Measuring Water Use at the Catchment Scale for South Eastern Australia – Solving the great unknown in water accounting

Location	Murray Darling basin, Australia
Contractor	Sinclair Knight Merz (SKM)
Period	2009

Scope of the project

How much water is being used by different land cover types at catchment scale is the great unknown in catchment water balances. Measurements of water use are usually at plant or field scale, which is expensive and inaccurate, especially in countries such as Australia. SEBAL is a model that estimates actual water use (actual evapotranspiration) at catchment scale using satellite data.. The objectives of the project were (1) to determine water use at catchment scale and for different land use types within a catchment, and (2) to demonstrate the effectiveness of the SEBAL methodology for a selection of typical land uses in Australia.

Study approach

The application of water use data is split in regional and local scale studies. SEBAL in combination with 250-m MODIS imagery has been used to estimate water use for the entire Murray-Darling basin. These results also were analysed for different land use types.

Furthermore four local scale applications were selected: (1) the macro ground water sharing plan, Blue Mountains (NSW); (2) irrigation and storage management, Darling River (NSW), Broken Hill; (3) the impact of forestry on catchment water use (Victoria forest); and (4) catchment water use by land use and identification of recharge sites (West Gippland). The local scale studies were based on SEBAL calculations in combination wtih 30-m Landsat imagery. In order to prove the effectiveness of the SEBAL methodology some of the local scale results were used for validation with field measurements while other results were used for application.

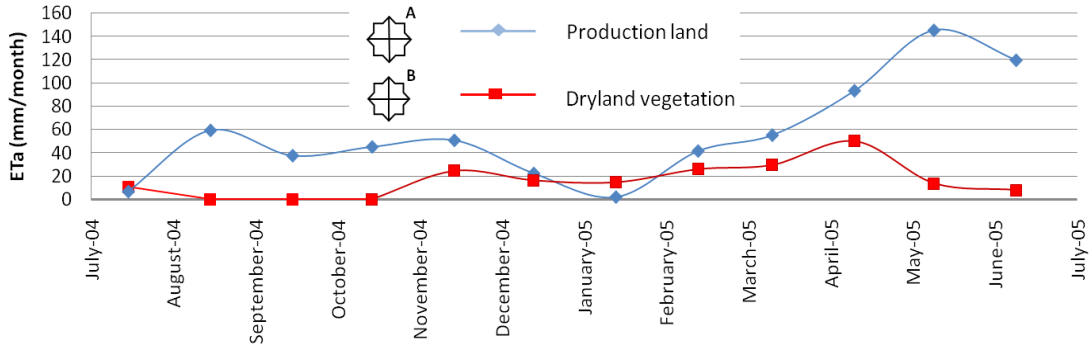
Results

From SEBAL monthly, quarterly and annual MODIS-based ET values for the periods July to June for the years 2002-2003, 2004-2005 and 2007-2008 were derived. SEBAL in combination with satellite images of MODIS and Landsat proved to be able to estimate actual evapotranspiration at different spatial and temporal scales.

Conclusions

This project demonstrated the ability to measure actual water use at very large scales across multiple land use types in a accurate and cost effective manner. The data can be used in the preparation of regional, State and National water balances and assessments.

Monthly timeseries of actual Evapotranspiration



WaterWatch – Generaal Foulkesweg 28 – 6703 BS – Wageningen – the Netherlands

T +31 317 423 401 – F +31 344 693 827 – E info@waterwatch.nl – www.waterwatch.nl