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Meeting the Demand for Skills in the Agri-food Sector in 2025

AFCP Forum 24th November 2015

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Background

- Research with Lincolnshire agri-food companies (2015) & young people in Norfolk (2015)
- UK Agritech Strategy (2013)
- Edge Careers project development (2012)
- HEFCE review of Land Based Studies (2007)
- ADER project (2000-08) – farmer programme – 4,500 farmers
- Multiple EU bids for skills & knowledge transfer projects
- 28 years in agricultural education – now lecture at the National Centre for Food Manufacturing (University of Lincoln)
- A lifetime in agriculture & the supply chain

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Demand for staff

- Demographic challenge of less young people
- Economic growth means demand in other sectors growing
- STEM skills in demand in many other sectors
- Unknown: future immigration which has met needs for 15+yrs

Forecasts (2012-22):

- Agriculture demand – 97,000new recruits
- Food manufacturing – 109,000new recruits

There is debate about the numbers & levels needed, but overall:

- The types of skills we need more of are in short supply
- We have to focus on upskilling the existing workforce
- Many jobs already cross 'sector' boundaries – this will increase

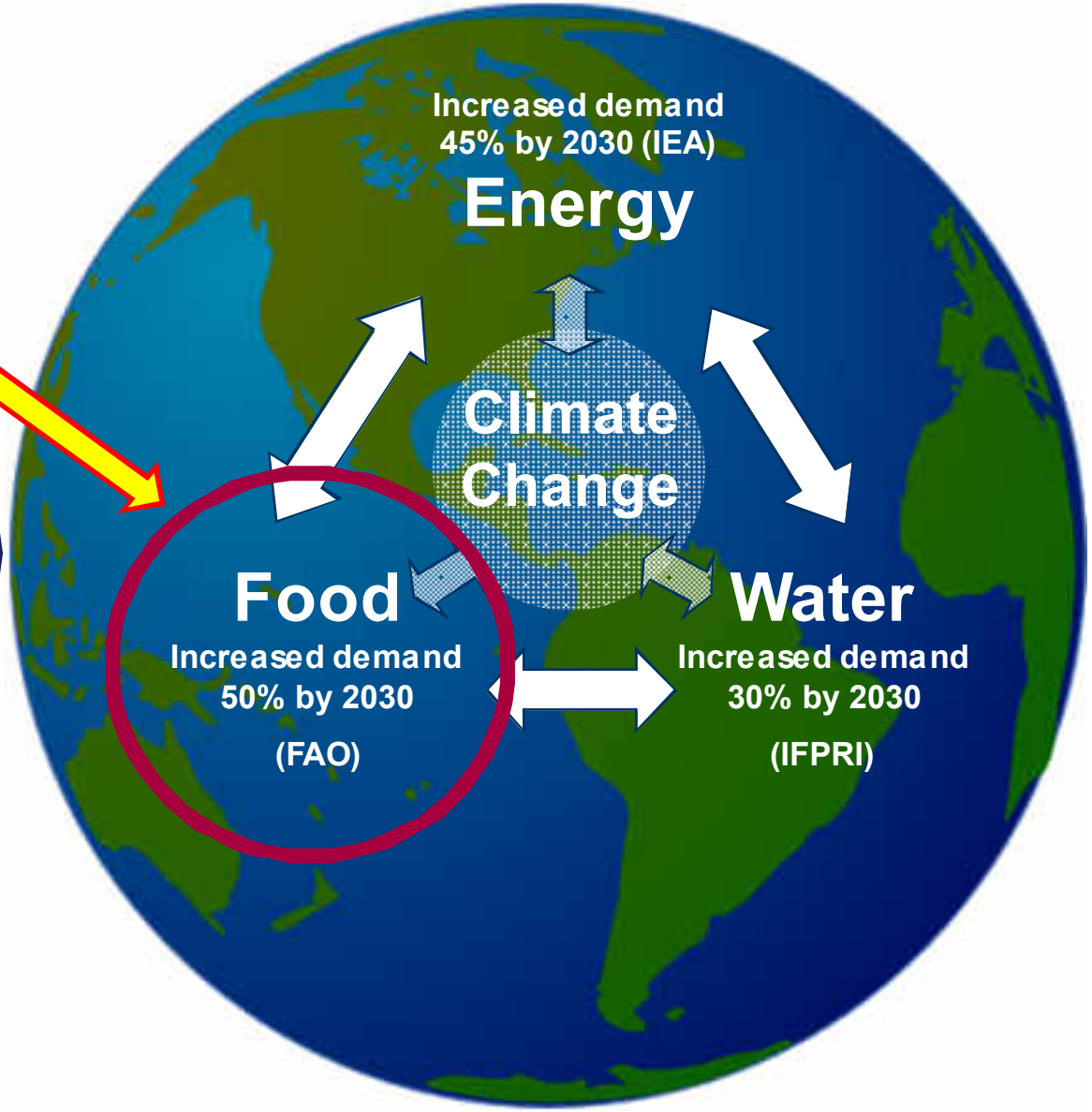
Government Office for Science

Professor Sir John Beddington alerted us to… the "Perfect Storm…"

Notice this says 'food' not agriculture

1. Increasing population
2. Increasing urbanisation
3. The rightful goal to alleviate poverty
4. Climate Change

Putting food security into context



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Importance of Food in the UK Economy

Defra (2014) Agriculture in the UK 2013

The Inverted Iceberg Food sector GVA £102bn
Catering 26.3%
Food Retail 27.3%
Food processing 23.7%
Food wholesale 9.5%
Input suppliers 3.5%
Agriculture & fishing 9.6%

Approximately

For Every £1 of GVA in agriculture there is:

A further £4 in food processing, logistics and supply industries

&

A further £5 in food retail & catering

Food is:

- the UK's largest manufacturing and retail sector
- long term post farm gate & input GVA has been growing faster than 'farming'
- important in other sectors e.g. over 1/3rd of tourism spending is on food & drink

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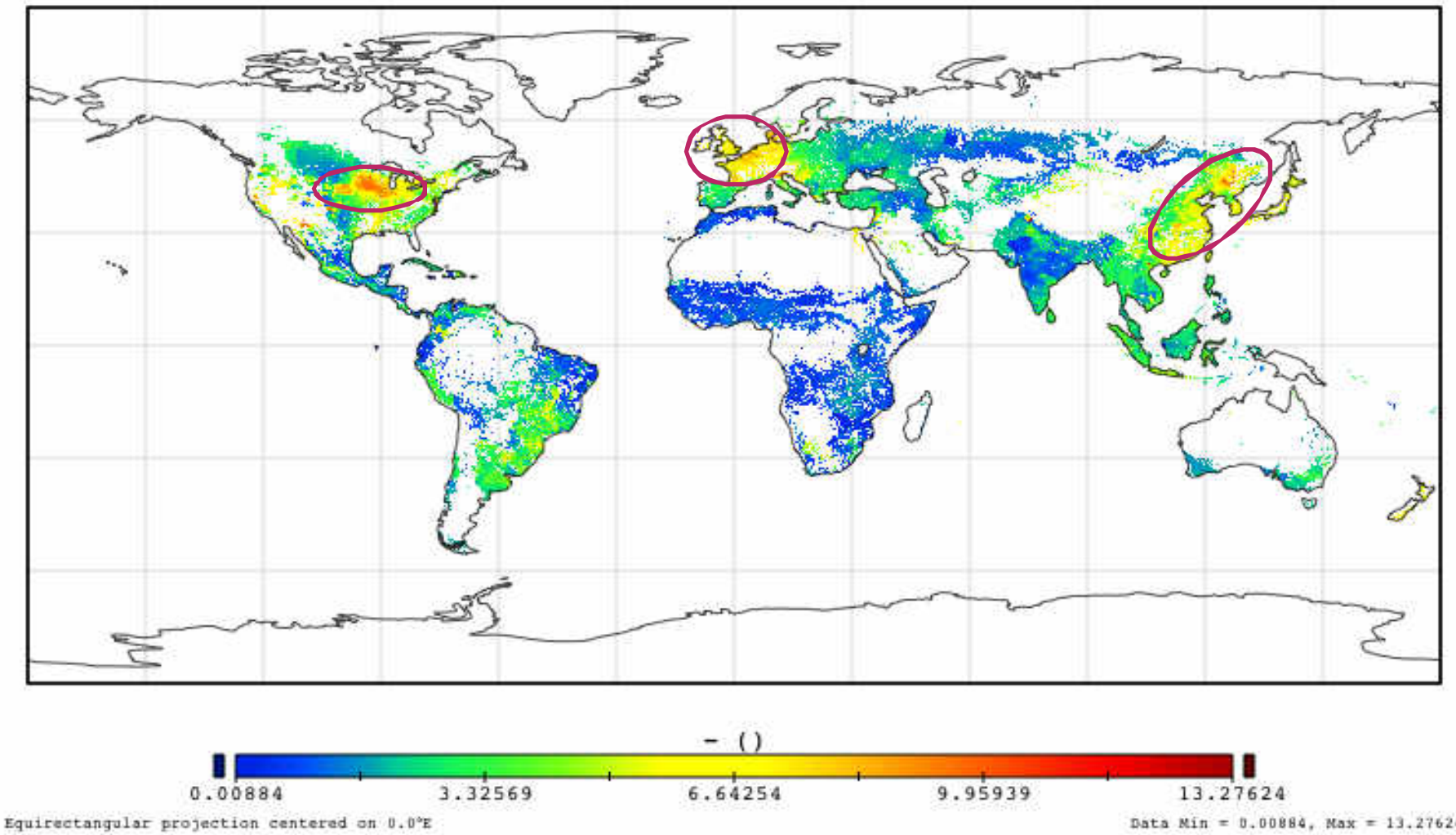
Modern Efficient Production: Yield is Critical - we have fed the World by increasing yield



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Young People – bridging the gap

Industry surveys and meetings routinely report a problem in promoting the industry as a ‘sexy’ career to young people

But … my experience is young people are interested but feel disengaged from the industry

‘Agriculture’ & ‘food processing’ turn them off, feeding the World, protecting nature, addressing waste & health attract them ….

edge Careers in agri-food
educate develop grow employ

BRIGHT CROP

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Young people's views

Prof Tim O'Riordan (UEA) & I ran workshops with 112 young people on how to meet the food challenge:

- 3 secondary schools (ages 12-15); VIth formers; BSc geography & science students at UEA; Young Farmers

These workshops discussed

- The Beddington 'perfect storm' challenge
- 4 ways to address the food challenge (produce more, reduce waste, eat less, change diets)
- & asked them to rank potential strategies & tactics

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Results

Across all the groups of young people there was a broad consensus that ***the easiest & most important issue to address first is food waste*** (scored 3.28 on a 1-4 scale)

The three other methods scored much lower:

- 2nd Produce more food scored 2.44
- 3rd Change diet scored 2.29
- 4th Eat less scored 1.99

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Other Feedback

We asked the young people some overarching questions:

- The need to preserve wildlife (3.49) scored the most highly of any issue raised
- … supported by a feeling that it was their personal responsibility to act on sustainable food supply (3.39)
- In contrast there was real scepticism about government's ability to address the challenge of sustainable food production (2.11)

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Conclusions – young people:

- Wanted to know more about food production
- Shocked at the scale of food waste & wanted action
- Sceptical about our ability to get consumers to change their diets or to eat less
- Supported the use of new technology to address waste & the food production challenge
- Had a keen sense of personal responsibility for bio-diversity but were cynical about government

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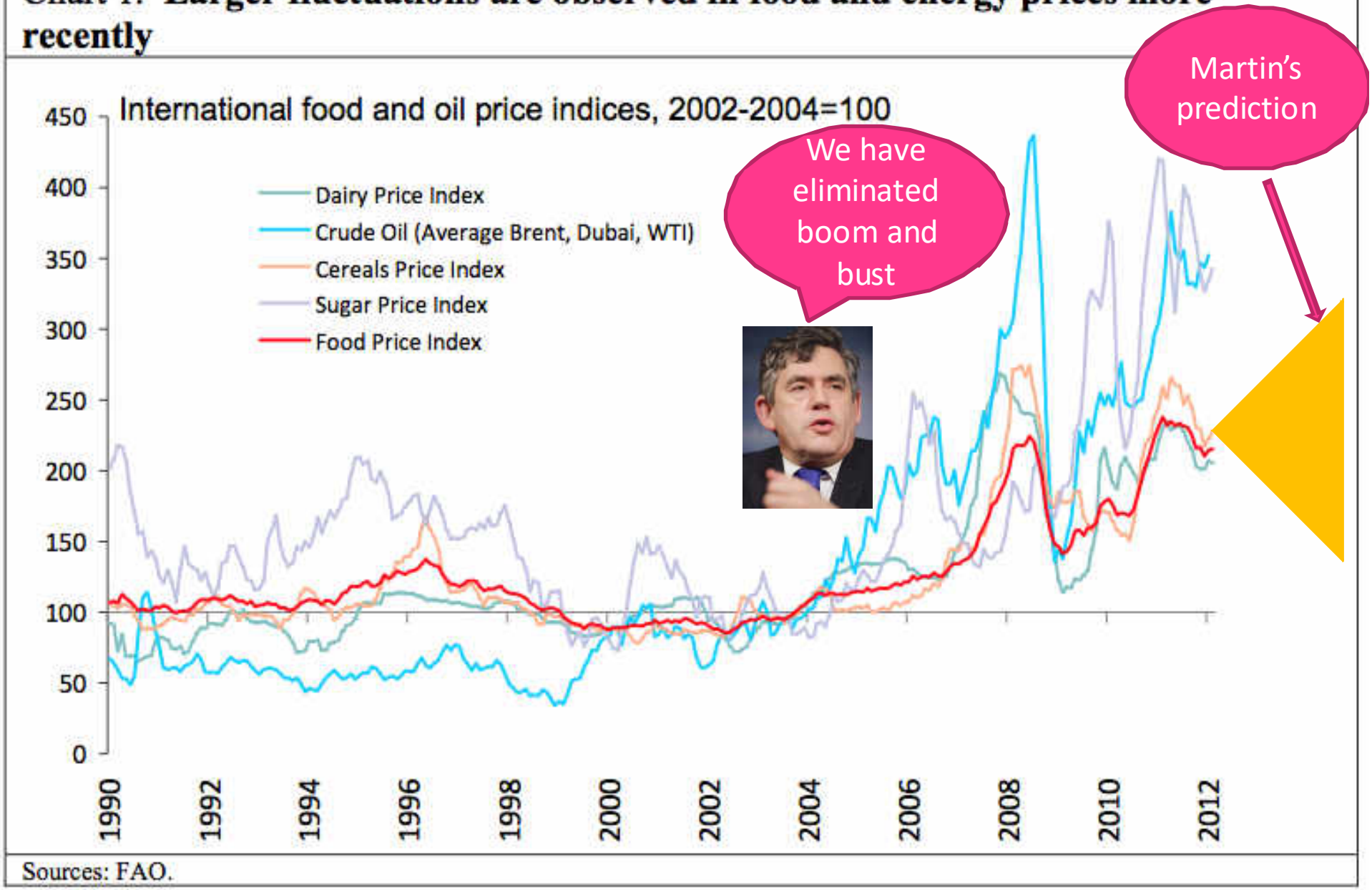
So what skills will be needed in agriculture & food in 2025?

We will still need agronomy, husbandry, farm management etc. … but new business critical areas are emerging

6 Mega Trends in Skill Needs

Chart 1. Larger fluctuations are observed in food and energy prices more recently



Sources: FAO.

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Mega Trend 1: Managing Volatility

More volatility is already with us:

- Product prices – feed wheat between £65-200/tonne since 2007
- Input costs – oil between $35-140/barrel since 2007
- The 25 year post cold war geo-political stability is breaking down – Arab Spring, Radical Islam, Ukraine, Terrorism
- Is the European Economic project ending – Grexit or Brexit?

Management skills to manage risk will increase in importance in every area of agriculture, food & ancillary industries

Product	Consumption g/person/week 2013	% change in 6 years (2007-2013)	% change in 20 years (1987-07)
Milk & cream	1,847	-7	-14
Meat	948	-8	-1
Fish	146	-12	+13
Eggs (number)	1.8	+12	-45
Fats and oils	171	-5	-36
Vegetables	1,102	-3	-4
Fruit	1,114	-13	+45
Confectionery	128	-1	-7
Soft drinks (ml)	1,664	-1	+275

Source: DEFRA Family Food series

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Diets in China …

More importantly for supply & demand, diets in the developing World have been changing rapidly due to rising wealth

Product	% change in per capita consumption 1980-2010	
	Urban China	Rural China
Meat	+31%	+172%
Poultry	+345%	+1,568%
Eggs	+70%	+540%

…. ***but consumption is still lower than in the UK***

Source: Zhangyue Zhou, Weiming Tian, Jimin Wang, Hongbo Liu and Lijuan Cao (2012), Food Consumption Trends in China April 2012, Australian Government Department of Agriculture, Fisheries and Forestry

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Where will our food choices go next?

- Culture
- Taste
- Health
- Convenience
- Premium & niche or basic
- Local or global

If you know the answer supermarkets & food processors would like to employ you….. !

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Mega Trend 2:
Marketing growing in importance

More mouths increase food demand … but changes in diet driven by health, wealth & cultural trends are as important

Rising global wealth will have a massive impact on the food & drink consumers want to buy & how they want to consume it

Skills will be needed in being able to:

- Spot trends in diet & respond with new profitable products
- Explore the potential in export markets – *we are a high cost premium producer* & so rising global wealth must be exploited

Marketing ≠ selling

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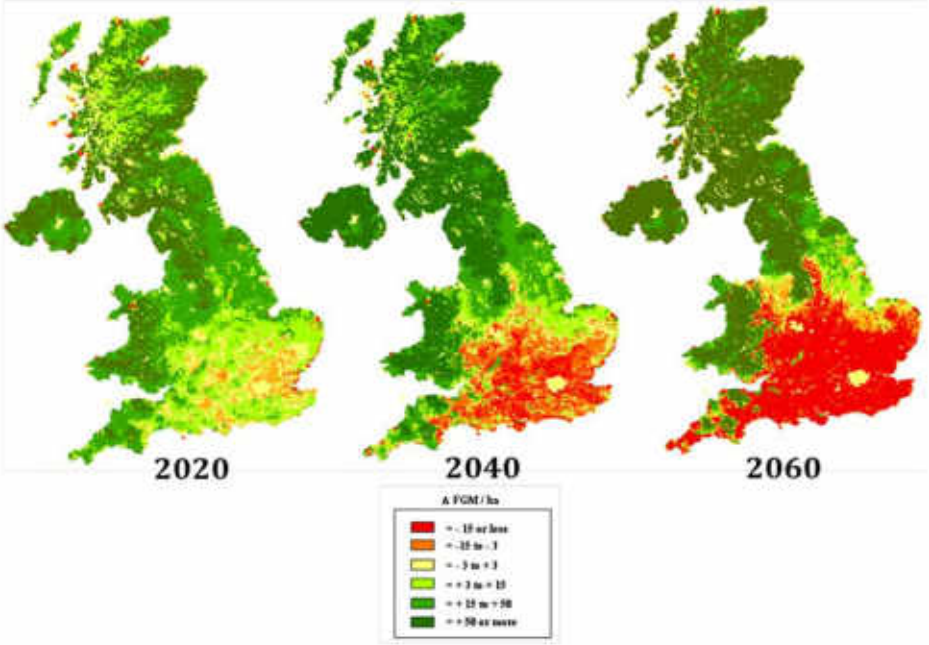
It is not just extreme locations which climate change will effect

UEA CSERGE research:
Changes in farm incomes due to climate change - show differences between:

- SE lowlands increased temperatures & less rainfall lead to reductions in income (red)
- Upland areas react to the same environmental changes by boosting productivity and hence incomes (green)



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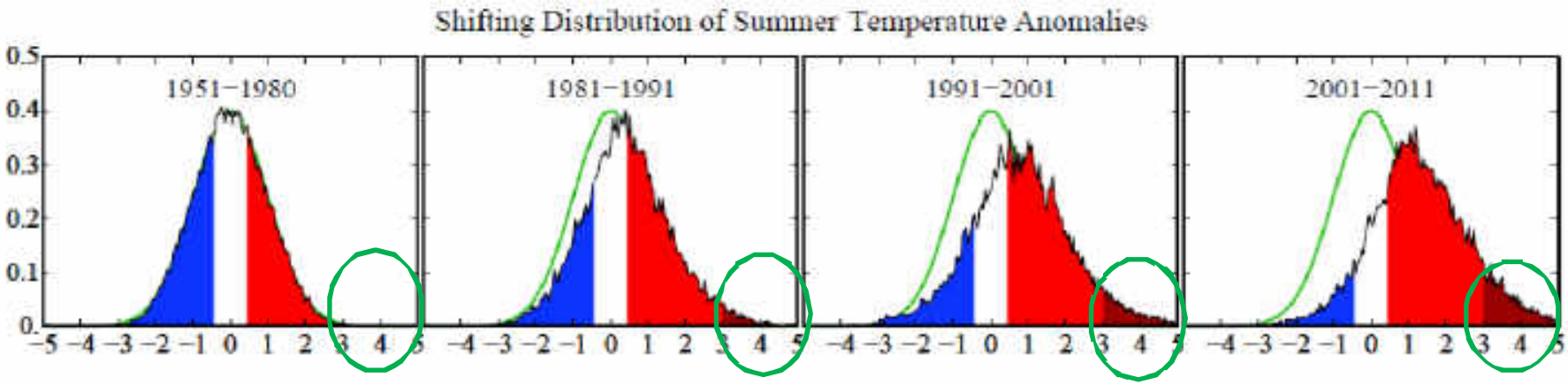
Climate change – biggest threat is more extremes

Historically, what was a 1 in 700 year event is now a 1 in 7-10 year event (Hansen et al, 2012) (from Prof Tim Benton)



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Mega Trend 3: Climate Change

Climate change will affect us all and the distribution of crops and livestock will change …. extremes are the big worry

The impact in the UK will be less than in many other countries

Skills in managing extreme weather will become important:

- Technology to manage extremes e.g. heat resistant genes
- More protected cropping & managed livestock environments
- New pests & diseases
- Water efficiency management & flooding ……

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Water supply

Latest research suggests in East of England by 2050:

- Winter rainfall up 14%
- Summer rainfall down 17%
- UK potato production only uses 29% of the water per tonne of the global average, cereals circa 35%

Globally:

- 75% of fresh water abstractions used for agriculture
- 30% increase in water demand by 2030
- 47% of global population in water stressed areas by 2030

- Also think about flooding - flooding spring 2014

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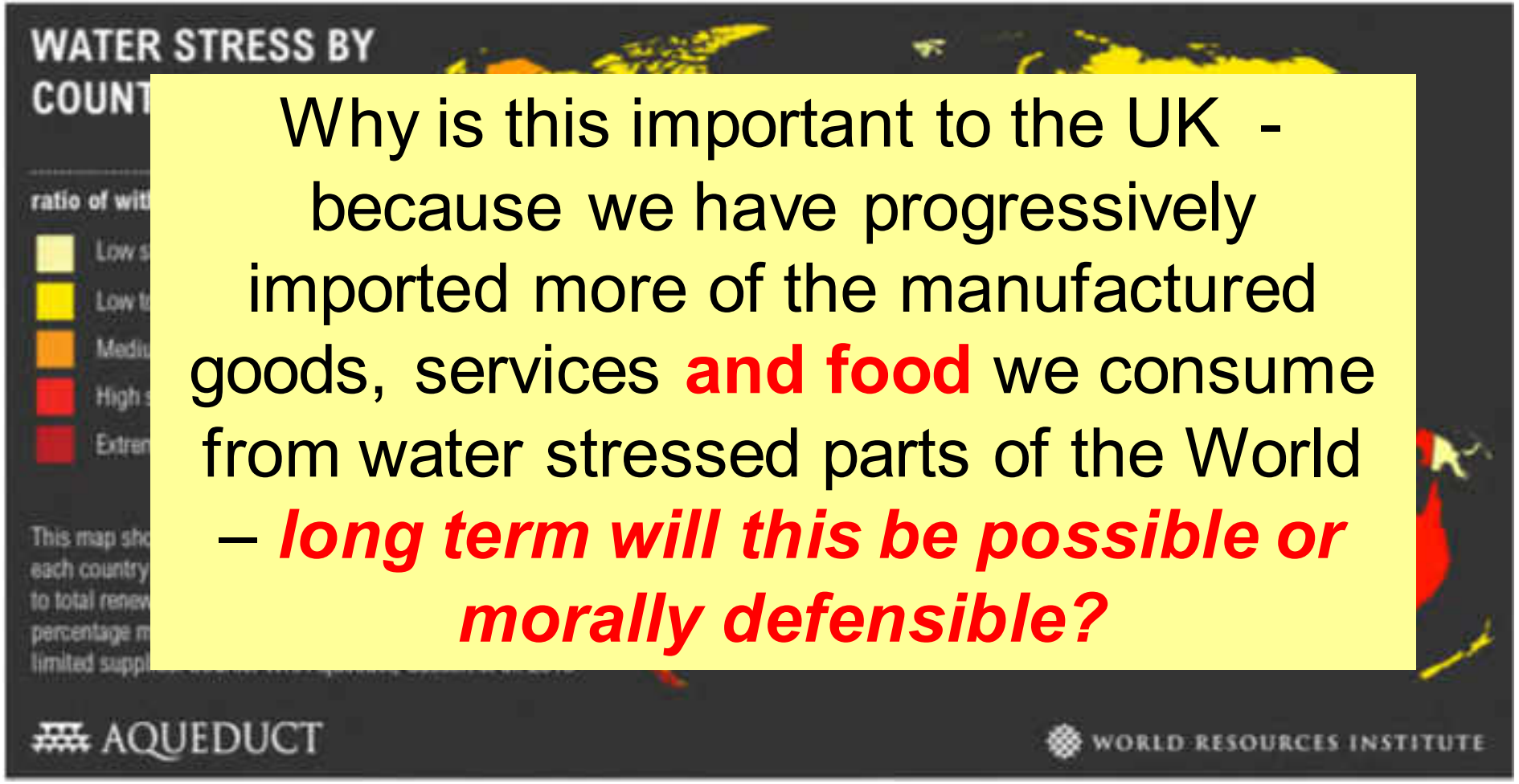
Long Term Challenge - Global



Why is this important to the UK - because we have progressively imported more of the manufactured goods, services **and food** we consume from water stressed parts of the World – ***long term will this be possible or morally defensible?***

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Mega Trend 4: Water

More focus on water management, both water supply & how to cope with flooding will be essential – globally we will run out of water before food ….

Skills for water management are needed in:

- Water efficiency on farms
- Making the case for UK water efficient production
- Soil management to manage flood & water holding capacity
- The technology to manage water efficiently including equipment, sensors, control systems, closed systems
- New genetics for drought & flood tolerance
- Water recycling

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Technology

We are all getting accustomed to GPS guidance, telematics ….

‘Rio Tinto says the self-drive fleet have superior fuel usage, tyre life and maintenance costs’
BBC News 19th Nov 2014

Garford Robocrop – robotic weeders, made in Lincolnshire, can weed between individual plants

But, what about:

- Graphene
- 3D printing
- Urban, enclosed farming systems or lab grown meat?

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Technology is coming to a field near you

Sensors collected more data in 2 years than in the history of mankind up to this point ('Data Explosion' – Cisco 2011)

Liz Truss MP, speech as DEFRA Secretary of State Nov 2014

- 'Our work in this area is being led by … Professor Ian Boyd …. one of the most exciting programmes Ian is leading is the Copernicus system, … a **£3 billion pound project across Europe** … its fleet of six satellites … will **be streaming out 8 terabytes of data a day**'
  - as much as 16 modern (500GB) PCs storage of new data per day …

4G signals will cover 90% of the UK **land area** by 2017 – but **what will 4G allow us to do?**

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Mega Trend 5: Technology

Technology will extend a farm's workforce into a virtual team of geneticists, engineers, data analysts, environmental-engineers, social media wizards ….

Many jobs of the future don't exist yet ... because the technology to enable them has not been invented

Our education system has to lead new technology adoption so:

- Farmers have the skills to implement technology
- Research/innovation centres/companies have skilled staff to develop technology
- Regulators, politicians, finance & media experts 'get it' so they support the adoption of new technology

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Wage Costs

- Living wage – £6.50 minimum wage to £9.00+ in 5 years (*Living Wage Foundation is arguing for £10+*)
- Pension auto-enrolment will typically add 3% to wage costs
- Apprenticeship levy (largest employers) ~ 0.5% of wage bill

The net result is that **employers with staff on the minimum wage will face a 40%+ wage cost increase in 5 years**

Rest of the food chain has a major problem – many jobs in food processing, retail & catering are low paid – they will have to find economies & will **pass cost saving pressure back down to farmers**

Other staff will want to maintain their differential

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Mega Trend 6: Automation

Labour efficiency will grow in significance & with it automation

Skills will be needed in:

- Designing, installing & maintaining automation
- Managing fewer more highly skilled globally mobile staff

The real challenge is this, will we:

- Import the automation solution – Dutch, Germans already very good at it as their wage costs are higher
- Or revitalize our agricultural & food engineering sector so they meet the need? …. do we have the skilled engineers to do this?

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Mega Trend 7

I said 6 mega trends … but another one unites them all …

Leadership, adaptability & embracing change

Our education system must prepare people for:

- multiple careers, shocks, crises & change
- continuous in career learning on & off the job
- working in & leading inter-disciplinary teams
- exchanges between sectors, R&D & innovation

Technical skills alone are of limited value – we need staff who think, take the initiative & get the job done

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7 Big Trends

If we prepare our staff (existing & new entrants) for 7 areas where skills demand is growing we can meet the challenge of the future, they will need additional skills in:

- Managing volatility
- Responding to market changes
- Adapting to climate change
- Managing water
- Embracing technology
- Adopting automation
- **Providing leadership & embracing change**

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The Response needs

- **Ambition** – scale & breadth of the demand for skills requires ambition reaching beyond previous responses
- **Budget** – scale needed requires investment by government & industry to support Colleges/Universities, Training Groups
- **Commitment** – we need to be in it for the long haul
- **Delivery** – depends on momentum to attract new entrants & resourcing to deliver effectively
- **Excellence** – the aim must be to lead globally – the highest ranked UK agric centre, Reading is 19th (QS rankings) & only one other in the top 50 (Nottingham 48th) …. across all subjects the UK has 4 of the top 10 Universities (Cambridge, Oxford, Imperial, UCL)

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Don’t leave it to others

The scale & complexity of the challenge is such that:

- Colleges & Universities can not do it on their own – they need to work with industry, charities & government to do it
- Technology is moving so fast, industry has to be prepared to train their staff, customers & College students to use it
- Industry & charity funding needs to work alongside government – if agriculture doesn’t lead government will invest in other sectors
- UK & EU money requires match funding
- Fragmentation & multiple small projects won’t work

Devolution also means **decisions on skills are likely to be devolved from government to ‘Combined Authorities’** at a local level

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Thank you

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