Cotton Catchment Communities CRC
Queensland Government Department of Primary Industries and Fisheries

COTTON TALES

Border Rivers

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2007/08
1.
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Limited Water & Planting Decisions.

Source: WaterPAK sec 3.4 Steve Milroy & Dirk Richards

How much cotton should I plant and irrigate:

Firstly, you have already prepared a certain area in anticipation of the 2007 cotton season to take advantage of any changes in water availability.
You will then need to consider –

- How much of this area should be planted?
- What proportion of this area should be irrigated?

The answers are a function of the total water supply available for application to the crop from all sources - from the river and bore allocation, on-farm storage and any expected off-allocation pumping, ultimately aiming for a minimum 5 to 6 ML of supply per Ha.

For further information on optimal planting area under limited water scenarios check out HydroLOGIC

Table 1: Water Supply required 1st Sept (pre establishment) and re assessed prior to first in crop irrigation 1st Dec.
ML/ha required to reduce risk of failing to breakeven to less than one out of 10 years and the supply which maximises returns per megalitre.

	Supply Ml/Ha 1st Sept		Supply Ml/Ha 1st Dec	
Region	**Break even in 9 out of 10 years**	**Maximise Returns per ML**	**Break even in 9 out of 10 years**	**Maximise Returns per ML**
Border Rivers	5.2	6	3.2	4
St George	5.5	5	3.5	3
Gwydir	5.3	6	3.4	4

**Assumes an Irrigation Efficiency of 75%*

Where your irrigation efficiency is less than 75% (that is, ¾ of the water supplied is used by the crop as evapotranspiration after accounting for storage, distribution and application losses.), the figures will need to be adjusted accordingly.

For further information to estimate your Whole Farm Irrigation Efficiency check out WaterPAK topics 2.1 Assessing Whole Farm Efficiency

Field selection:

The efficiency with which water is supplied to the field is more variable than the efficiency with which a crop uses the water delivered to it.

- **Efficiency of water supply**

Therefore, proximity to the best storages or being supplied by the best channels is the first factor to consider in field choice.

- **Yield expectation**

Fields with a history of high yield may be valuable, but reference to water use records may show that yield is commensurate with water use.

Pre-plant agronomic considerations:

Ideally agronomic management does not promote excessive crop vigour or delay maturity too much.

- **Nitrogen rate**

Under limited water the crop response to N is less, further there is a risk that excessive fertiliser will promote early growth potentially increasing WU early on and delay maturity.

For further information check on optimal N rates check out NutriLOGIC:
http://tools.cotton.crc.org.au/CottonLOGIC/NutriLOGIC

- **Variety**

Work by W.N. Stiller, CSIRO have shown that the cultivars which do best under irrigated conditions are generally those which do best under dryland or reduced irrigation conditions also, so choose a maturity type suited to your region. Cultivars with inherently long fibre provide a buffer against reductions in fibre length which may occur due to water stress. Okra-leafed cultivars as a group do relatively better under dryland conditions and may offer an advantage under limited water situations also.

For further information on variety comparison check out CSD Agronomic tools: http://www.csd.net.au/

- **Sowing date**

Cotton yield declines with delayed sowing due to the shorter time available to initiate and mature an adequate number of bolls. As a general rule, as the available water supply decreases, the expected decline in yield potential with sowing date begins somewhat later. This is because the crop is already yield-limited and so doesn't need as much season length to achieve the new water-limited yield potential. Excessive delay, however, may increase the risk of quality downgrades due to increased risk of late maturing bolls under cool conditions.

Table 2: Sowing date after which yield declines for different irrigation supplies. The higher the potential yield (higher irrigation supply) the greater the growing time required to reach maximum yield for that supply.

Region	Irrigation supply per hectare		
	2 ML	4 ML	6 ML
St George	30 Nov	15 Nov	15 Nov
Border Rivers	30 Nov	15 Nov	30 Oct
Gwydir Valley	15 Nov	15 Nov	15 Oct

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- **Irrigation strategy**

Watering-up is preferred to pre-irrigation, bearing in mind general management difficulties associated with watering-up.

Don't risk stretching the irrigation interval beyond the target deficit. This may pay off in some seasons, it is better to skip the last irrigation to allow maximum chance of catching rainfall or increased allocation before locking in to a reduced yield potential.

With very severe shortages there may be some advantage in delaying first irrigation a little, which is preferable to stress during flowering, when the crop is more sensitive. (WATERpak Topics 2.1 and 3.1)

As Steve Yeates and Dirk Richards report "In research conducted at Narrabri, Bollgard®II was found to accumulate yield faster than conventional cotton due to higher retention combined with a very low proportion of tipped plants. This meant that late in flowering and at cut-out Bollgard®II was less able to compensate for water stress equal to a depletion of ≥120mm of soil water (≥ 58% plant available soil water) and yields were lower relative to conventional cotton stressed at the same time. Therefore, stretching water late in the season as a result of limited water will have a larger impact on Bollgard than a conventional crop."

Major Upgrade for Cotton Nutrition Tools

http://tools.cotton.crc.org.au/CottonLOGIC/NutriLOGIC/

The NutriLOGIC program has recently undergone a major revision; it is now more user-friendly, provides information and analytical support for all major nutrients, provides interpretation of soil, petiole and leaf analyses and is relevant for high and low yielding cotton crops.

NutriLOGIC-on-the-web is an uncomplicated tool delivered through the Cotton CRC website, designed to aid cotton nutrient management. The information presented is derived from up-to-date cotton nutrition research.

NutriLOGIC-on-the-web helps interpret soil and leaf analyses for all major nutrients, and indicates when fertiliser application maybe warranted for individual fields. Petiole nitrate analyses are also interpreted. Growers need only enter the sowing and sampling dates, and the chemical analyses from their laboratory report.

Monitoring the nutrient status of each cotton field is essential to optimise yields and use fertilisers effectively. Inappropriate use of fertilisers affects profitability through increased input costs; excessive use of N fertilisers may damage the environment through greenhouse gas emissions and contamination of groundwater.

Specifically, the tool helps to interpret levels of the major nutrients (N, P, K & S) from soil tests and indicates where soil sodicity and salinity may affect production. The N fertiliser calculations have been fined-tuned to allow for cropping history, soil compaction and crop response to N inputs.

NutriLOGIC-on-the-web also interprets petiole nitrate nitrogen analyses to indicate crop N status and suggests fertiliser addition if required. To save time NutriLOGIC automatically retrieves Growing Day Degree data from the weather station selected, based on the crop sowing and sampling dates entered.

Importantly, NutriLOGIC-on-the-web can now interpret both major and minor nutrient levels in leaves sampled throughout the season and can indicate whether the nutrient status is adequate for that stage of crop growth.

NutriLOGIC-on-the-web provides general information on soil fertility and cotton nutrition through direct links to NUTRIpak and SOILpak. These links contain further information on cotton crop nutrition requirements, sampling techniques for soil or plant tissue, soil structure and soil chemistry.

Future upgrades will include graphing capabilities and integrate information on nutrient removal, based on cotton yields.

Thanks to Dirk Richards, Sandra Deutscher and Ian Rochester, CSIRO and the Cotton CRC for their contribution in developing this information.

Reminder: Soil Workshop Date: 30th of August

Time: 9:00 am – 1:00pm
Location: 'Carbucky', Boomi Rd, Goondiwindi, NSW

Understanding your soils health is a crucial tool to have in creating a profitable and sustainable farming system.

A soil workshop will be held on the 30th of August in the Goondiwindi region to help in understanding soil and some of its limitations in your area. The day will involve practical hands on look at the soil via soil pits under different management techniques and include expert advice from renowned soil management consultant Dr Pat Hulme (Sustainable Soils Management).

With the information provided growers and their consultants will be able to make more informed decisions and implement appropriate management practices based on knowledge of their own soil resource.

For further information or to **RSVP please contact :**
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