nature biotechnology

Join the dots

Pushing biotech as *the* 'solution' to the world's problems is doing more harm than good.

These days, governments, industry and experts seem to be putting biotech forward as a solution to almost everything. The mantra has changed from biotech simply providing cures for disease in developed markets to larger, more global problems. Biotech is now the solution to feeding developing nations. It is the answer to a renewable supply of energy. Or it is a means of reducing the carbon footprint and global warming. Although biotechnologies can certainly help solve these problems, ramming that message down people's throats is hardly likely to convince the doubters. And in the long run, it might even turn out to be counterproductive.

Take a recent case in point: the Biotechnology Industry Organization's (BIO) slogan for its annual meeting held in San Diego in June was "Heal, fuel, feed the world."

On no count is this equivocal or faltering or modest. Of course, perhaps that should be expected of an industry lobby organization whose job it is to proselytize the potential of its members' technology and products. But the problem is the slogan just isn't very realistic.

There are hundreds of thousands of acres of genetically modified (GM) crops being grown around the world, but they are not at present addressing key agricultural problems for poor farmers, such as salinity, desertification and drought. Nor are they addressing problems such as malnutrition (although with Golden Rice, they could). For the moment at least, there are only a handful of GM strains available for food staples (other than corn) widely cultivated in developing countries. Many nations in Africa have a ban on GM seeds.

As for biofuels, such as ethanol, these are being generated from maize in the US and from sugarcane in Brazil. Neither of these approaches has much to do with biotech. Biotech is just one part of the set of technologies and approaches that will be needed to make cellulosic ethanol a reality, among several other alternative renewable energy sources.

And although biotech has addressed a few orphan diseases, produced new therapies in infectious disease, cancer and autoimmune disorders, and recombinant versions of biologics for diabetes and growth disorders, it hasn't delivered on the promised 'cures' of genetic therapies or even the wide adoption of molecularly targeted medicine. Certainly, it hasn't done much to address disease and malnutrition among the world's poor.

This journal champions biotech research, so we are not downbeat on its prospects to, one day, generate products that will heal, fuel and feed the world. That is, nevertheless, an outrageous act of faith bordering on the religious. And the fact is that biotech approaches must be used in the context of other technical and nontechnological solutions. Thus, reason dictates that proponents should be very careful about overhyping what biotech can do now and overpromising what it can do in the future.

In biotech, the new 'thing'—whatever it has been at the time (interferons, antisense, sepsis therapies, antibodies, genomics, functional genomics, structural genomics, proteomics, RNA interference)—is constantly put forward as the 'solution' (usually with a concurrent stampede of startup activity and investment). Genomics and other 'omics were vaunted as solutions to the need for personalized medicine, a need that was poorly defined. Protein drugs were offered as wonder molecules, targeting diseases specifically and finally. GM crops solved concerns about the environmental consequences of intensive agricultural pesticide and herbicide use, they solved developing nations' food security and they replaced fossil fuel energy.

This pushy, solution-based approach elicits opposition instantly. The emergence of bioethanol and biodiesel as viable 'green' energy sources, for instance, has served to orchestrate a backlash against the approach. This has gained some ground following a series of reports from the Organization for Economic Cooperation and Development that point out that most of the biofuel policies in the developed world are narrowly focused—they stimulate the production of one or two types of fuel using one or two types of technology to process the excess agricultural production of just a few (and usually just one) crop types. Public and political opinion on biofuels swung rapidly from a rather gung-ho attitude in 2007 from almost everyone (farmers, car drivers, industrialists, politicians and even environmentalists) to antipathy in 2008.

It is time for biotech communication to be done right. And it is time that the industry and its lobby organizations learnt that pushing one-dimensional hype about biotech solutions is counterproductive.

A much more successful approach for encouraging the politicians and the general public to get on board the biotech bus would be to let them come to their own conclusions about the solution to the problems that society faces. This will mean outlining the problems accurately: in the fuel versus food debate, for instance, it is almost undeniably true that we will need more food (to feed 9 billion people), more energy (for 9 billion, most of whom want a higher standard of living) and more protection of biodiversity (by conserving natural habitats)—all within changing climatic conditions.

But it isn't necessary to finish the sentence by saying that biotech or GM is the solution. If that is said, then anyone with resistance to globalization, industry (and science), intensification and any other ignorance-based biases will—true to form—resist.

Biotech's proponents need to try less hard. The majority of people will eventually join their own dots and see that biotech and genetic modification are worth backing. And ultimately, they will recognize that biotech has its place as one—and in some cases the best—solution to some of the world's most pressing problems. After all, this is simple psychology. It generally is a good thing to allow other people to think that your good idea was theirs all along.