

Irrigation

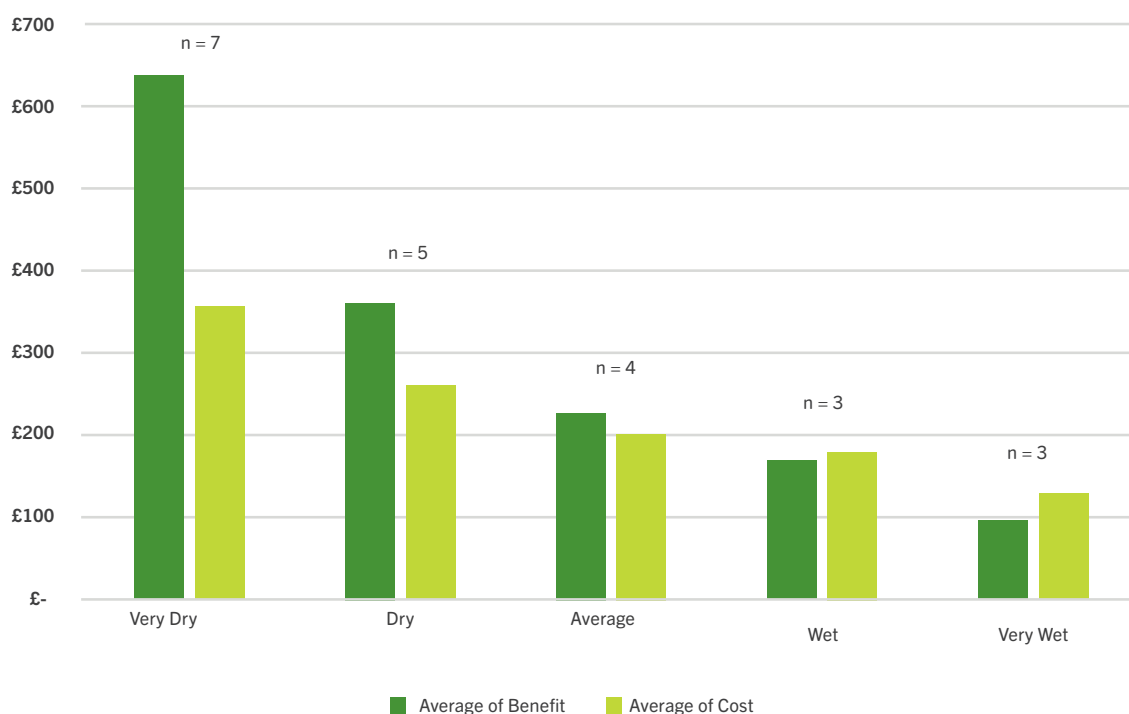
A review of the economics of sugar beet irrigation in England was carried out by Cranfield University in 2017-18, it aimed to:

- Quantify the response of sugar beet to irrigation and the economics of irrigating sugar beet through an extensive literature review
- Assess sugar beet irrigation needs and yield response to irrigation on different soil types using the sugar beet growth model 'BeetGro' and historic weather data
- Estimate the financial net benefits of irrigation

The 'BeetGro' sugar model (Qi et al., 2005) was run for five locations in England (Bury St Edmunds, Cantley, Wissington, Newark and Knaresborough) and four soil types (Sand, Loamy Sand, Sandy Loam and Clay Loam) from 1900 – 2014, to simulate sugar yield with and without irrigation under a range of alternative irrigation schedules. The long-term average modelled sugar yield increase from irrigation ranged from 0.3 t/ha at Knaresborough on a clay loam soil to 2.7 t/ha at Cantley on a sand soil. (All yield response are in tonnes of sugar/ha and not adjusted tonnes/ha.)



- 1 Sugar yields show a modest increase under irrigation in most years and on most soil types in the beet growing areas of England, but the largest increases occur in dry summers and on the lightest soils.
- 2 The increase in yield required to cover the cost of irrigation will differ between years and farms. In the Cranfield report for 2017-18 the cost of applying one 25mm irrigation with a hose-reel irrigator and rain-gun was typically £53/ha comprising labour, tractor use, water cost and diesel for pumping. At the 2017-18 sugar price it was estimated that a 0.3t/ha increase in sugar yield would be needed to cover this cost of irrigation.
- 3 The net benefit of irrigating depends on the weather. In a “wet” year, one or two irrigation applications could be made, but the increase in sugar yield would not be sufficient to cover the cost of irrigating, whereas in a “very dry” summer (expected, on average once in five years) an irrigated crop would generate an additional £250 - £300/ha compared to a rain fed crop after the cost of irrigating has been deducted.
- 4 Irrigating in June and July shows the greatest benefit and generates a net benefit in all but the wettest years. However, this is the time of year when other crops on the farm are also demanding irrigation water and decisions about which crop to prioritise will depend on which shows a greater financial response.
- 5 Irrigating sugar beet in August or September, in general, does not result in sufficient sugar yield increase to offset the cost of irrigating.
- 6 Given current sugar prices and weather, the benefit from irrigating sugar beet in England is not sufficient to justify the cost of investment in irrigation infrastructure (boreholes, pumps, pipes, hose-reels, etc.) for sugar alone, but irrigating sugar beet in a dry June or July can be beneficial if water, equipment and labour are available.



Estimated benefit and cost of irrigation, £/ha, at Bury St Edmunds on loamy sand soil (1900 – 2014) in years of different summer rainfall. n is the average number of irrigations.