



## SEBAL Model Using to Estimate Irrigation Water Efficiency & Water Requirement of Alfalfa Crop

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The sustainability of irrigation is a complex and comprehensive undertaking, requiring an attention to much more than hydraulics, chemistry, and agronomy. A special combination of human, environmental, and economic factors exists in each irrigated region and must be recognized and evaluated. A way to evaluate the efficiency of irrigation water use for crop production is to consider the so-called crop-water production functions, which express the relation between the yield of a crop and the quantity of water applied to it or consumed by it.

The term has been used in a somewhat ambiguous way. Some authors have defined the Crop-Water Production Functions between yield and the total amount of water applied, whereas others have defined it as a relation between yield and seasonal evapotranspiration (ET).

In case of high efficiency of irrigation water use the volume of water applied is less than the potential evapotranspiration (PET), then - assuming no significant change of soil moisture storage from beginning of the growing season to its end-the volume of water may be roughly equal to ET. In other case of low efficiency of irrigation water use the volume of water applied exceeds PET, then the excess of volume of water applied over PET must go to either augmenting soil moisture storage (end-of-season moisture being greater than start-of-season soil moisture) or to runoff or/and deep percolation beyond the root zone.

In presented contribution some results of a case study of estimation of biomass and leaf area index (LAI) for irrigated alfalfa by SEBAL algorithm will be discussed. The field study was conducted with aim to compare ground biomass of alfalfa at some irrigated fields (provided by agricultural farm) at Saratov and Volgograd Regions of Russia. The study was conducted during vegetation period of 2012 from April till September. All the operations from importing the data to calculation of the output data were carried by eLEAF company and uploaded in Fieldlook web geo database and used for experiment program management. Quite good agreement between measured and calculated biomass and LAI were obtained. Estimation of effectiveness of water efficiency as well as estimation of applied water losses were done in the base of supplied irrigation water provided by local operating irrigation water supply companies and data of soil moisture monitoring. Following analyse of the remote sensing use to estimate of crop water requirement will be presented.

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