

An inconvenient truth about food – Neither secure nor resilient



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“There is an excellent acknowledgement of the importance of food security right at the start (of the Policy Commission report): ‘but land and expertise remain available if greater quantities of home-produced food are suddenly needed’. But beyond this there is almost no mention of the need for resilience to potential risks from climate change, global resource (e.g. oil) disruption, transport breakdowns etc. Increases in local sourcing and distinctiveness are seen as cultural benefits; shorter supply chains as a way to cut costs. None of them are recognised as prudent ways to increase security through diversity.”

Sustainable Development Commission on 2002 Policy Commission review, UK Farming and Food.

1 *Food: An analysis of the issues*, Cabinet Office discussion paper, 2008

Context

From 2006 to 2008, global food prices rose rapidly, reflecting increases in the cost of oil and exacerbated by significant quantities of US grain being diverted into producing biofuels. Social and political unrest at the cost and scarcity of staple foods followed in 14 countries worldwide – from ‘tortilla riots’ in Mexico to protests over the price of pasta in Italy. For the UK, food inflation has been running at 13.7% since June 2008, up on the previous three months of 10.6%. Rising food prices are accepted to be a key factor in overall inflation.

Not surprisingly, UK food security is again an issue of public and media concern (so pushing it up the political agenda), but six years on that criticism by the Government’s own sustainable development advisers of official complacency at the lack of resilience in the UK’s food and farming systems holds true.

The first review Gordon Brown commissioned on becoming Prime Minister was a Cabinet Office Strategy Unit analysis of food issues. The initial report published in January 2008 concluded that: *“existing patterns of food production are not fit for a low-carbon, more resource-constrained future”,* and *“existing patterns of food consumption will result in our society being loaded with a heavy burden of obesity and diet-related ill health.”*¹

This stark analysis chimes with the Soil Association’s concern that our current UK food and farming system cannot meet the challenges of climate change, long-term costlier oil, or for providing a foundation for people’s health. Unfortunately, the Strategy Unit’s initial paper appears to be a ‘minority report’ and not the major influence over Government policy on food and farming. Instead the dominant view remains that expressed by Defra Minister Margaret Beckett in March 2006, *“We do not take the view that food security is synonymous with self-sufficiency... It is freer trade in agriculture which is key to ensuring security of supply in an integrating world. It allows producers to respond to global supply and demand signals,*

2 Beckett M 'Action in response to opportunity and challenge', speech given to the Agra-Europe Outlook Conference, London, 2006

3 *Ensuring the UK's Food Security in a Changing World*, Defra, 2008

4 Barling D et al, *Rethinking Britain's Food Security*, Centre for Food Policy, City University, 2008

5 *Rome Declaration on World Food Security*, FAO, 1996

6 *Food Security and the UK: An evidence and analysis paper*, Defra, 2006

and enables countries to source food from the global market in the event of climatic disaster or animal disease in a particular part of the world. ...it is trade liberalisation which will bring the prosperity and economic interdependency that underpins genuine long term global security." ²

That faith in the 'global market' and 'trade liberalisation' to meet our food needs is still prevalent in Defra's 2008 report, 'Ensuring the UK's Food Security in a Changing World',

'... because the UK is a developed economy, we are able to access the food we need on the global market.' ³

With Government policy seemingly out of tune with the public mood, the Soil Association commissioned the Centre for Food Policy at City University London to review our country's current food security, under the new fundamentals of the need to cut greenhouse gas emissions by 80% and of long-term scarcer and more costly oil. The review also assessed the limiting factors of natural resources, available labour, energy and other 'capacities' that determine our ability to produce food both here in the UK or source it from overseas. ⁴

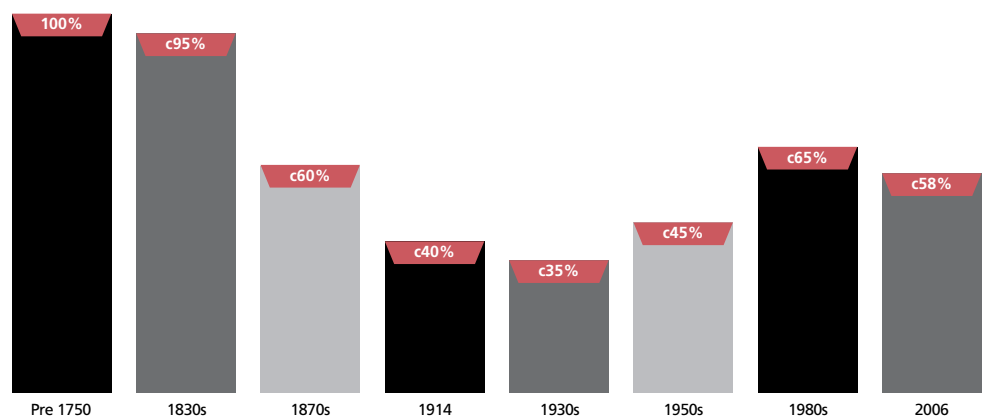
What do we mean by Food Security?

A widely accepted conventional definition of food security is that given by the United Nations Food and Agricultural Organisation in 1996: "Food security exists when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". ⁵

Food security is frequently discussed in parallel with national 'self-sufficiency' – i.e. the extent to which a country can meet its own food needs from home-grown production. Until the 1830s, the UK was virtually 100% self-sufficient, but since then with the exception of the two World Wars, home-produced food has made-up between 40-60% of all food consumed here (see Table 1).

For the past 200 years, the economic theory of 'comparative advantage', has dominated Treasury and Defra thinking. 'Comparative advantage' holds that a country will be better off if it specialises in producing the things it is best at producing, rather than trying to produce everything it needs. For the UK, the significance of agriculture to the GDP of the country has declined, with initially manufacturing and latterly financial services being exported and 'exchanged' for food grown more cheaply in Britain's former colonies and other exporting countries.

Table 1. Indicative UK self-sufficiency rates at different periods ⁶



The last 'food emergency' during World War Two alerted the nation to the neglect of UK food production and how dependent we had become on long, extended supply lines. Today's challenges of climate change and the longer-term shock of scarcer, costlier oil question the Government's faith in global markets for providing the bulk of our foodstuffs over the long-term.

Global Food Markets – '*... things aren't going to be the same in the future*'

The resilience and reliability of the global food market has been called into question by the recent rapid rise in food commodity prices, impacting on prices for consumers around the globe through until late 2008. A range of explanations have been put forward for this sudden surge:

- Rising demand for animal feed to supply growing meat consumption by increasingly affluent populations in China and other developing nations ⁷
- Competition for use of grains, 20% of US maize crop in 2006 diverted to biofuel ⁸
- Coinciding poor harvests among key exporters, 2007 Australian drought halved wheat harvest
- Commodity price speculation, linked to fall in value of the dollar in which commodities are traded ⁹
- Historically low levels of world food reserve stocks adding to sense of vulnerability; pressured further by individual nations like China restocking low grain reserves ¹⁰
- Export restrictions by producer countries Argentina, Russia, Ukraine and Kazakhstan affecting one-third of the world market wheat supply ¹¹
- Input costs, notably fertilisers, rising in tandem with the price of oil. ¹²

In a separate piece of research, gathering views from stakeholders throughout the food-chain on UK food security, the Centre for Food Policy recorded this telling comment from a national food retailer as to the increasing unreliability of global supply chains, "*A sense across the global supply chain that whereas in the past, as a retailer, we have been able to shift very rapidly between countries if there was a problem – so if country X has a problem, we can go to country Y, that may be a problem for the country itself, but it's not a problem for me – there is now a recognition that the ability to hop between countries is being constrained, as climate change and other issues, such as the price of oil kick in... a growing awareness in the food industry that things aren't going to be the same in the future.*" ¹³

The Soil Association is not 'anti-trade' nor seeking to return to the days of 100% UK self-sufficiency in home-grown and consumed foods. We accept that a wholly UK-based food supply would also be vulnerable, for example, to UK specific disease outbreaks or other national disruptions; that valuable and development driving export earnings would be lost to countries in the South, and our diet would certainly be duller. But given the vulnerabilities revealed, we question the Government's excessive faith in global markets and believe we need urgent answers to the following questions:

- How much food does the UK need to produce?
- Are there optimum levels of sustainable national self-sufficiency?
- How resilient is the UK's contemporary food supply and how does it look for the foreseeable future?

Current status of UK Food Security

To date, Defra has not seen national food security as an issue for the UK: "*Poverty and subsistence agriculture are root causes of national food insecurity. National food security is hugely more relevant for developing countries than the rich countries of Western Europe...*

7 Von Braun J, *Rising Food Prices: What should be done?* International Food Policy Research Institute, 2008. *Global Commodities: A long-term vision for stable, secure and sustainable global markets*, HM Treasury, 2008

8 'Biofuels: prospects, risks and opportunities', *State of Food and Agriculture Report*, FAO, 2008. *Food and Fuel Prices: Recent developments, macroeconomic impact and policy responses*, International Monetary Fund, 2008

9 *Global Commodities: A long-term vision for stable, secure and sustainable global markets*, HM Treasury, 2008

10 Ray D, 'Data show that China's more meat based diet is not the cause of ballooned international corn prices', *APAC Weekly Policy Articles*, Agricultural Policy Analysis Centre, University of Tennessee, 2008

11 Ibid.

12 *Global Commodities: A long-term vision for stable, secure and sustainable global markets*, HM Treasury, 2008

13 *Food Security and Sustainability*, Centre for Food Policy, City University, 2008

14 *Food Security and the UK: An evidence and analysis paper*, Defra, 2006

15 *Agriculture in the UK 2007*, Defra, 2008

16 *Food Statistics Pocketbook: 31*, Defra, 2008

17 *Agriculture in the UK 2007*, Defra, 2008

18 *Ibid.*

the UK is well placed to access sufficient foodstuffs through a well-functioning world market.”¹⁴

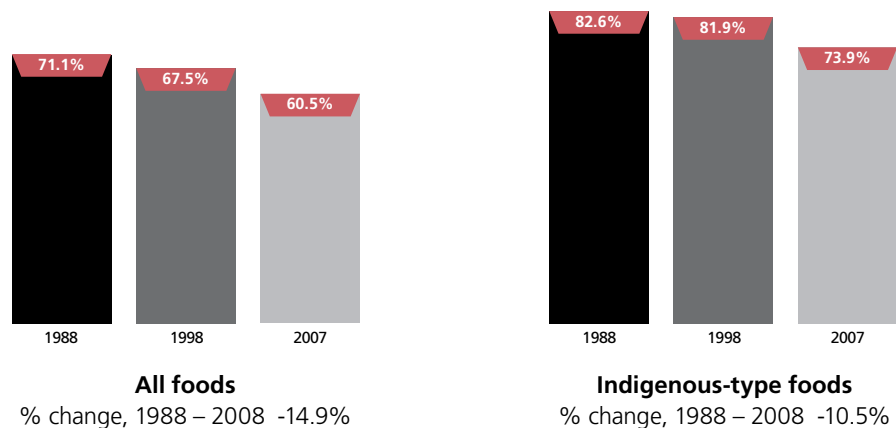
Nor has a level of national food self-sufficiency been seen as a precondition of national food security. Rather, Defra argues that national food security and the security of the UK’s food supply are strengthened by the integration of the international supply of food commodities into UK food chains, offering flexibility and compensating for unexpected harvest loss.

According to Defra figures, the UK is currently 74% self-sufficient in indigenous-type food (the sort that can be grown here), and 60% self sufficient overall, for all foods – in other words, 40% of the food we eat is imported (Table 2). Those figures may reassure some, but it is not clear whether they are accurate. For example, in a discussion of the origins of food consumed in the UK, the ‘official self-sufficiency figure’ given for the UK is 49%, implying that less than half of food consumed in the UK originates here.¹⁵

More worrying is the fact that these percentages are based on the value of imported and home-grown food – not on either volume or calorific (food energy) levels.¹⁶ So they do not represent ‘real’ (i.e. edible) self-sufficiency at all – nor give a true picture of whether or not the UK is well-placed to feed its citizens securely and nutritionally in the event of future challenges and unforeseen shocks. Any true assessment of a sustainable, resilient UK food and farming system would be based on human calorific requirements and food volumes, not merely monetary value.

What is unequivocal is that UK self-sufficiency has declined, falling from 100% to 60% over the past 200 years. More recently, the ratios for all foods and indigenous foods have fallen by 15% and 10% respectively over the past 20 years (Table 2).

Table 2: UK decline in self-sufficiency, 1988-2008¹⁷



‘Eat more fruit & veg, but don’t grow it’

The statistics also reveal a disparity between government policies. Consumers are urged to eat more fruit and vegetables, yet 90% of fruit eaten here is produced overseas with the area put down to vegetables in the UK down by nearly 25% since 1997. This gap between UK production and consumption is not just due to consumer tastes for exotic, non-native fruits or to improvements in productivity per hectare meaning less land is needed to grow the same amount of vegetables – as production volumes have fallen for many indigenous British fruits and vegetables.

In 2005, the UK had the largest trade deficit of any EU country in trade with countries outside the EU (5.35 billion). It was also the largest net importer of food and drink products among EU states, with an intra-EU trade deficit of €10bn.¹⁸ Defra’s response to food security concerns

related to this trade gap is that the majority (68%) of the UK's food and drink imports, came from other members of the EU, which it terms 'low-risk, stable trading partners'.¹⁹

Defra dismisses suggestions that a greater proportion of UK home-grown food provision might be wise by describing self-sufficiency as 'an illusion' – because it doesn't take into account the extent to which goods ostensibly produced in the UK depend on imported inputs, notably oil and gas, fertiliser, pesticides, feed and machinery.²⁰ In a 2005 paper, the government estimated that 69% of pesticides and 63 % of primary energy used in the UK for agriculture were imported, and a 2006 paper put the import figure for fertiliser at 37%, up from around 10% in the 1970s.²¹ ²² The EU as a whole imports fertilisers from a range of external countries, including Russia, Norway, Egypt, Morocco, Tunisia, Libya, Ukraine and Belarus.²³

Defra's claim that imports from the EU are 'low-risk' is undermined by its own argument, as those countries are producing their and our food on a similarly vulnerable and unsustainable base of high-dependency on imported, oil-based and finite mineral inputs. The fact that 70% of overall EU animal feed is imported underlines the European agriculture's dependency on external inputs.²⁴ As the European Commission commented, "Europe's agriculture is capable of feeding Europe's people, but not of feeding Europe's animals."

Our current food security, whether derived from home-grown production or imported foodstuffs from the EU or further afield, is based predominantly on vast inputs of non-renewable, oil-derived and climate-change exacerbating artificial inputs.

The New Fundamentals

'Resilience' is the key measure by which the Soil Association believes that our national food and farming security should be judged. Resilience is a term used by business and government to indicate what is necessary to 'keep the show on the road' in times of crisis. For government, one feature is preparing for civil contingencies

It is not just the resilience of our food supply to such short-term shocks that needs to be considered, but the underlying, long-term resilience of our predominant food system and farming model in the face of a number of these new fundamentals:

Climate Change

In an extraordinarily complacent statement, Defra dismisses climate change as having much impact on UK food security, "Climate change particularly is likely to bring new challenges for the food security, not of rich countries like the UK, but of less developed, tropical regions".²⁵

However, in October 2008, Ed Miliband, the new Energy and Climate Minister, accepted the recommendation of the Committee on Climate Change chaired by Lord Adair Turner to set the higher target of 80% cuts in greenhouse gas emissions by 2050 – and that this target should include all greenhouse gases, not just carbon dioxide. That policy decision alone questions the resilience of our current food and farming system – necessitating a radical change in how we grow, source and distribute our food.

Unlike other sectors of the UK economy, only 13% of agriculture's greenhouse gas emissions are in the form of carbon dioxide. Instead the majority of farming's 9% contribution to total UK emissions is made up of nitrous oxide and methane – the larger part by nitrous oxide. The main source of which is artificial nitrogen fertiliser, upon which non-organic farming in the UK is dependent – using over 1 million tonnes annually. Nitrous oxide is 310 times more damaging than carbon dioxide.

Globally, agriculture is the largest single source of nitrous oxide. To make 1 tonne of nitrogen fertiliser requires 1 tonne of oil and 108 tonnes of water – in the process giving off over 7

19 *Ensuring the UK's Food Security in a Changing World*, Defra, 2008

20 *A Vision for the Common Agricultural Policy*, HM Treasury and Defra, 2005

21 Ibid.

22 *Food Security and the UK: An evidence and analysis paper*, Defra, 2006

23 www.cms.efma.org European Fertiliser Manufacturers' Association, 2008

24 www.ec.europa.eu/agriculture/agista/2007 European Union, 2007

25 *Food Security and the UK: An evidence and analysis paper*, Defra, 2006

26 NFO614 *Environmental Assessment Tools for Biomaterials*, North Energy Associates/Springdale Crop Synergies, 2007. Mortimer N D et al, *Evaluation of the Comparative Energy, Global Warming and Socio-economic Costs and Benefits of Biodiesel*, Sheffield Hallam University, 2003

27 www.defra.gov.uk UK emissions of carbon dioxide, methane and nitrous oxide by source and end user: 2005-06, National Communications Categories, Defra, 2008

28 *Why Farming Matters in the Fens*, National Farmers Union, 2008

29 www.decc.gov.uk and www.ipcc.ch

30 Ibid.

31 *The Validity of Food Miles as an Indicator of Sustainable Development*, AEA Technology, 2005

32 Pimental D and Giampietro M, *Food, Land, Population and the US Economy Carrying Capacity Network*, 1994

33 Ibid.

34 *The Coming Oil Supply Crunch*, Chatham House, 2008

35 www.berr.gov.uk, 2007

tonnes of carbon dioxide equivalent greenhouse gases. Emissions from the manufacture and delivery of nitrogen fertilisers account for 14% of total greenhouse gas emissions from agriculture and 1.1% of the UK's total greenhouse gas emissions.²⁶

Annual agricultural emissions of methane make up 37% of all UK methane emissions, amounting to over 2 million tonnes of carbon dioxide equivalent greenhouse gases. However, total agricultural methane emissions are only 10% of the greenhouse gas emissions generated by fertiliser production and use.²⁷

Sea-level rise: Sea levels are predicted to rise between 26 – 86 cm above the current level in south east England by the 2080s. With 57% of Grade 1 farmland below sea level, this brings significantly increased risks of flooding, especially in East Anglia and most notably The Fens, which hold 37% of England's acreage for outdoor grown vegetables.²⁸ One analysis suggests that arable farming might become unviable on 86 % of the Fens; 10 % of the remainder of East Anglia, and 7% of the North West due to flooding.²⁹

Drought: Average annual temperatures across the UK could rise by 2° to 3.5°C or more by the 2080s, depending on future levels of greenhouse gas emissions. The unprecedented heat-wave that affected Europe in 2000, when crop yields fell by 25- 30% across France and Italy, gives an unpleasant foretaste of what is predicted to become a more frequent event.³⁰

Scarcer, costlier oil & other fossil fuels

In the UK, the food supply accounts for about one fifth of total energy use.³¹ 95% of our food is oil dependent. Available statistics reveal the extent of US intensive farming's reliance on oil: with 400 gallons of diesel fuel required to produce, process and distribute a year's worth of food for the average American.³² On average in the US, 10 calories of fossil-fuel energy go to produce each single calorie of food energy.³³

Whilst crude oil has dropped back from its July high of \$140 to below \$60 a barrel, long-term predictions are for an upward trend as new sources of oil become rare events and existing reserves become harder and costlier to extract. Respected think-tank, Chatham House has predicted prices rising to \$200 a barrel over the next two decades.³⁴

The Department for Business, Enterprise & Regulatory Reform states that by 2020, the UK will be reliant on overseas sources for the majority of our gas and over half of our oil. Energy security and food security are inextricably linked.³⁵

Production Capacity

Land: The key production capacity is available land. In the UK there are an estimated 18.5 million hectares of utilisable agricultural land (17.5m ha are currently farmed).

Much of our farmland is already subject to restrictions on its use for public health, wildlife and amenity values such as: Nitrate Vulnerable Zones (NVZ) required under EU law to protect surface and groundwater drinking water sources from excess nitrate pollution. Following a 2006 review, from January 2009 70% of England will be under NVZs, requiring restrictions on use and application of artificial fertilisers and manures. 15% of the English countryside and farmland is designated as Areas of Outstanding Natural Beauty, National Parks cover 8%, and the more specific Sites of Special Scientific Interest apply to 7%.

A small number of studies (Mellanby 1975; Fairlie 2007; Jones 2008) have examined whether the UK could, if required under another national emergency such as World War Two, feed current populations. A review of these, supported by other international studies, indicates that organic farming systems could produce sufficient foodstuffs to sustain food security for the UK and globally, but as for all agriculture under the new fundamentals not without major changes to diet, farming practice, and food distribution (see Appendix).

Soil: The quality and fertility of the land is as important as its quantity. This fundamental principle of the organic movement has been ignored by non-organic agriculture, which has substituted inputs of artificial fertilisers for good soil husbandry in building fertility through organic matter and rotations. The results of 60 years such neglect are becoming obvious.

The UN Environment Programme estimates that globally nearly 2 billion hectares of land are affected by human-induced soil degradation, and gives the shocking statistic that half of the world's current arable land will be 'unusable' by 2050.³⁶

The European Agricultural Conservation Foundation has estimated that soil erosion and degradation caused by conventional agriculture affect c. 157 million ha (16% of Europe, roughly three times the total surface of France).³⁷

The Soil Survey of England and Wales reported over 20 years ago that 44% of the country's arable land was at risk from erosion.³⁸ A 2004 study by the Environment Agency estimated that intensive farming was the main cause of the 2.3 million tonnes of UK soil 'lost' between 1995-8.³⁹ The Royal Agricultural Society of England in its 2008 report, expressed concern about the weakened state of UK soil science due to a decline in policy support and research infrastructure.⁴⁰ We simply do not have enough current knowledge of the state of our soils.

Soil contains up to 58% carbon.⁴¹ Defra estimates that 10 billion tonnes of carbon are stored in UK soils. In 2003, 3.73 million tonnes of carbon were emitted from UK soils, but only 1.52 million tonnes were added. It has been estimated that the UK's soils are losing carbon 'on an enormous scale', around 13 million tonnes annually, which nearly matches the 14 million tonnes of total greenhouse gases emitted by UK agriculture from all other sources and equivalent to 8% of UK carbon emissions from fuels.⁴²

Water: Agriculture is the greatest user of water worldwide, accounting for an estimated 70% of potable water use, with livestock playing a significant part in that.⁴³

The Intergovernmental Panel on Climate Change has highlighted that globally the underground aquifers supporting major cereal-producing areas are under stress.⁴⁴ With US arable farmers using a 1000 tons of water to produce each ton of grain, water stress could curtail or even end cereal production in parts of the USA and Australia.⁴⁵

With summer rainfall predicted to decline by up to 50% in the south and east of England by 2080, availability of and efficient use of water will become a key limiting factor and capacity by which food production will be gauged. More detailed auditing of 'embedded water' within food products is likely. Using one methodology, Dutch researchers calculated that a typical 150g beef burger 'contains' 2,400 litres of embedded water when all the water used to grow the grain, feed and water the cow, wash equipment, and in processing is accounted for.⁴⁶

Around 66% of Africa's landmass is either desert or drylands, making the Continent particularly vulnerable to greater water stress as predicted under climate change. Countries already experiencing drought will increasingly consider the quantity of 'embedded' water they are exporting with cash crops destined for the UK and Europe. Currently some 12% of the UK's fruit and vegetable imports come from Africa.⁴⁷ Professor Tony Allan of SOAS University of London has developed the concept of 'virtual water' to identify products traded within and between countries which are water-stressed.⁴⁸ Using Allan's methodology, the International Institute of Environment and Development calculated that 189 million m³ of virtual water is imported to the UK each year just 'in' green beans from Africa⁴⁹ – each bean stem uses four litres of virtual water.

Fertiliser 'Peak Phosphate'

We've considered the energy and greenhouse gas impacts of artificial nitrogen fertiliser above, but UK food production and our food security are also made vulnerable by reliance on another key fertiliser, phosphate. Described by science writer, Isaac Asimov, as 'life's bottle-neck',

36 State of World Soils, UNEP, 2002

37 *Conservation Agriculture in Europe*, European Conservation Agriculture Federation, 1999

38 Soil Survey of England and Wales

39 *The State of Soils in England and Wales*, Environment Agency, 2004

40 Goodwin R et al, *The Current Status of Soil and Water Management in England*, Royal Agricultural Society, 2008. See also www.sustainablefood.com/guide/soilissue

41 *Consultation on the Draft Soil Strategy for England*, Defra, 2008

42 Bellamy P et al, 'National Soil Resources Institute, carbon losses from all soils across England and Wales 1978-2003' *Nature*, Vol 437, 2005

43 Clarke R & King J, *The Atlas of Water: Mapping the world's most critical resource*, Earthscan, 2004. *Livestock's Long Shadow*, FAO, 2008

44 *Climate Change 2007: The physical science basis; summary for policy makers*, IPCC, 2007

45 Lester Brown, World Resources Institute

46 Chapagain A K & Hoekstra A Y, 'Water footprints of nations, vols 1 & 2', *Value of Water Research Report Series No. 16*, Unesco-IHE 2006

47 *Overview of the Benefits and Carbon Costs of the African Horticultural Trade with the UK*, Defra, 2007

48 Allan J A, 'Virtual water – the water, food and trade nexus: useful concept or misleading metaphor?' *Water International* 28, 2003

49 MacGregor J & Vorley W, personal communication, data presented at an IED/DfID seminar, 2006

50 Cisse L & Mrabet T, 'World phosphate production: overview and prospects', *Phosphorus Research Bulletin*, Vol 15, 2004

51 Tiessen, 1995; Steen, 1998

52 *What is Being Done About Biodiversity Loss?* National Environment Research Council, 2008

53 Constanza et al, 1997

54 *Dimensions of Need: An atlas of food and agriculture*, FAO, 1995

55 Ibid.

56 *Organic Works*, Soil Association, 2006

57 Agricultural Census, Defra, 2004

58 Tudge C, *Sow Shall We Reap*, 2003

phosphate is vital to plant, animal and human life – and as an input to agriculture. Indeed, it is considered the key limiting factor to crop plant growth.

The UK imported around 206,000 tonnes in 2007, with nearly 80% coming from four countries across North Africa; Morocco (estimated 46-53%), Tunisia, Algeria and Egypt.⁵⁰ Unlike nitrogen available in unlimited quantities from the atmosphere, phosphate fertiliser is made from a finite, mined mineral. World reserves are estimated at a mere 3.6 – 8bn tonnes. If the lower estimate is accepted, this leaves, at current global extraction rates of roughly 125 million tonnes/year, around 30 years supply. More optimistic estimates extend phosphate resources for 60-90 years.⁵¹

As a finite resource under increasing demand (with China and India the largest users) the price of the raw material, phosphate rock, has surged by more than 700% in recent months to over £185 per tonne.

Animal manures, green 'manure' crops and human sewage are other available forms of phosphate.

Environmental Capacity

In the UK, the Natural Environment Research Council has reported that between 1983- 2003 native butterfly populations fell by 71%, native bird species by 54%, and over 1963-2003 UK native plant species declined by 28%.⁵²

Environmental legislation brought in to halt further species decline and habitat loss, restricting the intensity and expansion of agriculture on all potentially utilisable food producing land delivers more than just wildlife value: The eco-services provided by the world's wildlife and ecosystems to humanity have been calculated to be up to \$38 trillion annually.⁵³

For agriculture, available genetic diversity and wild relatives of crop plants and livestock are key to improving yields and overcoming pest and disease resistance. Yet the UN Food & Agriculture Organisation (FAO) has estimated that between 1900 and 1995 about 75% of the global genetic diversity of domestic agricultural crops and livestock had already been lost.⁵⁴

FAO's argument for preserving and enhancing biodiversity is about utility, not sentimentality, *"When natural diversity is lost, so is irreplaceable genetic material, the essential building blocks of the plants and animals on which agriculture depends. These plants and animals are the result of 3,000 million years of natural evolution – and 12,000 years of domestication – and selection."*⁵⁵

Social Capacity

Labour force: there has been a long, steady decline in overall employment in UK agriculture. In 1900, around 40% of the UK population was still employed in agriculture, by the start of the Second World War that had fallen to some 15%; today less than 2% of the population works in farming.⁵⁶

The number of farm workers (excluding farm owners, partners, directors and their spouses) declined from 882,296 in 1951 to 183,600 by 2003 – a 79% decline over 50 years, averaging out at 37 farm workers leaving the land everyday.⁵⁷ The average age of farmers is 56, with the proportion of farmers aged 55 and over increasing from 48% to 56% in a single decade (1993-2003).

Author and agricultural commentator, Colin Tudge, has suggested that the UK would need to divert some 20% of its population into farming to produce the required amount of home-grown food needed under the coming constraints of climate change and peak oil.⁵⁸

Infrastructure: The loss of people with the skills or inclination to work in agriculture has been

accompanied by a parallel reduction in rural infrastructure: local food shops, greengrocers, butchers and bakers have disappeared – a 1000 such shops closed every year during the 1990's.

The dismantling of such regional food infrastructure has contributed to the 23% greater distance our food now travels than it did three decades ago.⁵⁹ The concentration of slaughter and processing plants into fewer, bigger sites also increases the risk of contamination and disease spread, as was the case with the 2001 Foot & Mouth outbreak, with livestock travelling the length and breadth of the country to slaughter.

The UK food system accounts for over a third of all road freight. As large supermarket chains have consolidated, so the distance people travel to shops has grown. From 1985/6 – 1996/8 average UK travel to shop distances increased 57%. As our food moves further and faster between suppliers and retail outlets, lower quantities are held in store. These 'low-inventory' logistics systems maximise profitability for supermarkets, but reduce regional food resilience and increase vulnerability to shocks such as the Fuel Protest of 2000 that brought London to within three days of running out of food.

Health: A third of heart disease and a quarter of all cancers are thought to be diet-related. A Department of Health Foresight analysis has predicted 40% of Britons will be obese by 2025 and 60% by 2050; with 70% of girls and 55% of boys being overweight or obese by 2050. Food-related ill health cost the NHS an estimated £7.7bn in 2007, 9% of its total budget.

An estimated 70,000 premature deaths in the UK could be prevented each year if UK diets matched nutritional guidelines – with the health benefits amounting to nearly £20 billion annually in quality-adjusted life years. While health experts calculate the largest number of premature deaths, 42,000, could be avoided if people increased their fruit and vegetable intake by 136g a day.

Such facts led the Cabinet Office Strategy Unit to observe, '*The public health and diet challenge is urgent, compelling, and goes beyond obesity.*' Yet there is no obvious joined-up thinking in linking national dietary guidelines⁶⁰ to enabling farmers to produce more of the key food groups at affordable prices that would improve people's health and cut costs to the NHS. A policy driven shift in the dietary habits and food production priorities of the UK towards World Health Organisation healthy eating guidelines would reduce demand for and production of meat, eggs, sugar, fats and dairy products and encourage increased demand for and planting of a wider range of cereals for direct human consumption, (rye, oats, spelt), more root crops, fresh fruit and vegetables⁶¹ – whilst still supporting consumption of less, more extensively reared meat (grass-fed beef and sheep).

Population: The global population is set to grow from c 6.7bn by over 25% to 9 billion by 2050 mainly in the developing world,⁶² an increase of 2.5 billion equivalent to the total world population in 1950. For the UK, as for most developed countries, predicted population growth is more modest – although the Office of National Statistics predicts the UK population, currently 60 million, growing to 71m by 2031.

The world actually produces more than enough food (WHO daily requirement of 2200 -2500 food calories) for everyone on the planet – but not everyone has access to it, can afford it, or is eating a healthy diet. Whilst some 850 million people are estimated to be malnourished in developing countries, in the Northern developed world nearly 2 billion are overweight and obese. One-third of the world's grain harvest goes to feed livestock and in recent years significant amounts have gone to fuel cars, rather than feeding either animals or people.

Growth in population on its own is not the main factor, but rather the consumption habits of current and future populations. An analysis of London's overall 'footprint' by The Greater London Authority in 2003 illustrates this, estimating the city's total 'footprint' at 48,868,000 global hectares (gha) or 6.63 gha per capita to supply all of Londoner's needs. London's food requirements alone accounted for 41% of that estimated footprint, totting up to 20,035,000 hectares – 2 million more hectares than the total available farmland in the UK. The capital's

59 *Food Transport Indicators to 2006*, Defra, 2007

60 WHO, 2003

61 Shankar et al, 2008 cited in Jones P & Crane R, *England and Wales under Organic Agriculture: How much food could be produced?* Centre for Agricultural strategy, University of Reading, 2008

62 *State of World Population 2007: Demographic, social and economic indicators*, UNFPA, 2007

true global 'fairshare'— i.e. if it reflected London's portion of the world's 'biocapacity' – would be a total footprint of 1,210,000 gha or 0.16 gha per capita.⁶³ To achieve this would require all Londoners to consume 70% less meat, eat more than 40% local, seasonal unprocessed food, and cut their food waste by one tonne a year – which indicates what might be required nationally if our food system were to be more resilient, deliver needed greenhouse gas emission cuts and improve people's health.

In summary

- UK food self-sufficiency has declined over the past decade and we have become more reliant on imported food
- Government faith in global markets is undermined by recent events revealing their volatility and unreliability
- The vulnerability of both the UK and EU food and farming systems to the new fundamentals of Climate Change and scarcer, costlier oil is underplayed in current policy
- There is little awareness of the lack of resilience within UK based food and farming especially in terms of sufficient, skilled labour and the supporting regional infrastructure that a healthier diet and 'a low-carbon, more resource constrained future' necessitates
- There is no overall, future-proofed 'Food Plan for Britain'.

Our Manifesto for Action

A Food Plan for Britain – This summary review of the UK's food security, self-sufficiency and resilience confirms the need for a new 'Food Plan for Britain', which takes fully into account the new fundamentals – i.e. to provide a healthier diet while cutting greenhouse gas emissions by 80%, which combined with longer-term scarcer and costlier oil requires a radical transformation of farming methods and reconstruction of more regionalised food processing and distribution networks.

Such a Plan based on a thorough analysis of the limiting factors and capacities we have touched on here, would enable strategic judgements to be made as to how much, of what type of food we need to grow here in the UK.

Supporting low-carbon farming – Government must provide incentives for encouraging farming practices and soil-management that minimise carbon emissions and maximise carbon storage in agricultural soils. These should become a requirement of Good Agricultural and Environmental Practice under the Single Farm Payment scheme.

Linking Farming & Health Policies – Bring health and farming policy objectives closer together, especially when non-intervention will result in avoidable premature deaths, rising obesity and other negative health effects and public costs of a poor diet.

Rebuilding regional food & farming communities – Working through the Food for Life Partnership, the Soil Association is recreating the diverse, regional food economies capable of responding to any future food emergency. By sourcing local, seasonal, organic food Food for Life schools are providing secure markets for farmers and encouraging mixed-farming that raises a greater variety of crops and livestock.

Cities and Towns across the UK should follow the lead of London's Food Czar, Rosie Boycott who has launched an ambitious project to turn 2,012 derelict pieces of land into green, food growing spaces by 2012 and set-up a network of 'food hubs' across the Capital.

Empowering & engaging individuals – With the largest share of our individual carbon-footprint (30%) coming from our food, consumers should be able to choose their food through the introduction of simple 'carbon-labelling'

The Soil Association's Community Supported Agriculture scheme is enabling communities to

relearn the skills to provide a proportion of their personal food security.

Supporting Views: The Soil Association is not alone in raising concerns about our nation's food security and the need for and value in balancing food production whilst sustaining biodiversity.

The International Agricultural Assessment of Science, Technology and Development (IAASTD), signed up to by over 60 governments and 400 scientists, concluded that: '*... despite significant scientific and technological achievements in our ability to increase agricultural productivity, we have been less attentive to some of the unintended social and environmental consequences of our achievements.*

*Business as usual is no longer an option... Policies that promote sustainable agricultural practices (...) stimulate more technology innovation, such as agroecological approaches and organic farming to alleviate poverty and improve food security*⁶⁴

The Soil Association supports this call for the development of and technological support for 'agroecological approaches', of which organic farming is one practical, commercially viable and existing example – as recognised by the Government's own Sustainable Development Commission, which has endorsed organic farming as '*the gold standard for sustainable farming*'.

Appendix

Other relevant reviews of UK Food Security

In 1975, ecologist Kenneth Mellanby published *Can Britain Feed Itself?*, which demonstrated how, by adapting both consumption and land use, the UK could feed its population, then around 53 million, with an adequate but simple diet of around 2800 calories per person per day, based on cereals, potatoes, milk, sugar and a reduced ration of meat, using conventional agricultural methods.⁶⁵

In 2007, Simon Fairlie in an article published in *The Land* magazine, updated Mellanby's analysis to determine not just whether the UK could produce enough to feed its current population of 60 million, but which of six agricultural systems ranging from 'Chemical with livestock', to 'Organic with Livestock', to 'Vegan Permaculture' might do so most successfully.⁶⁶ Fairlie concluded that a wholly organic UK agriculture based on the rotational cropping and livestock system most commonly practiced in the UK could meet the nutritional requirements of our present population of 60.6 million people – but given the need to build soil fertility through rotations and grass/clover leys took-up the greatest proportion of available agricultural land.

In 2008, the Soil Association commissioned the Centre for Agricultural Strategy at Reading University to answer the question, 'How much food could be produced in this country if all domestic agriculture were organic?' Using actual farm business data, the CAS analysis reflects a straightforward projection of the likely immediate effect on current production volumes of the major agricultural commodities if all non-organic agriculture switched to organic.

The broad answer from this study was that whilst a wholesale conversion to organic would not produce the same volume of the same food commodities as currently under non-organic systems – for certain sectors volumes of production would increase, i.e. beef, sheep, mixed cereals and oats; whilst fodder beans, peas and potatoes would be the same. The big declines were, not surprisingly, in intensive pork and poultry meat production, which organic standards would not permit – and of course, both those systems, unlike grass-fed beef and sheep, depend on large volumes of imported animal feed.

Additionally, the researchers noted that any 'significant movement' in the dietary habits of the UK public, towards World Health Organisation healthy eating guidelines leading to marked reductions in consumption of meat, sugar, fats, eggs and dairy products and an increase

64 Global Summary, Options for Action, IAAST

65 Mellanby K, *Can Britain Feed Itself?* 1975

66 Fairlie S, 'Can Britain feed itself', *The Land*, 4, 2007-08

67 *England and Wales Under Organic Agriculture: How much food could be produced?* Centre for Agricultural Strategy, 2008

68 Pretty and Hine, 2000

69 Badgley et al, 2007

70 UN Organic Agriculture and Food Security Conference, 2007

71 *Organic Agriculture and Food Security in Africa*, UNEP-UNCTAD, 2008

in consumption of horticultural crops, root crops (potatoes etc.) and minor cereals would favour organic farming.

The researchers also acknowledged the 'lower-fossil fuel use' and 'numerous environmental benefits' of organic farming, concluding that *'food production losses under an organic agriculture would be not as great as have been supposed by some and also that increases in on-farm employment would be rather higher than have been supposed.'*⁶⁷

Evidence of benefits to developing countries' food security from organic farming methods:

A study in 2000 of over 200 food production projects in the Southern Hemisphere found organic techniques increased yields, by anything between 46% and 150%.⁶⁸

A 2007 review of this data and others concluded that organic production methods increased yields of subsistence agriculture by 80% and that if world agriculture went organic, overall food production would increase.⁶⁹

Danish research presented to a UN Conference in 2007 found that in sub-Saharan Africa, a conversion of up to 50% of agriculture to organic methods would be likely to increase food availability and decrease food import dependency. Alexander Mueller, assistant director-general of the UN's Food and Agriculture Organisation praised the research and said considering that the impact of climate change will target the world's poor and most vulnerable, "a shift to organic agriculture could be beneficial."⁷⁰

These findings have been reinforced by a new survey from the UN Environment Programme in East Africa of 114 projects in 24 African countries.⁷¹ This found that yields had more than doubled where organic, or near-organic practices had been used. That increase in yield jumped to 128% in east Africa. The survey also found that over 90% of the organic or near organic agriculture case studies brought benefits for soil fertility; water control; improved water tables, carbon sequestration and biodiversity, so allowing farmers to extend the growing season in marginal areas. The Head of the UN's Environment Programme, Achim Steiner, and the Secretary-General of UNCTAD Supachai Panitchpakdi state in the report's executive summary, *"The evidence presented in this study supports the argument that organic agriculture can be more conducive to food security in Africa than most conventional production systems, and that it is more likely to be sustainable in the long-term"*.

Acknowledgements

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The Centre for Food Policy's research report, 'Rethinking Britain's Food Security' is available in full at www.soilassociation.org

Soil Association

The Soil Association is the UK's leading environmental charity campaigning for a global shift to sustainable, organic food and farming practices.

Founded in 1946 by a far-sighted group of farmers, doctors and concerned citizens, the organisation is dedicated to bringing about change by creating a growing body of public opinion that understands the direct link between farming practice and plant, animal, human and environmental health.

Today the Soil Association is an internationally respected authority on sustainable agriculture and recognised champion of healthy food, which uniquely represents and offers practical solutions to everyone involved in the food chain – farmers, food processors, retailers and consumers.

The Soil Association is reliant on the support of its members, donors and the public to carry out its work. You can help grow the organic movement, by joining the Soil Association you will be part of a dynamic organisation pressing to change the predominant food culture in this country. Single UK membership costs just £24 a year.

To join, visit www.soilassociation.org or call 0117 914 2447.



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