

Notes from the Water and Agriculture Conference held at Trinity Park Ipswich, 23rd October 2007

The conference was run by the Royal Agricultural Society of England, the Fellows of the Royal Agricultural Societies and the Suffolk Agricultural Association and sponsored by the British Potato Council and the British Institute of Agricultural Consultants.

These notes start with a summary of the main points from the conference. A fuller version follows.

Summary

Rt Hon John Gummer MP, Conference Chairman

1. 'The biggest battles in the world will be about water'.
2. Areas where water problems are most acute are the areas where food production is most important.
3. We need to change our lifestyles to stop the problems getting worse – we will be unable to reverse them
4. There are additional pressures from growing populations, climate change, economic development and new housing.
5. Where there is competition between agriculture and the rest of the population for water agriculture always loses out.

Fred Pearce, environmentalist

6. Some of the world's longest rivers like the Nile, the Indus and the Colorado no longer reach the sea, at least for some part of the year.
7. 'The green revolution is living on borrowed water and borrowed time.'
8. We need to become more conscious of our 'water footprint'. It takes 1,000 litres of water to produce a kilo of wheat and 11,000 litres to produce a beefburger.
9. Places with insufficient water, like Japan and Europe import 'virtual water' in the form of food. The biggest exporters of virtual water are the USA and Australia. What happens if they cut exports back?
10. Growing crops for biofuels not only increases food prices but they have a high potential water demand.
11. More desalination and moving water to where it is needed is possible but too expensive for agriculture. We need to catch more rain where it falls and manage demand through policy and pricing.

Jerry Knox, researcher

12. Agriculture uses less than 1% of total water used in this country but its use is concentrated in the driest years, the driest seasons and the driest areas of the country.
13. Only 4% of crops are irrigated but they make up 20% of total crop value – stopping irrigation would have a huge impact on the security of our food supplies and their quality and on farming and food economies (50,000 jobs in the Eastern Region).
14. But in the Eastern Region half the abstraction licences are in areas defined by the Environment Agency as over-licensed and a further quarter are in areas which are considered over-extracted. Sooner or later there will be tightening up.

15. Farmers need to work harder to ensure they get a fair share of the available water resource and also need to use water in a more sustainable way - by joining Water Abstractor's Groups, benchmarking, trading and sharing their water and by using new technology .
16. An Agricultural Water Supply Centre should be set up to develop a knowledge base, professional development and training and justify water for agriculture.
17. We need a water champion to raise the profile of these issues.

Jacob Tompkins, Waterwise

18. All other sectors are promoting their needs for water very hard but agriculture has not started.
19. Farmers do not value their water enough and are reluctant to work together to safeguard their supplies.
20. There will be increased pressure on householders and, as this happens, increasingly householders will question how and why farmers are irrigating.
21. There is no statutory protection of water for agriculture.
22. EU birds and habitats directives could mean a huge loss of deployable water.
23. We may see labelling of virtual and embedded water (eg one, two or three droplets on the packaging to show its water footprint). But UK produce should show up relatively well in such a scheme.
24. Farmers who do not manage their water well will lose their licenses. Unused license capacity also risks being lost.
25. We will need to grow more food in the UK in future- so we will need more irrigation
26. 'if you don't do anything about your water it will bite you'

Philip White, researcher

27. We don't have enough resources to breed for drought resistance in all crops so we should concentrate on one of them and it should be potatoes because they use 56% of irrigation water, and there is wide genetic variation available and so plenty of scope for improvement.
28. Breeding for scab resistance would also reduce water use.
29. In particular we could breed for better transpiration efficiency, different patterns of root development and the proportion of the crop which goes to yield of potatoes.

Peter Bennett, Savills – case study, the Benacre Estate

30. Investment in reservoirs and irrigation infrastructure is expensive but improves the guaranteed supply of water and so extends crop options and allows new vegetable land to be opened up. It also allows water to be sold to neighbouring farms.

Philip Merricks – case study, farmer and nature reserve manager

31. Managing wildlife can blend with farming to produce a viable business but needs to be run with care and commitment.

William S Knight – water related properties and activities

32. 'Visitors want to be as comfortable as they are at home.'
33. People come for short breaks rather than long holidays and are becoming more interested in environmental niche opportunities like canoeing, wherry sailing and art.
34. Water tourism has major support from local authorities but planning controls on development in low lying areas are a problem.

- 35. Protecting the coastal defences is the biggest problem – there is a risk that a lot of the Broads area will revert to salt marsh and floodplains.
- 36. Also problems for strong conservation lobbies
- 37. There are opportunities for farmers in marinas, moorings, waterside accommodation, and niche activities – infrastructure costs are high but there is high potential profitability.

Lindsay Hargreaves – case study – the Elveden Estate

- 38. Farming is the financial powerhouse of the business but the estate is also involved in forestry, property, a shop and restaurant, environmental work, field sports, guided tours and equestrian activities.
- 39. Water is vital to the success of field scale vegetables growing on the estate. It ensures crop supply, timeliness, quality and yield and sustains the local economy.
- 40. The estate’s cereal growing would not be viable without the fertility built up by the vegetables in the rotation.
- 41. Without farming the estate would revert to heathland but this would not be better for wildlife. Vegetable growing has its own ecology.
- 42. The estate has adopted practices which make best use of water. They use sprinkler systems in preference to rain guns and work hard at scheduling to avoid over-watering. They work with the infiltration characteristics of soils and slopes and monitor everything .
- 43. ‘We must work hard to keep the profile of farming high on the water agenda, we may only use 0.6% of the nations’ water, but it feels at times that our 0.6% is more important, more scarce, more sensitive and more coveted than everyone else’s 99.4%!’

The Conference

The Rt Hon John Gummer, MP Chaired the Conference and opened it with a prediction that the ‘biggest battles in the world’ would be about water. Some research carried out by the Coca Cola Company had indicated that 25% of the world would be under water stress in 25 years time. Algeria is set to run out of water in the next decade and Bangladesh moves tens of thousands of people every year to avoid rising sea levels.

In Suffolk the incursion of the sea is greater than any other county of the UK and the plans to give up huge acreages of land to the sea will cause problems with salination over thousands of acres. And after this the new coastline will be just as difficult and expensive to defend.

Areas where water problems are the most acute are the areas where food production is most important. East Anglia is now regarded as a semi-arid area. Climate change will have ‘tectonic’ effects.

We need to change our lifestyles to stop it getting worse (we are unable to reverse it – we will have to live with what we have done.)

Britain produces only a small proportion of the world’s greenhouse gases. Nevertheless we have a duty to show leadership in addressing the problems they cause. This is because we set the changes going which have caused the problem – industrialisation here produced the power to change lives and the joint stock company and limited liability produced the means to exploit that power.

All this is happening against a growing world population, a growing demand for space (both greater in this part of the world than most) plus pressure from industrial development, for example along the Felixstowe, Martlesham, Cambridge corridor).

In many parts of the world there is competition between agriculture and the rest of the population for water – and everywhere agriculture loses out. So agriculture must change to cope. It needs to build a different way of using its resources.

World Water demand and supply and its impacts on the UK - Fred Pearce

Fred Pearce is an environment consultant. His book 'When the Rivers Run Dry' is published by Eden Project Books. He put the conference in context by discussing world water challenges and in particular, how they might impact on life and farming in the UK.

Some of the world's longest rivers like the Nile, the Indus and the Colorado no longer reach the sea, either seasonally or for part of the year – we are running short of the most abundant resource on the planet.

We each drink around 5 litres of water a day and use a total of 150 litres directly.

Plus it takes:

- 2,000 to 5,000 litres to produce a kilo of rice
- 1,000 litres to produce a kilo of wheat
- 5,000 litres to produce a kilo of potatoes
- 11,000 litres to produce a beefburger
- 4,000 to produce a litre of milk
- 500 litres to produce a two egg omelette
- 2,000 litres to produce a pork chop
- 50 cups of water to produce a teaspoonful of sugar
- 25 bathtubs of water to produce a tee shirt saying 'bathe with a friend' (or saying anything else or nothing for that matter)

People are becoming conscious of their carbon footprints but the 'water footprints' of people in western countries deserves to become a high profile issue.

Cotton growing has caused a lot of environmental damage especially around the Aral Sea ('the world's greatest ecological disaster') but also round the Nile and in Pakistan where it soaks up one third of the flow of the Indus.

Two thirds of the world's water use goes on agriculture.

Practical limits

Most fresh water is underground – only 0.1% of that being used is being replaced.

We are using 2x, 3x and sometimes 4x as much water as we did a generation ago.

'It is the flip side of the green revolution which has fed the world since the 1960's. India was the centre of world famine 40 years ago – it has fed itself but at the cost of using all its water. There are 20 million Yamaha water pumps in India taking out 100 cubic kilometres of ground water every year over and above what the rain can replace. The green revolution is living on borrowed water and borrowed time.'

China can no longer feed itself through lack of water.

Countries are getting round these problems by trading 'virtual water' – importing what they don't have the water to produce themselves. The Middle East buys in more virtual water than flows down the Nile.

The USA and Australia are the biggest exporters of virtual water. Should they cut back? Will shortages of water force them into cutting into exports?

The biggest importers of virtual water are Europe and Japan. Britain imports 40 cubic kilometres of virtual water annually. If some countries decide not to export as much, importing countries will have to be more self sufficient.

Biofuels – are already pushing up food costs. They have a high potential water demand – is there enough water to produce them? If we want to substitute one quarter of fossil fuels with biofuels we would double water demand.

What we can do

- More desalination plants – feasible but too expensive for agricultural water.
- More large reservoirs – no point when rivers are running dry – they only take water from one set of users to another.
- Moving water to where it is needed – possible but expensive. India is talking about spending 200 billion dollars to move water.
- Catch and conserve more rain where it falls – ancient systems are being revived in India – in Australia they are building earth walls and channels to catch and store water.
- Be more efficient in how we use water especially in agriculture – flood irrigation is too wasteful – cheap drip irrigation is becoming more and more widely available.
- Use price mechanisms to encourage more efficient use – but care is needed in how this is done because adequate water is also a human right.

Discussion

(Q =question or comment from the floor. A=question or comment from speakers)

Q – Why can't we catch water off the roofs of houses and other buildings?

A- Yes we should – it's possibly a public health issue – the Conservative Party's Quality of Life Report suggests that planning should be changed to make it easier.

Q – What prospect has agriculture not to lose out in the battle for water?

A- The pressure will increase and the water will go to people who can pay most for it – the urban areas – unless there are political steps to give some preferences to agriculture. Certainly agriculture will not get to use more water than it does now.

Water policy and its impacts on farmers – Dr Jerry Knox

Jerry Knox is a Principal Research fellow in Irrigation and Water Resources at Cranfield University. He is leading a major study to develop a water strategy for agribusiness in Eastern England.

Water for agriculture uses less than 1% of total water used in this country, but use it is concentrated in the driest years, the driest seasons and the driest areas of the country so the impact of agricultural use is amplified.

Only 4% of the crop area is irrigated but it tends to be higher value crops – together they make up 20% of crop value. The east of England uses 60% of the water used for irrigation water in the UK.

More than 1,000 agribusinesses in Eastern England use irrigation and produce 30% of the potatoes and around 25% of the fruit and vegetables which the multiples use. These businesses support 50,000 jobs and put £3 billion a year into the economy.

Problems

In the Eastern Region half the abstraction licences are in areas defined by the Environment Agency as over-licensed and a quarter of licences are in areas that are considered over-abstracted. The biggest problem areas are North Essex, east Suffolk and the Cam and Ouse.

Climate change will aggravate these problems.

Assessing the risks

- Irrigation water demand is rising
- Competition for water is rising
- Availability of summer water declining
- Reliability of summer water declining
- More regulation seems inevitable
- Climate change exacerbates the problem (we think)

We need to identify a rational way forward for individual farm businesses and agri-food industry...

A water strategy

To ensure agriculture receives a fair share of the available water resource and uses it in a more sustainable and efficient way

Working together

Vision – to increase water security by improving communications and dialogue between abstractors, the regulatory agencies, and other stakeholders.

Action – to support the formation of new Water Abstractors Groups in water stressed catchments and help existing groups improve their water management skills.

Making best use of water

'More crop per drop'

Get more water by sharing reservoirs and permanent and temporary trading, renting land with water. There is room for innovative approaches.

Also use existing supplies better, eg benchmarking (being used in Spain and Australia).

New, improved technology – intelligent guns, valve-in-head sprinklers, improved scheduling, using wireless technology, optimising pumping by reducing energy consumption.

Developing a knowledge base

Vision – To continually improve the knowledge and skills of those engaged in water management in the food and farming industry, to ensure that future water supplies are used wisely

Action – Support the development a knowledge base to serve the irrigated food and farming industry

A strategy document is being printed at the moment – a Fair Share of Water

The main problem is that most ongoing work targets the top 10% of people and we need to get at the other 90%. Using demonstrations and demonstration farms (also useful to re-connect the public with farming), web-based resources (fact sheets, videos, newsletters, research notes, benchmarking, agro-climate data) and professional development and training.

Water needs a champion.

All parties need to get together (including golf courses). We need an Agricultural Water Supply Centre to focus all work especially to justify irrigation for agriculture.

Using Water Sustainably – Jacob Tompkins

Jacob Tompkins is the Director of Waterwise, an independent organisation focussed on reducing water consumption in the UK. Waterwise was established two years ago by the water industry.

Why bother to reduce water consumption – we are running out of water – it's required by legislation – it's good practice – it's more profitable.

Climate change - Rainfall intensity has increased by 40% in the Eastern Region in the last 10 years. 'Hot gets hotter – cold gets colder – wet gets wetter – dry gets drier.'

Plus high economic growth will increase water demand. High-tech industry and food processing are both important in Eastern Region and both have high water needs. Also high housing growth.

All other sectors are promoting their needs for water very hard but agriculture has not started. Farmers do not value their water and are reluctant to work together to safeguard their supplies.

There is no statutory protection of water for agriculture.

Farmers need to get involved in WFDs and CAMs and determine what happens to water abstraction in 5 year's time.

Watch out for...

- The water industry is worried about the EU birds and habitats directives – these could mean a huge loss of deployable water.
- Statements from the EU about pan-European Standards.
- Food sustainability strategy – a food industry initiative but it pushes the action as far down the supply chain as possible.
- Labelling of virtual and embedded water (eg one, two or three droplets on the packaging to show its water footprint). But UK produce should show up relatively well in such a scheme.
- Farmers who do not manage their water well will lose their licences. Unused licence capacity also risks being lost.
- Supply chain will ask how farmers use water – if they don't like the answers they will go abroad for produce.
- The cost of water will rise dramatically and there will be increasing difficulty for farmers buying water from water companies.
- Land values with water will be higher than those without.

We will need to grow more food in the UK in future and it will be drier – so we will need more irrigation.

Good water practice for farmers

- Manage water well – including attention to impacts on yield and quality.
- Benchmarking
- Produce labels
- Lots of new products to help farmers use water wisely – we need a central database of these.
- Use efficiency measures of water consumption
- Manage flood water for urban areas
- Water trading.
- Develop a water plan
- Keep records – they will create a good impression with inspectors
- Look at re-using water yourself and with neighbours.
- ‘Sell’ what you are doing – get the media involved – get more praise

‘if you don’t do anything about your water it will bite you’

Discussion

Q – If the price of licences go up who will get the money?

A - The cost of abstraction doesn’t reflect the cost of environmental damage.

A - All the different factors are interrelated – there will be increased pressure on householders and, as this happens, increasingly householders will question how farmers are irrigating.

‘Agriculture has not begun to understand what water is about’

Q - Where will we get the time and resources to do what we need to do?

A - Abstraction groups allow us to focus.

Q - We need to be as professional with our farming case – we are too fragmented.

Q - Domestic water prices should be x3 or x4 before people will get seriously involved in conservation measures.

Q – If the cost is too great for farmers the cost of food will rise.

A – We need to focus on the security of producing food at reasonable cost.

Q - There are not many farmers so it is easy to knock them about.

Q - Water footprints – people are now more conscious of carbon footprints – but how do you deal with the complexity of carbon- water – waste interactions?

A- Agriculture is an obvious user of water

Water-economical crops and varieties-Professor Philip White

Philip White researches crop mineral nutrition at the SCRI (Scottish Crops Research Institute)

We don’t have enough resources to breed for drought resistance and reduced water use for all crops so we should concentrate on one of them and it should be potatoes because:

- Potatoes use 56% of the water used for UK irrigated outdoor crop production.

- The harvest index (proportion of the crop which is harvested) of potatoes is high so there should be good yield response to any breeding improvement.
- The first irrigation of a crop of potatoes is to control common scab – if we could breed for resistance to scab we could reduce water use.
- Different potato varieties have a wide range of water use efficiency – so there is plenty of scope for selection.
- It would be possible to breed for transpiration efficiency and the proportion of carbon produced which goes to yield of potatoes.
- There is a wide range of root morphology so deep or shallow rooting varieties or those with particularly vigorous root growth could be used for different situations.

Making things happen on a large commercial farming unit – Peter Bennett, Savills

Benacre is a 2,500 ha coastal Suffolk estate with 950 ha in hand and 8 farming tenants some of whom use the estate's irrigation facilities. The estate is threatened by coastal erosion.

The irrigation schemes on the estate were built 35-45 years ago with underground mains which were failing – pumps and other equipment were underpowered, there were iron deposits in some boreholes, some problems with salinity and insufficient water flow as supplies dried up. Cropping in the 1990's included irrigated potatoes and parsnips

It was decided to build three new reservoirs and as the area is an AONB and there were also SSSIs involved planning permission and environmental impact appraisal were needed. Planning permission was accepted in 2003 and all the work completed by 2006.

Farming criteria

- Improved guarantee supply of water
- Extended crop options
- Link in with old system where appropriate
- Sell water to neighbouring farms
- Consider organic cropping
- Potential opening up of virgin vegetable land

Reservoir 1 is on a heavy clay site and is 20.5 acres in size and holds 59.5 million gallons – earth shifting cost £139k and infrastructure £19k

Reservoir 2 is on lighter land but it was possible to bring clay in to line it. It is 12.8 acres, holds 25million gallons and cost £78k for earth moving and £8k for infrastructure. This reservoir has generated £8,000 from fishing this year.

Reservoir 3 is on very light land and is plastic-lined. It is 4.7 acres in size, holds 17 million gallons and cost £63k for the lining, £77k for earth moving and £13k for infra structure.

Together the three reservoirs have made 100 million gallons of water available this year.

Water and wildlife – a farmer's view – Philip Merricks

Philip Merricks has responsibility for Elmley, the UK's only farmer-owned, farmer-managed National Nature Reserve. Through positive management Elmley now holds the largest concentration of breeding waders in lowland UK. Water and a viable farming system are the essential components for his conservation management.

The land in the North Kent Marshes is naturally dry with about 12 inches of rainfall per annum. Winter rainfall is captured in clay-line reservoirs and then pumped out when needed. In March when the water drops back a bit it exposes grassland for cattle – they are necessary to produce the heterogeneous sward of mixed length needed for the breeding birds.

Water need to be in lots of little shallow pools so that invertebrates are accessible for chicks so shallow flashes are dug. There is also a need for an uneven topography and grass growth needs to be slow.

Need good control of predators, foxes, stoats, crows etc.

800 beef cows are the main graziers but low beef prices make them very costly at present.

Defra Higher Level Stewardship Scheme is very helpful because it encourages management for waders although it is sad that management of the scheme slips back into an approach which is too prescriptive – it needs to be more outcome-focussed.

Water, tourism and recreation – William S Knight

Bill Knight works in all aspects of commercial property valuation, agency and planning but has a specialist interest in water-related properties and activities. He is a member of the Broads Authority and its Navigation Committee. In a time of decline in the traditional holiday sector he argued that change is necessary to transform to a thriving leisure economy given the challenges of global warming and a powerful conservation sector.

150 years ago the Norfolk Broads were a transport highway. The Victorians used the new railways to discover the area and the first diversification was when some wherryman cleaned up their boats in the summer for holiday makers. In the early part of the last century wherryies started to get more permanent conversion and specialist yacht hire fleets built up. At the same time the use of the Broads for transport declined.

Expansion continued after the Second World War and local yards thrived as the introduction of fibreglass for boat construction allowed them to expand their output. Holiday bungalows, some on stilts, also started to be built and there was ribbon development along the shores.

At peak there were 2,500 hire boats on the Broads and problems with overcrowding and wash damage of banks so policies were introduced to reduce the number of boats. Some boatyards have been sold for housing.

Now the Broads are down to 750-770 hire boats run by a few large operators.

Changing demand – opportunities and pressures:-

- 'Visitors want to be as comfortable as they are at home'
- Main holidays are taken overseas
- Schools discourage term-time holidays
- Climate change – extended seasons, return of holidaymakers to the UK as the Mediterranean gets hotter and drier
- Short breaks are quite successful
- Increased demand for niche environmental experiences – canoeing, cycling, art, wherry sailing
- Woodland wetland centre experience – 'Disneyland on peat'
- Sophisticated leisure destinations with shop, lodges, broadband, pub, land and water parks
- Planning – water tourism has major support from local authorities. PP25 to control development in low lying areas – snag is that's where the water is!

- Protecting the coastal defences is the biggest problem – there is a risk that a lot of the Broads area will revert to salt marsh and floodplains.
- Strong conservation lobbies

Opportunities for farmers

- Marinas and moorings
- Waterside holiday accommodation
- Combining existing resources with water based uses
- Lower key tourism – camping, canoeing, angling and waterside walks
- Increase use of existing buildings

There are high infrastructure costs but high potential profitability

Water use at Elveden - Lindsay Hargreaves

The Elveden estate extends to some 22,500 acres. Lindsay Hargreaves runs the in-hand farm of 10,000 acres. His talk described dealing with the challenges facing agricultural water users in eastern England today.

Water is vital to the success of agriculture on the estate, and its use in agriculture contributes strongly towards the sustaining of rural communities, meeting the UK's nutritional demands, supporting the ecological and biodiversity objectives of environmentalism and overall, to be a driver for success of the British economy.

British agriculture for the most part, relies on natural rainfall to supply the water needed for plant growth, and for the most part nature does a reasonable job, helped as well by the buffering effects of soils whose water holding capacity can successfully keep plants supplied until our temperate maritime climate delivers another welcome dose of rain.

The exception to this is fruit, vegetable and salad cropping where even with the soil buffer, nature gets it wrong - most of the time. It is not that nature's way results in no crops, but that those crops will be of unpredictable quality, yield and maturity – all factors of high significance in today's fiercely competitive market place.

Elveden's farming economy is now dependent upon water for irrigation – this has not always been the case.

In a single block the estate is in Suffolk Breckland, the soils are sand with flints overlying chalk, free draining and drought prone and naturally acidic and infertile.

The farming today arguably has its roots in the 18th and 19th centuries but took off in the 20th century. The estate has been through a 'livestock age', a 'sugar age' and now is in a 'vegetable age'. The changes have been driven by science, markets and politics.

In addition, the estate offers forestry, Christmas tree and hedging business, a shop and café-restaurant to showcase the Elveden brand, its property arm has let properties, both residential and commercial, field sports include the traditional elements of partridge and pheasant shooting along with deer stalking and falconry. There is also an equestrian cross country course and pony trekking. The estate opens its doors to walkers and riders and guided estate tours, both for the general public and special interest groups. It has an enviable environmental pedigree as part of the Breckland ESA and most of the estate carries SSSI designation, this covers not only the 3,500 acres of protected heathland, but also most of the forest and farmland.

Farming remains the financial powerhouse of the business. The farm economy is currently based on field scale vegetables; potatoes, onions, carrots and parsnips. These account for 40% of the farmed area in any year with cereals and green cover crops grown to complete a six year rotation.

The water resource at Elveden was largely developed in the 1980s to support sugar beet, a progression which came to a rapid halt in the early 90s when rhizomania forced the estate into its current 'vegetable age'. The vegetable age came from the combination of access to water, development of techniques for de-stoning soils and the control of wind erosion.

Elveden's soils are light and free draining, they warm up quickly in the Spring, can be worked most days of the year without significant structural damage, allow cultivation methods which maximise plant spacial arrangements and light interception. As a consequence, Elveden can produce high yields of safe, wholesome food, reliably and consistently, but only by working with nature and science together.

Groundwater is the primary source of irrigation water, abstracted from the underlying chalk aquifer by 12 borehole pumps directly into an underground mains distribution network. This network extends to some 100 miles with 1100 hydrants. It also feeds two above ground buffering reservoirs. The reservoirs can hold a volume equivalent to 30% of total annual licensed quantity, and allow the estate to buffer water from one season to the next; to abstract out of season (winter storage) and, thirdly, they allow a considerable increase in the spot pumping rate. Finally, the reservoirs give some protection against in-season restrictions on direct abstraction during sustained dry periods. Water is applied by linear move irrigators (22 units with a combined span length of 4500m) and by hose-reels fitted with booms or rain-guns. There are 35 hose-reels and booms, combined boom length of 1500m. Scheduling is from neutron probe data, with data collected once or twice weekly from around 40 sites. Running the system on a daily basis is a work of art and getting the best out of the pumping opportunity is sometimes hard to achieve. A small army of people works from dawn till dusk to keep up. On a busy day 10 million gallons will be pumped to ensure the 4000 acres of vegetables are optimally supplied with water. The outcome of it all is an annual production of 75,000 tonnes of vegetables with harvesting and marketing nearly every day of the year.

So what are the good things about Elveden doing what it does, where it does? If its access to water were to be restricted what would happen?

The first point is that no water equals no vegetable production – the natural rainfall pattern coupled with a low soil moisture holding capacity would result in severe losses of quality and yield in most years. Today's customers require a consistency of quality, volume and timeliness which could not be supported under 'natural' conditions. We would lose our market base very quickly. It also means no other farming as well, even commodity crops like cereals would not be commercially viable in the absence of vegetables in the rotation. This is due to a combination of effects, drought and lack of fertility – root vegetables bring fertility to the soil which in turn, supports the cereal break crops.

Elveden's customers would be obliged to source products from elsewhere –a massive re-sourcing exercise – with consequences. We sit within a two hour truck ride of 20million people, 1/3 UK population. If irrigated agriculture is excluded from eastern England, then the majority of the displacement will be overseas with huge consequences to the regional economy

There would also be environmental consequences – the short term thinkers would be over the moon, another 10000 acres of heathland. Wrong! Vegetable production in Breckland has its own ecology – more stone curlew chicks successfully fledge from nests on vegetable fields than any other habitat. So no vegetables, fewer stone curlews! The high yielding nature of Breckland crops means that the input loading per unit of output is disproportionately lower than for crops grown under more 'average' circumstances and also that more land is needed to grow a similar volume of product. So no vegetables here means more land take elsewhere and higher levels of inputs required per unit of output. Moving

production further away from the point of consumption – miles to market – another negative. And to cap it all, there is virtually nowhere in Europe where these crops could be grown, in the volumes required, without irrigation!

The estate has adopted practices which as far as possible, make best use of the resource. They use sprinkler systems in preference to rain guns and work hard at scheduling to avoid over-watering. They work with the infiltration characteristics of soils and slopes and monitor everything to measure.

There are spin-offs from 'best practice'. Two examples, low pressure sprinkler systems, especially under linear irrigators, will not 'unseat' a ground nesting bird. The close monitoring of soil water and avoiding over-watering reduces leaching losses, vital in our efforts against excess nitrate and residues in the water environment.

The Environment Agency have three tests for presumption of renewal of an abstraction licence. The applicant needs to be able to demonstrate 1) justification of need, 2) efficiency of use, and 3) that the abstraction will not harm the environment. Proving point three can be testing! The estate have a specialist firm to help to 'interface' with the EA, find out what the issues were or were likely to be, and then set about learning about them.

As far as catchment and region are concerned the estate participates with others to become part of the debate - through the local abstractor group, the Lark Abstractors, the UKIA, NFU and CLA, the EA Agricultural Liaison Committee and the CAMS Process. Every abstractor should be this involved. It is only through collaboration that a weight of opinion can be built which pushes a message through to be heard.

Predictions

- We have not seen the end of the consultation culture – if we don't take part it will be assumed we have no opinion.
- There will be problems but the application of good science will find a workable solution.
- Farmers will all have to change their habits – for instance some farmers will need to migrate more towards high flow abstraction and storage (not just winter!).
- Technology will give us ever better means of assessing crop need and applying water accurately.
- Crop science will breed plants better able to meet the prevailing conditions.
- The water resource management process will develop to become dynamic and responsive, it will have the sophistication to identify resource availability with speed and accuracy and allow abstractors to capture it. It will be sensitive to climate change, not only in how weather and rainfall patterns influence resource availability, but also in how the ecology of our water environments change with it.

We must work hard to keep the profile of farming high on the water agenda, we may only use 0.6% of the nations' water, but it feels at times that our 0.6% is more important, more scarce, more sensitive and more coveted than everyone else's 99.4%!

Alan Spedding, 29 October 2007