



An innovative drought risk management tool to support resilient irrigated food production

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Although the UK is typically considered a ‘wet’ region for crop production, irrigation is an essential component for many agribusinesses, particularly those involved in high-value field-scale agricultural and horticultural cropping, including potatoes, vegetables and soft fruit. Irrigation serves to increase yield and quality to attain stringent retailer and processor demands for premium quality and consistency of supply, especially in years where summer rainfall is insufficient. The total on-farm net benefits of irrigation in England and Wales in a ‘design’ dry year are estimated to be in excess of £50 million, but the added-value accrued along the supply chain for such produce is significantly higher.

In many river basins where agricultural production is concentrated, water resources are under severe pressure from competing water demands (notably public water supply). A changing climate with greater rainfall uncertainty will exacerbate the situation, whilst there is also regulatory pressures to increase environmental flows to improve protection of aquatic environments. Consequently, agribusinesses are not immune to the effects of drought nor to future changes in abstraction licensing which seeks to reallocate water. In this context, it is becoming increasingly important for growers to (1) manage the business risk of having insufficient licensed and/or stored irrigation water to meet crop needs; (2) demonstrate the continued justification for their licensed annual volume, given natural climate variability and efficient usage to the regulator, and (3) to understand the probability of having unused licensed water as an opportunity for trading or re-allocation to increase its economic value.

This PICO presentation will describe the rationale, co-development and application of a novel, user-friendly “D-Risk” decision modelling webtool co-designed with the farming community to enable irrigated individual businesses to understand and manage drought risks to their business. The freely available online D-Risk tool has been developed to enable farm businesses to quickly and easily evaluate their current drought risk, by integrating cropping plans, local soils and climate data, abstraction licences and on-farm reservoirs data and a synthetic ‘event set’ of 3000 years of simulated baseline hydroclimatic conditions covering the UK. It also allows users to conduct ‘what if’ scenario analyses to assess the consequences of short- and longer term farm business adaptation to their drought risk profile. For example, modifying their cropping plans, irrigation schedules or water resource availability, through increased winter reservoir storage, water trading and/or reducing licensed volumes.

This innovative modelling approach enables growers to integrate the impacts and risks of hydroclimatic variability into their business plans in support of maintaining high quality, nutritious food production, whilst underpinning regional economic development and environmental protection.