Germinating Ideas

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The coming season (as at August, 2002) presents many growers with difficult management decisions about the optimum use of available irrigation water for this crop.

Agronomic strategies involving planting date, fertiliser rates, row configuration and irrigation interval will ultimately interact with seasonal conditions to determine the final crop potential and net return to growers.

Considerations in a limited water situation

Area to plant

This season, limited water supply is a major problem faced by many cotton-growing areas. What area of cotton to grow in this situation is a difficult decision. Do you:

• Grow the same area of cotton as usual?

• Reduce the area in proportion to the reduced allocation? or,

• Something in between?

There are risks whatever option is chosen — risk of low yield and failing to break even if the area is not reduced sufficiently, or risk of lost opportunity if the area is reduced too much and rainfall is adequate to grow a larger area. The decision on how much to plant is a calculated risk — it is important to consider all options

When water supply is the major factor limiting production, it is economically rational to maximise the returns per megalitre of water rather than per hectare of land. With reduced irrigation water, the optimum strategy is to reduce the area of crop to allow five megalitres

TABLE 1: Fibre quality: 2002 dryland Ingard trials

Variety	Yield b/ha	Length	Strength	Micronaire
Siokra V-16RRi	2.77	1.09	32.8	4.4
Siokra V-16i	2.73	1.09	32.3	4.6
Sicot 289i	2.70	1.10	31.8	4.9
NuPearlRR	2.65	1.05	28.9	4.8

TABLE 2: Fibre quality: 2002 dryland conventional trials

Variety	Yield b/ha	Length	Strength	Micronaire
Sicot 80	2.20	1.09	33.5	4.6
Siokra V-16	2.03	1.13	33.5	4.8
Delta Diamond	2.03	1.05	32.2	4.8

Slight increases in irrigation intervals early in the season cause less yield loss than running out of water before the end of flowering.

per hectare on September 1 in the north and six megalitres per hectare in the south.

This will maximise the returns per megalitre and reduce the risk of failing to break even. This situation can then be reviewed prior to the first irrigation and provides a basis for making a decision if required to reduce the area irrigated and leaving the balance as a raingrown crop.

Increasing water deficits or late season plant stress?

A crop's requirement for water alters throughout the growing season and so the impact of water stress on final yield will vary depending on when the water stress occurs and the length of time for which the stress is imposed. Growers may manage a water limited season by stretching their irrigation intervals throughout the season or alternatively may cut off the water to the crop before it has finished maturing.

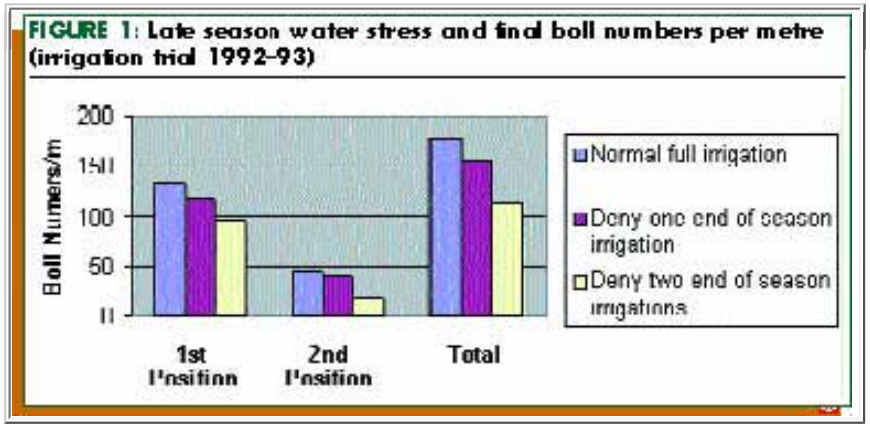
Slight increases (two to three days) in irrigation intervals early in the season will cause mild stress to the plant and may reduce plant vigour and fruit load. But this is far less damaging to final crop yield than if water is cut off to the crop prior to the end of flowering.

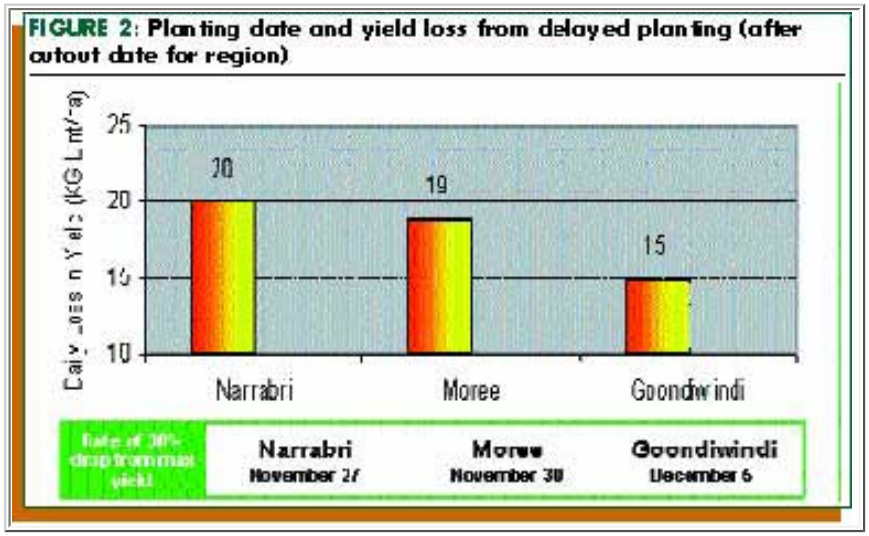
A trial conducted in 1993–94 compared stretching irrigation intervals by increasing the water deficit from 70 to 85 mm for each irrigation (Figure 1). This resulted in the need for one less irrigation, but it caused a yield reduction of 1.45 bales per hectare. This was compared with imposing late crop stress by reducing the normal irrigations by one at the end of the season.

Yield was reduced by 1.62 bales per hectare from denying the crop its final irrigation. (Source: Gibb, D. 1995. Cotton Production During Drought)

Field selection

When the area is reduced, the best fields should be selected on the basis of cropping history and ease of irrigation. These fields should be fallowed, clean (in terms of weeds and disease)





with the least compaction and waterlogging problems. Compacted soils will reduce the amount of water available to the plant and so may require more frequent irrigations.

It is also sensible to select fields that are easiest to supply with water. Irrigation efficiency falls significantly when a channel system designed for a large area has to be filled in order to water only a few fields.

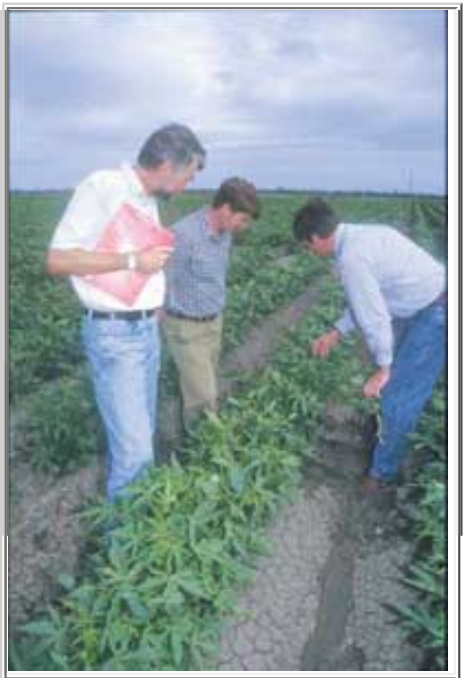
Planting date

Delayed planting may be considered. The objective of this is to increase the chance of receiving effective rainfall for planting and so save what water is available for use during peak crop demands. But such an option must be considered against the potential decrease in yield from delayed planting and the increase in growing costs from producing a later maturing crop. Long-term weather data and planting date trials suggest that yields begin to decline when planting is delayed beyond the second or third week in October, depending on locality.

But in dry seasons with limited water, late plantings (mid November) can produce a crop during more favourable rainfall periods and so result in an increase in yield. Figure 2 indicates, for different regions, daily loss in yield with delayed planting and that planting date for which a 30 per cent drop from maximum yield can be expected.

Fibre quality and possible increase in discounts resulting from delayed planting must also be considered. With late-sown cotton, a higher proportion of developing bolls are exposed to cooler growing conditions and this can delay crop maturity and result in the production of lower quality fibres. Varying crop planting dates across the farm is one management option which can be used to reduce the risk of total crop failure in drought years. (Source: Oct. 1994 Cotton Row Configuration & Reduced Irrigation, Cotton CRC Newsletter Vol 1, No. 5. Gibb, D.)

Nitrogen management



Varieties with long fibre are good choices for limited water situations provided they can maintain yield.

Skip row cotton may be an option in a water limited year.

The response of rain-grown cotton to nitrogen fertiliser is limited, even in high yielding crops. This would indicate that as yield potential decreases with reducing water allocation, less nitrogen is required. Trials carried out in Narrabri combining nitrogen and irrigation deficit showed that if yield potential is less than five bales per hectare, little nitrogen is required.

If high rates of nitrogen are used in a situation of limited water, incorrect timing of irrigation or rainfall can cause excessive vegetative growth.

Excessive growth early can cause inefficiency in yield production with extra moisture being used for vegetative growth rather than boll development.

A possible strategy would be to apply a low amount of pre-plant nitrogen, based on the assumption that water stress is going to restrict yield. If extra water becomes available later in the season, additional nitrogen can be applied prior to or during early flowering.

Applications after this time are generally not beneficial and will probably cause regrowth problems. It is also important to consider the cropping history of the field, as a long fallow will reduce the need for high nitrogen fertiliser rates, as would a field whose previous crop was a legume.

Varietal choice

Selecting a variety

Many growers are tempted in a water limited situation to use early maturing varieties to avoid moisture stress. The intention is to utilise seedbed moisture and early season rainfall and finish the crop earlier.

All the research carried out on this strategy strongly concluded that this does not work. In full season areas, early season varieties were more sensitive to stress, possibly due to shallower roots, and also had a lower yield potential. Full season varieties performed best under raingrown and limited water situations.

Full season varieties are best for dryland and limited water scenarios.

The use of Roundup Ready varieties are a considerable advantage in a water limited situation. Pre-plant residual herbicides can be left out, which allows the grower to quickly get in, plant and water up a cotton crop if adequate rainfall or increases in water allocation do occur, with the added benefit of being able to confidently control weeds after emergence. This also gives the grower greater flexibility as the full range of summer crop options is available as they are not committed to planting cotton.

Fibre quality

The choice of variety is critical under water limited situations as fibre quality parameters become proportionally more important to profitability as the crop is placed under increasing water stress.

Varieties with inherently long fibre are good choices for water limited water situations provided they can maintain yield.

Fibre length discounts can turn even good yields into very ordinary net returns.

Dryland growers know this and only plant the highest yielding and best quality varieties.

The 2002 dryland trials generally experienced late season moisture stress and can be used to indicate relative performance under water limited situations.

Recommended varieties

Varieties recommended for water limited situations are:

- Sicot 80 118 (8);
- Sicot 289i 107 (9); and,
- Sicot 289RRi 110 (3).

Note: all varieties recommended have F rank over 100.

Varieties recommended for disease free, water limited situations are:

- Siokra V-16 19 (6);
- Siokra V-16i 12 (2); and,
- Siokra V-16RRi.

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