



TWN
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“Chinese” Genetically Engineered Rice in Foreign Patent Trap?

Executive Summary

Currently, climate change, deficiency of water resources and decreasing farmland threatens food production in China. At the same time the change of nutritional structure and population increase have resulted in rising consumption. There are emerging concerns that China's self sufficiency in food production may be at risk. Thus some government officials and agricultural experts have seen genetically engineered (GE) crops as a quick solution to the huge and complex food supply challenge.

Many scientists and considerable investment have been concentrated in the research and development of genetic engineered crops in China. As rice is the most important crop, one third of R&D resources have been targeted for the development of GE rice in the past twenty years. In 2004 alone, the allocation was more than RMB **500 million**. In "The Eleventh 5 year Plan of Biological Industry Development", the goal is to develop this sector as a strategic industry of high priority with good competitive prospects. The generation of intellectual property is particularly emphasized.

Against this background, Greenpeace and Third World Network believe that it is necessary to conduct research on the development of Chinese GE rice to see whether the intellectual property of Chinese GE rice lines are domestically owned; whether GE rice can help China deal with a food crisis if it occurs; and whether there has been enough assessment about the implications of GE rice commercialization.

Major Findings in the Research

Although the Chinese government has invested heavily in the development of GE rice with domestic ownership of the related intellectual property right, published scientific papers reveal that for the three major GE rice lines closest to commercialization in China, there are a number of patents involved that are owned by foreign companies or research institutes. The three lines are: the line with the insecticidal protein gene from *Bacillus thuringiensis* (Bt); the line with the Cowpea Trypsin Inhibitor (CpTI) gene; and the line with a combination of CpTI/Bt genes. Among the foreign-owned patents, 11-12 of these have relevance to Bt, 5-7 to CpTI, and 10-11 to CpTI/Bt.

According to the research conducted by Greenpeace and Third World Network, the patents concerned have been granted in China, the U.S., the E.U., Japan and other countries. In general, the scope of the patent protection in China covers some basic elements such as the gene itself and the method used. Sometimes the patent scope also covers the GE plant itself. However, in regions or countries like the U.S., E.U. and

Japan, in addition to the above basic protection, the GE plant, seed and subsequent generations of the seed/plant are also protected. Whenever the technology and gene are used in commercialization, the patent holders can assert their legal rights. Therefore, the effects of foreign patents in the commercialization of GE rice should be considered.

The implications of commercialization

Serious debate continues over the long-term effects of genetically engineered plants and food on the environment and health. If China approves the commercialization of GE rice, it could trigger enormous risks with uncertainty for the staple food grain on which 1.3 billion people rely for survival. Significantly, many genetic engineering technologies are controlled by a few foreign companies and research institutes through patents. Some of these patents are involved in the Chinese GE rice lines development waiting for commercialization approval. If the commercialization of GE rice were approved, it would affect the control on rice, the most staple food grain in China, in the long term.

What would be the specific effects? To answer this question, detailed information needs to be collected about the nature of patents, their protection scope and whether there is any specific agreement on the use of the patented material or technology. However, some of this crucial information is not publicly available, such as any agreement for the use of the patented material or technology between Chinese scientists and foreign entities. Thus this report can only analyze the potential effects on China based on available information and similar international cases.

1. Potential risk on the food security of China in the long term

Is China at risk to lose the control on its staple crop? The current fact is that most of the standard methods, technology and genes in Chinese Bt, CpTI and Bt/CpTI rice lines are related to the patents owned by foreign companies and institutes. It raises the concerns on food security. Multinational corporations with a history of using lawsuits to protect their patents own many of the GE rice patents in China. The Chinese Government should place more emphasis on the threats to food security from foreign patents on Chinese GE rice lines. In the research, the authors identify many patents controlled by Monsanto, Syngenta, Rhone Poulenc Agrochimie/Bayer Crops, Pioneer/ DuPont. Among 15 patents in this research, Monsanto owns 5, and Pioneer/DuPont, Syngenta, Rhone Poulenc Agrochimie/Bayer own one respectively. When a company owns more patents, it has more power to define the terms and conditions for commercial working of the patents that enable the company and its shareholders to get more benefits.

2. Effect of increased seed prices on farmers' livelihood

There are cases in other countries to show that the prices of seeds of GE crops are much higher than those of conventional non-GE seeds, and eventually it will result in the price increases of seeds at large in the country concerned.

Because the patent holders or their authorized agents (i.e. seed companies) collect extra fees for the technology under signed agreements, the GE seeds are much more expensive than conventional seeds. For example, in 2005 Monsanto's Bt corn seed cost twice sometimes three times higher than conventional corn hybrid seed in the Philippines. At the same time, the yield of the GE seed was found to be similar to the conventional ones.

The figures of the U.S. Department of Agriculture show that the prices of corn, soybean and cotton rose significantly during the period 1997-2006. Compared to previous years, overall prices rose continuously since the mid-1990s due to the higher price of GE seeds. The price of GE cotton seed was 2-4 times more expensive than conventional seeds, and conventional seeds were difficult to find in the market.

If GE rice were commercialized in China, there will be great interest by foreign patent holders and they may try to get benefits through various channels. Patent holders may collect the extra fee from farmers and local seed companies. Although the Chinese government tries to reduce the burden on farmers, commercialized GE rice could result in big price increases of the seed. The cost that farmers have to bear will increase significantly.

3. Social consequences of increased production costs and rice prices

Higher seed prices and greater cost for farmers will affect the price which consumers pay for food. In the situation of continuing food price increases for the ordinary Chinese people, without question this will be one disaster after another.

If the interests of farmers were impinged, it would reduce their motivation to plant crops thus resulting in less long-term food supply. Meanwhile, consumption and demand always exist. A shortage of supply will further raise food prices hurting all consumers, especially the people with lower income for whom food expenses, including rice, constitutes a very big portion of their living budget. Rice is the staple food grain of most Chinese. Even if its price has a small variance, it will impact the life of ordinary people greatly.

4. The threat of lawsuits

The World Trade Organisation forces member countries to provide strict intellectual property rights for any technology including biotechnologies. China is a

target of the U.S. and the E.U. and is required to implement “higher standards” on the protection of intellectual property. In the U.S. and Canada, patent holders often take legal action against the farmers who allegedly infringe their patents. Even some countries which have not granted seed patents have been affected. Monsanto has filed lawsuits against European importers who import soybean flour from Argentina. By instituting lawsuits against alleged patent infringement in Europe, the company hopes to force Argentina to pay fees even though there are no patents related to the GE soya grown in the country.

In addition, it will be unavoidable that GE rice seed will contaminate conventional seeds in large scale planting of commercialized GE rice. The cause could be natural occurrences or human mistakes, such as leaking or mixing. If GE seed contaminates conventional seed, it may result in the seed company being embroiled in a lawsuit, especially in cases where the GE seed has not been approved in the country. The legal consequences that they have to face could be that patent holders will enforce their patent right and require compensation. All these indicate that commercialization of GE rice with foreign patents may lead to the threat of lawsuits against Chinese producers (majority of whom are small farmers) and companies.

Suggestions

Greenpeace and Third World Network suggest that the relevant government departments carefully investigate and analyze the possible implications of the foreign patents and take into consideration the additional costs, risks and uncertainties associated with GE rice commercialization. Before any such thorough investigation has been completed, any GE rice commercialization should be put on hold. Because of the potential enormous impact of GE rice commercialization, in the process of making policy and decision, more stakeholders should be involved in the decision making process.

The authors also suggest that the government investigate and assess the benefits of other technologies, such as molecular marker assisted breeding and ecological rice farming methods. Molecular marker assisted breeding does not have the risks and uncertainty associated with GE rice, and the technology is much less controlled by foreign patents. This technology can be used to reduce pests too. Sophisticated ecological rice farming is also another option for the sustainable development of rice planting. Sophisticated ecological rice farming strictly adopts comprehensive control on pests, such as biological control and advanced agricultural management measures, among other approaches.

In this situation, China does not have to promote GE rice commercialization at great risks.