SAPWAT Team Calls for Hands-on Feedback

This project has its origins in Water Research Commission (WRC) initiatives to document the performance of irrigation systems and their on-farm applications while at the same time upgrading the WRC funded computer program SAPWAT.

This project based on field contacts is ongoing, but has already led to the development of a revised version of SAPWAT specifically targeting on-farm management. We have now reached the stage where we would like to introduce the new version and obtain as much hands-on feedback as possible.

We can arrange to make a half-day introductory presentation to a small group in order to explain the application of the model using examples based on the farming activities of members. This will not be a hands-on course but interested groups and individuals will be invited to arrange for follow-up activities specifically suited to their requirements.

There will be no charge for the introductory presentation but obviously the participants will be responsible for the venue and refreshments. The program software will be available on a website at no cost. We have been pleasantly surprised to find that those farmers and others with in-depth irrigation experience who own and use computers have found it possible to evaluate and modify their irrigation management using SAPWAT without, or with very little, instruction. The introductory presentation may, in many cases, be all that is required. People with limited irrigation experience, however, will find it more difficult and will benefit from follow-up activities.

The procedure adopted for the presentations is relatively simple. The members of the group gather around the screen and the facilitator asks them to help set up typical crops for discussion. The reaction of the participants has been gratifying with the relaxed computer game atmosphere created leading to a readiness to suggest a variety of options for improvements both to SAPWAT and on-farm activities.

WHAT CAN A GROUP EXPECT TO GAIN FROM THE PRESENTATION?

SAPWAT "imitates" irrigation and to do this realistically must take into account all the inputs that influence irrigation as well as the interactions between them. Just running SAPWAT exposes the user to all those aspects that should be considered and, irrigation being as much an art as a science, only too often are not!

The user needs to know the evaporative demand of the atmosphere and the water holding capacity of the soil as well as the characteristics of the crops and the performance of the irrigation equipment and so on. If the user doesn't know all this SAPWAT will provide the answers but this will inevitably sow the seeds of honest doubt. Is SAPWAT right and has the user been wrong all these years? Perhaps!

SAPWAT can pin-point the factors that are critical in the management of irrigation. Even training needs and who should be trained.

If the irrigation group and their advisors and suppliers have SAPWAT in their armoury they have common ground for decision-making based on fact.

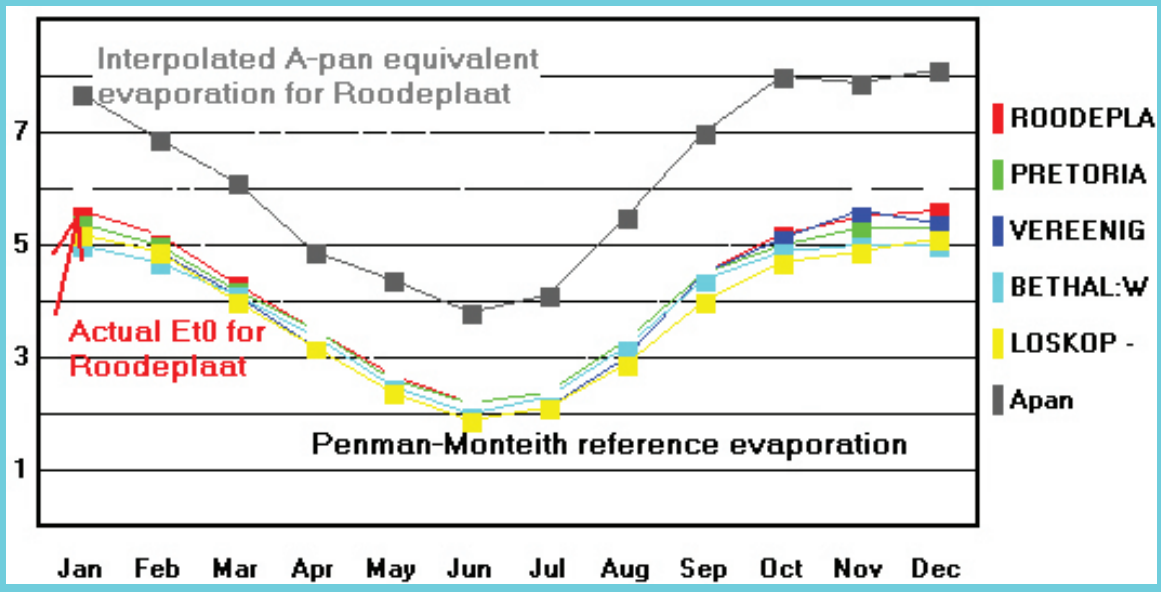
To be valid, however, SAPWAT must stand up and be counted in practice and that is why this appeal is being made.

In the following pages insights are provided into the elements that go to make up SAPWAT with particular emphasis on the extensive databases.

Farmers and scheduling consultant having a preliminary discussion.

Tea time, but lets sort this point out before we join the group.

ATMOSPHERIC DEMAND

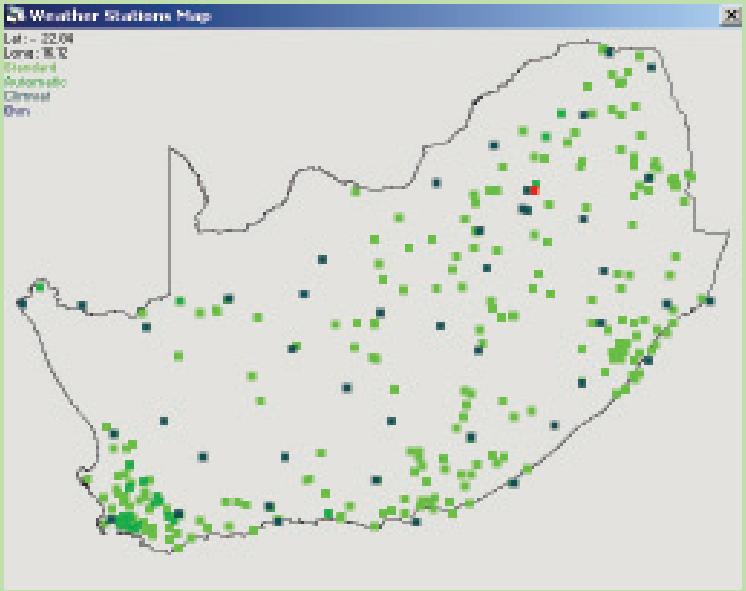


Average daily short grass (Penman-Monteith) reference evapotranspiration in mm

The six weather stations depicted cover a wide area from Pretoria and Vereeniging through to Bethal and Loskop but their average atmospheric demand throughout the year is remarkably similar. There is not the wide differences one would expect. We tend to relate evaporation to temperature but this is only one factor and is not as important as, for example, incoming solar radiation. The graph includes the extensively used A-pan evaporation value for comparative purposes.

The reference evapotranspiration value for the weather station sited out in the desert at Kakamas has an average January value of 9.5 mm per day. Uppington, Prieska, and Kimberley are next in line at 7 mm and are followed by Potchefstroom, Stellenbosch, Adelaide, Montagu, Bloemfontein and Colesberg in the 6 - 6.5 mm category. Pretoria and surprisingly Komatipoort are around 5 - 5.5 mm while the KZN midlands and the Eastern Cape coast is a low 4 mm. There is considerable variation from one day to the next but moving averages are surprisingly consistent.

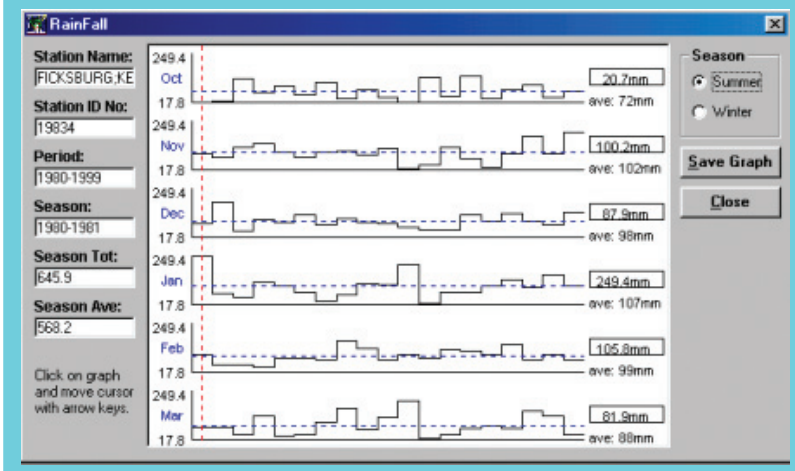
WEATHER DATA



Weather stations - zoom in for names

These are the available weather stations. Long-term evaporation and rainfall data are accessed by clicking on the squares. If you have other weather station data, you can add it to the map. The trick is to pick a station that has climatic conditions similar to those applicable to the farm, this may not be one of the nearest stations.

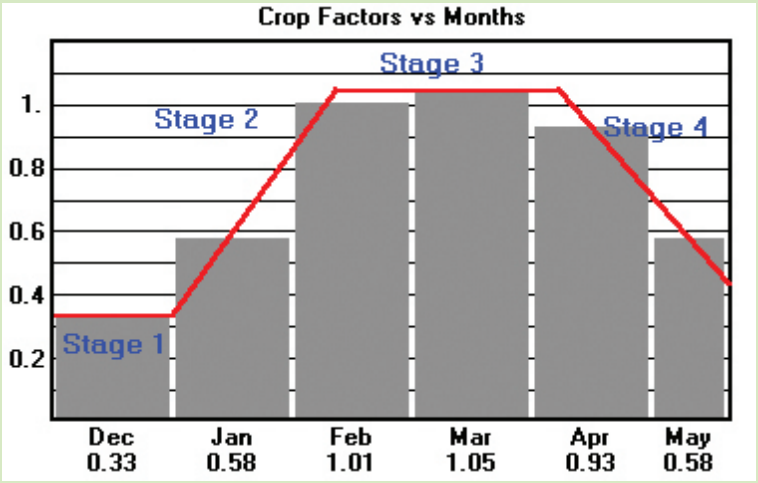
RAINFALL



Example of summer rainfall screen

Over many irrigated areas managing rainfall is an important factor in efficient irrigation during the summer months. There is a tendency to remember the exceptional years, either very wet or very dry, when planning irrigation strategies. As an aid to judgment SAPWAT provides a graphic representation of some 20 years of rainfall records for many of the weather stations. Farmers and designers are seldom statisticians and find it easier to look at the records of the past and, for example, see how often January was dry or what the likelihood is of having two or three dry months following close on each other.

CROP DEVELOPMENT STAGES



Development stages based on ground cover
Stage 1: 0 - 10%, Stage 2: 10 - 100%, Stage 3: 100%, Stage 4: 100 - ?%

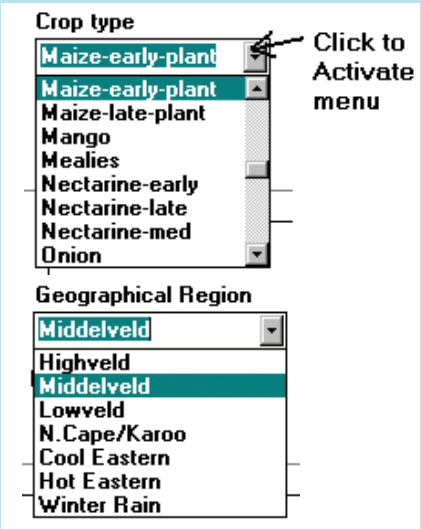
The FAO crop development stages have a major impact on crop factors and consequently irrigation requirements. Climatic conditions affect crop growth, crops develop quicker in warmer climates than in colder climates. Climatic regions and their influence on crop development are included in the SAPWAT database. Obviously planting date is also important so the database includes a range of planting dates, each with its own related phase lengths.

Power, Precision, Production!

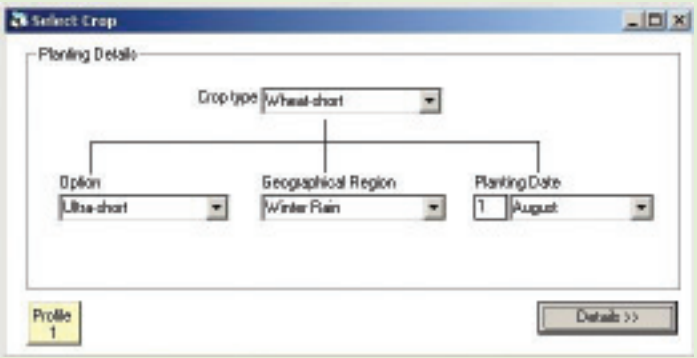
CROPS INCLUDED IN THE DATABASE

CEREALS	FIBRE CROPS	FORAGES	LEGUMES	OIL CROPS	VEGS - CUCUMBER	VEGS - GENERAL
Barley	Cotton	Babala	Beans-runner	Canola	Butternut	Beetroot
Maize		Cereals	Beans_Dry	Sunflower	Cucumbers	Broccoli
Sorghum	FRUIT TREES	Fescue	Beans_Green		Cucurbits	Brussels
Wheat	Almonds	Fodder	Cowpeas	TROPICAL FRUITS	Pumpkin	Carrot
	Apple	Lucerne	Groundnut	Avocado	Spanspek	Celery
ROOTS / TUBERS	Apricot	Summer	Lentils	Bananas	Squash	Clflower
Chicory	Cherries	Sum / win	Peas	Coffee	Squash-baby	Coriander
Patats	Citrus	Perennial	Peas-dry	Datepalm	Watermelon	Lettuce
Potato	Guavas	Ryegrass	Soybean	Grenadella		Onion
Sugarbeet	Macadamia			Litchi	VEGS - SOLANUM	Parsley
Turnips	Nectarine	GRAPES/ BERRIES	SUGAR CANE	Mango	Brinjals	Radishes
	Olives	Brambles	Sugar-annual	Pawpaw	Chillies	Spinach
OTHER	PecanNuts	Vine-table	Sugar-autumn	Tea	Green_peppers	Swiss-chard
Cut_flowers	Pistachio	Vine-wine	Sugar-spring		Paprika	
Mealies	Plums				Tomato	VEGS - PERENNIAL
Opuntia	Peach					Artichoke
Sweetcorn						Asparagus
Tobacco						Strawberry

The database of irrigated crops is extensive but is still in the process of development



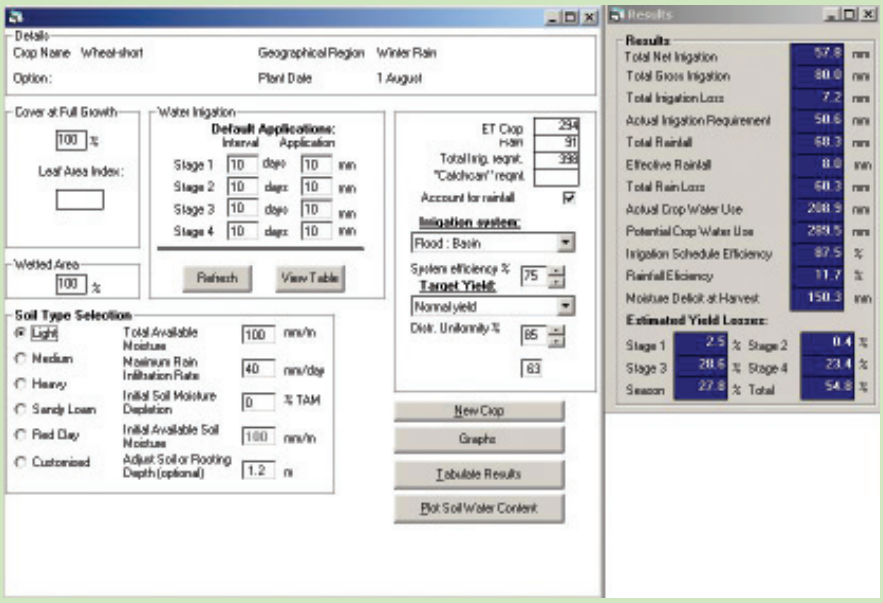
The SAPWAT database includes default planting dates for the various climatic regions as well as stage lengths and the monthly crop coefficients required to calculate crop evapotranspiration. Provision is also made for alternative varieties that may have different development characteristics. Virtually all crops grown under irrigation in South Africa are included as indicated in the table. Crop characteristics and Regions are accessed through drop-down menus and provision is made for the user to edit the files or to add additional crops.

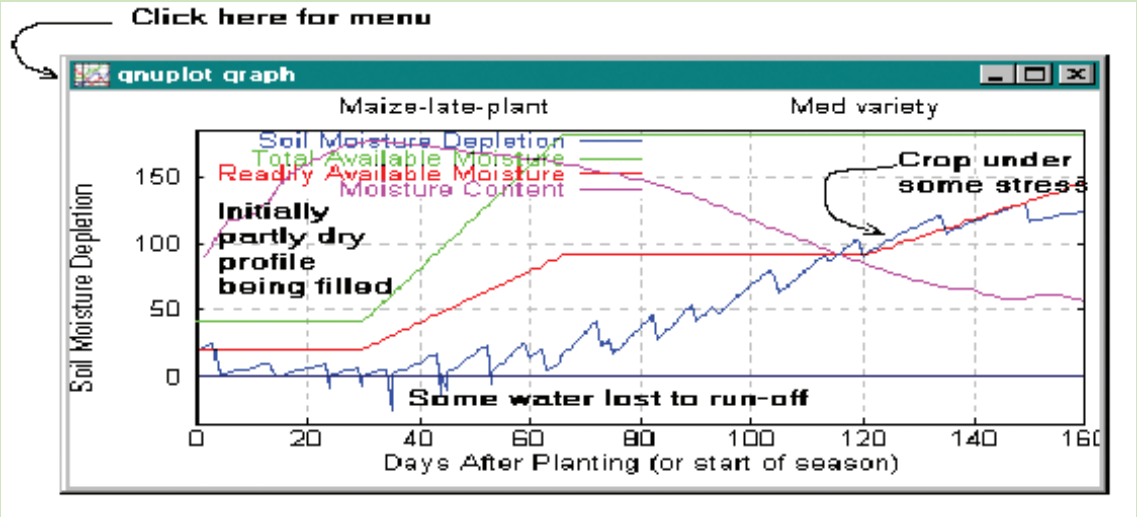


SETTING UP CROP DETAILS

In the new management module of SAPWAT one of the first requirements in setting up the crops is to specify the essential crop information in the screen (left) utilising the drop-down menus.

STRATEGY DEVELOPMENT SCREENS





The new approach to the irrigation strategy scenario development screens.

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HELP AND ASSISTANCE WANTED

Study groups, SABI branches and agricultural scientists and extensionists (and anyone else) interested in helping assess the revised on-farm irrigation management version of SAPWAT should please contact Charles Crosby at 012 803 2870 or 083 456 9489, or Pieter van Heerden at 051 446 1521 or 072 209 9329