

research come from biologists. "It is up to those of us within the scientific community and the community of life science publishers to define the standards and to establish the right framework—one that can ensure that critical information is withheld from terrorists while still permitting the continued advancement of biomedical research," he says.

In general, officials in the Bush Administration, including National Security Advisor Condoleezza Rice and White House Office of Science and Technology Policy (OSTP) director John Marburger, agree. For instance, they explicitly affirm a two-decade-old policy generally favoring open scientific research. However, federal law imposing export controls enables officials to restrict distributions of sensitive technologies and equipment. Other provisions in recently passed laws, and in other statutes allowing for secrecy over patented technology, provide additional authority for restricting disclo-

sure or use of research findings, even those obtained within the private sector, and also limiting who may work on designated microorganisms.

The anthrax scare following September 11 in 2001 (*Nat. Biotechnol.* 19, 998–1000; 2001) and several specific research reports in microbiology exacerbated national security-related concerns over research in biology, according to Parney Albright of the Office of Homeland Security and the OSTP. "The scientific community needs to develop and vet criteria for what is appropriate [biological] research...and needs a process for assessing the hard cases and handling unexpected results," he says. "In the absence of criteria...and as papers come out, the public will look for a policy and, without it, will invite political action, which will probably be onerous and is likely to be ineffective.... The community has to get its act together, or someone will do it for you."

Jeffrey L. Fox, Washington, DC

India set to embrace GM rice

India's apex body of agricultural scientists has given the go-ahead for the widespread introduction of genetically modified (GM) varieties of rice, lifting the gloom in the biotech industry cast by government indecision over GM mustard (*Nat. Biotechnol.* 21, 9, 2003).

"With a need for an additional 50% more rice by the year 2030, we need rice varieties with higher yield and greater yield stability. We should use all the tools at our disposal to meet these challenges," a spokesperson for the New Delhi-based National Academy of Agricultural Sciences (NAAS) said while releasing the recommendations of a workshop held in Chennai to discuss the biosafety issues of transgenic rice. Although the workshop took place during October 27–30, 2002, the final recommendations were officially released only at the end of December 2002.

The academy, the largest body of professional agricultural researchers in India, has endorsed development of rice varieties tolerant to drought, submergence, and salinity, and rich in micronutrients. Transgenes encoding products such as *Bt* (already introduced in cotton varieties released in India last year) can also be put in rice for pest resistance. However, the academy has discouraged work on transgenic rice varieties that produce drugs and pharmaceuticals, apparently to avoid unnecessary risks with a crop that is the staple of India's diet.



GM varieties of rice may soon be widely planted on the Indian subcontinent.

Swiss-based Syngenta (Basel), which has a major rice program in India, is expected to be pleased with the recommendations. According to Pawan Malik, president of the seeds division of Syngenta India, the company is working in collaboration with as many as 35 institutions in India, including the Pant University of Agriculture and

Technology at Pantnagar and the Konkan Agricultural University in Dapoli.

The academy's full support for GM rice came after the workshop dispelled the fears of non-governmental organizations (NGOs) that releasing transgenic varieties in a "center of origin of rice" would risk contaminating the land races, as reportedly happened with maize in Mexico. Although the workshop admits that "the potential of gene flow in rice does exist," Virendra Lal Chopra, president of NAAS says, "it did not identify any scientifically valid environmental or ecological impact" of transgenes on the center of diversity.

Although agreeing with this, Suman Sahai, convener of Gene Campaign, an NGO that opposed the introduction of *Bt* cotton in India last year, says the question of genetic pollution "must be addressed for transgenic rice through appropriate regulatory oversight, on a case-by-case basis."

Meanwhile, "The NAAS recommendations are a shot in the arm for biotech research," says E.A. Siddiq, formerly deputy director general of the Indian Council of Agricultural Research and a workshop participant. "Researchers who have been unsure if their work would enter field trials would be enthused."

One researcher is Akilesh Tyagi of Delhi University, whose salt-tolerant rice is ready for trials. At the International Center for Genetic Engineering and Biotechnology in New Delhi, Madan Mohan and colleagues have developed a variety resistant to attack by "gall midge," a major pest of rice worldwide. "We will have a gall midge-resistant transgenic plant growing in our lab in three months," he says, adding that he does not anticipate any NGO opposition because "we have only transferred a gene from one rice to another."

However, this is not the case with vitamin A-rich golden rice, which contains genes from bacteria. Gurumurthi Natarajan, a biotechnology consultant in Chennai, says that, under the recommendations, application of golden rice "must be reviewed through the regulatory process, keeping in view the social, political, and cultural implications." Although the Indian government has decided to introduce golden rice, "we have made sure that golden rice will not contain antibiotic markers," says Siddiq.

According to NAAS, lack of a scientifically sound regulatory review process is one critical factor that might limit the realization of the numerous proven and potential benefits of GM rice. Therefore it has called for "a transparent regulatory process and appropriate regulatory oversight based on sound scientific information."

K.S. Jayaraman, New Delhi, India