

AUTOMATIC BORDER CHECK IRRIGATION – THE WATER SAVINGS

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Acknowledgement

This project was funded as part of the Goulburn Broken Catchment Management Authority Regional Catchment Strategy in the Shepparton Irrigation Region and are provided with support and funding from the Australian Government and Victorian Government through the National Action Plan for salinity and water quality and the Natural Heritage Trust.

These projects are delivered primarily through partnerships between the Department of Primary Industries, Goulburn-Murray Water, Department of Sustainability and Environment, the Goulburn Broken Catchment Management Authority and other bodies.

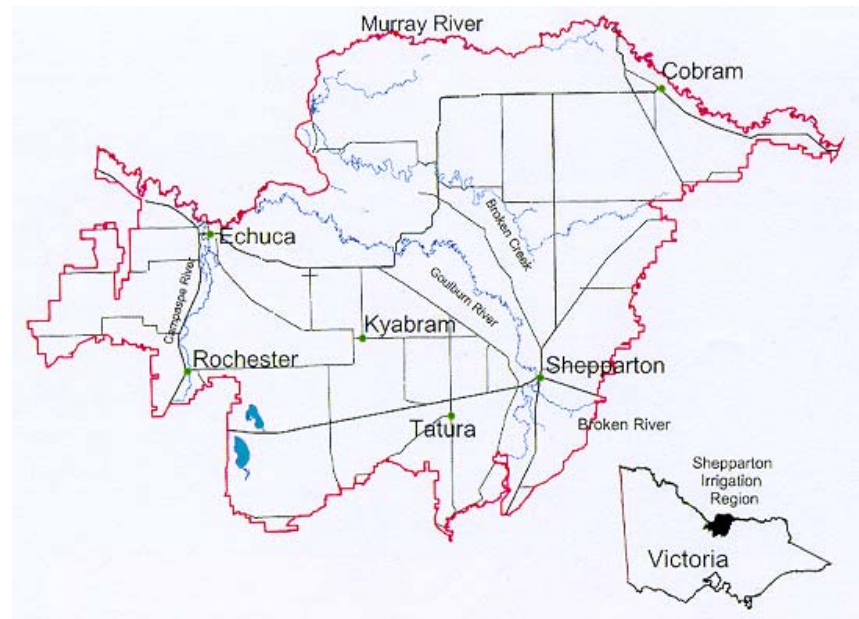


Australian Government



Background

- Study was located in the Shepparton Irrigation Region
- Automatic irrigation encouraged
- 300,000 ha irrigated with approx 3% automated



Why this study?

- Water for Rivers – quantify water savings from farm automation
- Project proposal claim water savings of 30% and more
- Qualitative Study done (Maskey & Lawler, 2002) – landowners view on water saving
- Farmers perceptions
 - Use less water
 - Grow more pasture
 - Less labour for irrigation

What is automatic irrigation?



Impact of Automation

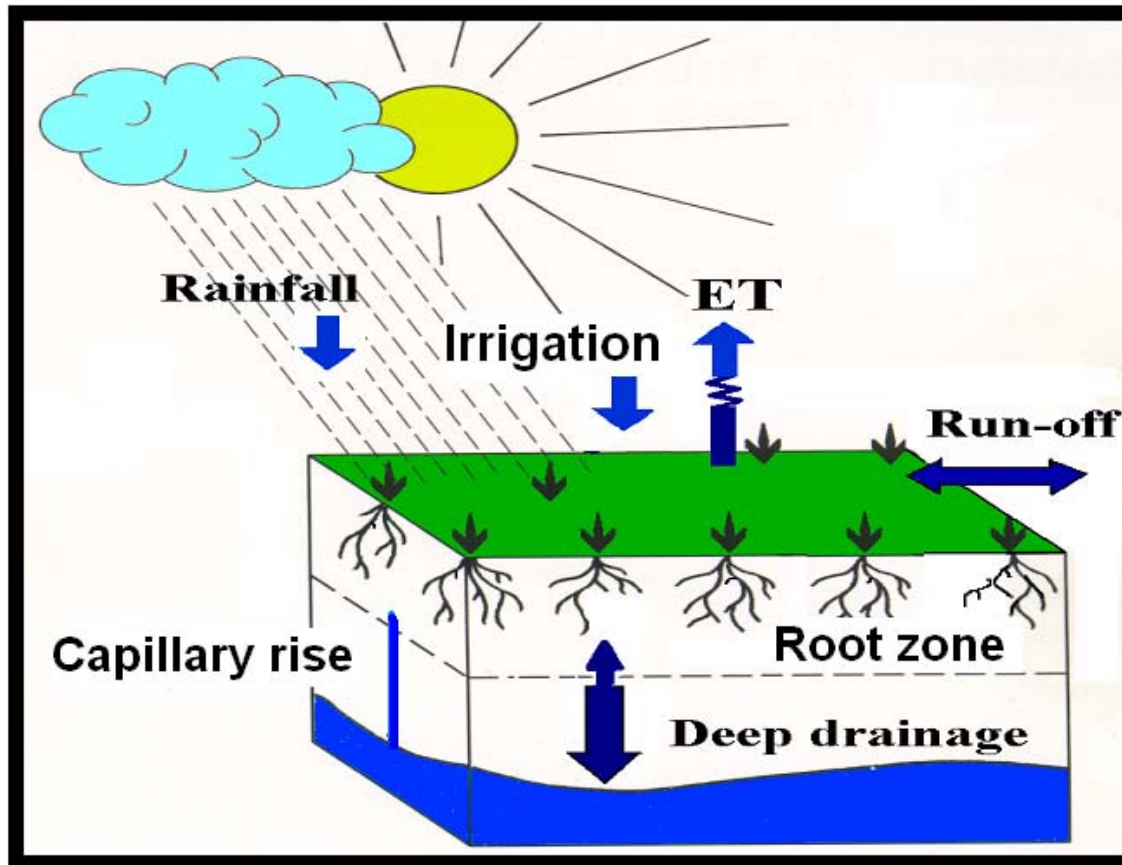
- Appropriate bay flow rates can be used with correct application times
- Optimum bay application times can be achieved, reducing deep percolation and runoff
- Scheduling for optimum productivity - this may increase water use
- Labour saving

Methodology

- Desk top study
- 1st Stage was to look at two properties
- Water use records from Goulburn-Murray Water
- Weather data, pan evaporation from Tatura, local rainfall
- Pre and post interviews with landowners
- Change in water use “before” and “after” automation

Measurements

Basic water balance : $I + R = ET + DD + \Delta S$



Assumptions

- Lots of assumptions used
- Pasture water requirements – evaporation data from Tatura
- Evapotranspiration assumed at 80% of pan evaporation
- Rainfall data – 15km and 2km away
- 80% of rainfall is considered effective

Results

| | Farm 1 15 ha Cobram sandy loam | |
|------------------------------|--------------------------------------|------------------|
| Automated | 2001/02 | |
| | Pre auto | Post auto |
| Avg. irrigation/y | 24 | 25.7 |
| Typical summer interval | 6-7 days | 6-7 days |
| Bay irrigated simultaneously | several | 1 |
| Bay application | Up to 8 hrs | 1-4 hrs |
| Avg. water use | 9.6 ML/ha | 8.7 ML/ha |
| Av application | 40mm | 34mm |
| Av ET-0.8R | 948mm | 935mm |
| Avg. ET-0.8R/irri | 39mm | 37mm |

- Water use (per ha) decreased by 9%, while the seasonal irrigation requirement (Av ET-0.8R) stayed approximately the same.

- Water used increased with the area irrigated increasing from 75% to 90%.

- The application depth has reduced from 40 mm to 34 mm following automation, as a result of the reduced application times.

Results

| | Farm 2 18 ha Lemnos loam, Shepparton Fine sandy loam | |
|------------------------------|---|-----------------|
| Automated | 2002/03 | |
| | Pre auto | Post auto |
| Avg. irrigation/y | 14.3 | 15 |
| Typical summer interval | 8-9 days | 8-9 days |
| Bay irrigated simultaneously | 2-3 | 1 |
| Bay application | 6-8 hrs | 3.5 hrs |
| Avg. water use | 7.4 ML/ha | 7.4ML/ha |
| Av application | 51.8mm | 49.3mm |
| Av ET-0.8R | 797mm | 836mm |
| Avg. ET-0.8R/irri | 56mm | 56mm |

- Water use (per ha) did not change after automation, while the seasonal irrigation requirement (Av ET-0.8R) for the seasons studied increased by 5%.
- Water usage on the site actually increased with the area irrigated increased.
- The average application depth reduced slightly with reduced application time enabled by automation

What do these results show

- Farmers change things
 - Site 1 increased area irrigated after automated as a result of associated farm channel works
 - Site 2 increased area irrigated after automation with optimum water flows
 - Changes in irrigation frequency
- Site 1: A 9% reduction in water while plant water use unchanged
- Site 2: A 5% reduction in water use due to increased plant water use.
- Difficulties of few measurements, lots of assumptions and relying on people's memory about things they did a few years before

Conclusions

- Automation – appears to have contributed to a reduction in water use of 9% and 5% on the two sites respectively
- These reductions in water use were similar to modelled results
- Both farmers have claimed productivity increases following automation
- Automation is only part of the changes made
- Claimed 30% reduction in water use not substantiated by this study