



Assessment of spatial and temporal variability of water use for cereal production in India using a new farmer engagement tool, the Cool Farm Tool Water.

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India has the highest level of blue and green water use globally and over 90% of this water is used for agricultural production. A recent study estimates that more than 50% of the per capita blue water footprint in India can be attributed to cereal production, in particular wheat and rice. In order to reduce pressure on water resources and define ways for sustaining or increasing food production in the future, this study investigates seasonal, annual and spatial fluctuations of water use in India for five major cereals looking at the variability in crop production and climate, as well as changes in irrigation management between 2004 and 2014.

This study employs a new online water assessment tool, the Cool Farm Tool Water, combined with district and state level production and irrigation statistics. Moreover we use the GEOSPHERE crop and irrigation allocation maps for India. The assessment tool is based on the FAO56 approach and is linked to global datasets for climate, crop and soil information.

Results show great temporal and spatial variations between the different cereals. While sorghum and millet show the highest green water footprint, rice and wheat are most dependent on irrigation and therefore have the highest blue water footprint. However, all five cereals show a common trend of reduced total water footprints over the ten year period, due to an increase in yields. This trend is most pronounced for sorghum and millet.

Overall, our findings highlight that increasing production of maize, sorghum and millet can help reducing pressure on ground water resources due to their low blue water footprints. Still, this would also require significant yield increases for sorghum and millet to secure cereal production and reduce green water footprints. These results and the updated cereal water footprints for India will help to develop an understanding of the consequences of shifts in diets and the potential threats of environmental change with respect to cereal consumption in India. By using a free online tool, results can be traced back directly to farm level allowing growers to do an individual assessment.