



Dueling Visions For a Hungry World

Sparks began to fly when scientists and activists against genetically modified crops came together to assess agricultural knowledge and the role of biotech in development

When economist Carl Pray heard about plans for the first international assessment of agricultural research, a gold standard sprang to mind: the Intergovernmental Panel on Climate Change (IPCC). But things didn't turn out the way he expected.

IPCC has been pivotal in proving that climate change is real and linking it to human activities. As an agricultural economist at Rutgers University who has worked in many poor countries, Pray is convinced that agricultural research—and genetic modification in particular—is key to fighting pervasive hunger, which will only worsen as the world's population soars to 9 billion during the next 50 years. He hoped that the new project, like IPCC, might be able to muster top experts and galvanize support for a field that had languished through the 1990s. Most encouraging was the leader: Robert Watson, who had earned high marks as a chair of IPCC.

By the time Pray had signed up and the International Assessment of Agricultural Science and Technology for Development (IAASTD) got under way in 2005 with funding from the United Nations, the World Bank, and several countries, the purview had broadened far beyond food production to include social justice and the environment. The overarching question, posed on the home page of IAASTD's Web site,* is a mouthful: "How can we reduce hunger and poverty, improve rural livelihoods, and facilitate equitable, environ-

mentally, socially and economically sustainable development through the generation, access to, and use of agricultural knowledge, science and technology?" Critics say this broad mandate made conflict inevitable and stunted the assessment's analytical rigor.

On several key issues, consensus proved elusive. Industry scientists and some academics—mainly agricultural economists and plant biologists—believe the assessment was "hijacked" by participants who oppose genetically modified (GM) crops and other common tools of industrial agriculture. Tensions peaked in October when Monsanto and Syngenta walked out of the assessment.

Many other participants, who include activists and social scientists, are pleased with

Key Findings of IAASTD

- Focus on "agroecological" strategies to address environmental issues.
- Create opportunities for poor farmers and rural laborers.
- Do more to involve women to advance toward sustainability and development goals.
- Integrate formal, traditional, and community-based knowledge.
- Create space for diverse voices and include social scientists in policy.

the outcome. They note that the voice and experience of small-scale farmers, particularly women, have finally been brought to the fore by the assessment. "It really deals with issues of power, influence, and benefits," says Marcia Ishii-Eiteman of the Pesticide Action Network North America in San Francisco, California. Toby Kiers, who studies sustainable agriculture at Vrije University in Amsterdam, the Netherlands, agrees. "For technology to be most effective, farmers must be at the center, influencing how it is developed, delivered, and managed," she says.

But as the drafts are being readied for a final meeting of governments next month, the camps for and against GM crops remain polarized with no resolution in sight. Industry groups, once considered key "stakeholders," are boycotting the meeting, and some participants suspect the dissent will undercut the assessment's impact. Says Piet van der Meer of the Public Research and Regulation Initiative in Delft, Netherlands: "There is a sense of having lost a wonderful opportunity."

Big tent

The origin of the \$12 million IAASTD dates to 2002, when a group of ag biotech companies asked the World Bank whether it recommended GM crops for developing countries. Watson, then the World Bank's chief scientist, suggested that the bank review the entire range of agricultural technologies and policies. Convinced that agricultural research should be considered in the context of the myriad factors

* www.agassessment.org

◀ **Green machines.** Experts debated the role of tools, such as fertilizers, that have boosted yields.

that affect farmers, Watson and his team solicited suggestions about what to include in the assessment from some 800 stakeholders representing scientific and agriculture-related organizations around the world. “Right from day one, I wanted to make sure there was a wide range of views,” Watson says. He formed an advisory bureau of 55 people, comprised of representatives from governments, consumer groups, industry, and nongovernmental organizations such as Greenpeace.

In theory, such an inclusive approach can be a plus, says William Clark, a science policy expert at Harvard University, conferring political legitimacy on an assessment. In practice, it can lead to logjams. Part of the tension over IAASTD reflects two competing worldviews of agriculture. Hans Herren, one of IAASTD’s co-chairs, stresses the importance of recognizing the “multifunctionality” of agriculture. That is, in addition to producing food, farmers have other important roles, such as maintaining the landscape and cultural heritage. In contrast to this view, Herren says others “see agriculture as an industrial process, like making cars.” That analogy doesn’t offend Jonathan Gressel, a plant scientist with the Weizmann Institute of Science in Rehovot, Israel. “Producing food is the primary function of agriculture,” says Gressel. “It should do it safely and [should be] compatible with the environment, just like GM [General Motors] should produce a safe and nonpolluting car—but they have to produce cars.”

Many of the players weren’t used to sitting at the same table with opponents. “We constantly had doubts about participating,” says Benedikt Haerlin. At the time, he represented Greenpeace, which wants a ban on GM organisms (GMOs) in the environment and a phase-out of pesticides and a reduction of synthetic fertilizers. Greenpeace is not used to compromising, Haerlin concedes.

Molecular biologists and groups that employ them were also skeptical. Rodney Brown of Brigham Young University in Provo, Utah, who was then deputy undersecretary for research, education, and economics at the U.S. Department of Agriculture, worried that the scientific analyses might be swamped by nonscientific views. “Like it or not, not all input is equally valuable,” Brown says. But almost all participants and observers interviewed by *Science* say that they had faith in Watson. “He has one of the finest, sharpest minds for assessments,” says Walter Reid, now at the David and Lucile Packard Foundation in Los Altos, California, who led the Millennium Ecosystem

Assessment that examined the state of the world’s ecosystems as of 2000 (*Science*, 1 April 2005, p. 41).

Watson—who is now at the University of East Anglia in Norwich, U.K., and chief science adviser to the U.K.’s Department for Environment, Food and Rural Affairs—was involved in several other projects, so much of the supervision of the assessment fell to his two co-chairs. Herren, a longtime advocate for sustainable agriculture, is the president of the Millennium Institute, a think tank in Arlington, Virginia. Adding perspective from a developing nation is energy specialist Judi Wakhungu of the African Centre for Technology Studies in Nairobi, Kenya. The pair convened meetings at which the advisory bureau picked the 400-odd authors and assigned them to groups to tackle the many topics, which included bioenergy and the role of women in agriculture, as well as five geographically focused subassessments.

A question of balance

It’s perhaps not surprising that this massive effort encountered some snags. Some authors of the eight main chapters say that from the start, the process was disorganized, lacked clear direction, and suffered from turnover of participants and continual rehashing of drafts. It didn’t help that the makeup of the teams was fairly rigid. Each chapter had to have the same number of men and women as authors. One of the two lead authors on each chapter had to be a woman, and one had to be from a developing country. “We wanted to make sure that everyone was represented equally,” says Herren. Pray has a different take: “It was excruciatingly politically correct in some ways.”

Some teams bogged down in conflicts about hot-button issues such as GM crops or trade liberalization, with various members charging each other with bias. One chapter, on how to help developing countries generate and adopt agricultural research, was canned entirely. “It was clear that the chapter was not going to fly,” says Beverly McIntyre of the World Bank, who was a senior administrator on the project. She says the team did not have the right expertise for the task. And midway through, just before initial results were to be presented, the bureau decided to eliminate a major modeling exer-

cise. The International Food Policy Research Institute had raised about \$460,000 for the modeling, which would have provided insights to help policymakers compare the outcomes of four broad policy scenarios, such as futures with more free trade or green technologies. But Greenpeace’s Haerlin and others objected that the models were not “transparent.”

Conflict erupted in the review process as well, with some scientists and GM advocates complaining that their comments were not incorporated. To a certain degree, they may have been outmaneuvered; environmental groups set up a well-organized Web site[†] to funnel comments to chapter lead authors. They may have been outnumbered as well. Bureau member Emile Frison, director of Biodiversity International, a research organization working to conserve agricultural biodiversity, says it was difficult from the outset to engage the best scientists “There are probably multiple reasons, including the fact that they didn’t see it as important,” he says. One participant who asked not to be named puts some of the blame on Watson for not spending enough effort personally recruiting top scientists, as Reid did with



Scrutinized. Perhaps the hottest issue was the role of genetically modified crops in helping poor farmers and making agriculture more sustainable.

the Millennium Ecosystem Assessment.

The text of the ag assessment concedes the difficulty of resolving the differences to everyone’s satisfaction: “One of the key findings of the IAASTD is that there are diverse and conflicting interpretations of past and current events, which need to be acknowledged and respected”—not exactly a helpful insight for policymakers trying to decide whether to approve the planting of GM crops, for example. “It devolved into ‘I’m okay; you’re okay,’” says Andrew McDonald, a crop and soil scientist at Cornell University.

[†] www.agassessment-watch.org/review.html

Critics such as Adrian Dubock, who participated while serving as Sygenta's head of biotech ventures, also complain that the summary and synthesis documents—which are all most people will read of the 2500-page draft assessment—are biased against GM crops and don't incorporate positive appraisals from some of the underlying chapters. Chapter 5, for example, concludes that both transgenic and conventional breeding will be needed to boost crop productivity during the next 50 years. Eliminate transgenic crops, the chapter notes, and “humanity would likely be more vulnerable to climatic and other shocks and to increased natural resource scarcity.”

But the Global Summary for Decision Makers puts less emphasis on the potential benefits of GM crops, says Dubock, who resigned in protest, and others. In the synthesis report as well, the section on biotechnology tends to highlight the controversies about GMOs, such as “lingering doubts about the adequacy of efficacy and safety testing.” The majority of the four authors of this synthesis chapter have experience in risk assessment and sociology but not in the agricultural industry or plant modification. Like all the other authors, they were picked by the bureau, which had relatively few representatives from industry. “The whole thing was incredibly stacked” against GM crops, claims Gressel. An IAASTD official disputes that charge and notes that Deborah Keith of Sygenta was slated to write the first draft but resigned. “I felt it was a hopeless cause,” Keith says.

Pullout

Last October, the biotech companies voted with their feet and pulled out of the process. Their representatives won't attend the final meeting. “We can't endorse something that is fundamentally giving the wrong message,” explains Keith Jones, manager of stewardship and sustainable agriculture at CropLife International, an industry trade group. He says that the report tends to overstate the potential of organic and “ecological” agriculture, which he doesn't think is a viable solution for boosting global agricultural productivity.

Watson, who says he was “extremely disappointed” in the companies' decision to withdraw, argues that instead of giving up, industry scientists ought to have played a bigger role. “They should have screamed and pushed,” he says. But he also accepts some responsibility



Backbreaking. The assessment concludes that agricultural research needs to do more for poor farmers such as these indigenous wheat growers in Bolivia, by better managing pests and soils, for example.

for not keeping close enough tabs on their concerns. “It means I didn't succeed as director at keeping all the players at the table.” Herren decries the 11th-hour move as well, pointing out that industry reps sat on the bureau, which vetted all of the authors. “You cannot come at the end, after all the meetings setting up the rules of the game, and say, ‘I don't like it.’” By walking out, industry ended the dialogue, Herren says: “You can agree to disagree, but that can't happen when you slam the door.”

Not all who were displeased left. In December, for instance, the Alliance Executive of the Consultative Group on International Agricultural Research (CGIAR)—the governing body of 15 publicly funded scientific centers around the world—wrote a private letter to the bureau about its concerns. “The reader would get a rather negative view about agricultural research in general,” says Frison, the chair of the alliance. In the letter, which *Science* has obtained, CGIAR notes that the assessment chapters might undermine support for research. But CGIAR has remained in the assessment. “It is more constructive to make our points as a participant,” says Frison, who also appreciates the assessment's emphasis on the importance of involving farmers in research.

At a final meeting in April, representatives from about 90 governments will gather in Johannesburg, South Africa, to decide whether to endorse the report. (They can accept, approve, or just note it.) Watson doesn't think that industry's pullout will lessen the impact of the report, which he hopes governments and international donors, for instance, will use to

guide their investments in agricultural research.

Robert Paarlberg of Wellesley College in Massachusetts, author of *Starved for Science: How Biotechnology Is Being Kept Out of Africa*, is skeptical. “It's a document that has much less scientific credibility” than does IPCC, he says. By being so inclusive, it ended up more a collection of opinions than an incisive summary of the scientific literature. And because its scope is so broad, the assessment doesn't offer targeted analyses for particular problems. “You end up with [platitudes] such as ‘Small farmers need to be supported,’” says Emmy Simmons, an agricultural development consultant who retired from the U.S. Agency for International Development in 2005.

Watson remains sanguine. He and others think the assessment will bring more attention to the plight of the rural poor and the chronic underinvestment in agricultural research. “If we can stimulate a debate,” he says—for instance, about the degree to which agricultural science is meeting the needs of the poor and whether everyone gains from free trade—“then it's a success.” Nor does he have any regrets about throwing the doors wide open. “I always knew it was a social experiment,” he says.

As for Pray, he has mixed feelings. “Halfway through this painful exercise, I thought, ‘If [Watson] can pull this off, it will be great,’” he says, “but we couldn't come to consensus. Now Greenpeace and Monsanto continue to beat each other up.” Meanwhile, he says, neither the environment nor the poor are getting the agricultural research they deserve.

—ERIK STOKSTAD