

Comment on “The future of agriculture”

In 2002, the World Bank (Washington, DC, USA) initiated a multiyear project with the ultimate goal of reducing hunger, malnutrition and poverty; known as the International Assessment of Agricultural Science and Technology for Development (IAASTD), it has brought together people from many different walks of life. The first meeting was held in 2004 and represented 185 groups, including 45 governments, 86 non-governmental organizations (NGOs)/civil societies, 29 co-sponsoring agencies, including the World Health Organization (WHO; Geneva, Switzerland) and the Food and Agriculture Organization of the United Nations (UN-FAO; Rome, Italy), and various international biotechnology companies. The mission statement of the IAASTD promised to evaluate the relevance, quality and effectiveness of agricultural knowledge, science and technology (AKST) in reducing hunger, improving sustainability, and improving the nutrition, health and livelihood of the world's rural populations. The report of their findings was recently published: *Agriculture at a Crossroads: The Synthesis Report* (IAASTD, 2008).

Despite the lofty goals of this project, science seems to have taken a backseat to ideology, as the report denounces biotechnology and praises the virtues of organic agriculture. This is the result of strong lobbying in support of organic agriculture—an ideology of affluent interested parties—which cannot effectively support less fortunate people or future increases in the human population. Agriculture is a man-made activity that has changed plants and animals to suit our needs for millennia, and it was the science and technology of the green revolution that helped to feed the human population as it increased from three billion to six billion.

The IAASTD claims that the report on AKST is, “an evidence-based guide for policy and decision-making” (IAASTD, 2008), but it mentions that the public continue to see “perceived risks” and “potential

harm” in biotechnology, even though the evidence of risks and harm are lacking. In 2003, the International Council for Science (ICSU; Paris, France)—probably the world's largest collection of scientific opinion—which represents most National Academies of Science and more than 150 scientific organizations, published an extensive review about the environmental and health risks of genetically modified (GM) crops and food (ICSU, 2003).

The ICSU review stated that, “there is no evidence of any ill effects from the consumption of foods containing genetically modified ingredients. [...] There are also benefits [for example, vitamin content of rice] to human health coming from GM foods; [...] Pest tolerant crops can be grown with lower levels of chemical pesticides, resulting in reduced chemical residues in food and less exposure to pesticides.” With respect to the environment, the ICSU report notes that, “there is no evidence of any deleterious environmental effects having occurred from the trait/species combinations currently available.”

By contrast, the IAASTD report states: “As the general public has become increasingly interested in the linkages between agricultural production systems and human health, the list of food related health concerns has continued to grow. It includes uncertainty with regard to the effects of GMO's on human health.” In fact, there is little scientific uncertainty. There is no evidence to support these perceived health risks and, therefore, they have no place in the ‘evidence-based’ IAASTD report (EC-JRC, 2008).

The IAASTD review also states: “Emerging evidence indicates that organic farmers are able to sustain their livelihoods [...].” This might be true in some places, but certainly not on a global scale with a human population of more than six billion. Nobel Laureate Norman Borlaug, the father of the Green Revolution, commented that organic agriculture can only feed four billion people and he does not see two billion volunteers to disappear (Pollock, 2008). On average, organic agriculture produces only 70% of the yield of conventional agriculture (Avery, 2006). If we were to increase organic agriculture on a global scale, as suggested in the IAASTD

report, we would have to put the remaining wilderness under the plow just to produce the same amount of food we do today. Such a massive increase in organic agriculture at the expense of other forms of agricultural production would both severely threaten global biodiversity and have a profound impact on the environment.

Although North America has largely accepted GM crops, the same cannot be said for Europe. It is not a difference in scientific opinion that blocks widespread adoption of GM crops in Europe (EFSA GMO Panel Working Group on Animal Feeding Trials, 2008). In 2001, the European Commission released a report on the safety of GM crops and food, which was based on more than 15 years of research involving 81 projects and more than 400 scientists. It concluded: “GM plants [...] have not shown any new risks to human health or the environment, beyond the usual uncertainties of conventional plant breeding. Indeed, the use of more precise technology and greater regulatory scrutiny probably make them safer than conventional plants and food” (EC, 2001).

One possible reason why Europe is reluctant to accept GM crops and foods has been due to a misinformation campaign by NGOs during the past 15 years. Statements made to the British House of Lords by Lord Melchett, then head of Greenpeace, made it clear that this NGO remains opposed to GM crops regardless of any scientific safety evaluations (Taverne, 2003, 2005). This type of blind ideology does not fit anywhere in a scientific assessment; however, this particular NGO is very active in the IAASTD.

Vitamin A deficiency causes 500,000 cases of blindness per year and up to 6,000 deaths per day among children in the developing world. Researchers have created GM rice with elevated levels of β -carotene, a vitamin A precursor; however, attempts to distribute this rice freely to subsistence farmers in the developing world have been blocked with overly cautious regulations. There is no doubt that some of the NGO participants of the IAASTD have been very active in helping to create these regulatory road blocks for Golden Rice, which conflicts

directly with one of the stated outcomes of increased nutrition by the IAASTD.

The authors of the IAASTD report are correct when they say that, “choices we make at this junction in history will determine how we protect our planet and secure our future.” Yet, there is no mention of a UN-FAO statement that biotechnology would provide powerful tools for the sustainable development of agriculture and food production (FAO, 2000). Similarly, the IAASTD states that “[s]uccess would require increased public investment in AKST, [and] the development of supporting policy regimes [...]”. However, plant biotechnology research and its practical application are hindered by the expansion of overly cautious, onerous regulations.

Drought tolerance, salt tolerance and insect resistance are just three examples of genetic modifications to crops that could help farmers in developing countries. But the extremely high costs of regulatory compliance keep these beneficial crops from being developed by publicly funded research. It has been estimated that it could cost up to US\$20 million to gain commercial certification of a single GM crop (CropGen, 2007). The end result of these costly regulations is that biotechnology crops, which would help the poor, are not developed.

The global plant research community was disappointed with the draft IAASTD report. The Public Research and Regulations Initiative (<http://pubresreg.org>) stated: “We believe that the chapter [on biotechnology] is written from a perspective that is so fundamentally different from what we believe should have been the perspective of such an evaluation, that a submission of comments on the many technical omissions and errors would not be meaningful” (van Montagu, 2008).

The unbalanced nature of the IAASTD report becomes even clearer when it makes statements such as: “some long standing problems such as mycotoxins continue to significantly add to the health burden, especially of infants”, but omits the peer-reviewed data that have shown consistently lower levels of mycotoxin in insect-resistant GM maize than in conventional or organically grown maize. It is difficult to reconcile the stated desire to improve nutrition and health with this omission. Moreover, the IAASTD refuses to acknowledge the massive reductions in pesticide use afforded by insect-resistant GM crops. Interestingly, nowhere in the report is there any mention

of the widespread use of highly toxic copper compounds in organic agriculture.

More than 10 million farmers in the developing world now grow GM crops and there is a 20% increase each year. Scientific evidence shows substantial benefits from these crops; yet, the IAASTD warns against increasing the education and training of farmers in the use of GM crops. It is hard to understand this position in the light of overwhelming scientific data in support of GM crops.

One of the most striking examples of a bias towards organic agriculture in the IAASTD report is the suggestion that organic certification is threatened by pollen flow from GM crops. This is pure rhetoric that comes directly from the organic food industry. During a time of unprecedented growth of both GM and organic agriculture, there has not been a single case in which an organic farmer has lost organic certification as a result of pollen flow from neighbouring GM crops. In fact, the International Federation of Organic Agriculture Movements (Bonn, Germany) does not advocate any testing for GM content.

The executive summary of the IAASTD report repeatedly advocates increases in organic agriculture without similar endorsements for biotechnology. This seems strange as the body of the report describes an alternative way forward: less biotechnology would mean that, “humanity would likely be more vulnerable to climate and other shocks and to increased natural resource scarcity.”

Most of the 6,000 year history of agriculture has been, by definition, organic. The poor yield of this type of agriculture is the main reason for hunger, malnutrition, soil degradation and poverty in much of the developing world. To suggest that organic agriculture is the best way to improve this defies logic and shows how the ‘science-based’ assessment of the IAASTD has been completely overridden by ideology-based green-washing. It is clear why those who work in the fields of agriculture biotechnology are so disappointed by the IAASTD report.

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