Drought positive initiatives in the lower Balonne

By Hamish McIntyre

During one of the driest periods of the past 100 years, many lower Balonne irrigators have taken the opportunity to raise the height of their empty water storages. Raising the wall height increases water depth and reduces surface area. This is the first step taken by irrigators to improve their water use efficiency.

Irrigators are also decommissioning other storages on farm so their take of water from the region's rivers is not increasing — just being stored more efficiently. Effectively they are growing more cotton with the same volume of water, by reducing their evaporation losses. Two metres of water is lost annually to evaporation in the region.

The drought, and subsequent empty water storages, has given irrigators the opportunity to move dirt from inside their storages, and lift the existing five metre banks up to eight metres on average. Storages require approximately one metre of free board — so this increases water depth to seven metres as against four

56 ▷

At "Cavillon" Dirranbandi, raising a dam wall during the drought.

metres previously. It costs around the same again to add the three metres on top as it did originally to build a five metre wall. This is due to the large quantity of dirt in the batters of the dam. It costs roughly $1 per cubic metre to move the soil into the new configuration.

REDUCED EVAPORATION

Queensland Department of Primary Industries studies show that evaporation is reduced by 56 per cent with eight metre walls compared to three metre walls in the lower Balonne.

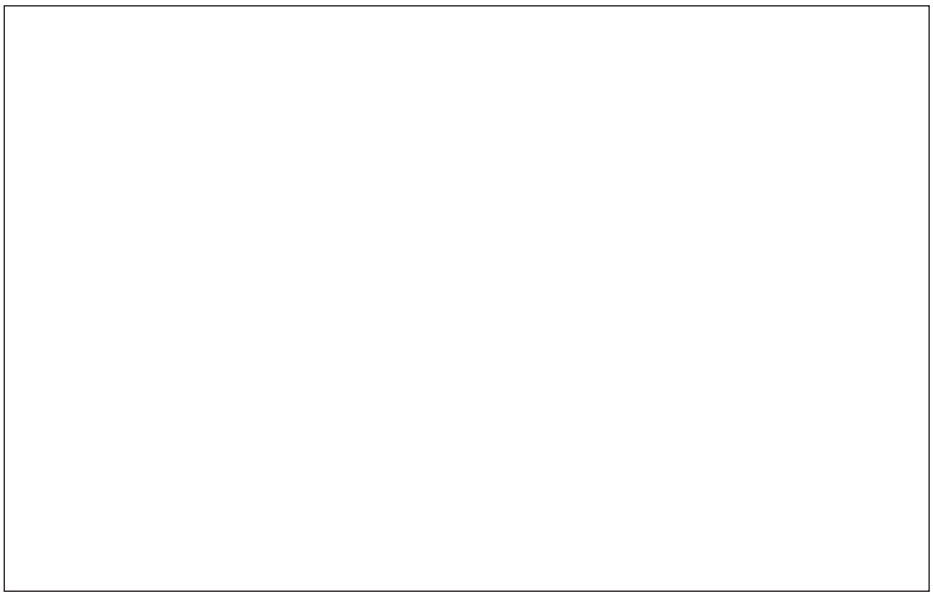
Australian Cotton CRC figures show the Australian irrigated cotton crop uses only just over half of the irrigation water supplied to the farm gate. Forty to 45 per cent is lost within the farm system through conveyance, storage and application losses or poor scheduling.

According to Paul Dalton from the National Centre for Engineering in Agriculture, "Australia consumes 22,185 gigalitres of water annually. Seventy per cent (15,502 gigalitres) is consumed for agricultural production and from that amount the cotton industry consumes 11.9 per cent (or 1,840 gigalitres)."

And the water savings can translate into major financial benefits. In the agriculture sector, cotton is second only to the horticultural industry as a value adder to Australia's water resource.

On a dollar return per megalitre of water consumed basis, the farm gate value of irrigated cotton is $613 per megalitre. This means that every megalitre of water the lower Balonne irrigators save from evaporation losses could mean another $613 in their pockets.

A typical cotton farm in the region is losing approximately $250,000 annually due to evaporation. In the Gwydir Valley, evaporation losses have been estimated at more $50 million per year.



Extending delivery pipe at "Cavillon" Dirranbandi.

MINIMUM STANDARDS

Queensland Department of Natural Resources and other registered irrigation design engineers have published best practise methods and minimum compaction standards that should be followed when building referable height storages. These mainly relate to the use of compacters in conjunction with other machinery.

Also, if the soil moisture content is too low, then water should be added to the wall during the construction stage. Water trucks with basic council-type booms can do this job adequately.

Scrapers, laser buckets and bulldozers are the three most common type of earth-moving machinery used in lifting the height of storages. It is critical to run the soil out in the thinnest of layers to get best possible compaction standards. Bulky loads with big rough aggregates tends to leave air pockets in the wall which can reduce compaction levels as walls dry out.

It is critical to blend the old wall with the new, by ripping the old wall to a depth of approximately 500 mm, before placing new dirt on top. Water will follow a shiny surface along and could cause a breach where the new and old wall meet.

It is very important to use the same soil type from start to finish, if possible. Many storages have breached along soil type changes because they usually have different moisture holding capacities. The more clay in the soil, the better it is for storage construction. Soils with high sand content are best avoided.

Pump stations usually have to be modified to pump water into a higher head of water. Many pumps will start to cavitate when trying to push water into deeper storages.

Adjusting the pitch of the impellers will help maintain pumping efficiency. Pumping water usually cost around $15 per megalitre. If using the right equipment, this cost will roughly stay the same when water depth is increased in storages. Storage inlet pipes usually have to be extended slightly to allow for the increased batter width.

Good planning during the drought will allow many irrigators in the lower Balonne to bounce out of the current dry spell with an ability to grow more acres of cotton using the same amount of water.

Their forward thinking is already paying dividends as they harvest large amounts of water from the January rains. And they will be secure in the knowledge that a bigger percentage of this water will be available for their next cotton crop.

This article was written by Hamish as an assignment for the CRC Cotton course at the University of New England. We hope to feature one or two other articles by students in the next issue.