

Regulating genetically modified crops in view of environmental risks

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VALORISATION ADDENDUM

1 Societal relevance

This thesis analysed the international and Chinese regulatory approaches addressing environmental risks that may be caused by GM crops and examined how China implements its international obligations in its policies and laws. The analysis carried out in this thesis takes a legal perspective. The precautionary principle and the public involvement principle, along with several legal measures at the international law level and in Chinese law were discussed.

Societal relevance is embodied in three aspects. Firstly, the discussion on the regulation of environmental risks that may be caused by GM crops may help the public to be more familiar with the use of GM crops and may help to prevent misunderstandings on the use of GM crops. The use of GM crops has been a hotly debated topic in the world since GM crops were put into the market in the 1980s. While China is considering to authorise the cultivation of GM maize and GM rice, such authorisation has, however, not been made. It is observed by some literature¹ that the hesitation of the authorities to give authorisation is partially due to the opposition of the public. Some members of the public oppose the use of GM crops without having got enough knowledge on the safety management of GM crops. Such members of the public may change their views when they are aware of the existence and functioning of current international and national legal frameworks that aim to address risks that may be caused by GM crops. However, it should also be noted that views of the public will not always be diverted to a positive direction. Some of the public may stay or become cautious about the use of GM crops when they know there are still gaps and inconsistencies in the current regulation on GM crops.

Secondly, the agricultural biotechnology industry needs to pay attention to several regulatory issues in order to promote the development of GM crops and international trade of GM crops. This thesis has discussed several regulatory aspects in this regard which include the authorisation procedures, the inspection and emergency mechanisms, and liability rules. For example, to put GM crops on the market, a company that develops such GM crops has to apply for biosafety certificates from the competent authorities. The industry plays an important role in ensuring the safe use of GM crops, because it holds the genetically modified materials and masters the methods to deal with emergencies. Furthermore, the agricultural biotechnology industry needs to review policies on GM crops in China regularly, because policy statements and policies on the allocation of research funds may set the priorities in the research and development of GM crops.

Thirdly, the prevention of environmental risks that may be caused by GM crops is an important aspect of environmental protection in modern society. There are several sources of environmental risks related to GM crops. Preventing and remediating environmental risks that may be caused by GM crops contributes to the protection of the environment as a whole. Meanwhile, results of this thesis may have implications on the prevention of risks that may be caused by other new techniques, such as genome-editing techniques and nanotechnology. These new techniques are also sources of environmental risks in modern society.

¹ Li, Y., Hallerman, E. M., Liu, Q., Wu, K. and Peng, Y., 2015, p. 845. Anderson-Sprecher, A. and Jie, M. 2015, p. 4. Li, Y., Peng, Y., Hallerman, E. M. and Wu, K., 2014, p. 572. Pan, Y., Lu, R., Zhou, A., Jia, S. and Sun, G., 2011, p. 3.

2 Target groups

This thesis is highly relevant for academics. It unveiled Chinese law to the English-speaking academic community. It discussed several topics in relation to GM crops specifically from the legal perspective. While the precautionary principle has been discussed by many publications, this thesis especially analysed the precautionary principle in the Cartagena Protocol on Biosafety and in Chinese law on GM crops. One important observation is that China has not codified the precautionary principle, but given the wide discretion provided by the Cartagena Protocol on Biosafety, it is difficult to determine whether China is in breach of this protocol or not. Public involvement is a hotly debated issue in many policy areas. Analysis on the public involvement principle may be useful for researchers who are willing to know the requirements regarding public involvement in international environmental law and in Chinese law. This thesis discussed the rights and obligations of the public regarding decision-making on GM crops in China. Readers may find some relevant Chinese legislation in this regard. Researchers who want to know how GM crops are regulated in China may also find some useful discussions on the application for biosafety certificates, the inspection and emergency mechanisms, and liability rules.

Policy-makers can specifically focus on the identification in this thesis of the international obligations of GM crops and discussions on the gaps and inconsistencies in the regulation of GM crops in China. This thesis has analysed, for example, to what extent the Chinese legislation already corresponds with the international obligation in the Nagoya–Kuala Lumpur Supplementary Protocol. Policy-makers who read this thesis may continue to consider what China can do to implement the Nagoya–Kuala Lumpur Supplementary Protocol after China ratifies this protocol. Researchers who are carrying out experiments on GM crops may also refer to this thesis when they are curious about the regulation of GM crops in international law and in Chinese law.

This thesis may also be of interest to other audiences. Practitioners who are developing and regulating GM crops can find useful references regarding the prevention and remediation of environmental risks that may be caused by GM crops at the international law level and in China. Although the use of GM crops has been hotly debated, the public still lacks the knowledge on the regulation of GM crops because the regulation in this regard is complex. The public can also refer to this thesis if they plan to get more knowledge on the regulation of GM crops in international law and in Chinese law. Moreover, the public can acquire a better understanding as to how to get involved in the regulation and use of GM crops. In accordance with the Cartagena Protocol on Biosafety and the Chinese law, the public involvement principle has to be applied. Specifically, the public has the right to get access to information related to the safe use of GM crops, to participate decision-making regarding GM crops, and to get access to courts if their procedural rights are infringed. For example, after reading this thesis, members of the public who are interested to know the regulatory status of certain types of GM crops in China will know how to get such information; they will also know how to apply for the disclosure of information related to GM crops from the Ministry of Agriculture and other administrative authorities.

3 Activities/products

The concrete products of this thesis include a presentation of the international and Chinese legal approaches to addressing environmental risks that may be caused by GM crops and

findings regarding the gaps and inconsistencies in the legal approaches. China has established a legal framework regarding the prevention of environmental risks that may be caused by the cultivation of GM crops and related activities. Legal principles and legal measures as provided for in this legal framework have generally implemented China's international obligations regarding the prevention of environmental risks that may be caused by the cultivation of GM crops and related activities. Chinese legislation contains every element that the Cartagena Protocol on Biosafety requires its parties to undertake. The requirements regarding the general risk management and the advance informed agreement procedure are relatively abstract in international instruments. China's legal measures implementing these requirements are detailed. With regard to the principles, this thesis found that Chinese law lacks an explicit codification of the precautionary principle and the same is true with regard to public participation; the regulatory framework lacks specific obligations.

Topics related to this thesis have been presented in several conferences. The following are some of the presentations:

(1) *Legal measures against environmental risks that may be caused by illegal cultivation of genetically modified crops in China* was presented at the International Conference on Compliance and Enforcement of Environmental Law: Recent Developments, held in September 2016 in Wuhan, China.

(2) The international liability and redress regime regarding environmental damage caused by cultivation of genetically modified crops—links with the Environmental Liability Directive was presented at the annual European Environmental Law Forum (EELF) conference held in September 2017 in Copenhagen, Denmark.

(3) *International Law and the Prevention of Risks to the Environment and Human Health Posed by Living Modified Organisms: Challenges and Opportunities* was presented at International Conference Health and the Environment in International Law: Actors, Norms and Responsibilities, held in October 2018 in Heidelberg, Germany.

4 Innovativeness of the research

This thesis is innovative in at least two aspects. Firstly, environmental risks rather than risks to human health are the focus of the thesis. The Chinese legislation on GM crops does not specifically separate environmental risks from risks to human health by generally mentioning the aim of preventing all types of risks that may be caused by GMOs. The Cartagena Protocol on Biosafety emphasises the prevention of environmental risks but also considers the risks caused by GMOs to human health. The current literature on the regulation of GM crops usually does not discuss environmental risks and risks to human health separately. This thesis only focuses on the prevention and remediation of environmental risks rather than risks to human health because, as explained in Chapter One of this thesis, environmental risks have different features as risks to human health and more specialised legal rules are required.

Secondly, the regulatory approaches are discussed by analysing legal principles and legal measures. Legal principles prescribe highly unspecific actions, and legal measures prescribe concrete actions and can provide legal certainty. A comprehensive study of the legal approaches is necessary to get an in-depth understanding of how GM crops are regulated in international law and the Chinese law. Furthermore, general principles of environmental law are studied in the specific context of GM crops. The precautionary

principle and the public involvement principle in relation to GM crops are discussed. The discussions in this regard contribute to the understanding of how general principles of environmental law are applied in specific areas.

5 Plans and implementation

Valorisation can be achieved in the following ways. Firstly, the author will continue doing research on this topic. This thesis contributes to research regarding the international and Chinese regulatory approaches addressing environmental risks that may be caused by cultivation of GM crops. However, more research remains to be carried out. For example, new biotechnological technologies that are based on GM techniques may be regulated differently. How these new technologies should be regulated and to what extent the results of this thesis can give implications to the regulation of these new technologies deserve in-depth discussions. The application and enforcement of the international law and national laws regarding GM crops also need further study. The author may hold an academic position in relation to environmental law in a Chinese university. There is good access to latest news and publications in the university, which will facilitate the future research. Cooperation with the supervisors and other researchers will continue.

Secondly, the author will seek for opportunities to participate in events that aim to communicate to the public and regulators the specifics of the regulation of environmental risks that may be caused by GM crops.

Thirdly, this thesis is planned to be published as a book in order to reach a wider audience. Some topics will be further developed with the aim to publish in journals. For example, the public involvement in decision-making regarding the prevention of environmental risks that may be caused by cultivation of GM crops in international law and in Chinese law may be published in a journal that is interested in public involvement issues regarding environmental protection, such as *Journal of International Biotechnology Law* and *Transgenic Research*.