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We Can't Keep Eating Like This

This is the question everyone should be attending to – where is the food going to come from?

Brexit; the crushing of democracy by billionaires; the next financial crash; a rogue US president: none of them keeps me awake at night. This is not because I don't care – I care very much. It's only because I have a bigger question on my mind. Where is the food going to come from?

By mid-century there will be two or three billion more people on Earth. Any one of the issues I am about to list could help precipitate mass starvation. And this is before you consider how they might interact.

❒ The trouble begins where everything begins: with soil. The UN's famous projection that, at current rates of soil loss, the world has 60 years of harvests left, appears to be supported by a new set of figures. Partly as a result of soil degradation, yields are already declining on 20% of the world's croplands.

❒ Now consider water loss. In places such as the North China Plain, the central United States, California and north-western India – among the world's critical growing regions – levels of the groundwater used to irrigate crops are already reaching crisis point. Water in the Upper Ganges aquifer, for example, is being withdrawn at 50 times its recharge rate. But, to keep pace with food demand, farmers in South Asia expect to use between 80 and 200% more water by 2050. Where will it come from?

❒ The next constraint is temperature. One study suggests that, all else being equal, with each degree Celsius of warming the global yield of rice drops by 3%, wheat by 6% and maize by 7%. This could be optimistic. Research published in the journal Agricultural & Environmental Letters finds that 4°C of warming in the US Corn Belt could reduce maize yields by between 84 and 100%.

The reason is that high temperatures at night disrupt the pollination process. But this describes just one component of the likely pollination crisis. Insectageddon, caused by the global deployment of scarcely-tested pesticides, will account for the rest. Already, in some parts of the world, workers are now pollinating plants by hand. But that's viable only for the most expensive crops.

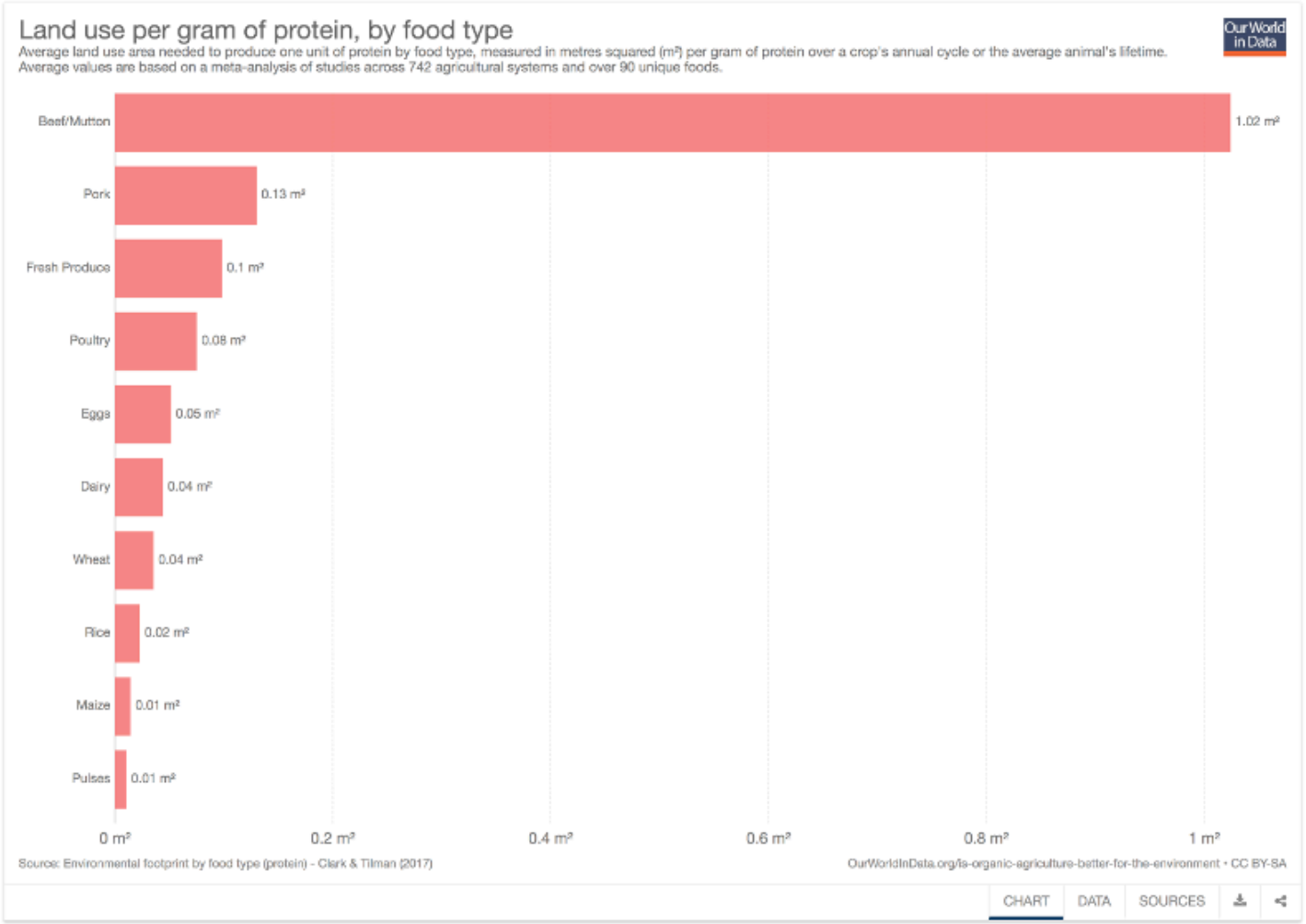
❒ Then there are the structural factors. Because they tend to use more labour, grow a wider range of crops and work the land more carefully, small farmers, as a rule, grow more food per hectare than large ones. In the poorer regions of the world, people with less than 5 hectares own 30% of the farmland but produce 70% of the food. Since 2000, an area of fertile ground roughly twice the size of the United Kingdom has been seized by land grabbers and consolidated into large farms, generally growing crops for export rather than the food needed by the poor.

❒ While these multiple disasters unfold on land, the seas are being sieved of everything but plastic. Despite a massive increase in effort (bigger boats, bigger engines, more gear), the worldwide fish catch is declining by roughly 1% a year, as populations collapse. The global land grab is mirrored by a global sea-grab: small fishers are displaced by big corporations, exporting fish to those who need it less but pay more. Around 3 billion people depend to a large extent on fish and shellfish protein. Where will it come from?

All this would be hard enough.

But as people's incomes increase, their diet tends to shift from plant protein to animal protein. World meat production has quadrupled in 50 years, but global average consumption is still only half that of the UK – where we eat roughly our bodyweight in meat every year – and just over a third of the US level. Because of the way we eat, the UK's farmland footprint (the land required to meet our demand) is 2.4 times the size of its agricultural area. If everyone aspires to this diet, how do we accommodate it?

The profligacy of livestock farming is astonishing. Already, 36% of the calories grown in the form of grain and pulses – and 53% of the protein – are used to feed farm animals. Two-thirds of this food is lost in conversion from plant to animal.



the graph produced last week by Our World in Data suggests that, on average, you need 0.01m2 of land to produce a gram of protein from beans or peas, but 1m2 to produce it from beef cattle or sheep: a difference of 100-fold.

It's true that much of the grazing land occupied by cattle and sheep cannot be used to grow crops. But it would otherwise have sustained wildlife and ecosystems. Instead, marshes are drained, trees are felled and their seedlings grazed out, predators are exterminated, wild herbivores fenced out and other lifeforms gradually erased as grazing systems intensify. Astonishing places – such as the rainforests of Madagascar and Brazil – are laid waste to make room for yet more cattle.

Because there is not enough land to meet both need and greed, a global transition to eating animals means snatching food from the mouths of the poor. It also means the ecological cleansing of almost every corner of the planet.

The shift in diets would be impossible to sustain even if there were no growth in the human population. But the greater the number of people, the greater the hunger meat eating will cause. From a baseline of 2010, the UN expects meat consumption to rise by 70% by 2030 (this is three times the rate of human population growth). Partly as a result, the global demand for crops could double (from the 2005 baseline) by 2050. The land required to grow them does not exist.

When I say this keeps me up at night, I mean it. I am plagued by visions of starving people seeking to escape from grey wastes, being beaten back by armed police. I see the last rich ecosystems snuffed out, the last of the global megafauna – lions, elephants, whales and tuna – vanishing. And when I wake, I cannot assure myself that it was just a nightmare.

Other people have different dreams: the fantasy of a feeding frenzy that need never end, the fairytale of reconciling continued economic growth with a living world. If humankind spirals into societal collapse, these dreams will be the cause.

There are no easy answers, but the crucial change is a shift from an animal to a plant-based diet.

All else being equal, stopping both meat production and the use of farmland to grow biofuels could provide enough calories for another 4 billion people and double the protein available for human consumption. Artificial meat will help: one paper suggests it reduces water use by at least 82% and land use by 99%.

The next *Green Revolution* will not be like the last one. It will rely not on flogging the land to death, but on reconsidering how we use it and why. Can we do this, or do we – the richer people now consuming the living planet – find mass death easier to contemplate than changing our diet?

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