

CSIR builds capacity in water management

Water management in South Africa is set to benefit from remote sensing technology, which estimates evaporation over large spatial scales.

CSIR researchers are being trained to use remote sensing technology developed in the Netherlands to measure evaporation over extensive areas in South Africa. This information could be integrated in catchment water balance modelling and be used by catchment management agencies and others tasked with water resources management. There is currently no local group that estimates evaporation operationally.

This follows the signing of a memorandum of understanding (MoU) between the CSIR and WaterWatch, a Dutch company, to use its Surface Energy Balance Algorithm for Land (SEBAL) technology to determine spatial estimates of evaporation using remote sensing data.

"Using the SEBAL technology, one can now upscale from ground measurement, so-called point-based estimates, to spatial estimates of evaporation over extensive areas at once. The only field-based technique that gives a spatial estimate of evaporation is the scintillometer and the data from this technique can be used to validate the results from SEBAL and other similar models," says Dr Caren Jarman, a senior researcher at the CSIR.

The CSIR's ecophysiology research group has expertise in various micrometeorological techniques for measuring evaporation at point and field scales.

"The MoU with WaterWatch will now facilitate more work between the two organisations and makes provision for the training of our researchers to independently apply and use the SEBAL algorithm. It is anticipated that this partnership will lead to a local centre where evaporation will be estimated operationally for different water resource management applications.

"These are exciting times. We are building good research contacts and exciting new opportunities lie ahead."

WaterWatch is the owner of intellectual property vested in its 'SEBAL' propriety and trademarked software.

"SEBAL is based on the shortened energy balance equation, $R_n - G - H - LE = 0$. R_n is the net radiation, G is the soil heat flux, H is the sensible heat flux and LE the latent heat flux." Jarman says using the information from a satellite, for the modelling of evaporation with SEBAL, both the radiation and the thermal band information are used to calculate the net radiation, soil heat flux and sensible heat flux and hence the latent heat flux. These are calculated at the time that the satellite passes over or sees an area.

The use of remote sensing technology to spatially estimate evaporation is new in South Africa. WaterWatch, together with researchers from the CSIR, has applied the SEBAL model in a number of projects in South



The MOU was signed by Dr Pat Manders, acting director of CSIR Natural Resources and the Environment, and Dr Wim Bastiaansen, scientific director of WaterWatch in the Netherlands. With them is Caren Jarman

Africa, for research purposes, and these projects have been funded mainly by the Department of Agriculture in the Western Cape, Working for Water and the Water Research Commission.

Details of how the centre will function have not been finalised as the two parties have just signed the agreement.

"We are keen to involve other partners, like the Western Cape Department of Agriculture, which has been supporting the potential of spatial data."

Enquiries: [CSIR Communication](#)