**OVERVIEW**

A lower Burdekin sugarcane farmer furrow irrigates 50 hectares of sugarcane using groundwater with approximately 17 applications per year. This results in electricity being one of the biggest expenses for his business. Eager to reduce costs and become more energy efficient, this farmer signed up to be a part of the ‘Energy Efficiency Gains for Australian Irrigators’ project.

An irrigation efficiency assessment was undertaken on an 8.8ha field. The major soil type on this field is clay loam with sand lenses in the soil profile. At the time of assessment, half of the paddock had been recently harvested green for seed cane, and was being ratooned through the trash blanket. The trash blanket was quite thick, making it difficult to get irrigation water down to the end of the paddock. To overcome this, the farmer was trying to irrigate using the highest inflow rates available. The EEGAI project looked at possible changes to this farmer’s irrigation practice to increase efficiency.

> **“ Energy is something we’ll always use and it will never decrease in price. Anything that might help us use it more efficiently is always of interest to us.”**

**THE ASSESSMENT**

The irrigation efficiency assessment was undertaken in three stages:

1. The first step involved an irrigation consultant meeting with the farmer to obtain information about a ‘typical irrigation’ during the peak crop demand period. The main aim of this meeting was to determine the amount of irrigation water applied surplus to crop requirements. Information collected included flow rates (litres/second), energy consumed (kilowatt hours), duration of irrigation events and cycle time (days between irrigation).

2. Once the surplus of irrigation water applied was determined, the consultant met with the farmer once again to discuss ways to reduce the amount of water applied to his crop while still ensuring sufficient watering of the whole field, thereby reducing energy cost per irrigation. Options such as reducing the duration of irrigation events, reducing the volume of water applied or altering the irrigation schedule were considered.

3. A follow up meeting was then held to assess and measure any changes made.

**RECOMMENDATIONS**

The irrigation efficiency assessment recommended that opportunities to better match irrigation to current soil water deficit be examined. This included:

- Increasing the inflow rates by reducing the amount of cups in an irrigation set. This reduced the irrigation time substantially for each irrigation set as the water reached the end of the furrows quicker.
- Turning irrigation off sooner to minimise runoff and pumping time.
RESULTS
By reducing the number of cups in each irrigation set the inflow rate was increased for each furrow which resulted in the irrigation duration per hectare more than halving, saving him considerable money in electricity consumption as his electric pump was only running for half as long.

OUTCOMES
Increasing the inflow rate for each furrow, resulted in a 54% decrease in energy cost per hectare per irrigation (Figure 3). Irrigating the 8.8 hectare field approximately 17 times per year, costs $2,595 less per year when irrigating for 50 hours instead of 108 hours.

Table 1 (below) shows a comparison of energy cost per hectare per irrigation before and after the inflow rate was increased and the irrigation duration decreased. Since completing the irrigation efficiency assessment, the farmer has harvested and re-cultivated the block, helping to increase irrigation efficiency even more. Realising the savings that can be made by increasing irrigation efficiency he intends to continue searching for ways to increase efficiency. In the future, he plans to use soil moisture monitors to help him learn more about the soil on his farm, and to monitor and record key parameters such as volume of water applied, daily crop growth for irrigation scheduling and soil moisture in different soil types.

Overall, this farmer is well on his way to achieving considerable savings through recognizing the benefits of increasing irrigation efficiency on his farm.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (ha)</td>
<td>8.79</td>
<td>8.79</td>
</tr>
<tr>
<td>Flow (L/s)</td>
<td>29</td>
<td>59</td>
</tr>
<tr>
<td>Time to irrigate (hours)</td>
<td>108</td>
<td>50</td>
</tr>
<tr>
<td>Electrical cost per irrigation ($/irrigation)</td>
<td>284</td>
<td>132</td>
</tr>
</tbody>
</table>

Figure 3 – Comparison of energy cost per hectare per irrigation

ACKNOWLEDGEMENTS
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