



Information Sheet

5. IRRIGATION

5.2 Irrigation strategies during water limiting periods

Droughts are an inherent part of the South African climate. With increasing competition for limited water resources, periods when water is not available to meet full crop water requirements are becoming increasingly frequent. Making more effective use of water is, therefore, vital to sustain agricultural production. The effective use of water and assistance with decision-making, particularly during droughts, is discussed below.

An important strategic decision to be made during a drought or water-scarce period is whether to reduce the area irrigated or to spread the limited water over the whole area.

Reduction in irrigated area

Reducing the area irrigated by abandoning fields is a drastic step which should only be considered as a last resort. The long-term consequences can be very costly. Where a decision is taken to abandon a field as a result of diseased cane, the crop should be completely eradicated to prevent spread of the disease (refer to *Information Sheet 4.2: Cane stool eradication*).

During droughts, it may be opportune to extend the standard three-month fallow period of fields with Ratoon Stunting Disease (RSD) even further. Planting a low input green manure crop like sunn hemp (*Crotalaria juncea* L.) should also be considered. An extended fallow or rotation crop often aids the rejuvenation of soils and helps with the control of pests and diseases. Water is conserved during the fallow and cane yields in subsequent seasons are often significantly boosted, potentially making up for the lost growth during the fallow.

Spreading limited water

There is good evidence that spreading limited water over a relatively larger area results in optimal overall returns due to gains in irrigation and rainfall use efficiency, as well as reductions in variable production costs. Sugarcane is a hardy crop and mild water stress often results in increased sucrose content. Optimal plans for specific circumstances can be investigated in detail by consulting SASRI.

Overall, a flexible approach is best, where some fields may not receive some irrigation water applications but can be brought back into normal irrigation when the water situation improves, rather than being completely abandoned.

Although the maximum growth of sugarcane requires timely and adequate irrigation (or rain) throughout the active growing period, there are two phases in the growing period when the effects of stress are less severe and water savings can be achieved:

- *Prior to harvesting, when water stress is induced by 'drying-off':* stress at this time is actually beneficial and considerable water savings can be made, and
- *In the post-harvest phase, before rapid stalk elongation commences:* mild water stress in this period has minimal impact on yield, provided the stress does not affect final tiller numbers.



Conversely, during rapid stalk elongation the effects of water stress will be relatively more severe and irrigation water applications should be concentrated during this period. Information to assist growers in controlling irrigation during these periods follows.

Drying-off

Normally drying-off involves stopping all irrigation applications for a period of time prior to harvesting. The determination of optimal drying-off periods for specific soil, climate and seasonal conditions can be facilitated by consulting your local SASRI Extension Specialist and referring to the SASRI website. Go to www.sasa.org.za/sasri, select 'Crop Resources' from the menu on the left and 'Drying-Off Advice' from the drop down menu.

Post-harvest

It is good practice to try to refill the soil profile shortly after harvest. Thereafter, the subsequent irrigation water application can be delayed until approximately 50 mm of water has been 'used' by the crop, on most soils. The time that this takes can be estimated by using any one of the scheduling tools provided by SASRI, including:

- *The Excel-based Irrigation Scheduling Calendar Decision Support Program (ISCDSP)*
- *MyCanesim* an internet-based decision support programme (DSP), and
- *SAsched* - a spreadsheet-based DSP.

MyCanesim and *SAsched* can use near-real time weather data in relatively detailed and representative water budgets, taking into account the contributions from rain and different soils. The ISCDSP is based on long-term average weather data. *MyCanesim* and the ISCDSP also account for the presence of a trash blanket. Growers wanting to use any of the above irrigation scheduling tools should consult their local Extension Specialist.

Sensitive growth periods

When prioritising irrigation water applications, consider the most sensitive growth phase to water stress: this is the rapid growth phase just prior to the establishment of a full crop canopy and ends just before the drying-off phase. Therefore, try to ensure that there is adequate irrigation during this period.

As the cane matures, subsequent to this 'rapid stalk elongation period', water can be saved by reducing the amount of irrigation applied and extending the interval between irrigation applications (drying-off), without severe impacts on sucrose yields.

Available water should rather be used for refilling the soil profile on recently harvested fields than for irrigating old and maturing crops. If necessary, give preference to fields that have had only a few ratoons, rather than fields which have had many ratoons and are due to be replanted soon.

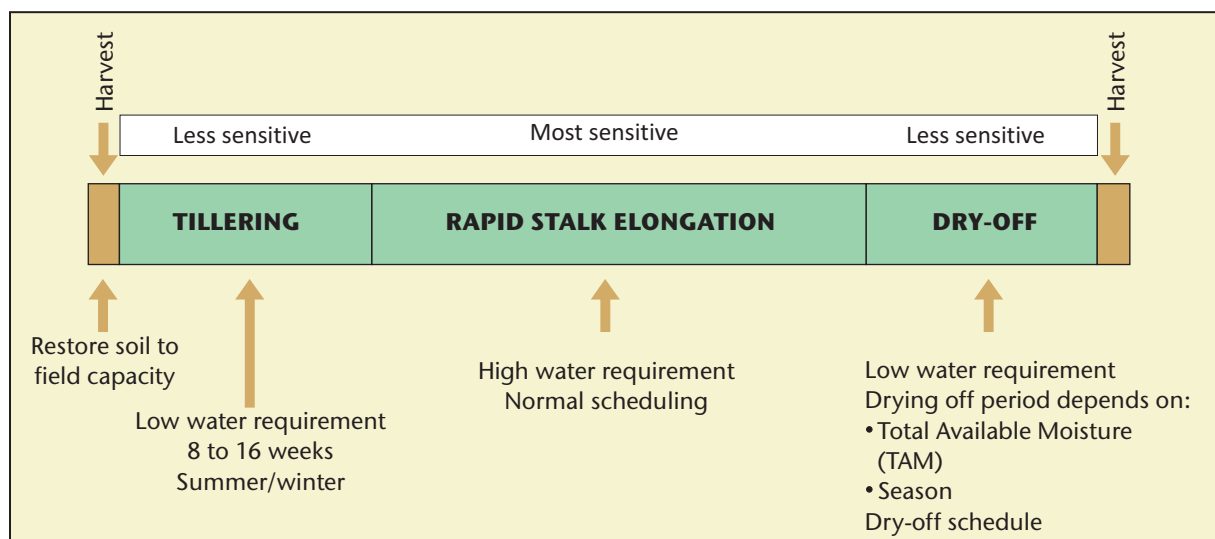


Figure 1. Critical stages of crop water requirements.

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