

Energy, Food and Agriculture

The importance, and costs, of food security

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There is only one source of energy that is essential to the humans; it's not coal, oil or natural gas – it's food! This briefing looks at the importance of food, our dependence upon cheap fossil fuels for its production, and how Peak Energy threatens our increasingly technological food supply.

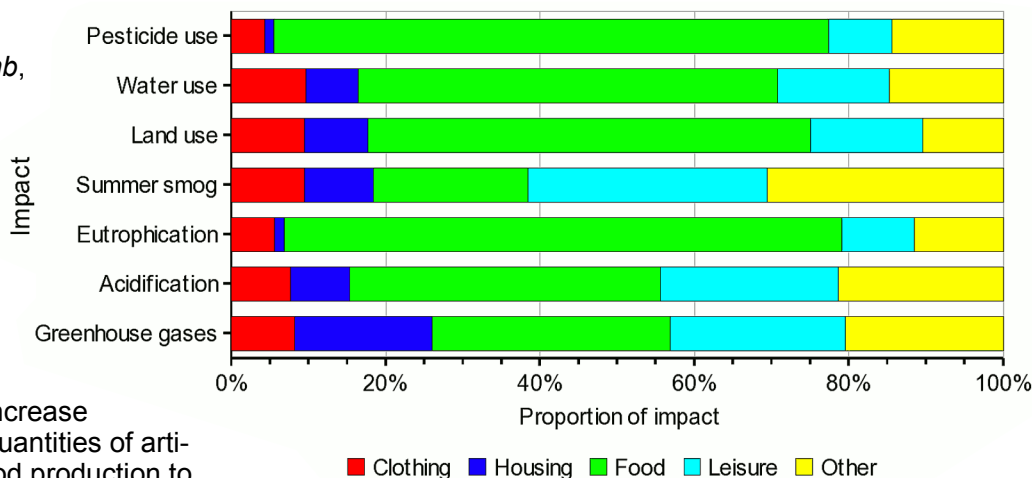
“Intensive” means energy, not “more”

In 1968, Paul Ehrlich's book, *The Population Bomb*, caused controversy when he predicted that the human species would grow so large that it would no longer be able to feed itself. It didn't happen. The reason was that during the 1960s and 1970 the “green revolution” – the development of new varieties of crops to increase production using greater quantities of artificial fertiliser – allowed food production to exceed the level of population growth. As food production grew the predicted starvation was avoided.

By the late 1970s the confounding of Ehrlich's thesis masked other trends. Fossil fuels were being used in ever greater amounts to keep the green revolution going, and population was still growing. If we look at food production per head of global population we begin to see some disturbing trends emerging: global grain production has increased three-fold since 1950, but production per person peaked in the mid-1980s; freshwater is another key ingredient of the green revolution, but we're already using over half of the world's accessible fresh water resource, and the water yield is dropping because of climate change and desertification (caused in part by the excessive use of irrigation water in agriculture); the effort put into developing new crop varieties has increased by a factor of four, but yields have not – the green revolution is producing diminishing returns.

Exacerbated by climate change and the peak in oil and gas production, Ehrlich's thesis could come true. Soon we will not have the energy, or water, to keep the green revolution going – world food supply will fall as a result. There are lower intensity alternatives – such as small-scale permaculture-based methods of farming that produce more calories of food per area of land than intensive systems – but to adopt these methods is not “business as usual”, and so at the present they are rejected by governments and the agricultural lobby.

Environmental Impacts of Typical Western Consumption

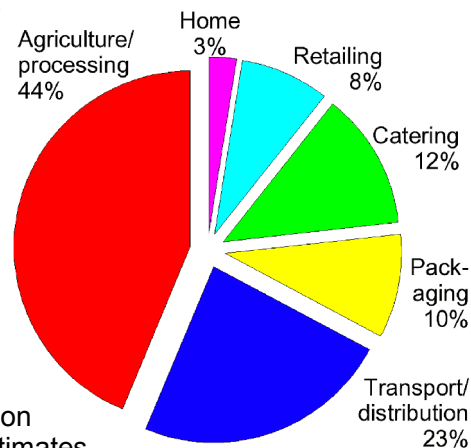


Food, energy and the environment

If we look at the results of a Dutch study of the environmental impacts of consumption (above) you can see that around half of the impacts are for 'food'. The study also found that the most of the impacts were not in the Netherlands, but around the world – so changing these trends is hard since the action required is beyond the jurisdiction of lawmakers.

In the UK we

see similar trends. As we eat more processed food, and as more people demand seasonal produce all-year-round, we've seen the environmental impacts of our food consumption grow. Some estimates



put the annual energy invested in the UK's food supply at 1.2 exa-Joules per year (equivalent to about 3.5 barrels, or 559 litres, of crude oil per person per year). If you factor that out then for every calorie of food the average person eats they're putting around 8 to 9 calories into their mouth – which

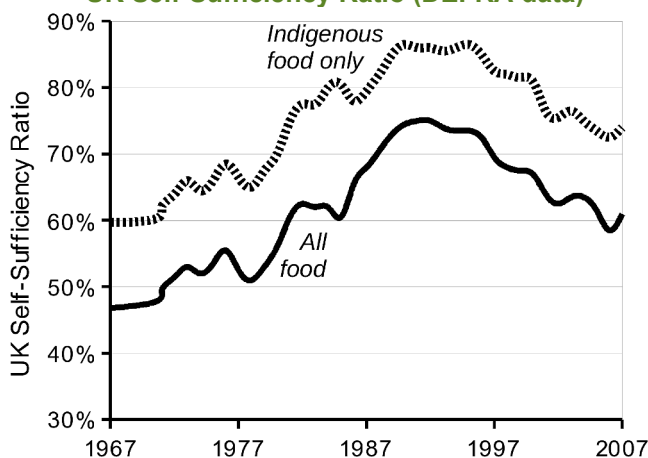
means the average person living in the average home puts slightly more energy into their mouth, per person per year, than into their home.

Peak Energy and food supply

As the UK has globalised its food system we've allowed agricultural production to decline. At the same time even those parts that are still productive have seen their earnings reduce due to the pressure of global commodity markets, reinforced by the power of the supermarkets, pushing down the price of food (which puts pressure on farmers to intensify further, with damaging effects on the environment). Over the last decade food prices have slowly fallen, but now the cheap oil that has enabled supermarkets to make large profits from food retailing, using longer supply and distribution chains, is gone – and the end of the era of cheap food will soon follow.

The graph below shows the UK's "self-sufficiency ratio", the amount of food produced in the UK in proportion to the total consumed. The UK exports food but much of this is 'reciprocal trade', where similar volumes of food are export to those imported. The level of production for individual commodities varies greatly as British agriculture has become highly specialised on certain commodities. For example we are roughly self-sufficient in milk and grain, but we import 91% of our fruit and 60% of our pig meat. Overall, from a peak in the early 90s, the level of indigenous food production has been falling and as the change in retailing has encouraged a higher level of imports.

UK Self-Sufficiency Ratio (DEFRA data)



Even for those goods that we do produce in the UK, the current system is unsustainable: we're using large amounts of energy in the production of food; we're losing significant quantities of topsoil due to intensive methods, which demands higher inputs to remedy the loss of fertility; and we're locked into centralised, 'just-in-time' systems of food production and supply that will become increasingly unreliable and expensive to operate as oil supplies deplete.

This situation is unlikely to change as UK food policy is now dictated by global market orthodoxy, not environmental or social criteria. This is typified in the reported statement of Environment Minister Elliot

Morley in 2005; "In an increasingly globalised world, the pursuit of self-sufficiency for its own sake is no longer necessary or desirable."

Food Miles

Food miles are a measure of how far the different components of our diet travel. Food miles are an excellent indicator of how globalised our food supply system has become, and by extension, how insecure our food supply has become (because our consumption is reliant on both global transport networks and amicable political relations between or within states). But food miles are not an indicator of the energy consumed or carbon emissions created by our diet (although some people believe this to be the case).

Food production abroad often uses less energy, and so creates less carbon emissions (even factoring in the transport impacts – air-freighting one tonne of goods requires around 16 mega-Joules (MJ) of energy, whereas by road it only requires 4MJ, by rail less than 1MJ and by water ½MJ). For example, a study for DEFRA estimated that growing one tonne of tomatoes in a heated greenhouse in the UK would consume 39,600MJ of energy, but growing them in polytunnels in Spain, and transporting them by road and sea, would use only 8,200MJ (and emit less than a quarter of the carbon dioxide).

Food security

"Food security" is the ability to feed ones-self – today, without large quantities of oil, gas and long-distance transport we cannot! So, in advance of the peak in global energy supply, we have to shift production to smaller, more localised systems of agriculture that integrate ecological systems to minimise inputs. As a nation, but also as individuals, we must also learn the value of a practice that our "modern" society has tried to eliminate – *subsistence*. To close the nutrient cycles, and reduce consumption, we have to become more involved with the production of our own food, and we have to re-learn the value of cooking food from raw, seasonal ingredients.

The most important thing to understand is that living with a lower amount of energy requires practical skill, but the last 50 years of consumerism has, through the option of convenience, 'de-skilled' the UK population. Many people no longer have a viable set of skills for cooking, assessing the quality of food and undertaking small-scale food production. Regaining these skills is a four-stage process:

- ◆ **Networking** – to regain these skills you need to contact and work with local people or groups who can communicate these skills to you;
- ◆ **Re-skilling** – learning skills by carrying out the activities that teach you what you need to know;
- ◆ **Practice** – you have to carry out the activities that teach you each skill in you own life to perfect them; and
- ◆ **Acclimatise** – you need to integrate these different activities into your life to slowly change your patterns of living and consumption.