

Water and climate risks for
UK irrigated agriculture and
horticulture

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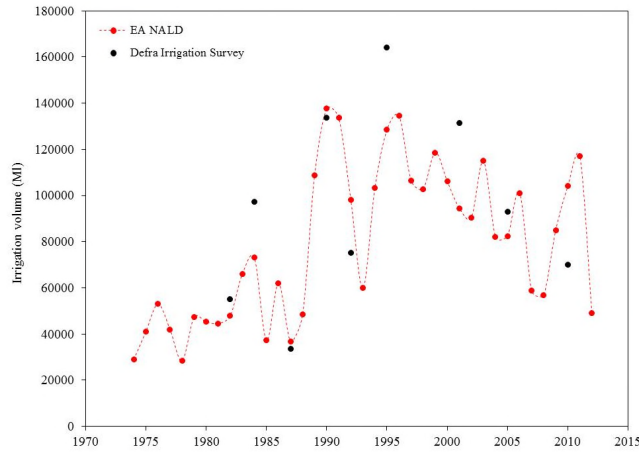
Presentation outline

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1. Recent trends in irrigation water abstraction
2. Current and future water-related production risks
3. Grower options to mitigate risks

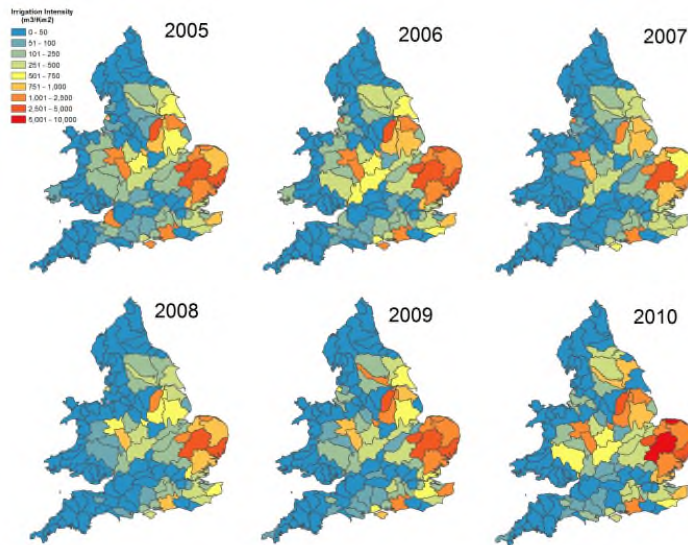
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Comparison of EA NALD reported volumes abstracted between 1974 and 2012 and Defra Irrigation Surveys



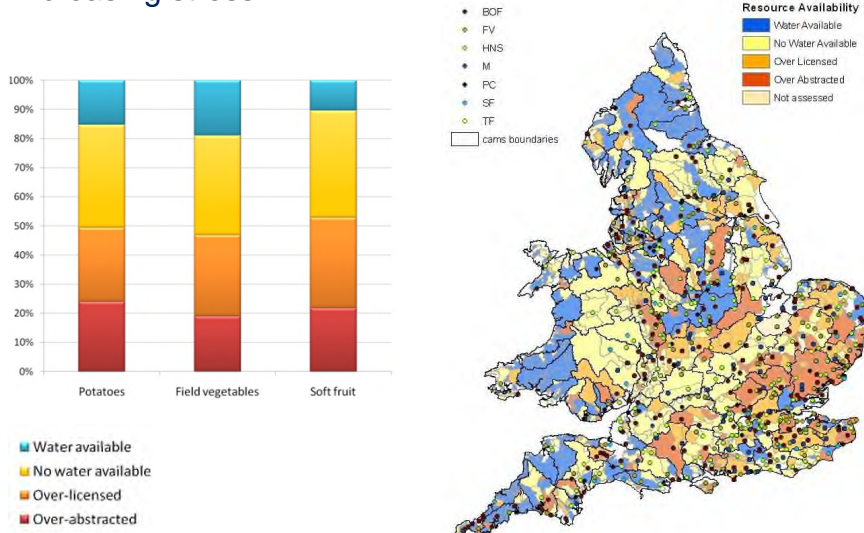
Adjusting for inter-annual weather variation, **total irrigation abstraction declining at c1.4% per annum**. Extrapolating forward suggests further reduction of -25% from 2010 to 2030

Irrigation intensity (m³) by catchment, based on EA abstraction data between 2005 and 2010



Knox et al (2015). Developing the evidence base on soil erosion and water use in agriculture. UK Committee on Climate Change (CCC)

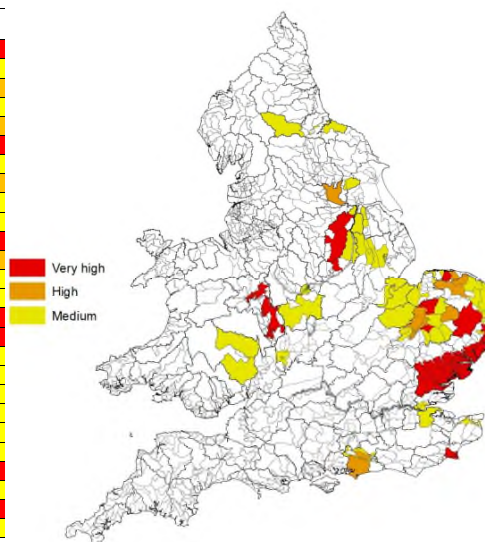
Water resources for horticulture under increasing stress



Hess, T.M., Knox, J.W., Kay, M.G., and Weatherhead, E.K. (2010). Managing the Water Footprint of Irrigated Food Production in England and Wales. In Hester, R.E. and Harrison, R.M. (Eds) *Issues in Environmental Science and Technology 31: Sustainable Water*, pp.185. ISBN: 9781849730198

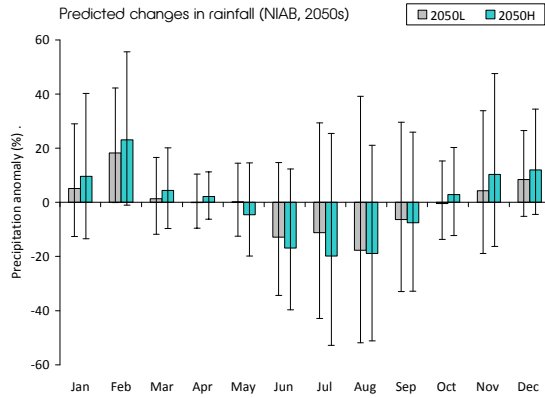
Irrigation hotspots starting to emerge

CAMS WRMU	No licences	Licensed volume (%)	Abstracted volume (%)
Arun & Western Streams	280	1.71	2.41
Broadland Rivers	357	4.38	5.96
Cam & Ely Ouse (incl S.Level)	562	16.77	25.08
Derwent	33	0.23	0.45
East Suffolk	239	4.15	7.40
Idle & Torne	397	6.06	5.41
Louth Grimsby and Ancholme	51	0.41	0.61
Lower Trent & Erewash	287	3.33	2.57
Medway	36	0.97	0.50
Nene	50	0.47	0.43
North Essex	617	5.87	4.52
North Norfolk	55	1.08	2.05
North West Norfolk	41	0.97	1.32
Old Bedford incl Middle Level	379	4.16	3.87
Rother	20	0.18	0.42
Shropshire Middle Severn	116	1.42	1.04
South Essex	7	0.22	0.48
Stour	158	0.95	0.67
Tame Anker and Mease	79	0.64	0.52
Tees	122	0.75	0.88
Warwickshire Avon	82	0.62	0.63
Welland	71	0.43	0.45
Wharfe and Lower Ouse	64	0.76	0.97
Witham	198	1.94	1.88
Worcs Middle Severn	170	1.45	1.79
Wye	452	3.54	2.75
Total	4863	63.48	75.04



Knox, J.W., Rodriguez-Diaz, J.A., Weatherhead, E.K., and Kay, M.G. (2010). Development of a water strategy for horticulture in England and Wales. *Journal of Horticultural Science and Biotechnology* 85(2): 89-93

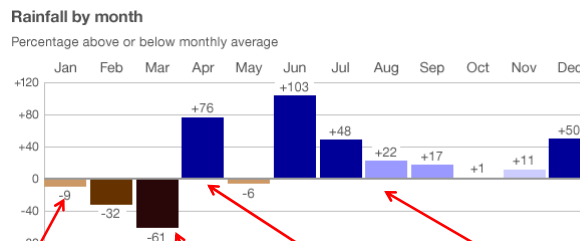
Increased uncertainty in future rainfall patterns likely to impact on irrigation for quality assurance



Knox, J.W., Morris, J., and Hess, T.M. (2010). Identifying future risks to UK agricultural crop production – putting climate change in context. *Outlook on Agriculture* 39 (4): 249-256.

Will 2012 be more typical in future years

Low winter rainfall (incl. 2010/11)	Low rainfall in the early spring	Wet summer
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Source: Met Office

Hydrological drought

Meteorological drought

Flooding

Waterlogging

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British farming in crisis as crop losses from 'relentless' floods pile up woes

Many farmers are quitting an industry hit by rain, disease and cheap imports – just as food security becomes a worldwide issue

Jamie Doward
The Observer, Saturday 23 February 2013 19:22 GMT
Jump to comments (385)



Farmer Steve Watkins on his farm near Worcester where floods have wrecked crops. Photograph: Andrew Fox

The Telegraph

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UK farming in crisis as drought hits crop yields

The prolonged dry spell is severely impacting on the production of grain, leading to higher prices of foodstuffs such as bread and peas and supplies of beer.



Cambridgeshire farmer Edd Banks with his withered, small, drought-affected crops. Photo: MARTIN POPE

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What are the impacts of rainfall uncertainty on irrigated production?

Impacts may be

- Acute e.g. lack of access due to flooding
- Chronic e.g. poor germination due to drought

Impacts are sensitive to

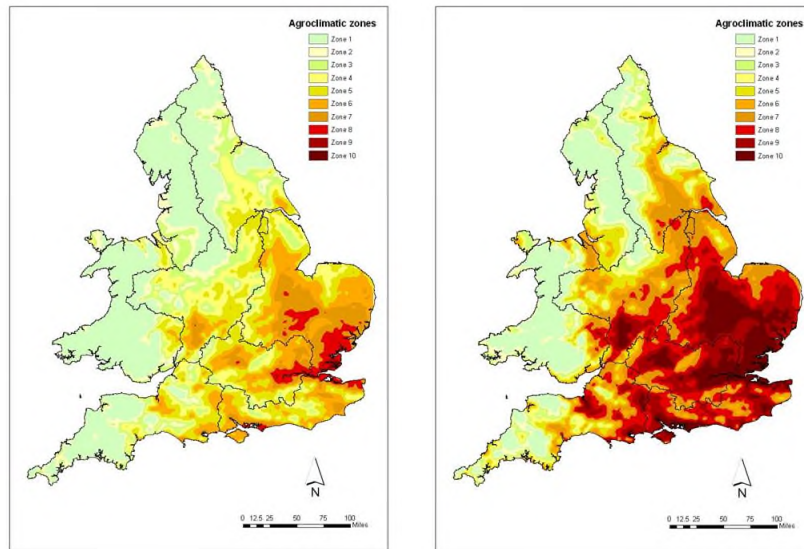
- Timing in relation to growing seasons
- Land use intensity

Drought and waterlogging can occur anywhere

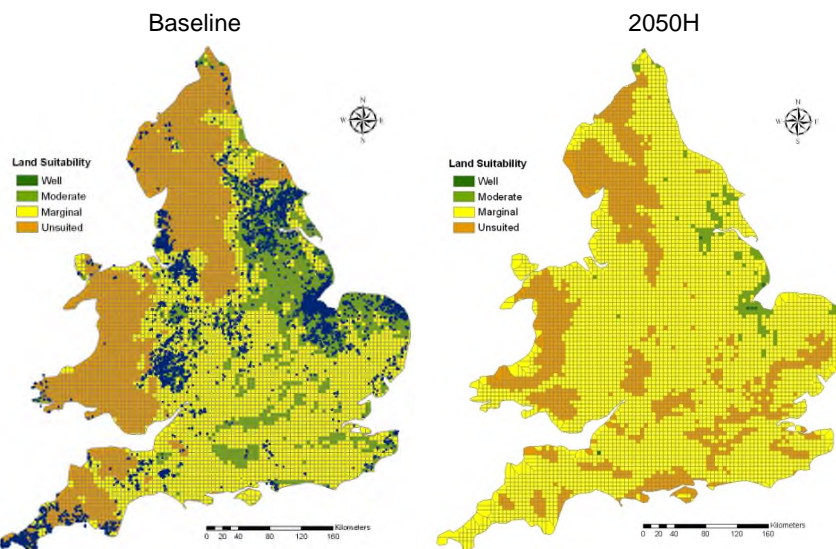
Flooding is localised, but more than half of the Grade 1 agricultural land is at risk of flooding (Roca et al., 2010)

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Projected changes in agroclimate (aridity) from the long-term average (1961-90) through to the 2030s



Current and future land suitability (rain-fed)



Daccache, A., Keay, C., Jones, R.J., Weatherhead, E., Stalham, M., Knox, J.W (2012). Climate change and land suitability for potato production in England and Wales: impacts and adaptation. *Journal of Agricultural Science* 150(2): 161-177

WFD and water abstraction reforms

Defra and EA considering how to renew **groundwater time limited licences**, from 2018 onwards, to be compliant with 'no deterioration' requirements of the EU Water Framework Directive

EA current proposal is to constrain future water allocation for time limited licences based on historical pattern of actual use during the WFD base years of 2003 to 2008 and **set an aggregate 6 year volume**

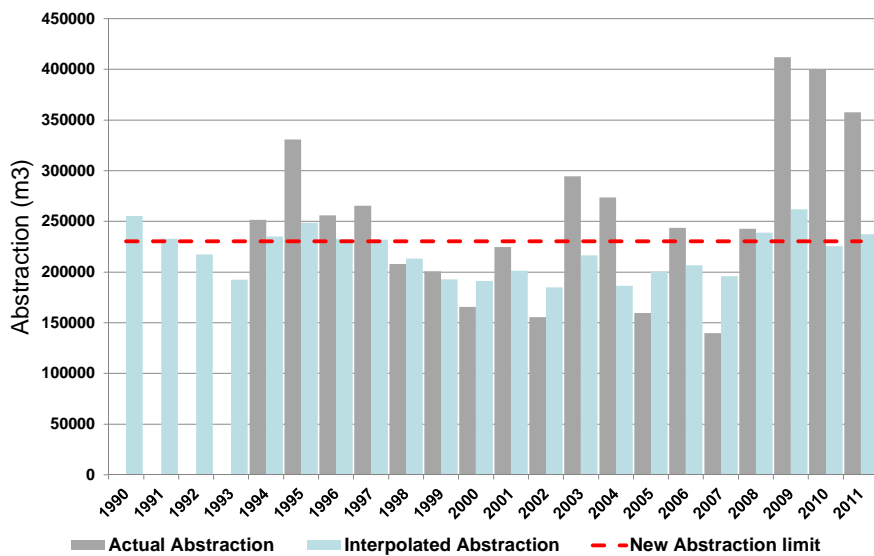
Some growers may need to peg back production to fit new licence limits

Growers need reassurance that future water allocations reflect current water use and recent business investment



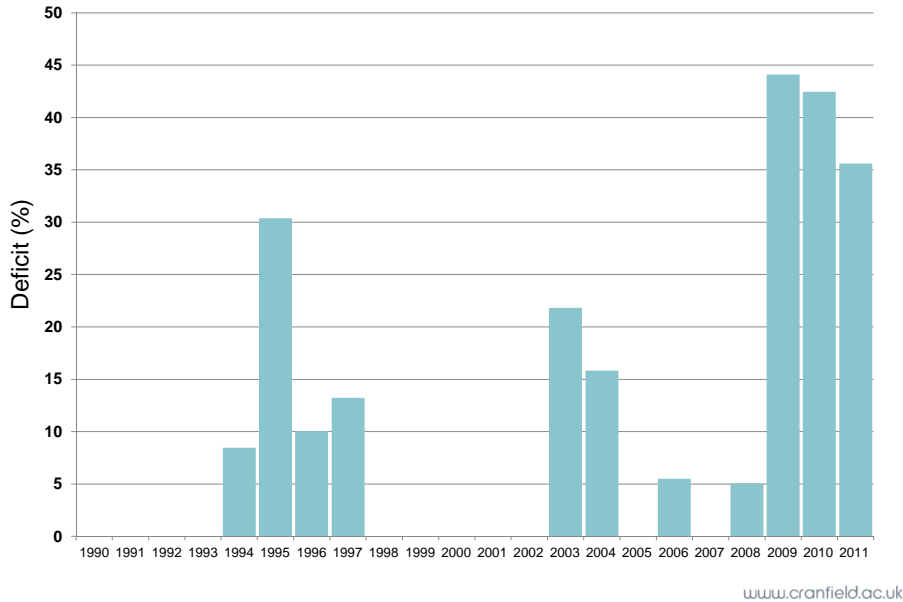
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Historical pattern of actual abstraction, derived synthetic abstraction and proposed new abstraction limit



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Estimated abstraction deficit (%) based on new abstraction limit



Summary

- In many catchments, water resources are under pressure and water likely to become less reliable and more expensive
- Beware of pending changes in abstraction reform and WFD compliance for groundwater abstractors
- Stay in touch with abstraction reform developments via UK Irrigation Association www.ukia.org
- Increased rainfall uncertainty and extremes will impact on rain-fed production and land suitability
- Adaptation – preferably planned – will be essential
- Many adaptations are “no regret” as they make business sense already
- Uncertainty needs to be factored into decision-making
- Increased farmer collaboration will help – keep in touch with your local EA water resources officer

We need to embrace Fonske and
“Put water into the minds of all people”

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Source: <http://wikimapia.org/10222678/Fonske>

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