

[Time to call out the anti-GMO conspiracy theory](#)

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I think the controversy over GMOs represents one of the greatest science communications failures of the past half-century. Millions, possibly billions, of people have come to believe what is essentially a conspiracy theory, generating fear and misunderstanding about a whole class of technologies on an unprecedentedly global scale.

This matters enormously because these technologies – in particular the various uses of molecular biology to enhance plant breeding potential – are clearly some of our most important tools for addressing food security and future environmental change.

I am a historian, and history surely offers us, from witch trials to eugenics, numerous examples of how when public misunderstanding and superstition becomes widespread on an issue, irrational policymaking is the inevitable consequence, and great damage is done to peoples' lives as a result.

This is what has happened with the GMOs food scare in Europe, Africa and many other parts of the world. Allowing anti-GMO activists to dictate policymaking on biotechnology is like putting homeopaths in charge of the health service, or asking anti-vaccine campaigners to take the lead in eradicating polio.

I believe the time has now come for everyone with a commitment to the primacy of the scientific method and evidence-based policy-making to decisively reject the anti-GMO conspiracy theory and to work together to begin to undo the damage that it has caused over the last decade and a half.

On a personal note, let me explain why I am standing here saying this. Believe me, I would much prefer to live a quieter life. However, following my apology for my former anti-GMO activism at my Oxford speech in January, I have been subject to a co-ordinated campaign of intimidation and hate, mostly via the internet.

Even when I was at school I didn't give in to bullies, and at the ripe old age of 40 I am even less inclined to do so now. Moreover, I have been encouraged by emails and other support from globally-renowned scientists who are experts on this issue, and who all said basically the same thing to me: 'You think you've got hateemail? Welcome to my world'.

I think these scientists are the unsung heroes of this saga. They carried on with their important work and tried year after year to fight against the rising tide of misinformation, while people like me were belittling and undermining them at every turn. I won't mention names, but they know who they are. Some of them are here today, and I would like to give them my deepest thanks.

So for me also there is also a moral dimension to this. The fact that I helped promote unfounded scare stories in the early stages of the anti-GMO movement in the mid 1990s is the reason why I now feel compelled to speak out against them. I have a personal responsibility to help put these myths to rest because I was so complicit in initially promoting them.

My activism, which I wrongly thought of at the time as being 'environmental', has done real damage in the world. For me, apologising was therefore only the beginning. I am now convinced that many people have died unnecessarily because of mistakes that we in the environmental movement collectively made in promoting anti-GMO fear. With that on your conscience, saying sorry and then moving on is not enough. Some restitution is in order.

Following a decade and a half of scientific and field research, I think we can now say with very high confidence that the key tenets of the anti-GMO case were not just wrong in points of fact but in large parts the precise opposite of the truth.

This is why I use the term conspiracy theory. Populist ideas about conspiracies do not arise spontaneously in a political and historic vacuum. They result when powerful ideological narratives collide with major world events, rare occasions where even a tiny number of dedicated activists can create a lasting change in public consciousness.

In the 1960s the conspiracy theories about Kennedy's assassination reflected the profound feeling that there were shadowy people high up in the CIA and government who were subverting democracy, and fighting the Cold War by devious and deadly means. More recently, conspiracy theories about 9-11 reflected the hatred many on the political Left had for the Bush Administration.

Successful conspiracy theories can do real damage. In Nigeria an outbreak of Muslim conspiracy theorising against the polio vaccination campaign there led to a renewed polio outbreak which then spread to 20 other countries just when the disease was on the brink of being entirely eradicated.

In South Africa during the presidency of Thabo Mbeki the HIV/AIDS denialist myth became official government policy, just as the anti-GMO denialist myth is official European Union policy today. The result in South Africa was that hundreds of thousands of people were denied life-saving anti-retroviral treatments and died unnecessarily.

The anti-GMO campaign has also undoubtedly led to unnecessary deaths. The best documented example, which is laid out in detail by Robert Paarlberg in his book 'Starved for Science', is the refusal of the Zambian government to allow its starving population to eat imported GMO corn during a severe famine in 2002.

Thousands died because the President of Zambia believed the lies of western environmental groups that genetically modified corn provided by the World Food Programme was somehow poisonous. I have yet to hear an apology from any of the responsible Western groups for their role in this humanitarian atrocity.

Friends of the Earth was one of those responsible, and I note that not only has no apology been forthcoming, but Friends of the Earth Europe is still actively promoting GMO denialism in the EU in a new campaign called Stop the Crop. Check out their Youtube video to see how they have learned nothing in ten years.

Another well-known example is that of Golden Rice, genetically modified to contain high levels of beta carotene in order to compensate for the vitamin A deficiency which kills hundreds of thousands of children around the world and blinds many more every year. One study on the prospects for Golden Rice in India found that the burden of vitamin A deficiency could be reduced by 60%, saving 1.4 million healthy life years.

Here the actions of Greenpeace in forestalling the use of golden rice to address micronutrient deficiencies in children makes them the moral and indeed practical equivalent of the Nigerian mullahs who preached against the polio vaccine – because they were stopping a lifesaving technology solely to flatter their own fanaticism.

I think this campaign is shameful and has brought the entire environmental movement into disrepute, with damaging consequences for the very beneficial work that many environmentalists do. Greenpeace's campaign against vitamin A-enhanced Golden Rice should therefore be cancelled, and I call on everyone concerned about children's health to lobby Greenpeace and demand that this happens immediately and without delay.

The anti-GMO campaign does not even have the benefit of intellectual coherence. If you truly think that herbicide-tolerant biotech crops are an evil plot by Monsanto to achieve a stranglehold on the entire world's food supply, why would you also oppose all other non-patented and open-source applications of biotechnology, which have nothing to do with Monsanto, apparently without exception? This is like being against all computer software because you object to the dominant position of Microsoft Office.

On a logical basis only a case by case assessment makes sense for deciding how any technology might best be applied. So if you think that Bt corn is bad for US farmers, despite all the evidence to the contrary, it shouldn't necessarily follow that you also have to ban virus-resistant papaya, or oppose a blight-resistant potato in Ireland.

This matters today more than ever because we are entering an age of increasingly threatening ecological scarcity. The planet is beginning to move outside the envelope of stable temperatures that we have enjoyed for 10,000 years, and into an age of instability and rapid change.

Within just a year from now, global CO₂ concentrations will break through the crucial 400 parts per million boundary, marking a change in atmospheric chemistry that is unprecedented for at least 3 million years.

Moreover, we are now on a global emissions path which puts us on track for 4-5 degrees Celsius of warming by 2100, a transformation which will leave this planet barely recognisable and considerably more hostile to human and other life.

But what about all those who say that global warming is a hoax, a product of thousands of scientists conspiring with governments and the UN to falsify temperature data and usher in a new age of global socialism?

Well, I've spent more than a decade arguing with climate sceptics, and in the end I fall back on a single killer argument: that if an overwhelming majority of experts say something is true, then any sensible non-expert should assume that they are probably right.

To make the point, here is the consensus position of the American Association for the Advancement of Sciences on climate change:

“The scientific evidence is clear: global climate change caused by human activities is occurring now, and it is a growing threat to society. Accumulating data from across the globe reveal a wide array of effects: rapidly melting glaciers, destabilization of major ice sheets, increases in extreme weather, rising sea level, shifts in species ranges, and more. The pace of change and the evidence of harm have increased markedly over the last five years. The time to control greenhouse gas emissions is now.”

Oh, but wait – the AAAS has also released another statement of consensus science on another area concerning us today:

“The science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe... The World Health Organization, the American Medical Association, the U.S. National Academy of Sciences, the British Royal Society, and every other respected organization that has examined the evidence has come to the same conclusion: consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques.”

So, my suggestion today is that a sensible baseline position for environmentalists and indeed everyone else is to accept the consensus science in both these areas. Instead, you have the unedifying spectacle of so-called green groups like the Union of Concerned Scientists stoutly defending consensus science in the area of climate change, while just as determinedly undermining it in the area of biotechnology.

Tellingly, the UCS utilises the exact same techniques as climate sceptics in its enduring and strikingly unscientific campaign against GMOs: it issues impressive reports based on strategic cherry-picking and only referencing its ideological allies in a kind of epistemological closed-loop, it pushes the perspective of a tiny minority of hand-picked pseudo-experts, and it tries to capture and control the public policy agenda to enforce its long-held prejudices.

Many of the most influential denialists like those at the Union of Concerned Scientists sound like experts; indeed they may even be experts. Richard Dawkins tells a story about a professor of geology, who lectured and published papers about stratigraphy in hundred-million year old rocks whilst at the same time being a ‘young-earth’ creationist who really believed the world was only 6,000 years old. His pre-existing religious conviction simply overpowered his scientific evidence-based training.

An even more striking example is Peter Duesberg, the leading light in the AIDS denialist movement, who is a professor of cell biology at the University of California in Berkeley.

Many anti-vaccine campaigners, like Andrew Wakefield, started out as qualified medical professionals. This is why scientific consensus matters – it is the last line of defence we have against the impressive credentials and sciency-sounding language of those who are really on the lunatic fringe.

Speaking of the lunatic fringe, someone else who claims scientific credentials is Vandana Shiva, probably the most prominent Indian anti-biotechnology activist, who incidentally draws much larger audiences than this one to her fiery speeches about the evils of Monsanto and all things new in agriculture. Shiva tweeted after my Oxford speech that me saying that farmers should be free to use GMO crops was like giving rapists the freedom to rape.

That is obscene and offensive, but actually is not the half of it. Let me give you my all-time favourite Vandana Shiva quote, regarding the so-called terminator technology, on which she launches constant blistering attacks without once acknowledging the salient fact that it was never actually developed.

“The danger that the terminator may spread to surrounding food crops or the natural environment is a serious one. The gradual spread of sterility in seeding plants would result in a global catastrophe that could eventually wipe out higher life forms, including humans, from the planet”.

Now, I’ve said and done some pretty stupid things in my time, but this one takes some beating. You don’t need the intelligence of a Richard Dawkins or indeed a Charles Darwin to understand that sterility is not a great selective advantage when it comes to reproduction, hence the regular observed failure of sterile couples to breed large numbers of children.

As Shiva’s case so clearly shows, if we reject data-driven empiricism and evidence as the basis for identifying and solving problems, we have nothing left but vacuous ideology and self-referential myth-making. Indeed in many related areas, like nuclear power, the environmental movement has already done great harm to the planet, even as it has rightly helped raise awareness in other areas such as deforestation, pollution and biodiversity loss.

Science tells us today that the coming age of ecological scarcity extends much further than just global warming. If we wish to preserve a semblance of current biodiversity on this planet, for example, we must urgently curtail agricultural land conversion in rainforest and other sensitive areas.

This is why organic agriculture is an ecological dead-end: it is dramatically less efficient in terms of land use, so likely leads to higher rates of biodiversity loss overall. Maybe organic producers should be legally mandated to specify on labels the overall land-use efficiency of their products. I'm all in favour of food labelling by the way when it comes to something important that the consumer should have the right to know.

Of course conventional agriculture has well-documented and major environmental failings, not least of which is the massive use of agricultural fertilisers which is destroying river and ocean biology around the world. But the flip side of this is that intensive agriculture's extremely efficient use of land is conversely of great ecological benefit.

For example, if we had tried to produce all of today's yield using the technologies of 1960 – largely organically in other words – we would have had to cultivate an additional 3 billion hectares, the area of two South Americas.

We cannot afford the luxury of romanticised but inefficient agricultural systems like organic because the planet is already maxxed out in terms of both land and water. Our only option therefore is to learn to do more with less. This is known as sustainable intensification – it's about improving the efficiency of our most ecologically scarce resources.

But remember, everything is changing. Food demand will inevitably skyrocket this half-century because of the twin pressures of population growth and economic development. We need to sustainably increase food production by at least 100% by 2050 to feed a larger and increasingly affluent global population.

This is where the eco-Malthusians tend to pop up, illustrating another uncomfortable aspect of the anti-GMO philosophy. Let me share with you a rather revealing quote I read just a couple of weeks ago on Yale 360, from the US environmental writer Paul Greenberg, where he is lamenting the supposed wrongs of genetically engineered salmon. But forget the fish – when it comes to humans he says the following:

“If we continue to bend the rules of nature so that we can provide more and more food for an open-ended expansion of humans on the planet, something eventually will have to give. Would you like to live in a world of 15 billion people? 20 billion? I would not. And while it's possible you will label my response as New Age-ish, I feel that GE food distracts us from the real question of the carrying capacity of the planet.”

Well, I think that calling these sentiments New Age-ish is to give them far too much credit. I would actually call them misanthropic. What Greenberg seems to be suggesting here, as Paul Ehrlich did before him, is the denial of food to hungry people in order to prevent them breeding more children and contributing to overpopulation.

Luckily this modern-day Malthusianism is wrong in point of fact as well as by moral implication. Firstly, the human population is never going to reach 20 billion. Instead, it is forecast to peak at 9-10 billion and then slowly decline.

Secondly, although we are certainly heading for 9 billion people by mid-century, but that is not because people in poor countries are still having too many babies. The main reason is that children who are born today are much more likely to survive, and become parents themselves.

It is a little-known fact that the global average fertility rate is now down to about 2.4, not far above natural replacement of 2.1. So pretty much all the increased population growth to 2050 will come from more children surviving into adulthood.

And that is surely a good thing. I want to see child death rates in developing countries continue to plummet thanks to better healthcare, access to clean water and sanitation, and all the other benefits the modern world can and should bring to everyone.

No doubt like all of you, I also want to see an end to the scourge of hunger which today affects more people in an absolute sense than ever before in history. It is surely an abomination that in 2013 we can all go to bed each night knowing that 900 million other people are hungry.

This scourge affects children disproportionately – one third of child deaths are attributable to malnutrition. Among those who survive, nutrient deficiencies like iron, zinc and vitamin A can lead to cognitive impairment and other health problems, reducing a child's life chances for his or her entire future.

It is a truism to say that people are hungry not because there is a global shortage of food in an absolute sense, but because they are too poor to afford to eat. But it is a dangerous fallacy to suggest therefore that because the world on average has enough food, we should therefore oppose efforts to improve agricultural productivity in food insecure countries.

In fact probably the best way to address rural poverty is to ensure that subsistence farmers the world over enjoy more reliable and increasingly productive harvests. This will enable them both to feed their own families and to generate a surplus to sell at a profit so their children can go to school.

Is genetic modification a silver bullet way to achieve this? Of course not. It cannot build better roads or chase away corrupt officials. But surely seeds which deliver higher levels of nutrition, which protect the resulting plant against pests without the need for expensive chemical inputs, and which have greater yield resilience in drought years are least worth a try?

And real-world evidence so far gives grounds for optimism. The use of Bt cotton in China has been shown to dramatically improve biodiversity, unlike broad-spectrum insecticides which kill everything, pests and predators alike. The Bt protein only affects the insects which bore into the crop, is entirely safe for us, and has led to insecticide reductions of 60% in China and 40% in India on cotton.

The introduction of Bt brinjal in India, a project which I know people here in Cornell were closely involved in leading, would have dramatically reduced insecticide poisonings associated with that crop too, had the anti-GMO activists in India not succeeded in preventing its use.

India today seems to be perched on a scientific knife-edge, with a vociferous lobby pushing dark-age traditionalism on the brink of permanently capturing the entire political and legal agenda. If they succeed, hundreds of millions of food-insecure Indians will be the losers.

In Africa too there are a multitude of western-funded NGOs who all claim to be mysteriously protecting biodiversity by keeping cultivated plant genetic improvements permanently out of the continent. In many African countries GMOs are subject to the same kind of de-facto ban as is the case in Europe, leaving poorer farmers at the mercy of a changing climate and exhausted soils.

However, a showdown is looming, because some of the most exciting biotechnology initiatives are now based in African countries. The Bill and Melinda Gates Foundation is putting substantial funding into these efforts – such as improved maize for poorer African soils, a project which is looking to get yield increases of 50% even where fertiliser is not available or the farmer cannot afford to buy it.

There's also the public-private partnership called Water Efficient Maize for Africa, using biotech to produce drought tolerant corn specifically for African smallholders facing the challenges of a changing climate. There's C4 rice, aiming to improve the photosynthetic capacity of rice and thereby dramatically increase yields.

Another Gates-funded project is based at the John Innes Centre in the UK and aims by 2017 to have cereal crops which fix their own nitrogen available for farmers in sub-Saharan Africa. The list goes on: there's biofortified cooking bananas in East Africa, and cassava fortified with iron, protein and vitamin A in Nigeria and elsewhere.

I haven't finished! There's resistance to cassava brown streak disease, which is currently spreading rapidly and threatens the staple crop for two out of every five people in sub-Saharan Africa.

And of course transgenic technology focused on conferring wheat rust resistance at the molecular level to head off the threat of a global pandemic which could otherwise threaten one of humanity's most important staple foods.

But if the activists have their way, none of these improved seeds will ever leave the laboratory. And this brings me, by way of conclusion, to the essentially authoritarian nature of the anti-GMO project.

All these activists, strikingly few of whom are themselves smallholder farmers in Africa or India, claim to know exactly which seeds developing country farmers should be allowed to plant. Those which are not ideologically approved by self-appointed campaigners should be banned forever.

The irony here is that predominantly left-wing activists, who are supposedly so concerned about corporate power, are determined to deny the right to choose to the most powerless people in the world – subsistence farmers in developing countries. In fact, this is more than an irony – it is a cruelty. And it is a cruelty which must stop, and stop now.

HG Wells is often quoted as saying that civilization is a race between education and catastrophe. The New Yorker writer Michael Specter, who wrote a great book about anti-science movements called 'Denialism', updates this, writing that civilisation is a race between innovation and catastrophe.

This is surely no more true than today, when civilisation is genuinely threatened by the twin catastrophes of climate change and ecological scarcity colliding with vastly greater food demand from a larger and wealthier population.

The solution is the same one that it always was – innovation – the uniquely human capacity to produce new tools which has saved our species so many times before from apparently inevitable Malthusian collapses. Therefore if we reject innovation now of all times we make catastrophe not just likely but probably inevitable.

This was indeed the warning the great Norman Borlaug left us with before he died. To quote:

“If the naysayers do manage to stop agricultural biotechnology, they might actually precipitate the famines and the crisis of global biodiversity they have been predicting for nearly 40 years.”

In the final assessment only way that conspiracy theories die is because more and more people begin to wake up to reality and reject them. Then perhaps there comes a tipping point where what was once received wisdom becomes increasingly understood for the foolish nonsense that it always was.

I think – I hope – that we are close to this tipping point today. And now, with just a little extra push, we can all join in consigning anti-GMO denialism to the dustbin of history where it belongs.

<http://www.marklynas.org/2013/04/time-to-call-out-the-anti-gmo-conspiracy-theory/>

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