

Using D-Risk to inform irrigation management at Euston Estate (Suffolk)

Business profile

Location	Euston, Suffolk
Main irrigated crops	Potatoes, onions, parsnips, carrots, sugar beet
Irrigated area	523 ha
Dominant soil type	Sand and sandy loams
Licensed abstraction	1,150,000 m ³ /year
Storage capacity	773,000 m ³

Euston Estate - business overview

Euston Estate is a large family owned business extending over 4400 ha including three agricultural tenant farmers. Collectively, the businesses are responsible for growing over 700 ha of high-value irrigated crops each year, which include salad and maincrop potatoes, onions, carrots and parsnips in conjunction with R.G. Abrey Farms. These are all entirely dependent on a reliable and plentiful supply of water for supplemental irrigation to cope with the droughty soils and low summer rainfall. The business is acutely aware of local water pressures and actively engaged with the NFU and other organisations in monitoring developments and responding to ongoing consultations regarding water regulation and abstraction reform. It is also aware of the potential impact of the Water Framework Directive (WFD) which raises concern over the viability of all businesses at Euston Estate.



Managing future irrigation abstraction and drought risks

Securing water for irrigated production at Euston Estate is a critical business issue. The significant drought in 2011 to 2012 was a real eye opener, highlighting just how important water was to the business, particularly since most of their irrigated production was destined for the retail sector and major supermarkets where quality assurance and timeliness is absolutely critical. At Euston Estate, the major concern now is how they deal with the future risk of droughts within a potentially very different regime of abstraction licensing. This makes forward planning difficult. The main challenges include knowing how to set future planting programmes for both rainfed and irrigated crops, understanding how rainfall uncertainty might impact on future irrigation demand (both the likelihood of back to back droughts/low rainfall and its impact on aggregate timing of demand) and how these multiple water risks impact on planting the following year.

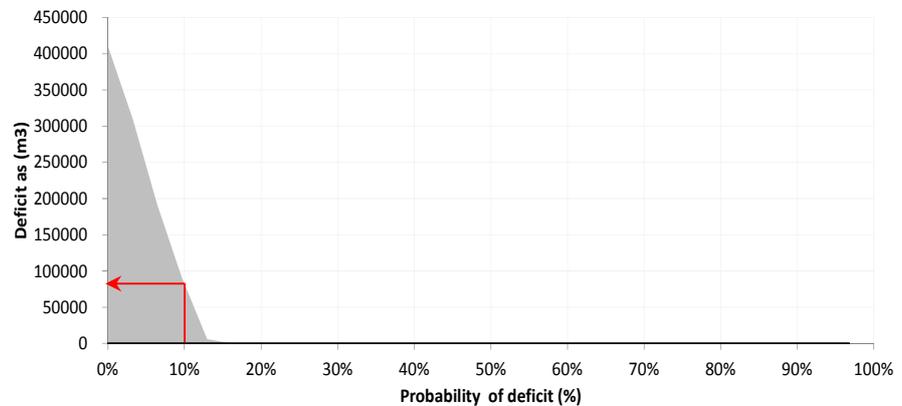


D-Risk – helping to underpin decisions with evidence

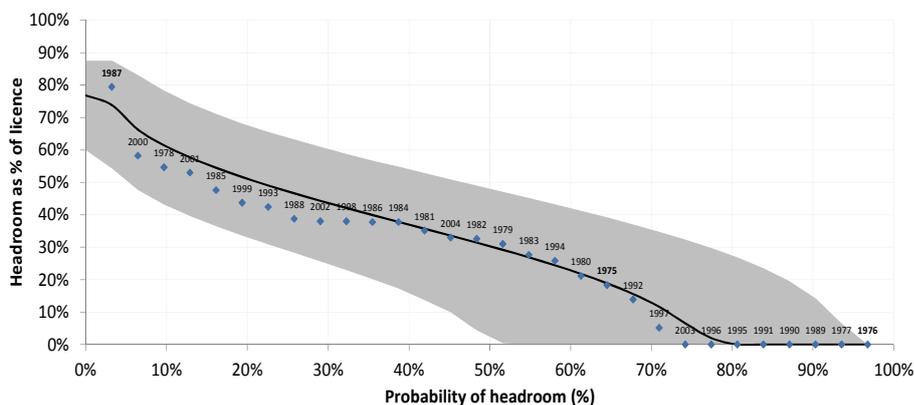
D-Risk uses a dataset of equally probable weather series to calculate multiple estimates of annual irrigation demand for the farm; the tool also assesses the reliability of meeting that demand given current abstraction licence limits. A monthly time-step water balance model is then used to assess how irrigation demands compare against the licensed abstraction for the farm. From this, it is possible to assess any annual irrigation deficit and changes in licensed 'headroom'. Examples are shown overleaf.

Using D-Risk to assess potential irrigation deficits and changes in abstraction 'headroom'

An irrigation deficit is assumed to be any proportion of demand that is not met by available supply due either to annual or monthly licence limits and/or not being able to supply water from reservoirs. Licensed 'headroom' is defined as the proportion of licensed volume that is not used in any given year. It is calculated from the sum of all available licences (both direct and storage). Assuming no abstraction restrictions, if the distribution of annual irrigation need follows the long-term average, then the risk that Euston Estate would suffer from a water shortage is very low.



If the coming years are generally drier and/or more variable than the long-term average, then the worst-case probability of having an annual irrigation deficit in a given year at Euston Estate could increase to about 1 in 10 years with associated annual irrigation deficit of more than 80,000 m³ (see figure above).



The importance of farm reservoirs in reducing but not eliminating risk is clearly evident. If the distribution of annual irrigation need follows the long-term average, then there is an 80% or 1 in 5 year probability of abstracting the total licensed volume (i.e. 0% headroom) in a given

year. Under the worst-case conditions, this increases to an estimated 52% annual probability.

Using D-Risk to inform agribusiness decision-making

Trying to understand the water resource impacts and economic consequences of any changes in abstraction licensing on Euston Estate is a significant challenge. Not only will they need to assess the likely impacts of changes in water allocation on timing and demand for irrigation; but they will also have to contend with managing areas of irrigated and rainfed crops with less certainty about their licensed resource and greater dependence on rainfall. Changing from a system where the business had a known licensed volume and abstracted each year depending on their cropping pattern and the weather will no longer be the case. In future, they will need to manage water in a very different way, with more flexible business plans, plantings and water demand. The burden for dealing with changing water availability is likely to shift disproportionately onto the business, affecting how they invest in irrigated production. In this context, D-Risk can inform Euston Estate management on how their headroom and deficit is likely to change. It can provide valuable insights on how modified irrigated crop mixes may reduce vulnerability, and the effect of investing in new or enlarged on-farm storage capacity.

“D-Risk helped us assess how vulnerable our irrigated cropping was to future changes in abstraction licensing and drought risk, and the actions needed to create a more resilient business”

Andrew Blenkiron Estate Manager, February 2018