases in irrigation water requirements due to climate change in the Mediterranean area**

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Irrigation in the Mediterranean is of vital importance for food security, employment and economic development. We will present a recently published study<sup>1</sup> that estimates the current level of water demand for Mediterranean agriculture and simulates the potential impacts of climate change, population growth and transitions to water-saving irrigation and conveyance technologies.

The results indicate that, at present, Mediterranean region could save 35% of water by implementing more efficient irrigation and conveyance systems, with large differences in the saving potentials across countries.

Under climate change, more efficient irrigation is of vital importance for counteracting increases in irrigation water requirements. The Mediterranean area as a whole might face an increase in gross irrigation requirements between 4% and 18% from climate change alone by the end of the century if irrigation systems and conveyance are not improved. Population growth increases these numbers to 22% and 74%, respectively, affecting mainly the Southern and Eastern Mediterranean. However, improved irrigation technologies and conveyance systems have large water saving potentials, especially in the Eastern Mediterranean. Both the Eastern and the Southern Mediterranean would need around 35% more water than today if they could afford some degree of modernization of irrigation and conveyance systems and benefit from the CO<sub>2</sub>-fertilization effect. However, in some scenarios water scarcity may constrain the supply of the irrigation water needed in future in Algeria, Libya, Israel, Jordan, Lebanon, Syria, Serbia, Morocco, Tunisia and Spain.

In this study, vegetation growth, phenology, agricultural production and irrigation water requirements and withdrawal were simulated with the process-based ecohydrological and agro-ecosystem model LPJmL ("Lund-Potsdam-Jena managed Land") after a large development<sup>2</sup> that comprised the improved representation of Mediterranean crops.

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<sup>1</sup>Fader, M., Shi, S., von Bloh, W., Bondeau, A., Cramer, W. (2016): Mediterranean irrigation under climate change: More efficient irrigation needed to compensate for increases in irrigation water requirements. *Hydrol. Earth Syst. Sci.*, 20, 953-973.

<sup>2</sup>Fader, M., von Bloh, W., Shi, S., Bondeau, A., Cramer, W. (2015): Modelling Mediterranean agro-ecosystems by including agricultural trees in the LPJmL model. *Geosci. Model Dev.*, 8, 3545-3561, 2015.