

Preface

Population, resources and environment have always been the triple fundamental problems facing the survival as well as development of human beings, and technological revolutions suppose to have the answer to which. Ever since 1980s, along with the development and application of gene recombination and transformation, biotechnology has evolved into the modern stage, tremendous economic benefits have been produced which signals that modern biotechnology industry with genetic engineering as its core is rising and growing dramatically.

The industrialization of biotechnology promotes the trade in biotechnological products worldwide, especially with respect to development and application of biotechnological agricultural products. Transgenic crops grown with the traits of insect-resistant and herbicide-tolerant have already been commercialized in some American and Asian countries as far back as 1990s, and the products have been sold to other countries continuously. Nevertheless, the process has been very fast, as the approval for large-scale commercialization of genetically modified organisms' only dates back to 15 years.

Commercialization of transgenic tomatoes back in 1994 signaled the start of using genetically modified organisms. The planting area of transgenic crops in 1996 was 1.70 million hectares, with an increasing rate of 13%; 114.3 million hectares in 2007 and was 65 times higher as that of 1996. There were totally 23 countries planting transgenic crops back in 2007, including 12 developing countries and 11 developed countries, and genetically modified crops were predominantly grown in six countries, namely, the U.S., Canada, Argentina, Brazil, India and China.

In China, transgenic Bt cottons are the main crops approved for commercially planting, and the planting area accounts for approximately 2/3 of the total planting area of cotton, which distributed in the regions around Yellow River, Yangzi River and Xinjiang province as well. Although the approval for commercially planting of genetically modified food products is not yet in place in China, several genetic engineering researches with regard to rice, wheat, maize, rape, soybean and other crops have been carried out already. In the past dozens of years, soybeans with quite large quantity have been imported for producing cooking oil and other products. 70% of soybeans that imported mainly from the U.S., Argentina and Brazil are transgenic types, and the importation rate is increasing in the meanwhile. None of us could ever be immune from transgenic food products as genetic engineering soybean oil has been used quite widely for cooking.

Notwithstanding, genetically modified organisms are characterized as scientifically uncertainty, certain risks regarding to commercialization and large-scale application are therefore inevitable. How to address the issues concerning risks assessment and management is of crucial importance for scientific management and sustainable development.

Release of GMOs into the environment could be harmful to humans and to other organisms as well.

Biotechnological products may have environmental risks over the course of packaging, transportation, storage and application, potential risks posed by living modified organisms that consumed by human and animals as food or feed are relatively high. With the development of industrialization of biotechnology products, biosafety issues concerning biotechnology therefore have emerged as the common concern of international community as a whole and each government as well. Issues with regard to biosafety have also been one of the hot topics in the areas of environmental protection cooperation among nations, especially for the developing countries which are obviously lack of capacity building in dealing with the environmental risks posed by biotechnological products. These countries expect to put in place an international agreement on import of GMOs, and could be supported financially and technologically by international community in terms of capacity building, while on the basis of current international trade in GMOs, several developed countries have expressed great concern with regard to such agreement. All these driven factors lead to the emergence of the Cartagena Protocol on Biosafety.

Issues concerning biosafety of GMOs encompass quite a wide range, including genetic engineering technology, biosafety and risk assessment of transgenic food, ecological risks and evaluation of such potential risks, detection and monitoring of GMOs, risk management, socio-economic impacts, international biosafety law, the domestic regulations and management systems and public education and participation. That is to say, biosafety issues regarding to GMOs can not only be addressed within scientific framework alone, but also have to be scrutinized under social framework as well. With respect to scientific research, risks assessment should be carried out so as to provide data for management; in the meanwhile, great emphasizes should also be attached to social aspect of GMOs, so as to reaffirm the those objectives set by scientific studies.

In this context, we have initiated a lecture course on GMOs and Biosafety for graduate and undergraduate students in Minzu University of China. After several years of practice, teaching materials and framework have been continuously accumulated and improved accordingly. Afterwards, several active researchers within related areas of expertise were invited to participate in the editing work which was supported by the projects of GTZ/BMZ Biosafety Capacity Construction and UNEP/GEF China Biosafety National Framework; over the course of compilation, some latest research results were included. Apart from the contribution from members of the editor board, other researchers including ZHANG Zhen, WANG Junhui, ZHOU Qiulin, XU Haibin, WANG Xuejun, CAI Xingxing, YANG Jing, CHENG Wenjuan, PAN Feng and others have also provided great support. ZHANG Wenguo and WANG Jie from the Ministry of Environmental Protection and FENG Jinchao and ZHOU Yijun from Minzu University of China have also been of great help during the compilation of this book.

We hope that this book can be of help and reference for researchers, students and others who are interested in issues concerning GMOs and biosafety. Any comments as well as criticisms are appreciated.

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