

Online - Science - The future on a plate - Organic farming will not solve the crisis in food production, ...

By Henry Gee.

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Online - Science - The future on a plate - Organic farming will not solve the crisis in food production, writes Henry Gee.

Pick up any recent newspaper and check the headlines. Britons get fatter, while famine looms over Africa - but should Zimbabweans accept genetically modified (GM) crops as aid? British fishermen face quotas as North Sea cod has its chips - while organic farmers chafe under what they perceive to be unfair competition. And the smoke from the pyre of the livestock industry devastated by foot and mouth hangs balefully over all. You don't have to look far to realise that food is news.

But there's nothing new. Food has been news since the first farmers harvested wild wheat in the Middle East 10,000 years ago, turning mankind into a diseased, overcrowded domestic animal.

As Jared Diamond, of the University of California, Los Angeles, writes in today's Nature - in one of a selection of articles about the future of food - if our hunter-gatherer ancestors knew what they were getting into, they would not have started.

We like to think we've learned the lessons of history. This would be just as well, given that the decisions we make now - as a nation and as a planet - will affect our descendants for millennia to come. When the fluff of headlines is swept away, two big themes emerge - sustainability and population. The global population is likely to top 10 billion in the next century. Our task is to feed these mouths, as well as the ones already here, while coping with the fact that we have nowhere left to grow things.

We must squeeze greater yield out of the same patch of ground while trying to leave the plot in a reasonable state for descendants. We've been here before. After the second world war, doom-mongers threatened that we'd all starve by the

1970s. Instead, scientists averted the crisis by creating new breeds of high-yield cereal crops.

This "Green Revolution" has been swamped by its success - by leaving an ever larger population with greater aspirations towards consumption and wealth. We need to continually pull the rabbit out of the hat. GM technology is just one of many strategies in a diverse palette of techniques that New Macdonald will adopt on his small, but efficient, patch. Others include growing several varieties of grain at once (proven to reduce pests); micro-management of irrigation (thus conserving scarce water) and sowing seed without ploughing up the field first (conserving biodiversity and minimising soil run-off). New Macdonald will grow trees as a carbon sink, perhaps have a fishpond and will have to grow a few houses to meet increasing demand.

But it is GM that grabs the headlines. Why? According to Rosie Hails, of the NERC Centre for Ecology and Hydrology in Oxford, it is a function of land use and how we perceive our environment.

In crowded Europe, where people live "inside their national parks", GM crops and their perceived environmental risks have become an obsession. It is of less concern in America, where more space means a more demarcated kind of land use. In the developing world, in contrast, GM crops are proving themselves.

According to Scott Rozelle, of the University of California at Davis, and his colleagues, Chinese scientists have 15 GM crops either commercialised or in trials, ranging from wheat and maize to papaya, peanuts and petunias. Cotton that carries a bacterial gene for a poison that kills cotton bollworm - a major pest - means that a subsistence farmer working a hectare of ground can boost his income by a quarter, cut costs by a third and slash pesticide use by three quarters. Such statistics tend to show up protests against GM crops as indulgences affordable only by those who already have more than enough to eat.

Sustainability issues are illustrated most starkly in two kinds of food production which, at first sight, seem poles apart - fishing and organic farming. As Daniel Pauly of the University of British Columbia, Vancouver, and colleagues show, fishing represents the last hunter-gatherer industry. Hunting deer and bison by clear cutting forests and then blasting them out with heavy artillery is a patently ridiculous idea, but modern industrial fishing does much the same to the sea. Not surprisingly, world fisheries are in decline. Aquaculture - fish farming - has been proposed as a remedy, but farmed fish tend to consume more fish protein than they yield, so the exercise is inherently unsustainable. Farmed smoked salmon is a luxury only available in a diversified system of agriculture in which well-fed people are happy to pay high prices for delicacies.

Organic farming is much the same kind of exercise. In the quest for sustainability, organic farming will lose, because it cannot be relied on to match the yields from intensive agriculture if practised on a large scale - whatever the perceived benefits. Organic farming only works if it is subsidised or marketed as a boutique product.

Some may promote organic farming as a panacea - but they would have history against them. Mankind stumbled across agriculture more or less simultaneously in several parts of the world, but most successfully in the "Fertile Crescent", the home of what are still the world's most valuable domestic plant and animal species, including sheep, cattle, barley and wheat. The Fertile Crescent is a strip of land stretching from the Jordan Valley, across Syria and parts of Turkey and Iran, into the Tigris-Euphrates drainage, and Iraq. It doesn't look fertile any more, and the reason is simple - agriculture.

After 10 millennia of tillage, says Diamond, "human societies of the Fertile Crescent inadvertently committed slow ecological suicide in a zone of low rainfall prone to deforestation, soil erosion and salinisation". Before artificial pesticides and fertilisers, organic farming was the only game in town. When practised on a scale sufficient to feed the world's first empires, the effort could not be sustained and the result was a desert.

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