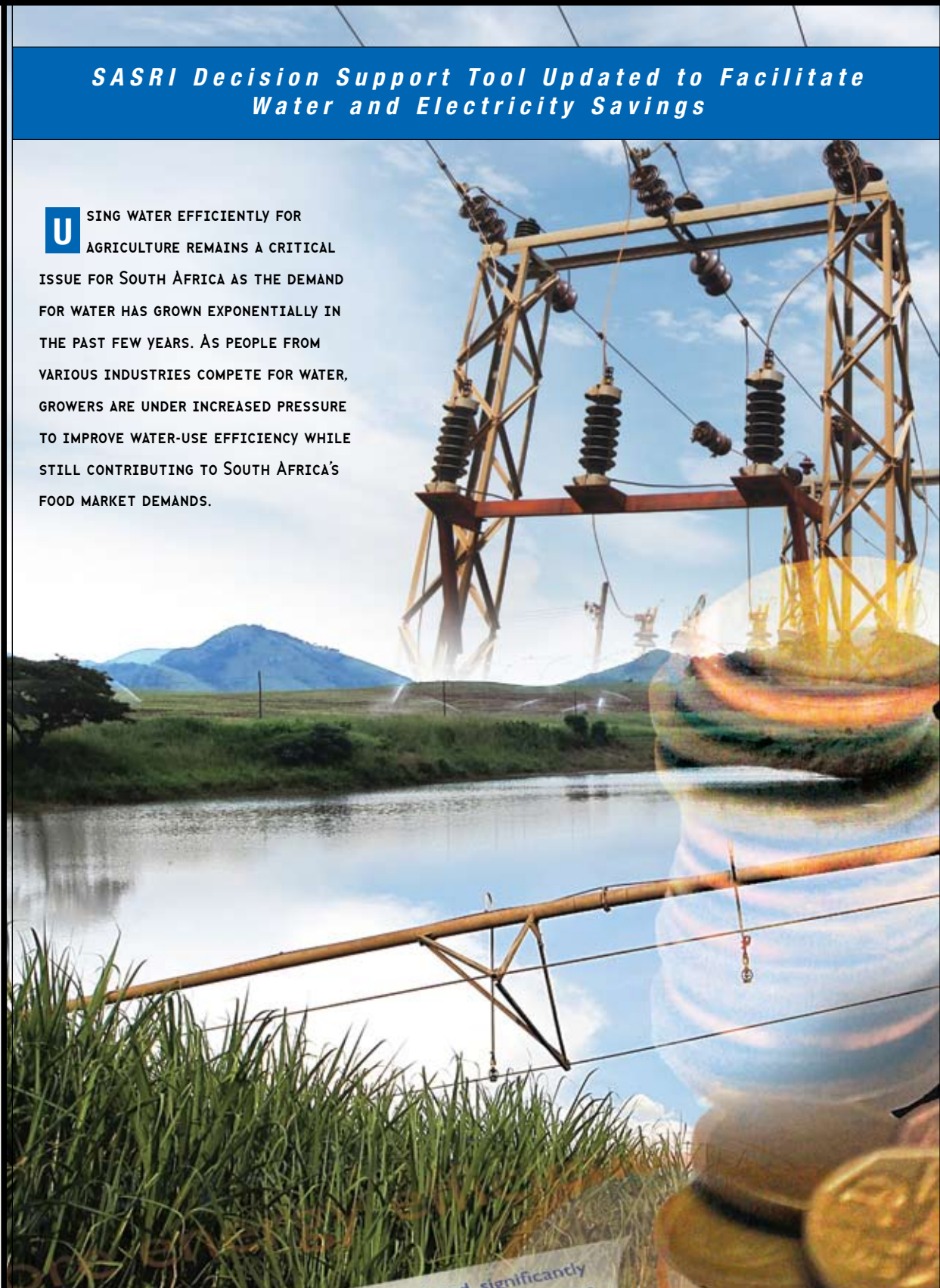


Irrigation Scheduling

SASRI Decision Support Tool Updated to Facilitate Water and Electricity Savings

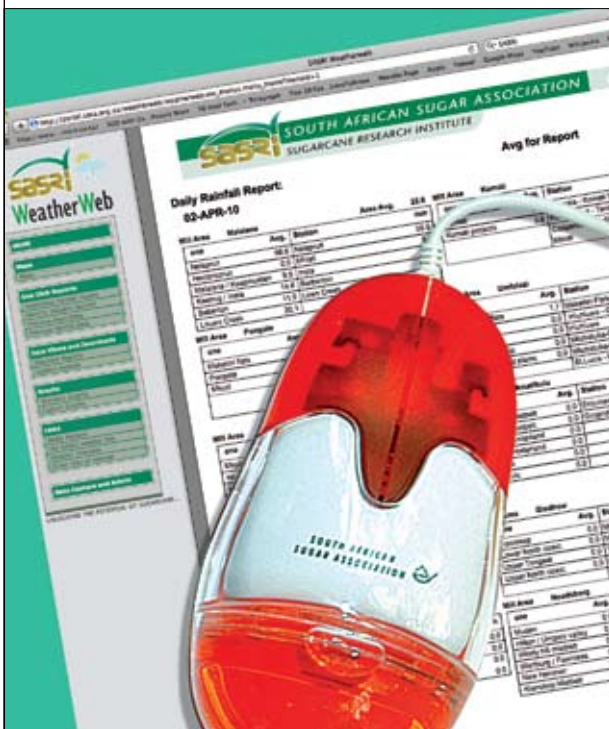
USING WATER EFFICIENTLY FOR AGRICULTURE REMAINS A CRITICAL ISSUE FOR SOUTH AFRICA AS THE DEMAND FOR WATER HAS GROWN EXPONENTIALLY IN THE PAST FEW YEARS. AS PEOPLE FROM VARIOUS INDUSTRIES COMPETE FOR WATER, GROWERS ARE UNDER INCREASED PRESSURE TO IMPROVE WATER-USE EFFICIENCY WHILE STILL CONTRIBUTING TO SOUTH AFRICA'S FOOD MARKET DEMANDS.



With the increase in Eskom's electricity tariffs, the interest in irrigation scheduling tools has become more intense. *SAsched* is a spreadsheet-based water balance and yield prediction tool developed to assist with irrigation scheduling decisions. In a demonstration trial at the South African Sugarcane Research Institute (SASRI) research farm in Komatipoort, various methods and tools for scheduling irrigation were tested. *SAsched* proved to be one of best performing tools and its use resulted in substantial water and electricity savings and excellent crop yields for a plant and 1st ratoon crop.

Recent developments in *SAsched*

SAsched was specifically developed in a spreadsheet so that it would be easy to understand and simple to use. Nevertheless, the process of downloading and updating daily weather proved to be a hurdle. Matthew Jones, a Scientific Programmer at SASRI, provided the key to simplifying this process, namely a method to access the new SASRI weather web (www.sasa.org.za and follow the 'Divisional' links to SASRI and the weather web) directly from a spreadsheet.



Access the new SASRI weather web at www.sasa.org.za

With a few additional developments, the process of updating daily weather data now takes place automatically, provided that weather data is available on the website. Thus, if a grower has access to the Internet, using *SAsched* is now as simple as opening a spreadsheet file; however, it does still require a basic understanding of a water balance and users need to know how much water they are applying. In a further development, the procedure to account for impacts of rain on the water balance at the start and end positions of an irrigation cycle, has been simplified. Thus, knowing when to start and/or stop irrigation after a rain event is relatively straightforward, even for a dragline system with a 10 day cycle.

Potential benefits

The trial at Komatipoort indicated that average water savings of approximately 290 mm per annum are likely if scheduling is improved through the use of a tool like *SAsched*. Assuming electricity costs of R0.21 per m³ and water costs of R0.12 per m³, a typical 100 hectare farm stands to save up to R95 000 per annum in electricity and water savings. Furthermore, improved scheduling is likely to result in better nutrient uptake and improved yields, especially on poor and/or badly drained soils. A yield increase of only 5% on 100 hectares will translate to additional income of approximately R95 000 after paying for harvest and haulage costs.


If water allocations are cut, reducing water wastage and using the water saved to increase the area irrigated effectively, will translate to even greater benefits. For example, consider a 100ha farm using 1000 mm per hectare or 1.0 Mm³ per annum and making a profit of R6 000 per hectare. Assume the water allocation to the farm is cut by 20%. If the farmer carries on applying 1000 mm per hectare without improved scheduling there will only be enough water to irrigate 80ha and the total farm profit will drop to 80 x R6 000 = R480 000. With improved scheduling the farmer should be able to apply 800 mm per hectare on 100 hectares while maintaining or

improving yields. Thus, the whole 100 hectares will only require 0.8 Mm³ per annum (1.0 Mm³ less 20%) and an extra 20 hectares can be kept in production, equating to an extra (20 x R6 000) + R66 000 (electricity and water savings per hectare) = R186 000 increase in the overall profit margin - an increase of nearly 40% at a time when water allocations are cut. Improved scheduling is worthwhile, especially when considering that water allocation cuts could become more frequent and Eskom is proposing tariff hikes which will soon lead to a doubling in the electricity price.

Limitations

If the irrigation hardware has been poorly designed or maintained and water is applied unevenly and in inappropriate amounts, even the best scheduling is unlikely to provide improvements. Thus, a very, very important first step to improved irrigation

performance is to evaluate the irrigation system and correct any problems related to the performance of the hardware. The South African Irrigation Institute (SABI) provides excellent training courses which deal with the evaluation, design and maintenance of irrigation system hardware. (See www.sabi.co.za for more details).

SAsched can be obtained free of charge by sending an email with your complete contact details to library@sugar.org.za 



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