



Using D-Risk to inform irrigation management at Frederick Hiam (Suffolk)

Business profile

Location	Tuddenham, Suffolk
Main irrigated crops	Potatoes, onions and parsnips
Irrigated area	186 ha
Dominant soil type	Light Breckland soils
Licensed abstraction	526,830 m ³ /year
Storage capacity	350,000 m ³

Frederick Hiam - business overview

Frederick Hiam is a well-established farming and fresh produce company with a history going back over 100 years. Today the business farms over 1,700 ha of land spread across Suffolk and Cambridgeshire. For the recent drought year 2018, the business was responsible for growing 186 ha of high-value irrigated produce at Tuddenham. The main irrigated crops include maincrop potatoes, onions and parsnips. Due to the low water holding capacity of the light Breckland soils on the farm, the crops are all dependent on a reliable and plentiful supply of water for supplemental irrigation. The business is acutely aware of local water pressures and actively engaged with the Lark Water Abstractors Group, the NFU Water for Food Group, the UK Irrigation Association (UKIA) and river Lark Catchment Partnership in responding to ongoing discussions regarding water allocations to agriculture, and the business impacts of water regulatory and abstraction reforms.



Managing future irrigation abstraction and drought risks

Securing water for irrigated production at Frederick Hiam is a critical business issue, given the low water holding capacity soils and high value crops grown across the farm. Like many other farming businesses, it is acutely aware of the risks to their business if access to a reliable supply of affordable water is curtailed. All of the high-value crops grown by Hiam's could simply not be produced on these light Breckland soils to meet the stringent quality assurance criteria demanded by the retailers without irrigation. It is an essential component of their business, and its role will only become more important as they deal with increased climate uncertainty and the risk of more frequent droughts. The proposed changes in abstraction licensing including potential reductions in licensed headroom pose a real business threat, but they are conscious they must work with the water regulator (EA), local stakeholders and science community to find innovative ways to ensure agriculture receives a fair and equitable share of water resources, and uses them in the most efficient way.



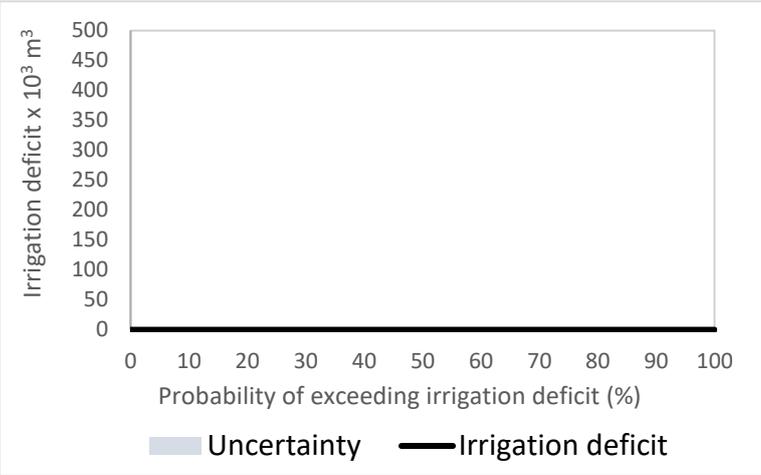
D-Risk – underpinning decisions with evidence

D-Risk uses a dataset of equally probable weather series to calculate multiple estimates of annual irrigation demand for the farm site, and its reliability considering current abstraction licence limits. A monthly time-step water balance model is then used to assess how irrigation demands compare against

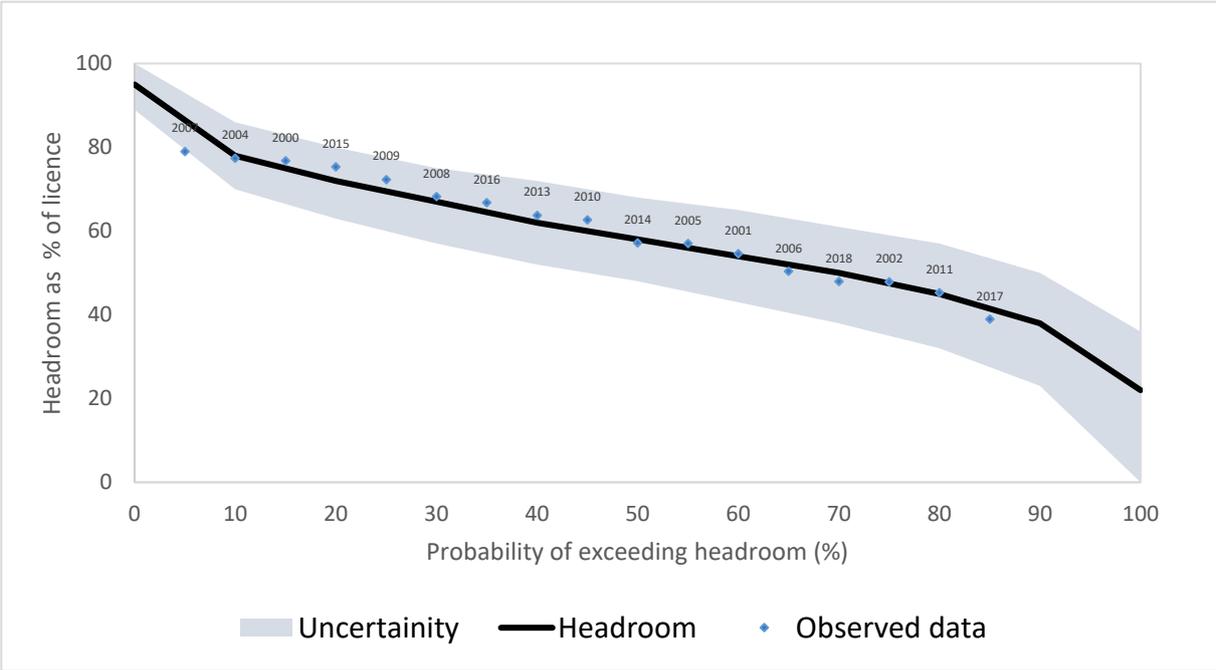
the licensed abstraction for the farm. From this, it is possible to assess any annual irrigation deficit and changes in licensed abstraction ‘headroom’. Examples are shown below.

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 either due to annual or monthly licence limits, abstraction restrictions, 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). If the distribution of annual irrigation need follows the long-term average D-Risk profile, Frederick Hiam should have sufficient water to meet



the irrigation need of their current cropping at Tuddenham. However, whilst the annual probability of having an irrigation deficit is zero even in the worst-case year and there is still an estimated 47% headroom available in a ‘design’ dry year (which is equivalent to the 80th percentile depicted by red arrows), reduced levels of headroom in extreme dry years could constrain irrigation plans. Future changes in licensed volumes would of course impact on available headroom too.



Using D-Risk to inform agribusiness decision-making

D-Risk provides valuable insights on how modified irrigated crop mixes or business expansion may alter the future drought risk profiles at Tuddenham as well as at other Hiam farm locations. It can also be used to understand the effects of investing in additional reservoir storage capacity.