RURAL INDUSTRY RESEARCH FUNDS
FINAL REPORT

Authorised Body: COTTON RESEARCH COUNCIL

Project Number: DAN 10L

Project Title: AN EVALUATION OF DRIP IRRIGATION IN COTTON

Field of Research: Agronomy Field code: 2.2

Organisation: Department of Agriculture, NSW

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Commencement and completion dates: August 1983, June 1987

OBJECTIVES

* To make a direct and impartial yield comparison between two types of drip irrigation and standard furrow irrigation. This study should determine whether drip irrigation is a viable alternative to traditional methods.

* To use a drip irrigation facility as a research tool to study waterlogging, nutrient uptake, water relations, physiology of fruiting and root distribution.

* To determine new cultivar suitability for drip irrigation.

BUDGET SUMMARY

	1983/84	1984/85	1985/86	1986/87	
Salaries	3500	3850	3850	1840	
Operating	2000	2500	2500	1200	
Capital	20600	1950	1300	-	
Total	26100	8300	7650	3040	45090

SUMMARY OF RESULTS

Surface (SD) and buried (BD) methods of drip irrigation were compared with furrow irrigation (F) over four seasons on a cracking grey clay soil. Drip irrigated treatments were watered to maintain a deficit of 45 mm; while F was watered on a deficit of 90 mm. Nitrogen fertilizer was applied weekly to drip irrigated treatments during watering over the first half of the season; and to F as one application before sowing.

Emergence was slower for seeds sown in a SD system than for BD or F. This delay was associated with slower sorption of water from drip laterals located in the furrow to seeds sown in the top of ridges.

In two hot seasons there was heavier yield from SD and BD irrigation than from F; in one wet season the yields were the same; and in another season there was a slight reduction in yield with drip irrigation. Average lint yields for cultivar Deltapine 61 over the four seasons were: 1633, 1736 and 1676 kg/ha for SD, BD and F, respectively. The cultivar Siokra had more stable performance under drip irrigation than Deltapine types. Both types of drip laterals were capable of maintaining a consistent output of water and fertilizer over the 200 m long field. Drip irrigation generally delayed maturity, which was associated with delayed nitrogen uptake and reduced fibre micronaire when compared to F. Fibre length and strength were generally not affected by method of irrigation.

It was concluded that the performance of drip irrigation did not justify the high economic outlay to grow cotton on this soil type, especially in cool or wet seasons.

ACHIEVEMENT OF AIMS

All objectives were achieved. Good results were obtained on the relative yield potential of drip and furrow irrigation at this site. Recommendations can be made for a range of circumstances regarding whether drip irrigation would be economic.

The drip irrigation facility was a valuable research tool. We have used the experiment for a number of projects including waterlogging, nitrogen uptake, trace element uptake, mapping of fruit initiation and survival, and root distribution studies.

The locally bred cultivar 'Siokra' was better adapted to drip irrigation than Deltapine types. This difference was due to disease resistance and to more open canopy growth characteristics.