Eating GMOs with Chopsticks?

Risks of Biotechnology in China

Research > China

Heng Zhao

A plant genetically modified with a fluorescent gene for experimental reasons

Recombinant DNA techniques have dramatically changed life on our planet ranging from genetically modified organisms (GMOs) to human embryo cloning. The public reactions to biotechnology have varied from pragmatic acceptance in the Netherlands – 'everything is okay as long as it is cheap' – to outright social resistance in Brazil. In August last year, United States President Bush prohibited the human cell cloning for stem cell research work, whereas early this year the Dutch government organized the 'Terlouw debate' to poll public opinion on the desirability of GMOs. This debate was heavily criticized by NGOs for being too government-directed and thus stripped from any 'real' content. However, in developing countries like China, such debate might be completely lacking.

By Heng Zhao

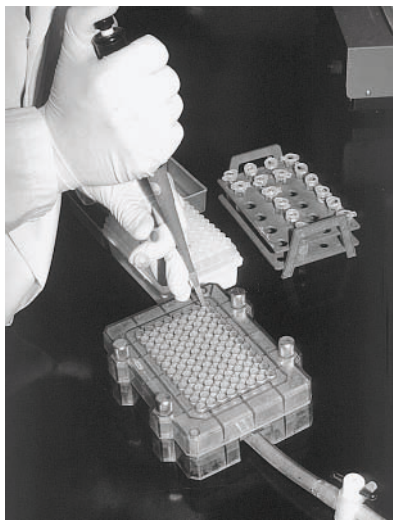
During the 1990s, the Chinese government began reforming the country's scientific organization in order to prepare them for the challenges of increased globalization and international competition. The government cut the budgets of laboratories in research institutes and universities, and encouraged them to hunt for financial gains by establishing their own joint ventures and companies. In 1992 one of the leading scientists in China, professor Chen Zhangliang of Beijing University, set up the PKU Weiming Biotech Group with USD 50,000 and a small office in his laboratory. After two years, the company grew to USD 14.5 million by taking advantage of its unique location and the government's desire to promote the biotechnology industry. At present, it has developed into one of the major biotech holding groups in China with ten wholly owned subsidiaries and joint ventures, including Kexing, Beijing PKU WBL Biotech, and Xiamen Bioway Biotech. Their scope of activities focuses on human medication such as recombinant DNA drugs, traditional Chinese medicines, chemical medicine, biochemical reagents, vaccines, diagnostics, and recombinant DNA applications for agriculture.

During the past decade, China accelerated its investments in agricultural biotechnology research and developed the largest plant biotechnology capacity outside of North America. With a rapidly growing area of GM plants, China has become the fourth largest grower of GM crops after the United States, Argentina, and Canada. Before 1999, China grew only 300,000 hectares of GM crops. Last year, the amount of land cultivated with GM cotton alone has increased to 3 million hectares according to the data provided by the Monsanto Company.

From 1996 to 2000, China's Office of Genetic Engineering Safety Administration approved 251 cases of GM plants, animals, and micro-organisms for field trials, environmental release, or commercialization. Among them, there were forty-five GM plant variety applications for field trials, sixty-five for environmental release, and thirty-one for commercialization: cotton, maize, potato, rice, tomato, soybean, peanut, pepper, papaya, and so forth. Meanwhile the research budget for plant biotechnology of the Chinese government is flourishing: it increased fourteen times from USD 8 million in 1986 to USD 112 million in 1999! At present, China accounts for more than half of the developing world's expenditures on plant biotechnology. Last year, Chinese officials announced plans to raise the research budgets by 400 per cent before 2005. If this goal is achieved, China will take up nearly one-third of the world's public spending on plant biotechnology.

In developing countries with a high population pressure, GMOs might be a ready way to solve food security and this can be a reason for hasty adoption, though this promise is not being fulfilled by industry. Food shortage is particularly imminent for China, which houses one-fifth of the world population. In 1995, the scientist Lester Brown shocked the Chinese government with his prediction that the People's Republic would face critical food shortages in the future.* In China the average area of farmland per capita is only one-third of the world average. Many experts say that high yield and disease-resistant GM crops may help developing nations like China and India feed their growing populations. GM foods might thus provide an attractive solution to the Chinese government.

This was exactly the point made by the Xinhua News Agency. In an editorial on 6 June 2001, the following was written:



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Molecular biological experiments in the laboratory

'China has enthusiastically pursued genetically modified products in its drive to be self-sufficient in food supplies for its 1.26 billion people. Proponents contend that genetically altering crops to resist pests, drought or other adverse conditions may be the only way to ensure food security in the developing world, particularly in densely populated Asia. But the technique of splicing genes from one organism into another has also provoked fears of unforeseen hazards to health and the environment. The country has not seen the level of heated debate that has raged in Europe and elsewhere over their safety.'

But does the Chinese government realize the possible negative impact of the large-scale release of GMOs into the environment? Will China really benefit from this new and uncertain technology promised by the foreign GMOs producers? While one Chinese saying goes, 'bringing charcoal in snowy weather', its opposite adage speaks of 'adding frost on the snow'. Such is the question for China: GMOs, a welcome solution or just one disaster piled on another?

Whatever the future will bring, the government is stepping up its efforts to control the biotechnological sector. On 23 May 2001, Premier Zhu Rongji approved new regulations on GMO products. These were designed to protect the environment and human health while promoting research. Under the new rules, Chinese-foreign joint ventures and foreign-owned companies need government approval to research or test GMOs. Also the sale of modified seeds, seedlings, or animals is now restricted through official permits.

For those GMO products that are already available on shelves in the shops, the rules require labelling of genetically altered products. Such rules had been indeed established already in 1998 by the State Council, China's cabinet. The regulations require that GMO products be labelled as such before being made available for sale. Unfortunately, the rules do not seem to have reached the shop shelf yet. No wonder that Monsanto, in reply to a question on the possible impact of the new rules, stated that these seem to be merely a 'paper' publication to make people aware that the safety system is in place. On 7 January 2002, top officials of the US Department of Agriculture (USDA) said that they were reviewing the details of China's long-awaited rules for GMOs. USDA spokeswoman Alisa Harrison said that Agriculture Secretary Ann Veneman and other top officials were still translating the new rules into English. Hopefully the cooperation with the USDA will improve the situation for China.

Xinhua News Agency pointed out that only China has not experienced the level of heated debate over GMOs safety that has occurred in Europe or elsewhere. But one of the reasons is that in China, there are no NGOs on GMOs, whereas in the West, NGOs are playing an essential role. Greenpeace, for example, has successfully called on Monsanto to immediately recall the transgenic potatoes circulating in Georgia and neighbouring regions; to compensate farmers for any losses they sustain from these transgenic potatoes; and to set up a compensation fund in Georgia to restore any potential damage to the environment. A positive sign in this respect is that the Chinese government recently allowed the re-opening of the Greenpeace Beijing office in April 2002.

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Biotechnology experiments in greenhouses

China is already working on GMO regulation. And even more surprisingly, the media have noted the lack of public participation for effective GMO control. However, there is still a long way to go. During my two-month-long fieldwork in China from February to April this year, the latest news was that the Chinese Ministry of Agriculture has issued temporary safety certificates for the import of GM foods. In addition, labels for domestically imported GM foods are required. The Ministry of Agriculture is establishing a new department for GM food safety, and the major authorized centres are under assessment, involving leading research institutes such as the Chinese Health Institute, the Chinese Academy of Science, and the Chinese Agriculture University.

Obviously, there are still many hurdles to be overcome. The situation is that GMOs have already arrived in China, not only those on the shelves of supermarkets, but also many more that are currently under development. It is easy to forget that DNA is and always has been part of our daily diet. Every daily consumer is absorbing millions of copies of genes from thousands of sources and by different ways of intake. We do not know what many of these genes do, and their sources are innumerable: they could be genes from a piece of tomato, cucumber, and lettuce in a salad; the bovine genes in a beef steak; the fragmented DNA in many differently processed foods; and even the genes of the many micro-organisms that we breath and swallow. How many Chinese people stop during one of their meals to consider those unknown genes consumed? And how can they realize this anyway when there is little public access to information about GMOs? The latter question touches on one of the main issues to be tackled in the future. <

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Biotechnology experiments in the field

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***Dr Heng Zhao** is a research scientist in molecular biology who has been working on biotechnology at the Institute for Animal Science (ID-Lelystad) since 1992. She is currently researching the social aspects of genomics research in China.*
hengzhao2001@yahoo.com