Summary

A field trip to six cotton farms in Northern NSW was undertaken in March 1995 by Geoff Sainty (Sainty and Associates), Anthony Scott (CSIRO Division of Water Resources) and Scott Condey (CSIRO Centre of Environmental Mechanics). The aim of the trip was to obtain data on water management practices associated with irrigation cotton farming, and discuss with farmers potential methods of reducing water loss through evaporation.

a) Cost of Evaporation losses from off-river storages on cotton farms
Pan evaporation in the cotton growing districts of northern NSW is over 2000mm per year. The cotton industry estimates that up to 50% of water in off-river storages is lost to evaporation. The cost of evaporation losses for a 700ML storage on the Wyadrigah cotton farm was estimated as follows; Evaporation losses were 1.2 metres between March 1994 and January 1995. This equals 420ML of water, and (assuming 6ML/hectare of cotton) is equivalent to 70 hectares of cotton. At a price of $500/bale this equals lost production of $200,000.

All the cotton farmers interviewed considered the loss of water from evaporation as one of their major problems and were very keen to learn about techniques of reducing these losses.

b) Deeper storages reduce the evaporation losses.
Constructing deeper storages reduces the amount of water lost through evaporation since there is less water surface area from which evaporation can occur. For instance a 500ML storage which is 2 metres deep has a surface area of 25 hectares, whereas a 500ML storage which is 4 metres deep only has a surface area of 12.5 hectares. Therefore evaporation rates are halved. Although the cost of building storages increases with depth, all farmers interviewed considered it worthwhile to build storages which were 4 (or more) metres deep so that evaporation losses would be reduced and the area of land taken up by the storage would be minimised. However, there was concern expressed at building storages with earth walls higher than 5 to 6 metres due to the risk of a failure.

c) Split large storages into cells.
Another method of reducing evaporation is to split large storages into 2 (or more) cells. Rather than have the entire storage only half full (which is a common occurrence), the water is all stored in one cell. This halves the surface area of water and hence halves the losses due to evaporation. Alternatively, if there are two storages on the cotton farm that are half full, evaporation losses can be reduced by transferring all the water to one storage and leaving the other storage empty. This type of water management is practised on a number of cotton farms including Norwood.

d) Use of windbreaks to reduce evaporation
There are suggestions that if the storages are lined with trees, these will act as windbreaks and reduce the rate of evaporation. However, many farmers expressed concern that planting trees on or near the earth walls might cause them to crack and ultimately lead to a failure. Another suggestion is to plant trees along custom built embankments within the storage. This suggestion overcomes the problem of planting trees on the main storage walls, but has the disadvantage of the added costs associated with building extra walls within the storage. These extra walls (or

embankments would also reduce the capacity of the storage facility. Additionally, there was some concern about the quantity of water that the trees themselves might consume and whether this might be greater than the savings created by the effects of having a windbreak.

e) Place plastic rings on the surface of the water

Reducing evaporation by placing plastic rings on the surface of the water, was considered by all farmers interviewed as a proposal worth pursuing and were keen to see further tests carried out. Plastic rings, or for that matter any other material that covers the water surface, will significantly reduce evaporation losses. Although all the farmers mentioned practical problems with the placing of large numbers of rings on their storages, most felt that there would be ways of overcoming these problems and provided a number of suggestions.