

A SIMPLE STRATEGY TO MANAGE FURROW IRRIGATION EFFICIENTLY

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Issue being addressed?

Cut-off time is vital in furrow irrigation as it significantly affects the efficiency of irrigation. Traditionally, irrigators continue the irrigation until the water reaches the end of the field. Simulation software can also be used to optimise cut-off time. However, first method is proven inappropriate and the latter method is complex. Hence, a simple method to determine cut-off time for farmers to manage furrow irrigation efficiently was evaluated and found to give cut-off times similar to the optimum time.

Key results and findings?

Historical data analysis suggest two relationship between T_{co} and T_{adv} for cracking soils:

$$T_{co} = 2.55T_{adv50} - 0.11L$$

$$T_{co} = T_{adv90}$$

where T_{co} is the time to cut-off (min), and T_{adv50} and T_{adv90} are the advance rate (min) at 50% and 90%, respectively of the field, L is the length of the field (m). If it can be assumed that all of the cracking soil types have infiltration curves of similar shape then this relationship might be applicable for all cracking soils.

A comparison of different techniques to determine the cut-off time for some irrigation events in cracking soil is presented in Figure 2. The data revealed that cut-off time in farmers' managed irrigation was significantly higher than optimum. Figure 2 also shows that T_{co} obtained from the two relationships opposite were similar to the optimised cut-off time obtained from the simulations. The minor differences between methods suggest that the two methods react differently to differences in the shape of the infiltration characteristic.

Impact on the Australian cotton industry?

This technique will replace the farmer's guessing and complex optimisation techniques to manage the furrow irrigation efficiently with higher efficiency. It can save a significant amount of water and energy cost.

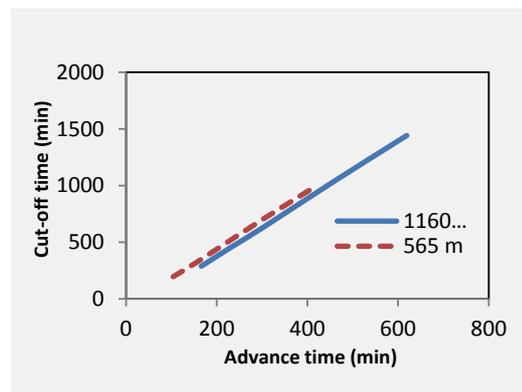


FIGURE 1. Relationship between advance time and cut-off time

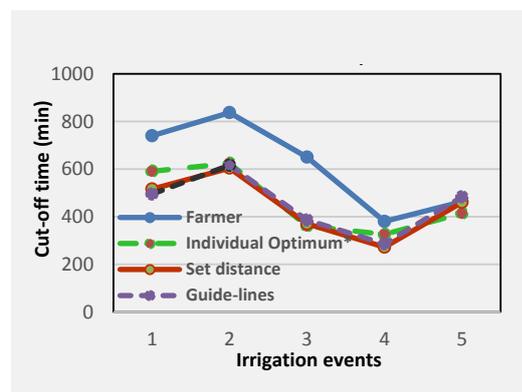


FIGURE 2. Comparison of cut-off time in different techniques.

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