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OPEN-ENDED AD HOC WORKING GROUP OF
LEGAL AND TECHNICAL EXPERTS ON
LIABILITY AND REDRESS IN THE CONTEXT OF
THE CARTAGENA PROTOCOL ON BIOSAFETY
Third meeting
Montreal, 19-23 February 2007
Item 3 of the provisional agenda*

FINANCIAL SECURITY TO COVER LIABILITY RESULTING FROM TRANSBOUNDARY MOVEMENTS OF LIVING MODIFIED ORGANISMS

Note by the Executive Secretary

I. INTRODUCTION

1. At its second meeting, the Open-Ended Ad Hoc Working Group of Legal and Technical Experts on Liability and Redress in the Context of the Cartagena Protocol on Biosafety requested the Secretariat to gather information on financial security to cover liability resulting from transboundary movements of living modified organisms, including information from Parties and other Governments on national experiences in this respect. This repeated a similar request made by the Working Group at its first meeting.

2. The document on financial security (UNEP/CBD/BS/WG-L&R/2/INF/7) that was prepared for the second meeting of the Working Group covered relevant concepts from the insurance industry, the availability of insurance for different heads of losses, and other options including compulsory insurance and compensation funds. The current document, therefore, aims to supplement rather than repeat this content. Based on the available information, it discusses the availability of financial security to cover damages from genetically modified organisms.

II. AVAILABILITY OF FINANCIAL SECURITY TO COVER DAMAGES FROM GENETICALLY MODIFIED ORGANISMS

3. There is little apparent discussion specifically on the availability of financial security to cover damage resulting from the transboundary movements of living modified organisms. There is, however, some information on the availability of financial security pertaining to genetically modified organisms (GMOs).

* UNEP/CBD/BS/WG-L&R/3/1.

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4. In October 2003, a British non-governmental organization surveyed five major British insurance companies: Agricultural Insurance Underwriters Agency, Rural Insurance Group, BiB Underwriters Limited (AXA), Farm Web and NFU Mutual (the National Farmers Union Mutual Insurance Society). None were willing to offer cover to farmers considering growing genetically modified crops or to non-GM farmers seeking to protect their businesses from the spread of living modified organisms. All the companies felt that there was not enough information about the potential risks, thus hindering their ability to set premiums in exchange for accepting the risk. BiB Underwriters went so far as to say that it would refuse to give insurance of any kind, including buildings insurance, to GM farmers amid fears the farmers could be targets for environmental protesters. 1/

5. In the context of the Farm Scale Evaluations, the British government's study of the environmental impacts of herbicide-tolerant genetically modified crops, NFU Mutual added the following endorsement to its policy:

> "NFU Mutual will not indemnify the insured in respect of any liability arising from the production, supply of or presence on the premises of any genetically modified crops, where liability may be attributed directly or indirectly to the genetic characteristics of the crop. In particular, no indemnity will be provided in respect of liability arising from the spread or the threat of spread of genetically modified organism characteristics into the environment or any change to the environment arising from research into, testing of or production of genetically modified organisms." 2/

6. Other insurance policies may also include broad exclusions for genetically modified organisms. The approach of these policies is to exclude coverage "for all losses arising out of the actual, alleged or threatened discharge, dispersal, mishandling, migration, pollination, inhalation, ingestion, contact with, exposure to, existence of, presence of, release of, or escape of GMOs. A broad exclusion could expressly deny coverage for demands to abate, test for, monitor, clean up, remove, contain, treat, neutralize, detoxify, remediate, dispose of, or in any way respond to or assess the effects of GMOs." 3/ An example of a GMO exclusion is reproduced in exhibit 1 in annex I below.

7. There are a few companies with GMO exclusions who also offer limited "buy-backs" of GMO coverage. These offer a limited amount of coverage for GMO risks "and are primarily designed to address third-party liability exposure, not just first-party property losses". 4/ Because of this, defence costs such as legal fees and experts' fees count against the policy limit. An example of such a buy-back is included in exhibit 2 of annex I below.

8. In November 2003, the British Agriculture and Environment Biotechnology Commission released a report entitled "GM Crops? Coexistence and Liability". The report includes a discussion of insurance. The Commission distinguishes between two types of insurance: third party liability insurance and first party insurance. Third party liability insurance is intended to protect the policy-holder against claims for damages from third parties. First party insurance covers damage caused to the policy-holder's own property. The Commission states that insurers would be reluctant to offer third party insurance for adventitious presence to GM farmers in light of the uncertainty over whether or not the farmer would, in fact, be liable for compensation and under what circumstances. In addition, in the event that third party liability insurance was available, the uncertainty over whether the farmer would be liable would make it unlikely that an insurance company would be willing to pay out to cover a claim. The report further states that the incentive for a GM farmer to take out third party liability insurance would also be reduced while

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1/ Sally Bolton, "Insurers 'would not cover' GM farmers", *Guardian Unlimited* (7 October 2003).

2/ Agriculture and Environment Biotechnology Commission, *GM Crops? Coexistence and Liability* (November 2003).

3/ Michael Davenport, "Genetically Modified Plants and Foods: Brave New World or Brand New Headache for Insurers?" The Brief, v. 35(4) (Summer 2006) at p. 64.

4/ *Ibid.*

liability remains unclear. 5/ It is noted that more information about requirements and allowances for adventitious presence and how often such thresholds might be breached in practice would be helpful, but without this information, insurance cover seems unlikely to be forthcoming. 6/

9. The Commission found that insurance coverage for adventitious presence was unavailable to seed companies or farmers in the United Kingdom and abroad, with the possible exception of Australia. They state that such coverage had been available in the past but incidents such as the StarLink corn case from 2000 caused insurance companies to specifically exclude adventitious presence from their policies. 7/ The Commission also found that there is little first party insurance in the United Kingdom for a decrease in crop value, whatever the cause:

> "It is likely that agricultural insurers would offer first party insurance for adventitious presence, were they to do so, as part of 'multi-peril' crop insurance cover. First party cover is available for seed crops that could lose value through, for example, admixture, and we understand that multi-peril commodity crop insurance is common in the USA and to a lesser extent in some European countries." 8/

10. The report goes on to describe what would be necessary for an insurance market to emerge in this area. First, functioning coexistence arrangements would need to be in place meaning that economic loss from breaches of a threshold would need to be occasional and relatively rare. A first party insurance market would not develop if such breaches were routine and widespread. 9/ Secondly, there would need to be sufficient numbers of farmers seeking to purchase such insurance. The Commission found that 500 farmers would be the necessary starting point. The Commission concludes that "the evidence suggests that insurance would not in the short term provide reliable compensation for any cases of loss and the prospects for it doing so in the medium term are uncertain, both for non-GM and organic crops". 10/

11. The Commission also briefly touches on the availability of insurance for seed producers to protect themselves against damages from adventitious presence in their seed production. The report states that insurance cover for inadvertent release by a seed company is only available if the contamination level is above 5 per cent. The Commission finds that this would only happen if something went wrong with the gateway testing of genetically modified organisms that all companies do and if there was a mix up at the seed processing plant. The result is that the available insurance "would not cover the highly unlikely but catastrophic scenario for a small seed company facing massive financial consequences of issuing seed with a high level of adventitious presence that had knock-on effects on farms and up the food chain, exposing the company to a financial claim that would instantly render them insolvent. These are precisely the circumstances where they (and indeed, their customers) need the company to have insurance cover." 11/

12. A report from Munich Re compares the liability models for genetically modified crops in the Netherlands and Germany and the associated insurance coverage. In the Netherlands, a group of stakeholders including farmers, seed manufacturers, processing firms and others reached an agreement in 2004 concerning the cultivation of genetically modified corn, potatoes and sugar beet. Farmers who keep to the rules will not be held liable. If cross-pollination occurs despite the rules being followed then conventional farmers will be indemnified from a special fund to which all stakeholders and, initially, the state have contributed. 12/

5/ *GM Crops? Coexistence and Liability, supra* note 2 at p. 87.

6/ *Ibid.*

7/ *Ibid*.

8/ *GM Crops? Coexistence and Liability, supra* note 2 at p. 88.

9/ *Ibid.*

10/ *GM Crops? Coexistence and Liability, supra* note 2 at p. 89.

11/ *GM Crops? Coexistence and Liability, supra* note 2 at p. 93.

12/ Munich Re, *In Focus* at p. 19.

13. In Germany, on the other hand, the 2004 amendments to the country's Genetic Technology Act created strict liability for the spread of introduced genes, including by means of the cultivation of genetically modified organisms by farmers. GM farmers can also be held jointly and severally liable if it cannot be determined whose crops are responsible for the spread of genes. On account of these rules, Munich Re finds that insurance for the cultivation of genetically modified crops in Germany is currently considered unfeasible. It is, however, noted that this may change, as an amendment of the Act "is part of the coalition pact that was agreed following the change of government in the autumn of 2005. A liability ruling is envisaged similar to the one in the Netherlands, although the fund will be replaced in the long term by an insurance solution. State participation in this fund is not planned." 13/

14. In another document, it is pointed out that Germany has traditionally favoured an approach of detailed special insurance cover as this permits targeted marketing and facilitates the separate monitoring of risks. It is stated that there is longstanding practice of specific coverage models in, for example, environmental liability insurance and product liability insurance for pharmaceuticals. It is, therefore, highlighted that this trend towards special covers matches the German tradition of special liability laws. Genetic engineering, however, involves a number of "different liability categories which can only be partially combined in a specific coverage model". 14/

15. With the kind permission of the appropriate people, a couple of articles from Munich Re Group sources are reproduced and made available as annex II below, for further information and discussion of the issues relevant to liability and insurance in the context of the concept of damage caused by genetically modified organisms.

13/ *Ibid.*

14/ "Discussion Report" in Munich Re Group, *5th International Liability Forum* (Munich 2001) at p. 126.

Annex I

Source: Michael Davenport, "Genetically Modified Plants and Foods: Brave New World or Brand New Headache for Insurers?" The Brief, v. 35(4) (Summer 2006)

EXHIBIT 1
MODIFIED SEEDS, PLANTS, GRAINS, CROPS, ORGANISMS, ANIMALS OR OTHER MATERIAL EXCLUSION

THIS ENDORSEMENT MODIFIES INSURANCE PROVIDED UNDER THE FOLLOWING:

FARM PROPERTY COVERAGE FORM

FARM LIABILITY COVERAGE FORM

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

COMMERCIAL UMBRELLA LIABILITY COVERAGE FORM

EXCESS LIABILITY COVERAGE FORM

This insurance does not apply to any injury, damage, expense, cost, loss, liability or legal obligation arising out of or in any way related to Modified Seeds, Plants, Grains, Crops, Organisms, Animals Or Other Material, however caused, including but not limited to:

1."Bodily injury" and "property damage" arising out of the actual, alleged or threatened discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, ingestion, contact with, exposure to, existence of, presence of, release of, or escape of "genetically modified" seeds, plants, grains, crops, organisms, animals or other materials regardless of whether any other cause, event, material or product contributed concurrently or in any sequence to such injury or damage;

2.Request, demand, claim, suit or order that any "insured" or others abate, test for, monitor, clean up, remove, contain, treat, neutralize, detoxify, remediate, dispose of, or in any way respond to or assess the effects of "modified" seeds, plants, grains, crops, organisms, animals or other materials; or

3.Request, demand, claim, suit or order by or on behalf of a governmental authority for damages because of testing for, abating, cleaning up, removing, containing, treating, neutralizing, detoxifying, remediation, disposing of or in any way responding to, or assessing the effects of "modified" seeds, plants, grains, crops, organisms, animals or other materials.

"Modified" means a process through science, engineering or any other method that changes, alters or manipulates the genome, the chromosomes, the sequence of DNA, or the DNA of a gene and includes, but is not limited to zoonosis, gene therapy, breeding, cloning, recombinant DNA technology, transgenic technology and nuclear transfer technology.

We shall have no duty to defend any claim or "suit" arising out of or in any way related to "modified" seeds, plants, grains, crops, organisms, animals or other material excluded by this endorsement.

The addition of this endorsement does not imply that other policy provisions, including but not limited to any products-completed operations exclusion or pollution exclusion, do not also exclude coverage for "modified" seeds, plants, grains, crops, organisms, animals or other material.

EXHIBIT 2
MODIFIED SEEDS, PLANTS, GRAINS, CROPS,
ORGANISMS, ANIMALS OR OTHER MATERIAL EXTENSION ENDORSEMENT

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE FORM

Schedule

Modified Seeds, Plants, Grains, Crops, Organisms, Animals or Other Material Extension Aggregate Limit	**$** _____

"DEFENSE EXPENSE" IS PART OF AND INCLUDED IN THE AGGREGATE LIMIT.

1. With respect to "bodily injury" and "property damage" liability arising out of the actual, alleged or threatened discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, ingestion, injection, contact with, exposure to, existence of, presence of, release of, or escape of "modified" seeds, plants, grains, crops, organisms, animals or other material:

a. The "Each Occurrence Limit" shown in the Declarations does not apply.

b. Paragraphs **2,** through **7.** of **Limits Of Insurance, Section III** do not apply.

c. Paragraph **1.** of **Section III – Limits of Insurance** is replaced by the following:

1. The Aggregate Limit shown in the schedule above is the most we will pay for the sum of damages for claims or "suits" and "defense expense" under this endorsement. The rules below fix the most we will pay regardless of the number of:

a. Insureds;

b. Claims made or "suits" brought; or

c. Persons or organizations making claims or bringing "suits".

d. The following is added to Section III – Limits Of Insurance:

2. The Modified Seeds, Plants, Grains, Crops, Organisms, Animals Or Other Material Extension Aggregate Limit shown in the Schedule is the most we will pay for "bodily injury" and "property damage" arising out of the actual, alleged or threatened discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, injection, contact with, exposure to, existence of, presence of, release of, or escape of "modified" seeds, plants, grains, crops, organisms, animals or other material.

2. Coverage under this endorsement only applies to "bodily injury" and "property damage" that takes place during the policy period and meets all of the following:

a. The initial discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, ingestion, injection, contact with, exposure to, existence of, presence of, release of, or escape of "modified" seeds, plants, grains, crops, organisms, animals or other material must be both unexpected and unintended from the standpoint of the insured; and

b. The operations which resulted in the discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, ingestion, injection, contact with, exposure to, existence of, presence of, release of, or escape of "modified" seeds, plants, grains, crops, organisms, animals or other material were performed in compliance with any and all standards of federal, state, local and regulatory statutes, ordinances, regulations, license requirements, permits, or license agreements that apply to those operations; and

c. The initial discharge, dispersal, mishandling, migration, pollination, gene flow, inhalation, ingestion, injection, contact with, exposure to, existence of, presence of, release of, or escape of "modified" seeds, plants, grains, crops, organisms, animals or other material were demonstrably commenced at a specific time on a specific date during the policy period; and

d. The insured made a reasonable effort to mitigate the damages as soon as conditions permitted.

/…

3. The following additional conditions apply to this endorsement:

a. Duty to Defend

Our duty to defend and to pay for "defense expense" is limited as part of the Aggregate Limit shown above and ends:

(1) When we have paid the full amount of the Aggregate Limit shown in the schedule of this endorsement; or

(2) When any applicable limit on the policy is exhausted;

which ever comes first.

b. Termination of Duty to Defend

(1) When we determine that our duty to defend either has ended or is expected to end in the near future, we will:

(a) Send written notification to the First Named Insured, to that effect, and our intent to transfer control of all outstanding or pending claims for damages or "suits";

(b) Advise the First Named Insured of any outstanding or pending claims for damages or "suits" to which this coverage applies;

(c) Cooperate in the transfer of control of such pending claims for damages or "suits".

(2) The insured must as soon as practical arrange for the handling of such claims for damages and the continued defense of pending "suits".

(3) After the date we have sent written notice that our duty to defend has ended, but in no event longer than ninety (90) days after such date, we will take, on behalf of the insured, those steps that we think are appropriate to:

(a) Avoid default in any "suit"; or

(b) Continue the defense of a "suit".

(4) You agree that if we take such steps:

(a) We do not give up any of our rights under this policy; and

(b) You will reimburse us for any "defense expense" that arises out of such steps.

4. As used in this endorsement:

a. "Defense Expense" means all of the following:

(1) All fees, costs, and expenses necessary to defend any insured, including, legal fees and salaries of attorneys we retain, expert witness fees and expenses, expenses for investigation, court costs and all costs allocated to a specific "suit";

(2) The cost of premiums for bonds to release attachment, even though we do not have to furnish these bonds;

(3) All reasonable expense incurred by the insured at our request to assist us in the investigation of any claim or defense of any "suit" including loss of earnings up to $250 a day because of time off from work;

(4) All costs taxed against the insured in the "suit"; and

(5) All the interest we pay on the full amount of any judgment that accrues after entry of the judgment and before we have paid, offered to pay or deposited in court the part of the judgment that is within the Each "Occurrence" or Annual Aggregate Limits shown in the schedule of this endorsement.

"Defense Expense" does not include any other expenses or costs.

b. "Modified" means a process through science, engineering or any other method that changes, alters or manipulates the genome, the chromosomes, the sequence of DNA, or the DNA of a gene and includes, but is not limited to zoonosis, gene therapy, hybridization, breeding, cloning, recombinant DNA technology, transgenic technology and nuclear transfer technology.

Annex II

Source: Munich Re Group, *Perspectives: Today's Ideas for Tomorrow's World* (2003), pp. 18-22.

Beware of drifting genes: Who is liable when genetic engineering products cross with organic farming products?

The peaceful coexistence between farmers is threatened. Losses of considerable magnitude are possible wherever organic seed and genetically modified seed are sown on adjacent fields.

By Dr. Manuela Zweimüller and Helmut Steber

"Fatted chicken with creamed sweet corn (genetically modified)". Such dishes have occasionally been found on menus in restaurants or canteens since April 2004 – the idea is not exactly appetising. The supplement "genetically modified" is prescribed by a new EU Directive, which states that genetically modified foods and animal feedstuffs must be labelled as such more strictly than before. It affects all products containing genetically modified organisms or constituents made from such organisms if produced after 18 April 2004. On the other hand, it only applies if certain thresholds are exceeded. Munich Re welcomes this mandatory labelling, as it gives consumers the freedom to choose.

Further changes involving genetic engineering were resolved by the German parliament, the Bundestag, in June 2004. First of all, the federal government translated the Deliberate Release Directive (2001/18/EC) into national law, which the EU had originally scheduled for October 2002. Secondly, the amendment clearly shows the requirements to be met by German liability rules in cases of coexistence, i.e. the side-by-side existence of organic farming with conventional seed and farming with genetically modified seed, as well as the resultant crops in both cases.

The new German law on genetic engineering will help to end the de facto moratorium which has been in force throughout the EU since 1998: since then, genetically modified organisms – including plants – have no longer been brought onto the market anywhere in the European Union. Although this was not actually prohibited by law, the public authorities simply ceased to grant further permits in a kind of voluntary commitment. It was agreed that stricter environmental tests and labelling guidelines would have to be introduced first. Particularly the new Deliberate Release Directive (2001/18/EC) and the new EU Regulations on genetically modified foods and feeds are considered to lay the foundations for ending this de facto moratorium.

Stricter liability

The new law on genetic engineering will mean stricter liability for all farmers who grow or use genetically modified seed in Germany. Such farmers would have to pay organic farmers compensation for lost earnings if the latter were no longer able to supply their customers with goods which have not been genetically modified. And that applies regardless of the question of fault. In addition, the concept of joint and several liability (all are liable for one, one is liable for all) has likewise been embodied in the new law.

"A problematic issue," according to Helmut Steber, manager of the agricultural facility at Hohenkammer, 35 km north of Munich. The estate farmed by Akademie Schloss Hohenkammer GmbH is wholly owned by Munich Re. It is the largest seed propagation operation for organic species (e.g. winter barley, rye, triticale, spelt, wheat, oats, peas, broad beans) in Bavaria and strictly follows the guidelines of Naturland, an association of organic farmers. That was not always so. In 1992, master farmer Steber changed over from conventional to organic farming and transformed the estate's 235 hectares of farmland. He is now an organic farmer through and through. For him, the significance of the new law is as follows: "The problem is first and foremost economic." The price of organically produced seed is roughly twice as high as that of conventional seed. In future, however, organic farmers cannot be sure that their organically grown maize has not been genetically modified. "Plant pollen travels long distances, sometimes over hundreds of kilometres. That applies to all pollen, including the pollen of genetically modified plants," explains Steber. Pollen could cause genetically modified maize to cross with conventional maize. Just as

conventional and organically grown maize varieties can cross with one another. If genetically modified maize pollen were to land on an organic farmer's field, he could at best sell his maize as conventional maize. A restaurant, however, would have to specify that such maize was "genetically modified" if it exceeded the thresholds for adventitious and technically unavoidable mixtures, even if it had been grown on an organic farmer's field. "What is much more likely is that the organic farmer will not be able to sell such a crop," according to Steber, for customers expect the goods to be totally free from genetic engineering and would not even tolerate values below the statutory thresholds. The same basically also applies to conventional farmers who prefer to work without genetic engineering. Anyone who sells seed would also have to have the complete production output tested in order to establish whether it is without genetic modification. According to Steber, this would cost several thousand euros per year and would jeopardise the farms' existence.

Opinions diverge over whether or not the random outcrossing of genetically modified plants constitutes a loss in insurance terms. After all, farmers are permitted to grow officially approved, genetically modified plants. Can a farmer consequently be obliged to compensate another if he legally grows genetically modified maize? According to the new law on genetic engineering, the answer is yes. But how are we to stop the pollen flying across to the neighbouring field?

Steber is convinced that liability cannot be a matter solely for the farmers who grow genetically modified plants. The seed industry (as the manufacturer of genetically modified plants) must bear part of this liability.

Munich Re is also against letting the farmers bear all the liability, for "they are the weakest link in the chain," according to Dr. Manuela Zweimüller of the Casualty Risk Consulting Unit and an expert on genetic engineering in Munich Re's Centre of Competence for Biosciences. She points out that the usual limits of indemnity for farms would have to be increased if they were to cover genetic engineering risks, but that could make them unaffordable for the individual farmers.

The insurance industry is also debating over whether such risks as purely financial loss due to pollen dispersal can be insured at all. "Liability insurance normally only covers unforeseen losses," explains Zweimüller. Growing genetically modified plants, however, inevitably includes the foreseeable and unavoidable risk of these plants crossing or mixing with others which are not genetically modified. "It's rather like trying to insure a house in an area with a very high risk of flooding." In other words, a contradiction of the principle of insurance. Munich Re believes that the risk should be ascribed to the day-to-day costs of the business. Such costs are normally not covered by liability insurance, which aims to protect against unforeseeable personal injury and third-party property losses.

Public opinion as a risk of change

Another very important factor for "green genetic engineering" as a risk is that the general public virtually does not accept genetically modified foods. Fear of genetic engineering could cause people to file claims leading to high defence costs for losses which, as it turns out years later, had not been caused by genetic engineering at all. The risk for the insurance industry may also be increased by more stringent statutory regulations and by the opponents of genetic engineering influencing public opinion – a typical risk of change.

Munich Re concurs here with the Association of German Insurers (GDV) and its doubts over the insurability of these risks. Nevertheless, it has not generally excluded genetic engineering from its terms of insurance. The risks are considered in each individual case and analysed in detail. Munich Re considers the general law on liability to be adequate: even before the genetic engineering amendment, airborne genetically modified pollen constituted a major impairment for organic farmers, and they were able to avert it by legal means in the past too.

Complex interrelationships must be investigated further

For organic farmer Steber, genetic engineering entails other risks too, including those which do not feature in any debates on liability. "We do not know what effect genetic engineering will one day have on such beneficial organisms as bees," he says. One genetically modified variety of maize damages the

European corn borer, a caterpillar that nibbles maize. The genetically modified plant protects itself against the pest without the help of pesticides. “Yet who can guarantee that this maize is not also harmful to other butterflies and particularly those which we want to preserve?” asks Steber. Further research is therefore needed to investigate the impact of genetic engineering on ecology and the diversity of species. Much to Munich Re’s regret, however, long-term trials are difficult due to disruptive action by the opponents of genetic engineering. After all, research into safety is indispensable for the approval process; genetically modified plants are subjected to strict and careful testing before being released onto the market.

As an organic farmer, Steber is also concerned about the following possibility: pollen of genetically modified plants, such as maize, could land on an organic farmer’s field. If the genetically modified maize pollen were then inadvertently to cross with the organically grown maize and the farmer were to use these plants to produce seed, which he in turn uses for propagation, then he himself could help to produce genetically modified maize, albeit unwittingly. That would not only cause him to make a loss because he would earn less than with organic maize, but would also lead to further losses because the manufacturer of the genetically modified maize would see this as a violation of its patent rights and could therefore demand royalties from the organic farmer.

In a dispute between a Canadian farmer and an international agrochemical corporation, the Canadian Supreme Court ruled at the end of May in favour of the corporation.

Conclusion

The new laws will probably have a variety of effects on organic farming: both positive, because the mandatory labelling of genetically modified foods opens up new market opportunities for organic farmers and gives the consumer greater transparency, but also negative, because seemingly uninsurable financial losses must be expected. Munich Re is strongly committed to continuing talks on the subject of genetic engineering, for this is the only way to find constructive solutions and at the same time take advantage of the opportunities presented by genetic engineering.

Source: Christian Lahnstein, Munich Re, "Genetic engineering law, liability law and liability insurance: Considerations regarding the development risk in liability insurance" in Munich Re Group, *5th International Liability Forum* (Munich 2001), pp. 132-176.

[Table of contents omitted]

Overview

(1) The debate on the risks of genetic engineering differs from debates on other risks. It extends the risk aspect in two directions. More than with other technologies, it includes the anticipatory field of hypothetical or speculative suspicion of risk. And it serves as a vehicle for expressing reservations of all kinds regarding the social, cultural, political and economic consequences of genetic engineering.

(2) In genetic engineering law, an initially restrictive regulative approach by the state has been relaxed in the course of increasing practice. This trend has also been influenced by the strategic importance of genetic engineering. At the same time, however, the significance of consumer and environmental protection associations has been increasing as more and more genetic engineering products are launched onto the market, with the result that public debates on risk are intensifying and state regulation is being tightened again, whilst the influence of consumer decisions is growing.

(3) Liability ensues from the traditional rules of civil codes and common law, and from the rules of product, environmental and medical liability. Within the scope of currently applicable law, the risk scenarios of genetic engineering raise the issue of extended interpretations of bodily injury, property damage or ecological damage. Furthermore, there is the question of specific liability rules, particularly more stringent product or environmental liability in connection with genetic engineering or also a channelling of liability law to the detriment of producers and in favour of users, doctors or farmers. US product liability has so far been surprisingly reserved in respect of genetic engineering risks and has tended to be characterized more by an easing of liability in favour of producers.

(4) Liability insurers have so far been barely confronted with the core of the problem – development risks for health and the environment.

However, they are already confronted to a massive extent by the consequences and side effects of precautionary measures. These measures are, in turn, influenced by the above-mentioned characteristics of the risk debate on genetic engineering: decisions in the field of speculative risk, shaped by the many different aspects of the debate. Such decisions give rise to commercial risks involving liability insurance, recall insurance, property insurance and credit insurance.

There are options for action at both risk levels. In some areas, exclusions or specific covers may be considered. Realistic scenarios should be created by means of simulations. And with regard to specific development risks, insurers can commission their own research.

1 Genetic engineering law

The law relating to genetic engineering is a new and rapidly developing area. Genetic engineering is understood to mean "all the methods used to characterize and isolate genetic material, to form new combinations of genetic material, and to reintroduce and propagate recombined genetic material in other biological environments" 15/

Genetic engineering is an area of biotechnology which generally involves the targeted use of living organisms for man's purposes.

(1) Risks and opportunities

– The law relating to genetic engineering has to deal primarily with the specific risks associated with genetic engineering. These are, on the one hand, the risks to human health posed by genetically

15/ Report of the Commission of Inquiry on "Chancen und Risiken der Gentechnologie" (Opportunities and risks in genetic engineering), Deutscher Bundestag publication 10/6775, 7.

engineered drugs and food, and on the other, the risk that genetically modified organisms which get into the environment might set in train uncontrolled processes, thus permanently changing it. A distinction has to be made between the accidental escape of genetically modified organisms and their deliberate release as part of field trials or marketing and the use of genetically engineered products. Besides hazardous incidents and the undesirable side effects and latent damage caused by the use of genetically modified material, consideration also has to be given to the inherent threat to species diversity from the production of genetically manipulated "new" animal and plant species which out-compete the other animals and plants. This risk is all the greater when few types are cultivated on large areas because of the development costs. Particular emphasis is placed on the risk that release is irreversible once it has taken place. In addition to the risk posed by the genetically modified organisms themselves, there is also the risk of hybridization into other organisms and of horizontal gene transfer, which involves the uncontrolled transfer of the modified transgenes to other organisms by viruses, pollen or similar vectors.

– On the other hand, the law relating to genetic engineering must not be blind to the opportunities that genetic engineering offers for human health and industry, as well as for the environment itself. These lie in the reduced use of fertilizers, pesticides and insecticides through the production of new, particularly undemanding or resistant plants, or through genetically engineered changes in insects; or in the genetically engineered modification of pollution-eliminating bacteria to combat contaminated soil or water. Lately, however, fewer pest-resistant than herbicide-resistant plants have been developed, i.e. resistance to so-called soil sterilants has been increased. In this respect, the gains for environmental protection are doubtful. There is also the risk of this resistance finding its way through cross-breeding into weeds, which will then have to be combated with additional herbicides. 16/

(2) Overloading the risk argument 17/

The debate on genetic technology involves not only safety aspects but also questions concerning the ethics of the technology, its abuse, and the undesirable social, political, cultural and economic developments it could trigger. On the other hand, risk arguments are especially effective politically: averting risks is undeniably the task of the state. Furthermore, risk perceptions and definitions are selective and can be changed. The risk debate is therefore influenced by the debates in the surrounding areas.

(3) Different approaches

In the 1990s, it was possible to distinguish two approaches in genetic engineering law: the EU approach, characterized by the German Genetic Engineering Act of 1990, and the US approach. The EU approach is regarded as the more pessimistic, precaution-oriented "process approach", in contrast to the more innovation-friendly American "product approach". 18/

– In the US, according to the political guidelines published in 1990, 19/ the regulation of biotechnology should firstly refer to the features and risks associated with the product, not to the process for manufacturing the product. Secondly, a continuous process of deregulation is called for. Thirdly, adaptation of the legal arrangements to the current state of science and technology should be achieved less through concrete "design standards" than through "product standards" describing the quality target to be met. Fourthly, there should be incentives for innovative products. In 1991, the Report on National Biotechnology Policy stressed the importance of regulation as a location factor and said that delays, costs and legal uncertainty would weaken innovation and also the public's confidence in new technologies. In 1995, another deregulation initiative – Reinventing the Regulation of Drugs made from Biotechnology –

16/ Cf. Kloepfer, Umweltrecht (Environmental Law), 1998, 1081, 1082.

17/ Cf. van den Daele, Wahrnehmung von Risiken in der Gentechnik (Perception of risks in genetic engineering) in "Risiko ist ein Konstrukt" (Risk is a construct) edited by Bayerische Rück, 1993, 170.

18/ Overview of genetic engineering law in Germany, Switzerland and the US in Wildhaber, Produkthaftung im Gentechnikrecht (Product liability in genetic engineering law), 2000, 77–124.

19/ Four Principles of Regulatory Review for Biotechnology, 57 Fed. Reg. 6760 (1992).

led to the extensive cutting of red tape in the pharmaceuticals sector by the FDA (Food and Drug Administration) Modernization Act of 1997.

Regulation does not refer to a hypothetical risk, but to empirically demonstrable or scientifically defined risks. The fact that a product is made using genetic engineering methods does not necessarily justify specific monitoring. Releasing and putting genetically modified organisms into circulation does not in itself require official approval. Thus, for example, where food additives have been approved regardless of the manufacturing process and the same products are now produced using genetic engineering, no new regulation is required. The FDA can of course take a product off the market in cases where there are suspicions that it is dangerous.

Nor is there any general requirement to label genetically engineered products. Here, the provisions of the Food, Drug and Cosmetic Act (FDCA) are followed. According to this, misleading descriptions are forbidden, and even the voluntary marking of genetically modified (GM) products has been held to be impermissible, as it would suggest that conventional products were better or safer. 20/

– In contrast, the German Genetic Engineering Act of 1990 first of all emphasizes prevention. It is an example of how the state's traditional job of averting risks is being shifted forward into the area of suspected risks and even to an anticipatory stage prior to this. 21/ This shifting forward takes place because the subject is too complex, and the level of knowledge is not sufficient to allow the risks to be forecast. The definition of risk has thus been moved into the centre here for the first time in German administrative law. From the point of view of the government decision-making body, there are three problems to be solved. In the run-up to the decision, the process of information gathering has to be sorted out. It must be possible to follow the reasoning behind decisions which are taken on the basis of deficient risk information. Finally, risks must be prioritized and reduced at reasonable expense. This results in an organizational task which goes beyond the traditional monitoring of plants and installations and is aimed not only at the administration but also at the committees of experts, which have become independent, and at the applicants, whose duties involve carrying out investigations. The talk was of a "statutory mandate to carry out cooperative, flexible risk assessment and risk management under the leadership of the competent authority". 22/

– During the 1990s, with increasing practice, a process of deregulation took place in Germany as well, in conjunction with the government promotion of genetic engineering laboratories. In other words, the preceding US trend was followed in Germany. However, with the increasing commercialization of GM products, a counterprocess of re-tightening regulation was triggered in both Europe and the US by consumer and environmental associations. Regulations at the national and EU level were also overlaid with the agreements of the Cartagena Protocol on Biosafety, negotiated in Montreal in the year 2000, under which import bans can be declared in cases where scientifically founded doubts exist as to the harmlessness of GM products. This rule is contrary to the WTO's World Trade Agreement, according to which import bans are only permissible in the case of scientifically proven environmental or health risks. The conflict between the two approaches to regulation therefore remains open.

2 Liability law and genetic engineering

(1) General or specific liability rules?

A new technology may necessitate specific regulation or even a new field of law, but not necessarily new or specific rules on liability. The general principles of liability law are already there, and their scope is considerable. The objectification of negligence criteria means that traditional liability based on fault is often no longer distinguishable from strict liability – a development which would scarcely have been

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20/ Wildhaber (loc. cit.), 101, 122.

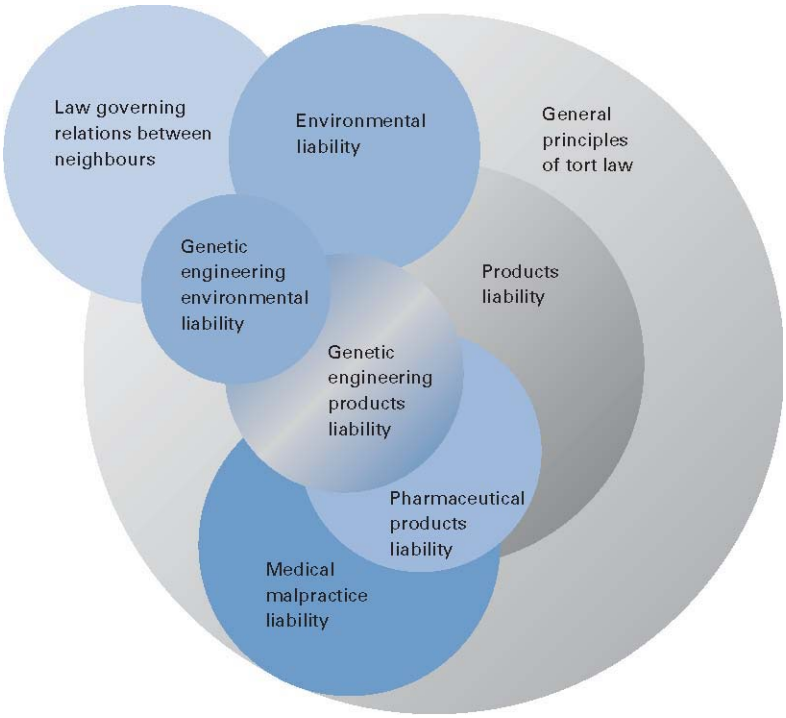
21/ Cf. in this connection di Fabio, Risikoentscheidungen im Rechtsstaat (Risk decisions in the constitutional state), 1994, 115–137.

22/ Di Fabio (loc. cit.), 137.

conceivable without the spread of liability insurance. 23/ Of course, liability for development risks cannot be justified anywhere within the scope of liability based on fault – and it is often an exclusion even within the scope of strict liability. Strict liability can be based on the traditional law governing relations between neighbours ("neighbour law"). Claims for compensation and damages under such neighbour law in Germany, Austria or Italy, 24/ in the case of "troubles anormaux de voisinage" (abnormal nuisance caused by neighbours) under French or Spanish tort law, 25/ and in the case of "private nuisance" in countries where common law applies, have developed into strict liability for detriment to adjacent properties which is not customary in the locality and is unacceptable. This may be of relevance, for example, where field trials of GMOs are concerned.

Where special regulations are conceivable under liability law in connection with genetic engineering and what reasons exist for and against? Essentially, the areas concerned are medical liability, environmental liability and product liability (cf. Fig. 1).

1 Overlapping types of claims in genetic engineering liability



(2) Medical liability

So far, hardly any legislators have passed special provisions with respect to medical liability, be it medical liability in general under civil law, or liability involving new methods of treatment and experiments, 26/ or liability with regard to methods of treatment and diagnosis in genetic medicine.

However, everywhere it is court decisions that develop specific rules for medical liability. These rules also apply to genetic medicine, which often reduces liability risks, e.g. the HIV risk where human blood is

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23/ Von Bar, Wandel der Haftpflichtversicherung (Changes in liability insurance), Archiv für die zivilistische Praxis (Archive for Civil Law Practice) 181 (1981) 292-294.

24/ Sections 906, 1004 BGB (German Civil Code), 364 ABGB (Austrian Civil Code), 844 Codice Civile (Italian Civil Code).

25/ Sections 1908 Code Civil (French Civil Code), 509 Código Civil (Spanish Civil Code).

26/ This is not the case, however, with Scandinavian clinical trials insurances, in which the liability is largely taken over by no-fault models similar to social insurance. Even these do not differentiate between genetic and other methods of treatment, however.

replaced with Factor VIII produced using genetic engineering. New decision options create new responsibility, however.

A few basic issues regarding medical liability are of particular interest with respect to genetic medicine. For instance, European courts have so far been largely unanimous on the point that no-one has a right to their own non-existence – not even a person who is severely disabled as a result of a genetic defect which, through negligence, was not discovered. 27/ The lament made by Orpheus which will be familiar to every opera fan – "oh, would that I had never been born" – accordingly remains irrelevant under liability law. A different conclusion, however, was reached in a decision by the French Court of Cassation on 17 November 2000. 28/

In other questions of medical liability in connection with birth, the German Federal Constitutional Court described the Federal Supreme Court of Justice's viewpoint as "worth reconsidering". On the other hand, a Supreme Court Judge drew attention to the fact that "if we liability judges ... have pushed out beyond the boundaries of tortious liability, then this merely reflects the boundlessness of the competencies which medicine is assuming today." 29/ The crossing of boundaries by genetic medicine may well lead to further boundaries being crossed in liability law.

Outside medical liability, too, the handling of genetic tests may become relevant in liability law. For instance, the Equal Employment Opportunity Commission in the US recently laid down when such tests are unacceptable. A railroad company had secretly subjected workers to genetic tests in order to prove that tendon problems from which they were suffering were not a consequence of their work but due to genetic factors.

(3) Environmental liability

Specific liability rules in respect of genetic engineering have been developed in connection with environmental liability.

At the start of the 1990s, it was still less a matter of application than of research in the laboratory and of development, including release trials. While the two relevant EC directives 30/ did not provide for any rules on liability, the initial idea in Germany was for the traditional strict liability of keepers of animals to be developed further into strict liability for biotechnology. 31/ The arrangements for strict liability under the Genetic Engineering Act of 1990 (Section 32) were based primarily on environmental aspects, especially since the German Environmental Liability Act, which for its part did not include genetic engineering risks, was being worked on at the same time. It was similar with the liability provision that was inserted into the Austrian Genetic Engineering Liability Act of 1995 (Section 79).

– In Germany, a limit of liability of DM 160m is provided for (Section 33), as in the Environmental Liability Act. Typical of both environmental and genetic engineering risks are complex liability situations in which it is difficult to draw the line between the individual (serial) loss to which the limit relates, and several individual losses. This problem of definition, which is typical of insurance contract law, thus moves into liability law.

– Liability is assumed for bodily injury and property damage, but not for purely financial losses. Property damage is deemed to include not only impairments of the substance of the property (e.g. through cross-pollination), but possibly also restrictions on use, seizure by the authorities, and the refusal of quality

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27/ Cf. von Bar, Gemeineuropäisches Deliktsrecht (Common European Law of Torts), Vol. I, 1996, 576.

28/ Radé, Être ou ne pas naître? telle n'est pas la question! (To be or not to be born? That is not the question!) in: Responsabilité civile et assurances (Liability and insurance), January 2001, 4–7.

29/ Steffen, Haftung im Wandel (Changing liability), ZVersWiss 1993, 23.

30/ Council Directives 90/219/EEC of 23.4.90 ("Closed System Directive") and 90/220/EEC of 23.4.90 ("Deliberate Release Directive").

31/ Cf. Deutsch, Haftung und Rechtsschutz im Gentechnikrecht (Liability and legal protection in genetic engineering law), in: Gentechnikrecht und Umwelt (Genetic engineering law and environment), 6. Trierer Kolloquium zum Umwelt- und Technikrecht (6th Trier Colloquium on law relating to the environment and technology) 1990, 117.

marks, eco-labels and the like. Here there may be scope for definitions that can be made more concrete depending on cultural preferences and political objectives. 32/ This broadens the concept of property damage.

– In Austria, liability for purely financial losses was proposed, for example to cover the eventuality of a beekeeper producing less because of the destruction of plant species. However, in cases where consumers avoid products from an entire region after learning of a loss, the profits lost should not be indemnified, since the loss involved is only indirect. Because of the problems of delimitation and incalculable liabilities which might be expected in fairly realistic situations of this kind, this extension of liability was abandoned, particularly since it was also contrary to the general principles of the Austrian (and also German) law of torts. 33/

–As in the German Environmental Liability Act, property damage also includes increased expenditure in connection with damage to nature and the landscape (Section 32, para 7) in cases where ownership rights are involved. No liability is assumed for purely ecological damage. This type of damage requires clarification, however, firstly because of the debate about extending liability within the framework of a European directive on environmental liability and secondly because of the largely traditional liability that already exists with respect to damage to nature and the landscape for which ownership is of relevance. Even where the cause is identified unequivocally, the dynamics of natural evolution make it difficult to assess indemnifiable ecological damage. In the case of losses caused by genetic engineering, the difficulties are increased as a result of the "indissoluble linkage of the biotechnological operation with the complexity and interconnected character of nature". 34/

– Other rules specific to the genetic engineering risk relate to the right to be informed (Section 35) and the presumption of causality (Section 34): damage in connection with genetic engineering work is attributed to this specific risk. The compulsory cover provided for in both countries has so far been realized only in Austria.

(4) Product liability

As genetically engineered products are increasingly marketed, product liability is coming to the fore.

Should genetically engineered products be treated like other products, or should liability be tightened or eased? How should the producer's liability be regulated compared to the users' liability? How is the question of liability seen in the US, where liability is traditionally channelled via the producers?

–Tightening of liability and the granting of liability privileges according to product group are the exception in product liability, but not altogether unknown. In European product liability laws, privileges were traditionally granted in respect of primary agricultural products, but these have now been abolished. In Spain, product liability for development risks applies only to food and drugs, while in Germany it applies only to drugs and genetically engineered products. 35/

In the Swiss debate on liability for genetic engineering, further options are currently being discussed. One is the establishment of pure strict liability for genetically engineered products which goes beyond the Product Liability Act, in particular by no longer making it a requirement to prove that there was a product

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32/ Cf. van den Daele, Von rechtlicher Risikovorsorge zu politischer Planung (From legal protection against risk to political planning) in: Rechtliches Risikomanagement (Legal risk management) published by Bora, 1999, 272–275.

33/ Koziol, Stellungnahme zum Entwurf eines Bundesgesetzes, mit dem das Gentechnikgesetz und das Produkthaftungsgesetz geändert werden (Opinion on the draft of a federal law amending the Genetic Engineering Act and the Product Liability Act), 1998, 2–4.

34/ Wahl, Forschungs- und Anwendungskontrolle technischen Fortschritts als Staatsaufgabe? – dargestellt am Beispiel der Gentechnik (Research and application control of technical progress as a job for government? – illustrated using the example of genetic engineering), in: Gentechnik und Umweltrecht (Genetic engineering and environmental law) (footnote 16), 10.

35/ Section 37 II 2 of the Genetic Engineering Act (GenTG), which excludes Section 1 II 5 of the Product Liability Act. Austria has no comparable arrangement.

defect. Another option is to consider the possibility of channelling liability for genetic engineering – not only in fact but in law – through the producers on the model of nuclear liability, with certain users such as doctors or farmers being exempted from liability accordingly.

Where liability is differentiated according to product groups, problems of delimitation result and the question of equal treatment arises. Why liability for drugs or foodstuffs but not for toxic products? 36/

– As in Germany, specific product liability arrangements for drugs also apply in the United States. These arose in both countries as a result of the thalidomide case in the early 1960s, though the United States rules, unlike those in Germany, grant privileges more in favour of the drug manufacturers. 37/

In the area of liability for genetically engineered products, as in Europe traditional liability for negligence is also flexible in the United States. In the area of genetic engineering in particular, there is an "evolutionary" scale for the duty of care. While failure to comply with safety regulations mostly indicates negligence, even compliance with them does not automatically rule out negligence. 38/

In the United States, strict liability for genetically engineered products has so far been largely rejected. There are two reasons for this. Firstly, the authors who in the 1980s and early 1990s advocated "negligence only" liability referred above all to the "red" genetically engineered products – drugs and medicinal products – which at that time still dominated genetically engineered production as a whole. Secondly, the high costs of United States product liability was generally considered to constitute a factor in international competition, and there was a desire not to overburden the genetic engineering industry with those costs, because of its strategic importance.39

3 Genetic engineering risks in liability insurance

Are specific covers, clauses or tariffs used in the liability insurance of genetic engineering risks? And, irrespective of this, how do insurers assess the genetic engineering risks that for the most part are tacitly included in the cover? Here a distinction can be made between liabilities resulting from the realization of the feared development risk and liabilities prior to a development risk which are a consequence or side effect of prevention. This distinction is generally helpful for understanding liabilities in connection with development risks.

(1) Specific covers and clauses

Covers or clauses specific to genetic engineering are not usual either in medical liability insurance or in product liability insurance. The same goes for special covers such as product liability for agricultural seed. However, the Association of German Insurers' recall insurance model provides for the exclusion of genetically modified products. And there are deliberations regarding the development of specific recall models.

The Association also has a model for genetic engineering environmental liability insurance to cover the risk from installations and deliberate releases. This largely follows the German model for environmental liability insurance, for instance as regards the definition of loss event (manifestation of damage during the policy period and no sunset clause, i.e. with unlimited long-tail liability).

(2) Development risks, including liabilities as side effects of precautionary decisions

When assessing the liability risks automatically covered in connection with genetic engineering, two liability complexes need to be distinguished:

36/ Cf. Wildhaber (loc. cit.), 386, 387.

37/ Restatement Second 1965, Section 402A, note k, Restatement Third 1998, Section 6, cf. Wildhaber (loc. cit.), 357.

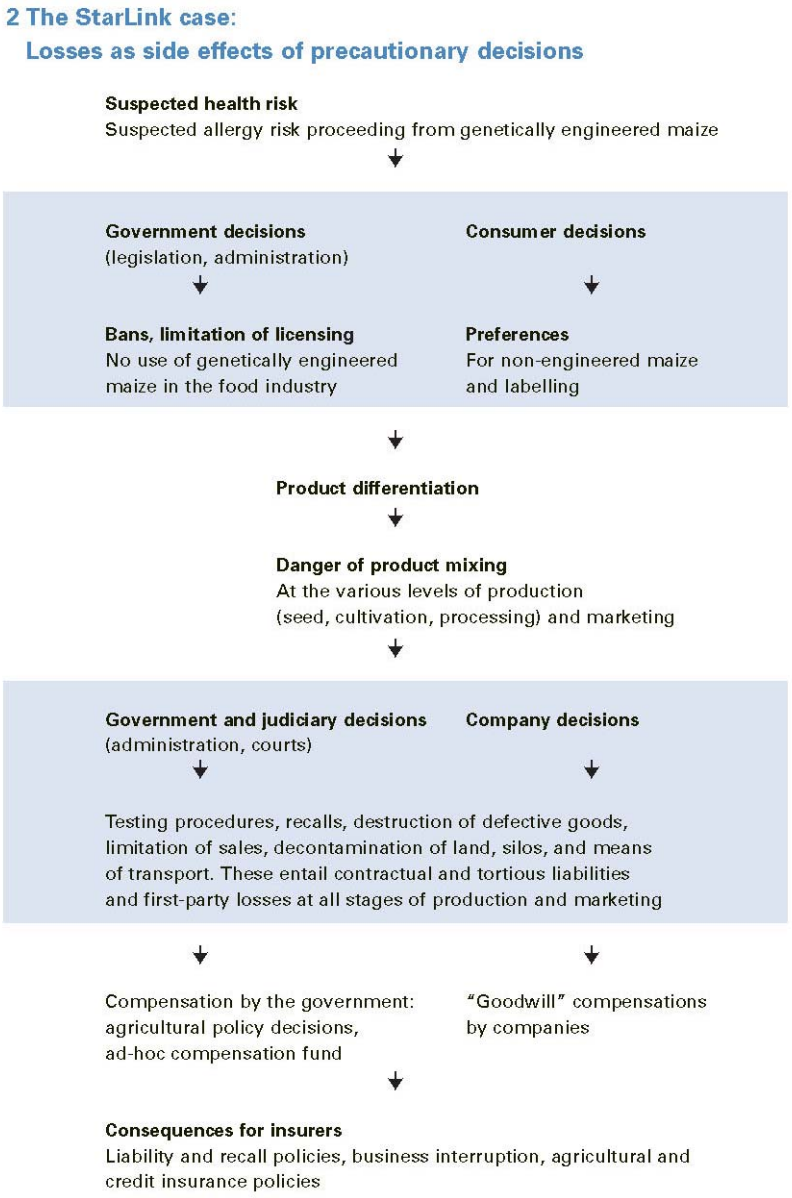
38/ Cf. Wildhaber (loc. cit.), 364–366.

39/ Cf. Wildhaber (loc. cit.), 368, 369.

– Much attention is focused on the mostly long-term development risks for the environment and human health, which form the background to genetic engineering law and, as it were, represent the residual risk of genetic engineering which has to be covered under liability law. These risks are the main subject of state and corporate genetic engineering research.

– In practice, however, other liabilities have so far been to the fore: the very diverse, often short-term commercial risks which are created as a result of the regulation of preventive genetic engineering law, or which arise through market mechanisms, which for their part are influenced by the public discussion of risks and political intervention. In short, liabilities as consequence or side effect of prevention.

Example: genetically modified maize is only permitted to be sold as animal feed, because – although there is no empirical basis for this – it is suspected that there is an allergy risk if humans consume it directly. The market structures at the different levels of production lead to genetically unmodified products or land becoming “contaminated”, be it through the mixing of seed or in mills, or through the spread of pollen to neighbouring property. Thus a politically defined “environmental quality target” may result in an extended concept of property damage relevant for tort law, and at the very 2 The StarLink case: Losses as side effects of precautionary decisions least in contractually relevant warranties and claims for damages. The many types of property damage, financial losses, business interruptions, contractual and tort-law liabilities impact on the traditional lines of liability, recall, property and credit insurance. These are masked by or overlap with state measures of agricultural policy and ad hoc compensation funds, as well as by corporate goodwill campaigns (cf. Fig. 2).



(3) Comparison with other development risks

In the case of BSE, the development risk has so far been realized in Europe at three levels (leaving aside measures of market regulation in agricultural policy): killing of cattle in cases of suspected infection; killing of infected cattle (in a few hundred thousand cases) and lastly the around one hundred victims of the human BSE variant so far. A striking fact in this much more concrete scenario compared with the genetic engineering debate is the extent of ignorance still remaining on the core point, the hazard to consumers. According to an article in the magazine "Nature", the estimates of the number of deaths to be expected in the UK range from one hundred to several hundred thousand, depending on the still-to-be-clarified incubation period of the disease and an almost unlimited number of conceivable combinations of other risk parameters. 40/

In the case of asbestos, public discussions both in Germany in the eighties and in France in the nineties mixed the core issue – the occupational diseases of workers – with a side issue: the hazard of asbestos in

40/ Ghani, Ferguson, Donnelly in vol. 406, 10.8.2000.

buildings. The consequence was asbestos remediation involving many cases of exaggerated prevention measures. The costs of this prevention only marginally affected liability insurers, however. As regards the number of cancer victims among workers, so far the forecasts of the nineties are proving correct, which predicted that by 2020 some hundred thousand cases would manifest themselves in Europe. But apart from in the UK and the Netherlands, the impact that there has been on liability insurers elsewhere is scarcely anticipated.

(4) Options for liability insurers in the case of genetic engineering risks

Exclusions and special covers: exclusions have so far involved small laboratories rather than large companies. In Bavaria, the former have been protected by state assumption of liabilities – an instrument of government promotion. Special covers need to resolve the question of delimitation: when does damage in connection with genetic technology equal damage caused by genetic technology? 41/

Given the largely automatic inclusion of genetic engineering risks in insurance, there is a need for risk assessment that is consistent enough to make a convincing premium calculation. It must consider both risk levels: the development risk itself and the commercial risks resulting from precautionary decisions. Simulations of liability scenarios would be helpful: for instance on the risk of pollen spreading to neighbouring property or on the allergy risk. Such simulations can illustrate the scientific, liability law and insurance mechanisms.

Finally liability insurers can commission their own scientific research – in those areas where government or corporate genetic engineering research fails to cover aspects that are important for liability law. This could include the effect of genetically modified bacteria used in soil remediation, for example, or the influence of genetically modified plants on the species diversity of traditional crops in the tropics.

41/ Presumption of causality under liability law, as provided for in Section 34 of the German Genetic Engineering Act would then have to be matched at the insurance policy level.