New on-line tool for crop water footprint assessments for farmers worldwide - Cool Farm Tool Water

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The agricultural sector accounts for 70% of all water consumption and poses great pressure on groundwater resources. Therefore, evaluating agricultural water consumption is highly important for farmers and consumer good producers as it helps to understand the sustainability, risk and environmental impact of crop production. In this context, the green and blue water footprint showed to be a useful and efficient approach to support analysis and decisions.

However, water footprint assessments are often cumbersome for farmers and stakeholders as data and models or experiments are needed. To overcome these limitations we developed CFTW in collaboration with members of the Cool Farm Alliance: A new on-line field scale water tool that enables users to obtain the water footprint, irrigation requirements and the components of the soil water balance with a very limited need for additional data beside the ones already available at the farm. The tool is fully integrated in the already existing greenhouse gas accounting and biodiversity assessment tool CFT. The tool combines the FAO56 approach with various global data-sets providing crop, soil and climate data.

This contribution describes the model and database of CFTW and compares modeling results against observations of field trials presented in the scientific literature for potato, maize and wheat using the soil water balance, lysimeters or eddy covariance systems.

Results show a strong agreement of observed and modeled total water footprints using CFTW ($R^2 = 0.96$). The smallest offset was found for the potato crop, while wheat showed the largest errors. Using CFTW with global soil, crop and climate data-sets and limited user input reduced the root mean square error by over 70% compared to using long-term average state-level estimates.

Our work highlights that finding the optimum between data requirements and an accuracy that fulfills stakeholder needs is crucial. Engaging farmers and using a network as the Cool Farm Alliance will help to achieve this goal. The tool provides a practical, reliable way to assess agricultural water use, and offers a means to engage growers and stakeholders in identifying efficient water management practices.