

**From Rio to Johannesburg and beyond:
Globalizing precaution for genetically modified
organisms**

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1 Summary

The *precautionary principle* (PP) requires that action should be taken to prevent damage even if there are still scientific uncertainties about the cause of the harm. Ambiguous as it is, the PP has nevertheless developed into an important aspect of international environmental law. This study focuses on the regulation of *genetically modified organisms* (GMOs) and traces back the history, components and future consequences of the PP. It scrutinizes the criticism on the PP based on the premises of 'sound science' and how for GMOs, disputes around the PP dominate the conflict between the USA and Europe, but also rifts between trade and environmental law. For this, examples of the implementation of the PP in international agreements of the Rio Earth Summit and the World Trade Organization are discussed and an outlook will be given, how the cause of precaution can be strengthened between Doha, Johannesburg and beyond.

This study comes to the conclusion that there is still ample leeway to further the case of the environment in the arena of international treaties. Yet a large part of present and future conflicts do not only stem from environment versus trade-related international treaties, but from the unilateralist position of the USA. The recent tendency of the USA to abandon multilateral mechanisms limits merely legalistic policy approaches. Instead, as will be shown by examples of WTO laws, the interpretation and practice of existing treaties remains dependent on political power compositions, in which non-state actors become increasingly important. International law moves slowly and not without the interference of non-governmental actors.

Presently, the most urgent measure needed to strengthen precaution when dealing with biotechnology is still the implementation of the Biosafety Protocol. Beyond Johannesburg, a lot remains to be done and several recommendations are discussed. The outlook starts with those measures within the legal system and in the framework of international treaties. Finally, light will be shed on the extension of precaution through the international civil society. Only when there are the capacities for and the awareness of different needs of precaution will the PP live up to its full potential in the broader sense.

2 Aim of the study

When in August 2002 the head of states of most countries of the world will gather in Johannesburg for the *World Summit on Sustainable Development* (WSSD), it will be time for both internal soul searching and new momentum. Ten years after the *UN Conference on Environment and Development* – dubbed the Earth Summit - in Rio de Janeiro, the world is still confronted with the challenges of endemic poverty, unsustainable lifestyles and environmental degradation. The then adopted *Agenda 21* to promote worldwide economic growth in a socially and environmentally sustainable manner still has a long way to go. Notwithstanding the tasks ahead, Agenda 21 acknowledged the ‘common but differentiated responsibilities’ for rich and poor countries and poverty eradication as the ‘indispensable requirement for sustainable development’. As one measure to foster economic growth worldwide, the liberalization of trade has gained increasing importance. This was reflected by the finalization of the Uruguay round of trade negotiations under the *General Agreement on Tariffs and Trade* (GATT), which led to the creation of the *World Trade Organization* (WTO) in 1995.

Trade and environmental issues are both indicators for the transforming role of nation states in the international policy arena. New international treaties and bodies have come to the fore, but also *non-governmental organizations* (NGOs) have emerged as new actors next to the nation state. Nevertheless, the shift of powers is complex and not a unidirectional undermining of national entities. Ultimately, it is still nation states that sign the agreements.

It is exactly this new pattern that characterizes the shape of biotechnologies as a typical technological endeavor in globalizing times. Societal awareness and expectations have increased the demands for accountability not only of private entities, but also of public institutions and regulatory agencies for the ecological and sustainable merits of technological development. At the same time, the distribution of benefits of technological development has gained increasing importance and provoked questions of its own kind.

In the following report, the regulation of these newly arising technologies by two different sets of international legal frameworks will be analyzed. On the one hand the environmental treaties that emanated from the Earth Summit in 1992 in Rio, and on the other hand, the agreements that shaped the international trade system with the establishment of the WTO. The nexus between these sets of law is already well documented as regards conflicts that have arisen from the access to and use of biological resources. Questions regarding the commodification of living matter and the 'quality' of knowledge are dealt with in depth elsewhere and will not be tackled here¹. Instead, the following study will focus on the ongoing debates regarding the *precautionary principle* (PP) for the aversion of harm to the environment and humans that may be caused by biotechnologies and especially *genetic engineering* (GE). While the PP is perceived by some as a prerequisite for responsible regulation of GE, an alternative reading contends its unscientific basis and its non-tariff distortion of trade.

To fully comprehend the implications of the PP for biotechnology regulation between trade and environment, this report will first give an overview of the main characteristics of the PP as well as its history, which led to the inclusion of the PP in the Rio treaties. Then, the WTO treaties and their taking into consideration of precaution will be analyzed. To understand better the frictions and the interests at stake, it is inevitable to analyze and compare discussions in the USA and Europe regarding the PP. Subsequently, the decision of the fourth ministerial conference of the WTO in Qatar (Doha) in November 2001 not to include the PP into the next round of trade negotiations will be highlighted as well as the implications of this outcome for the Johannesburg Summit. The report will conclude with some thoughts and speculations about the future of the PP regarding biotechnology regulation and the prospects of strengthening it in international law with regards to environment and trade.

¹ A theoretical overview is given in Goldman, M. (1998) (ed.). *Privatizing Nature: Political Struggles for the Global Commons*. London: Pluto Press. For an introduction to the relationship between the CBD and the TRIPS agreement with focus on policy strategies see Mugabe et. al (1997)(eds.). *Access to Genetic Resources: Strategies for Sharing Benefits*. Nairobi: ACTS.

3 From London to Cartagena

3.1 History of the PP

Historically, the first documented case of precaution took place about 150 years ago in the context of urban public health. When in 1854, a cholera epidemic swept through a London neighborhood, a local physician, *John Snow*, suspected an association between the drinking water from a public water pump and the outbreak of the disease. Although at that point no causal connection could be demonstrated, he was able to convince local authorities to close the pump. The costs of closing down the water source, he argued, were negligible in comparison with the consequences of leaving it open, even if the decision might turn out to be wrong in the end. While his theory of cholera as a waterborne disease proved to be correct, it was only 30 years later that the cause, the bacterium *Vibrio cholerae*, was discovered.²

In this historic incident, action took place before the cause-effect relationship for the damage had been fully elucidated to *prevent harm*. Yet often it is necessary to *prevent action*, because its outcome may be harmful. For both scenarios, however, the situation becomes more complicated if we become more specific about what ‘harm’ and ‘action’ mean. In assessing harm, precaution has to straddle two paradoxes: The absence of proof (of harm) is not its proof of absence. Yet the proof of absence of harm is very often impossible.

Due to these conflicts, most definitions of the PP fall into two broad classes.

- (1) The strong PP: Take no action until you are certain that it will do no harm.
- (2) The weak PP: lack of full certainty is not a justification for preventing an action that might be harmful.

² See “Working towards a strong protocol“ (2000). Editorial. *Biotechnology and Development Monitor*, 43, pp. 2-3.

Even more, how could a local assessment of risk, as in the case of a water pump in London, be a rational basis for global action? These are the questions that we are confronted with in the assessment of risk and the decision-making regarding the release of *genetically modified organisms* (GMOs). And all these factors interplay and will have to be dealt with in their particular role in the PP for the regulation of biotechnology.

The more recent history of the PP can be traced back to German environmental legislation in the 1970s based on the principle of *Vorsorge*, or foresight.³ While it grounded the belief that societies should prevent environmental damage by careful, forward-looking planning, it balanced such concerns with principles of economic viability. At an international level, the PP was first recognized in the *World Charter for Nature*, adopted by the *UN General Assembly* in 1982. In 1992, it became the basis for European environmental law by the *Treaty on European Union*. However, while Article 174 of the treaty states that “*Community policy on the environment shall...be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay,*”⁴ a definition of the PP is still missing.

Different agreements often use different versions of principles. The PP is no exception. One of the most important distinctions is, whether we talk about precautionary ‘principle’ or ‘approach’. One reading of this distinction implies that ‘principle’ refers to a general rule adopted as a guide for developing international environmental policy, whereas ‘approach’ only describes a way of considering or handling something, especially a problem.”⁵ Other interpretations see the precautionary approach as the precautionary principle that is enriched by some extra non-scientific factors.⁶ Being aware of such

3 Raffensberger C. And Tickner, J. (1999). *Protecting Public Health and the Environment: Implementing the Precautionary Principle*. Washington, DC: Science and Environment Health Network, p 2.

4 See European Union (1997). *Consolidated Treaties: Treaty on European Union. Treaty establishing the European Community*. Luxembourg: Office for Official Publications of the European Communities. P.117. Retrieved from the World Wide Web 26 February 2002: http://europa.eu.int/eur-lex/en/treaties/dat/ec_cons_treaty_en.pdf

5 See Hey, E. (1992). The Precautionary Concept in Environmental Policy and Law: Institutionalizing Caution. *Georgetown International Environmental Law Review*. 303, p. 304.

6 This is the case for the regulation of GMOs in Switzerland. See Ammann, D. and B. Vogel (2002). Vom Risiko zur Vorsorge. *Gen-ethischer Informationsdienst*, 150, pp. 26-27.

discrepancies, in the following there will be made no distinction between ‘principle’ and ‘approach’.

Incorporation of the PP can be found in various international legal instruments, such as the 1995 *Agreement on Fish Stocks*; the 1992 *Convention on Climate Change*; and the 1992 *Convention for the Protection of the Marine Environment of the North-East Atlantic*. It comes as no surprise that the PP is fraught with variability in interpretation. One legal analysis⁷ found that there were 14 different formulations of the principle in treaties and non-treaty declarations. At one end of the gradient, and in its strongest versions, the PP calls for absolute proof of safety before allowing a new technology. The World Charter for Nature mentioned above demands that “*where potential adverse effects are not fully understood, the activities should not proceed.*”⁸ At the other end of the gradient, activities are demanded even without any scientific evidence at all. The 1990 declaration on protection of the North Sea calls for action to be taken even if there is “*no scientific evidence to prove a causal link between emissions [of wastes onto ocean waters] and effects.*”⁹

Along this line, the agreements of the 1992 Earth Summit take a middle ground. While the Agenda 21 makes general reference to precautionary measures on several occasions,¹⁰ the PP is not included in chapter 16 that deals with “*Environmentally Sound Management Of Biotechnology*”. The PP is spelled out more explicitly in principle 15 of the *Rio Declaration on Environment and Development* (see Appendix). Central here is the element of anticipation, reflecting a requirement that effective environmental measures need to be based upon actions which take a long-term approach and which might anticipate changes on the basis of scientific knowledge.

7 Vanderzwaag, D. (1999). *Journal of Environmental Law Practice* 8, 355. As quoted in Foster, K.R., Vecchia, P., and M.H. Repacholi (2000). Science and the precautionary principle. *Science*, 288, 5468, pp. 979-981, Reference (2).

8 United Nations (1982). *World Charter for Nature*. U.N. GA Resolution 37/7.

9 Declaration of the Third International Conference on the Protection of the North Sea (1990) (Preamble).

10 Precautionary measures are suggested in chapters 17 and 18, which deal with the protection and utilization of oceans and freshwaters. The PP is also mentioned in chapter 19 (dealing with toxic substances); chapter 20 (hazardous wastes); chapter 22 (radioactive waste). See United Nations Sustainable Development, Agenda 21 Website. <http://www.un.org/esa/sustdev/agenda21text.htm#pre>

At the same time, however, the Rio Declaration introduces precaution as a function of cost-benefit analysis, demanding that *“full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”*

Most important for the transboundary movement of GMOs, the PP was also included in the Cartagena Protocol on Biosafety (CPB) as a supplementary agreement to the CBD. *“Lack of scientific certainty...shall not prevent [a] Party from taking a decision, as appropriate, with regard to the import of the living modified organism in question...in order to avoid or minimize such potential adverse effects”* (see Appendix).

3.2 Different concepts of risk assessment and precaution

To understand the ongoing debate in the political arena about different regulatory practices, the relationship between risk and precaution has to be clarified. Risk, defined as the probability of a hazard, has become an issue for decision-making during the 1970s. Decision-making tools such as risk assessment and cost-benefit analysis were developed to bridge the gap between scientific uncertainty and the need to prevent harm. Originating from mechanical problems with well-defined parameters, such as bridge constructions, risk assessment took on the role of predictor of uncertain and highly variable events in complex human and ecological systems.¹¹

From there, a direct line goes to those who see risk assessment as ‘sound science’ because it grounds decision-making on what can be quantified without considering what is unknown or cannot be measured. Therefore, the debate in the international arena regarding the implementation of the PP, three different attitudes can be roughly distinguished:

- (1) Reject the PP, because of its limited scientific validity in risk assessment.
- (2) Use the PP as a policy tool for risk management.
- (3) See the PP as a reiterative process that entails both risk analysis and risk management.

¹¹ See Raffensperger and Tickner (1999). p. 14.

Science policy confrontations on the PP have mainly pitted the first two opinions against each other. They are represented by the U.S. and European position, respectively and will be analyzed in section 4.

The third concept of the PP, which is brought to the fore by public health and environmental advocacy groups, is even further reaching.¹² In this view, precaution is not simply a tool for risk management, but is also an element of risk assessment and risk communication. Its role already starts within risk analysis, because in carrying out risk assessments, expert bodies make numerous subjective choices. For instance, in an exercise, eleven European governments established teams of experts to predict the probability of accidental release of ammonia. The teams came up with eleven different risk estimates ranging from 1 in 400 to 1 in 10 million. Organizers concluded that assumptions are introduced in risk analysis and that the numerical results are strongly dependent on these assumptions.¹³

Obviously, questions of causality are basically policy and not so much science decisions, and therefore, “[the] choice is not between science and politics, but rather between ways of linking them.”¹⁴ This also asks for a new approach to include the impacted public into the decision-making process. Raffensperger and Tickner contend that risk assessment puts the burden on the general public and that resources were more wisely spent on pollution prevention.¹⁵ Yet they see a place for risk assessment in the PP process to better understand hazards and to compare actions for prevention. In their view the PP provokes a shift in the burden of proof from the public to the actor of a certain activity.

12 Groth, N. (2001). Key Facts About Precaution and Codex. Consumers Union. Retrieved from the World Wide Web 20 February 2002. http://www.ecologic-ipm.com/key_facts.html

13 See Contini, M. et al. (1991). Benchmark Exercise on Major Hazard Analysis. EUR 13386 EN. Luxemburg: Commission of the European Communities.

14 Levidow, L. and S. Carr (2000). Sound Science or Ideology? *Forum for Applied Research and Public Policy*. Vol 15, 3, pp. 44-50. p.49.

15. Raffensperger, C. and Tickner, T. (1999). p. 15.

What does such a far-reaching interpretation of the precautionary approach mean when applied for GMOs? Several elements can be distinguished¹⁶:

- *Threats of harm.* For GMOs there are differences between environmental, biological, social, economic and cultural effects.
- *Scientific uncertainty.* Such insecurities can be distinguished between *statistical uncertainty*, namely of key variables; *model uncertainty*, regarding the multiple, complex ways these variables may interact; *fundamental uncertainty*, such as does the assumption of ‘substantial equivalence’ really apply for GMOs?¹⁷
- *Precautionary action.* The intention of such measures is to be anticipatory and prevent or minimize harm. It also shifts the burden of proof. The ratio behind it is to move from the question: ‘what level of risk is acceptable?’ to ‘how much risk can be avoided?’ which also entails the evaluation of alternatives. For instance, instead of genetically modifying rice to enhance its vitamin content, malnutrition could also be tackled by diversifying the diet.

4 Comparing apples with pears? The PP perception in Europe and the USA

4.1 The European precaution

The PP has been at the basis of European environmental law ever since it was mentioned in the Treaty on European Union in 1992. However, due to lack of defining the PP, there was ample leeway in its interpretation. Therefore, fuelled to some extent also by the confrontations around GMOs in Europe, the Commission of the European Communities undertook an attempt to specify the use of the PP. The 2000 “*Communication from the Commission on the precautionary principle*” emphasizes the distinction between

16 Schettler, T. (2000). The Precautionary Principle, Risk Assessment, and Genetically Modified Organisms. In: *World Trade, Food and Agriculture: A Look at the World Trade Organization, Genetically Modified Organisms and the Issue of Food Security*. Washington, D.C.: Heinrich Böll Foundation. pp. 71-76.

17 The underlying argument here is that a genetically modified crop is not fundamentally different from a wild type or an offspring from classical breeding techniques.

“reliance on the precautionary principle and the search for zero risk, which in reality is rarely to be found.”¹⁸ Furthermore, “the precautionary principle can under no circumstances be used to justify the adoption of arbitrary decisions”¹⁹ and it “is no excuse for derogating from the general principles of risk management.”²⁰ Therefore, risk management measures should be:

- Proportional to the desired level of protection;
- Non-discriminatory in their application;
- Consistent with the measures already adopted in similar circumstances or using similar approaches;
- Examined in terms of costs and benefits for taking, or respectively not taking action;
- Open for re-examination in light of scientific developments;
- Examined on a case-by-case basis if they turn the burden of proof of safety to the producer.

Furthermore, it first and foremost defines the PP as a useful tool for risk management of decision-makers and distinguishes this function from a prudential approach, the “*caution that scientists apply in their assessment of scientific data*”.²¹ Consequently, it comes to the conclusion that decisions to act (or not) are ultimately political.

The pragmatic approach of the Commission can also be seen in the most recent effort of the EU on food regulation. The Regulation (EC) 178/2002 of the European Parliament and Council that entered into force on 21 February 2002, for the first time defines the PP in EU food legislation. Article 7 of the Regulation states that in cases where the possibility of harmful effects on health have been identified “*but scientific uncertainty persists, risk management measures...may be adopted, pending further scientific information for a more comprehensive risk assessment.*” The language states that such

¹⁸ Commission of the European Communities (2000). *Communication on the precautionary principle*. Brussels, COM(2000) 1. Retrieved from the World Wide Web 25 February 2002.
http://europa.eu.int/comm/dgs/health_consumer/library/pub/pub07_en.pdf

¹⁹ Ibid., p. 13.

²⁰ Ibid., p. 18.

²¹ Ibid., p. 3.

measures should not be more trade-restrictive than required to meet the desired level of health protection and should be reviewed “*within a reasonable period of time.*”²²

Next to this strong statement in favor of the PP, the same regulation will also establish a *European Food Safety Authority*, which will provide scientific and technical support to EU policy makers, also regarding GMOs. Presently, however, the PP and the fate of GMOs in the EU is decided by other mechanisms. Under the deliberate release directive (90/220/EEC, now repealed by 2001/18/EC), a de facto moratorium has been imposed on the commercialization of GMOs in Europe. The EU’s de facto moratorium was initiated by five member states in 1999 - Denmark, France, Greece, Italy and Luxembourg - which demanded traceability and labelling regulations before any more GMOs are approved for release in the EU. Since then, three more member states – Austria, Belgium and Germany – have adopted positions that support the moratorium.

Yet the PP will gain backing from another recent development. On February 22, 2002, the European Commission proposed to implement the CPB into the EU’s legal framework on biotechnology. This will not only strengthen the PP’s international stance, but also more specifically bring the CPB closer to the number of 50 member states that are dearly needed for its entry into force.

4.2 USA: The case of sound science

Also in the USA, regulatory actions distinguish between ‘risk assessment’ and ‘risk management.’ Already in the groundbreaking guideline of the *National Research Council*, the 1983 ‘red book’ of risk assessment,²³ the authors outline different steps in risk assessment: hazard identification, dose-response assessment, and the exposure assessment, which culminate in the characterization of risk. Based on such information, the process of risk management is responsible for developing regulatory options, taking also into consideration economic, social, and political consequences of options.²⁴

22 Official Journal of the European Communities L 31/1. (2002). 1 February. p.9. retrieved from the World Wide Web 7 March 2002: http://europa.eu.int/eur-lex/en/dat/2002/l_031/1_03120020201en00010024.pdf

23 National Research Council (1983). *Risk Assessment in the Federal Government: Managing the Process*. Washington, DC: National Academy Press.

24 Ibid., p. 21.

Although the PP is not explicitly mentioned in U.S. laws or policies, its rationale is at the basis of much of the environmental legislation. For instance, the “*National Environmental Policy Act requires that any project receiving federal funding and which may pose serious harm to the environment undergo an environmental impact study, demonstrating that there are no safer alternatives.*”²⁵

In the international arena, however, the USA is one of the major parties that opposes the PP. Instead, it emphasizes that regulation is to rely solely on ‘sound science.’ Nevertheless, this term itself is not as free of value as it may first appear. It has gained prominence in the public debate linked with struggles about the tobacco industry. In 1992, tobacco companies started a campaign against ‘junk science’ to discredit the evidence that secondhand smoke - among other environmental toxins - causes disease.²⁶ Public relations firms and lawyers were hired to develop a ‘sound science’ program in the USA and Europe that involved recruiting other industries and issues to obscure the tobacco industry’s role. Also in the field of environmental regulation, ‘sound science’ has become a buzzword that evolved in a specific setting in the late 1980s.²⁷ Interestingly, at present the call for ‘sound science’ comes from contenders of environmental measures, as well as from its advocates.²⁸

Next to the concern about the PP being non-scientific, another often raised criticism in the USA is that the PP “*does not allow for an assessment of all the risks, including indirect risks of alternative technologies, nor does it contemplate the benefits of an activity, to achieve an overall comparison.*”²⁹ Following this logic, there are also the *risks of applying the PP*, which is perceived as a threat to trade, because trade

25 See Raffensperger and Tickner (1999). p. 3.

27 Ong, E.K. and S.A. Glantz. (2001). Constructing ‘sound science’ and ‘good epidemiology’: Tobacco, lawyers, and public relations firms. *American Journal of Public Health*. Volume 91, Issue 11, pp. 1749-1757.

27 Bereano, P.L. (2000). Politics, sound science and the precautionary principle. *Viewpoints Harvard Center for International Development. Biotechnology*. Retrieved from the World Wide Web 22 March 2002. <http://www.cid.harvard.edu/cidbiotech/comments/comments92.htm>

28 See the plea of the Defenders of Wilderness to protect dolphins from tuna fishing. Retrieved from the World Wide Web 17 March 2002. <http://www.defenders.org/wildlife/new/dolphins.html>

29 Katz, D. (2001). The Mismatch Between the Biosafety Protocol and the Precautionary Principle. *Georgetown International Environmental Law Review*. Vol. 13, pp. 949-982. p. 966.

protectionism may come under the guise of safety concerns. Therefore, the PP seems to be best suited for situations in which the activity presents considerable risks and few benefits (such as in the case of dumping hazardous waste), but seems to be less suited if the possible risks are accompanied by potentially large benefits. The risk-benefit equation would look different if GM crops were to limit pesticide use and hence damage to the environment, or to balance their potential risks with benefits due to their contribution to fight world hunger and malnutrition.³⁰

Regarding the CPB to be more appealing to the USA it is therefore suggested to apply the PP on a case-by-case-basis taking into account the potential risks and benefits of an activity. Furthermore, a common standard should be applied rather than giving individual members the possibility to oppose on individual grounds.

The reality of regulation of genetically modified crops for the U.S. market, however, looks different. Three agencies are primarily responsible for regulating agricultural biotechnology in the USA: The *United States Department of Agriculture* (USDA), the *Environmental Protection Agency* (EPA), and the *Food and Drug Administration* (FDA).³¹ Contrary to, for instance, regulation in Europe, which centers around the process, FDA policy focuses on the product. In 1992, the FDA ruled that genetically engineered foods (GMO's) are 'substantially equivalent' to conventional foods, as long as they do not contain substances that are significantly different from those already in the diet.

In other words, unless their harm is scientifically proven, GMOs are assumed to be risk free. This cuts short the process of risk assessment in that it begins and ends with the generalization of a 'substantial equivalence' of GMOs. Presently they therefore do not require safety testing before or labeling after market approval. However, companies carry out voluntary safety testing in collaboration with the FDA. In May 2000, the FDA announced to revise its regulatory practice of GM products. Changes were to become

30 Goklany, I.M. (2001). The Future of Food. *Forum for Applied Research and Public Policy*. Vol 16, 2. pp. 59-65.

31 For an overview see <http://www.aphis.usda.gov/biotech/OECD/usregs.htm>

more urgent after GM *StarLink* maize, which had only been approved as animal feed, was found in products for human consumption.³² FDA's revised guidelines will furthermore make notification before marketing a food or animal feed product from GM organisms compulsory. It will, however, still not require mandatory safety testing.

5 Struggle in the international arena

5.1 Biotechnology and PP in the WTO

The discrepancy between the different approaches in the USA and Europe to precaution is mirrored by ongoing struggles about international treaties. Of particular importance are trade-related agreements with their mechanisms to prevent non-tariff barriers and the interference with environmental treaties.

The global regulation of biotechnology is impacted in several ways by the conflict between environmental agreements and trade treaties of the WTO. For instance, as mentioned earlier, the debate about the *WTO Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS) interferes with the CBD. And the *WTO Agreement on Technical Barriers to Trade* (TBT) impacts on discussions about the labeling of GMOs. The following will focus on two major frameworks of trade-related international regulation that are influenced by the discussion around the PP.

The Agreement on Sanitary and Phytosanitary Measures (SPS)

The SPS agreement was completed during the trade negotiations of the Uruguay round leading to the establishment of the WTO. The SPS agreement is explicitly based on science and is intended to prevent that different national sanitary and phytosanitary standards become non-tariff trade barriers. The PP is present in the SPS and the precaution language is contained in Article 5.7,³³ which says that where relevant

32 "Seeds of Doubt" (2001), *Wall Street Journal*, April 5, pp. A1, A14.

33 See WTO (2002). *The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)*. Retrieved from the World Wide Web 25 February 2002.
http://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm#Article5

scientific evidence is insufficient, a member may provisionally adopt a measure based on “*available pertinent information.*” Yet they are required to gain scientific evidence “*within a reasonable period of time*” (see Appendix). That the range of the PP is in the language rather than in spirit is shown by the ruling of the WTO dispute settlement body on the European regulation of growth hormones in beef production (see section 5.2 below).

U.S. criticism on the EU’s de facto moratorium on the approval of GMOs is in part due to the different approaches to the PP, which is seen as a violation of the SPS. Irrespective of the PP, there has been a more recent dispute that proves the power of dispute settlement bodies and the accountability to trade laws – features that international environmental law lacks. Conflicts arose regarding China’s regulation on the import of GMOs, which was scheduled to enter into force on 21 March 2002.³⁴ The USA, Canada, Argentina and Australia again criticized China for not notifying the measure and questioned the regulation’s compatibility with WTO rules. China defended the regulation, arguing it was responding to growing consumer concerns over food safety in the country. As one of the conditions for accession, China is required to notify all existing SPS measures at the WTO. Even if it remained unclear, whether the regulation had been notified in time at the WTO, China ultimately bowed down and the regulations were temporarily waived allowing for a transition period of nine months.

The Codex Alimentarius Commission

The Codex was implemented in 1963 as a joint food standards programme by the United Nation’s *World Health Organization* (WHO) and *Food and Agriculture Organization* (FAO). Initially a voluntary agreement, the Codex is charged with “*protecting the health of consumers and ensuring fair practices in the food trade.*”³⁵ The SPS Agreement now recognizes the Codex as the international organization responsible for standard setting related to food safety and the harmonization of food safety measures affecting trade. As

34 See BRIDGES Trade BioRes, 21 March 2002. Retrieved from the World Wide Web 23 March 2002. <http://www.ictsd.org/biores/02-03-21/story1.htm>

35 Statutes of the Codex Alimentarius Commission. *Procedural Manual of the Codex Alimentarius Commission*. Art. 1. 12th edition. Retrieved from the World Wide Web, 26 February 2002: <ftp://ftp.fao.org/codex/manual/Manual12ce.pdf>

such, WTO members are required to base their food safety measures on the Commission's standards, guidelines or recommendations.³⁶ Its prominent role in trade disputes is underpinned by the fact that the WTO agreement refers to the Codex as a point of reference in cases of disputes over non-tariff trade barriers and whether certain trade restrictions have a legitimate scientific basis.

That the Codex does not recognize the PP was reiterated at the last Commission meeting in Geneva in July 2001, where several delegations contended that the PP was not a principle of international law and should not be mentioned as such within the Codex. How far away the Commission is from accepting precaution instead of scientific evidence is exemplified by the adoption of the following alternative compromise: "*When there is evidence that a risk to human health exists but scientific data are insufficient or incomplete, the Commission should not proceed to elaborate a standard but should consider elaborating a related text, such as a code of practice, provided that such a text would be supported by the available scientific evidence.*"³⁷

5.2 European precautions against beef hormones

Incidences of WTO dispute settlements occurred after Canada's call in 1995 against Australia import restriction on fresh salmon, and in 1997, when the USA brought a formal WTO complaint against Japan for prohibiting imports of fresh fruits.³⁸ Yet the most far-reaching controversy between trade and safety issues that referred to the SPS Agreement occurred between the USA and Europe in relation to the use of *bovine growth hormones* (BGHs) in cattle production. Depending on the viewpoint on the U.S. beef hormone, the PP is either part of risk aversion or a measure of trade protectionism. While some of these hormones occur naturally, others are synthetic. The metabolic cycle of

³⁶ The other two international standard-setting bodies recognized in the SPS Agreement are the *International Plant Protection Convention* (IPPC) for plant health and the *Office International de Epizooties* (OIE) for animal health and zoonoses.

³⁷ See Codex Alimentarius Commission (2001). 24th Session, Geneva, 2-7 July. *Risk Analysis Policies of the Codex Alimentarius Commission* (Agenda Item 8, Para 81) [ALINORM 01/9, CAC/LIM 1]. Retrieved from the World Wide Web 25 February 2002: <http://www.codexalimentarius.net/cac24/alinorm0141/bodye.htm#E9E9>

³⁸ See USDA (2001). *Fact Sheet: Sanitary and Phytosanitary Measures and the World Trade Organization*. FAS Online. Foreign Agricultural Service, U.S. Department of Agriculture. Retrieved from the World Wide Web 25 February 2002. <http://www.fas.usda.gov/info/factsheets/sps.html>

such substances into humans via meat and meat products have raised concerns regarding health consequences in Europe. In 1989, a European Council Directive prohibited sales and imports of meat or meat products derived from animals that were treated with different BGHs. After the USA and Canada filed complaints to the WTO, the *Appellate Body* ruled in 1998 that the ban was in violation of the SPS Agreement³⁹ and not adequately based on scientific evidence. The EU has refused to lift the import ban until the completion of a new round of scientific studies. Meanwhile, the WTO has imposed a penalty fee of US\$ 124 million on the EU, and has allowed Canada and the USA to impose 100 percent tariffs on selected European goods.

Although article 5.7 of the SPS Agreement allows countries to adopt “*temporary*” measures where “*relevant scientific information is insufficient*”, the BGH ruling clearly shows the limited affinity of the WTO to put the PP into practice. It put the burden of scientific proof on the regulating state, which has to prove that regulated substances pose an identifiable risk, in contrast to a precautionary approach that would require that substances be proven safe before introduced into food. The WTO ruling came despite the fact that the USA and Canada withheld information on the substance’s risk, claiming that it was proprietary and confidential information.

5.3 Biosafety Protocol versus trade agreements

With the release of GMOs into the environment and their commercial distribution as food, feed, and derived products, the necessity for a global regulation and oversight of such transboundary movements increased in the early 1990s. Inevitably, such regulation interferes with the unfettered promotion of trade and puts the conflicts between trade and environmental regulation into the spotlight. Developing countries not only feared to become the testing ground for products without prior informed consent⁴⁰, but also that there were no international mechanisms for risk assessment in place, in case countries

39 See WTO (1998). *EC Measures Concerning Meat and Meat Products (Hormones): A Report of the Appellate Body*. WT/DS26/AB/R, WT/DS48/AB/R, 16 January. Available through WTO document distribution facility at: http://docsonline.wto.org/gen_search.asp

40 This happened in 1986 in Argentina, where a US research team tested a genetically modified rabies vaccine without knowledge of the local authorities. See Gupta, A. (2000). “Governing trade in genetically modified organisms: The Cartagena Protocol on Biosafety.” *Environment*. 42, 4, pp. 22-33.

themselves do not have the capacities to evaluate such consequences on environment and human health. The need for an internationally binding Biosafety Protocol was triggered by Article 19.3 of the CBD, to guarantee “*the safe transfer, handling and use of any living modified organism [LMO] resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity.*”

When negotiations started in November 1995, the divide on this matter has never been a clear-cut North/South issue, since agricultural exporters such as Argentina and Chile sided with the USA. Contention arose not only from an inclusion of the PP, but especially from several trade-related issues, such as prior notification. Ultimately, however, both the PP and *Advance Information Agreement (AIA)* were integrated and the CPB was adopted on 29 January 2000 as a supplementary agreement to the CBD. The USA, although it has signed the CBD, has never ratified it. Consequently, the country has not yet signed the CPB either.

While the protocol enjoyed broad international attention up to its finalization, ratification seems to have lost momentum. Of the 108 parties that have signed the CPB, until March 2002 only 13 have ratified it.⁴¹ To enter into force, however, 50 ratifications are needed. The European Commission proposed in February 2002 to implement the CPB into the EU’s legal framework on biotechnology. To support the CPB and its ratification, the *United Nations Environment Program (UNEP)* has launched a \$38.4 million scheme to help establish up to 100 biosafety administrative bodies in developing nations.⁴²

As with other environmental treaties, a contentious issue is the relationship with other agreements, especially those related to trade. Without specifically mentioning any other international agreement, and following the logics of the *Vienna Convention on the Law of Treaties*, the CPB as the more specific and the more recent agreement would be

41 See Cartagena Protocol on Biosafety: Signatures and Ratifications. Retrieved from the World Wide Web 25 March 2002. <http://www.biodiv.org/biosafety/signinglist.asp?order=date>

42 Hodgson, J. (2002). “UNEP ‘Buys Support for Cartagena,’ Say Critics.” *Nature Biotechnology*. 20 (3), p. 205.

superimposed over the WTO agreements.⁴³ It was agreed that the CPB is considered to have equal status with other treaties, such as trade agreements. This critical balance is sketched in the preamble to the CPB: “...*this Protocol shall not be interpreted as implying a change in the rights and obligations of a Party under any existing international agreements.*” Yet at the same time “*the above recital is not intended to subordinate this Protocol to other international agreements.*”

Notwithstanding the equal standing on paper, WTO treaties’ dispute settlement body, which can be used to enforce legislation in court, poses an important practical advantage over the agreements of Rio and the CPB. This right, as the case of BGH has shown, is indeed used in practice and although in this specific case it has not provoked Europe to change its legislation, it provides a huge stick against those countries that are not able to compensate for several hundred million dollars of annual trade sanctions. Last year, U.S. threats of action under the WTO against Sri Lanka led the country to abandon its proposed ban on GMOs, which was to have been implemented in September 2001. This incidence demonstrates the need that Southern countries have for the right to take action when scientific evidence is not yet absolutely certain.

43 See Meyer, H. (2000). The Cartagena Protocol on Biosafety. *Biotechnology and Development Monitor*. 43, pp. 2-7.

6 The Doha declaration and the PP

The declaration adopted at the WTO's fourth ministerial meeting in November 2001 in Doha, Qatar sets the agenda for the upcoming round of trade liberalization talks by the WTO. The relationship between trade and environment was one of the most important issues in Doha. Although work on trade and environment in the GATT/WTO dates back 30 years, the WTO has no specific agreement dealing with environmental issues. This is not surprising, since in its own perception and according to the mandate of the WTO, the organization should not become an environmental agency. Nor should it get involved in reviewing national environmental priorities, setting environmental standards or developing global policies on the environment, which will continue to be the task of national governments and of other intergovernmental organizations.

However, a number of the WTO agreements, such as the TBT and SBS agreements, include provisions dealing with environmental concerns. Furthermore, there are about 200 *multilateral environmental agreements* (MEAs) of which about 20 contain trade-restrictive measures. Examples are the *Basel Convention on the Transboundary Movement of Hazardous Waste*, the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), the *Montreal Protocol on Substances that Deplete the Ozone Layer*, or the CBD.⁴⁴ The principal forum for discussing these issues in the WTO is the *Committee on Trade and Environment* (CTE).

Under the Doha declaration, countries agreed for the first time in the WTO of a significant programme of negotiations on trade and environment. The declaration argues for the elimination of trade barriers to environmental goods and services; ecolabeling and the effect of environmental measures on market access; the reduction in fisheries subsidies; and to clarify the relationship between trade and environmental treaties, such as the TRIPS agreement and the CBD.⁴⁵ The negotiations will also address how WTO

44 United Nations Environmental Programme (UNEP) and International Institute for Sustainable Development (IISD) (2000): *Environment and Trade*. Manitoba.

45 See Ministerial Declaration World Trade Organization WT/MIN(01)/DEC/1. Retrieved from the World Wide Web 19 March 2002. http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.doc

rules are to apply to members that are parties to environmental agreements. The Doha declaration stipulates, “*negotiations shall not prejudice the WTO rights of any Member that is not a party to the MEA in question.*” For instance, regarding transgenic crops, the USA, as the world’s single largest producer and exporter of such GMOs did not sign the CPB. Yet the CPB nevertheless affects the country, because U.S.-based exporters are still confronted with requirements imposed on them by importing countries that are parties to the protocol. For the time being the situation is far from clear. Nevertheless, the conflict between the USA and Sri Lanka shows how pressure is built up by threatening to settle such cases by the WTO dispute mechanism.

Since Doha, the future of the PP within WTO frameworks has been stalled. At the Doha meeting, the USA opposed negotiations to alter Article 20 of the GATT agreement as requested by the EU’s environmental initiative, particularly because of its push for the PP. But the EU also faced resistance from the *Cairns Group* (18 agro-exporting countries including Canada, Australia and Argentina) and developing countries, who oppose environmental negotiations because they fear they could lead to disguise trade restrictions. As a result, the Doha Declaration does not contain direct reference to the PP.

An alternative avenue would be to strengthen the PP via the CTE. Observers have come to the conclusion that Doha has promoted the CTE in its advisory role, but that the text of the Doha treaty lacks authority to true reform on rules.⁴⁶ In the case of CBD principles, it was concluded that such CTE recommendations would have to go a long way before being introduced into the WTO system. The road may be even lengthier for PP regarding biotechnology, since they are not even included in CTE’s negotiation agenda for 2002.

46 Vivas, D. and E. Tuerk (2001). *Treatment of Biodiversity related issues in the WTO: Preliminary Comments on the revised documents for the Doha ministerial conference*. Center for International Environmental Law. Geneva, Switzerland: CIEL. p.6.

7 Consequences for the Johannesburg summit

At the end of March 2002, the agenda for the Johannesburg Summit was about to be finalized. In the preparation paper, linkages between the various international institutions, including the WTO, are scrutinized⁴⁷. The document calls for the implementation of the outcomes of Doha, and among trade-related issues, to address questions regarding the protection of intellectual property on traditional knowledge, improved market access for developing countries, and reduction of agricultural subsidies. Several of them will be subjects of the new trade round that Doha agreed upon. Although there, the relationship between MEAs and WTO rules will enjoy special attention, some NGOs fear that the reference to the Doha Declaration and to the WTO in the preparatory documents will bias the WSSD in Johannesburg and subordinate it to the free trade regime.

What does this mean for biotechnology and the regime on PP? Presently the most urgent task will be to implement the already existing agreements rather than create new legal frameworks. In gearing up for the Johannesburg summit, the call has gone out for the “*ratification and implementation...of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, and provide support for capacity-building to developing countries in dealing with the challenges and opportunities of genetically modified organisms.*”⁴⁸ Both treaties had their respective meetings in April 2002 with moderate progress. The foremost task to strengthen biotechnology-related precaution is still the entry into force of the CPB. Presently, not enough signing parties have ratified it, which puts its legal and political use on hold. While it has been hoped that this procedure will be finished by the Johannesburg summit, this has become doubtful. Yet it may also be that the summit will provide the momentum needed to get the job finally done. A failure on this point would not only be a big embarrassment but also hold back the entire procedure of establishing international precautionary measures regarding biotechnology.

47 Chairman’s Paper (2002). Second Summit Preparatory Committee (PREPCOM 2). 28 January - 8 February. New York: United Nations General Assembly. Retrieved from the World Wide Web 1 March 2002. http://www.johannesburgsummit.org/html/documents/prep2final_papers/conf199pcl1_eng.pdf

48 Ibid.

In sum, new internationally binding agreements can hardly be expected from Johannesburg. The summit will provide a stage for all actors concerned with environment and sustainability to further their goals, but the groundwork will have to be done outside such large-scale events.

8 Perspectives on the PP

Beyond Johannesburg, a lot remains to be done to strengthen precautionary approaches, not only, but especially when applied to biotechnologies. The following outlook starts with those measures within the legal system and in the framework of international treaties. Finally, to come back to the introductory statement about the actors and forces that shape biotechnologies, some light will be shed on the extension of precaution in the broader sense of the international civil society.

8.1 The future of PP in international legal bodies

For the time being, the legalistic status of the PP remains ambiguous. New Zealand invoked the precautionary principle in support of its application to the International Court of Justice to review France's decision to recommence nuclear tests.⁴⁹ The court by and large gave way to France's reply that the legal status of the principle was "uncertain",⁵⁰ whereas Judge Weeramantry in his opinion dissenting from the Order of the Court concluded that the precautionary principle was gaining increasing support as part of the international law of the environment. Similarly, Cameron and Abouchar (1996) came to the conclusion that the PP is too vague to be a principle of law, but that its widespread inclusion into international agreements indicates it is customary law.⁵¹

49 Commission on Sustainable Development (1997). Fifth session 7-25 April. *Rio Declaration on Environment and Development: Application and implementation. Report of the Secretary-General*. E/CN.17/1997/8. New York: United Nations. pp. 22-24.

50 International Court of Justice (1995). *Nuclear Tests Case (New Zealand v. France)*. *Verbatim Record (CR 95/20)*. 12 September. p. 71.

51 Cameron, J. and Abouchar, J. (1996). The Status of the Precautionary Principle in International Law. In: Freestone, D. and Hey, E. (eds.) *The Precautionary Principle and International Law: The Challenge of Implementation*.

Yet the strengthening of precautionary matters may often be an issue of details that do not necessarily entail the entire rephrasing of the legal structures. It could be achieved within environmental treaties as well as within the WTO agreements. Even if the PP is not included in the declaration of Doha, there is ample opportunity for improvement. For instance, the WTO ruling on BGH did not make disclosure of scientific information compulsory (see section 5.2 above). In this regard, the PP could easily be strengthened by requiring that a party that seeks to use trade rules to override health or environmental regulation has to present proof that the substance is safe, at least to a certain minimum threshold, based on scientific evidence.

Since the PP is already included in several bodies of international environmental law, especially those from the 1992 Earth Summit, it would also profit from a strengthening of these treaties with regards to other agreements, especially those of the WTO. One suggestion would be that the Ministerial Conference of the WTO should endorse certain MEAs as the internationally accepted standards in their respective domain. In fact, this is exactly what happened with a non-MEA, namely the Codex, when it was promoted to become the authoritative body for food safety within the WTO. While this example shows that it is in principle possible to overcome the technical details related to combining different treaties, the problems ahead would rather be the spirit of the agreements. And presently it remains far from clear how for instance the CPB could co-exist with the SPS to regulate the export of plants. Hence this is a maximal demand for which many details remain unsolved.

Minimally, however, it should be prevented that WTO bodies overrule MEAs and that the environmental treaties are adequately represented in the development and implementation of the WTO agenda. For this, one practical step would be to grant Executive Secretaries observer status in the respective WTO bodies. This should apply for instance to the CPB to be represented at SPS and Codex. A similar demand already exists for the CBD for observer status of the CBD Secretariat on the TRIPS Council.

Different agendas of the TRIPS agreement and the CBD exemplify similar conflicts between other issues of trade versus environment. For instance, on November 3, 2001, after seven long years of stormy negotiations at the FAO, the new International Treaty on Plant Genetic Resources for Food and Agriculture was finally struck. Although it is far from satisfying, the adopted treaty is to set the rules for sharing, conserving and using the world's crop genetic resources and to limit their patentability.

Another avenue to strengthen environmental law may be to pool different MEAs under the umbrella of one World Environment Organization. Much of the appeal of this approach is rendered by WTO's advantage of having a dispute settlement body. Yet transferring this model to international environmental legislation has its pitfalls. For instance, the WTO dispute settlement mechanism allows for extra tariffs as punitive measures. But how would one retaliate against a polluting nation if reciprocal environmental damage were not an option?⁵² Also, the approach to 'trade in' environmentally detrimental actions is vigorously criticized and is one of the reasons why the negotiations of the Kyoto Protocol for climate change stalled.

Furthermore, there are several institutional problems ahead, for instance to avoid a competition with the *United Nations Environment Programme* (UNEP), or if it might be broadened into a *World Sustainable Development Organization*.⁵³ Ultimately, the most important reason against such an organization might be the general fatigue or skepticism with UN organizations. In the international arena, more flexible compacts are taking over increasing responsibility, for instance for developing drugs and allocating medical resources.⁵⁴

52 Yet imposing punitive tariffs to make countries obey free-trade agreements is a contradiction in itself and is therefore also disputed amongst WTO advocates.

53 For an in depth discussion of a centralized versus function-dependent environmental law see UNU (2002). *International Environmental Governance. The Question of Reform: Key Issues and Proposals*. Tokyo: United Nations University, Institute of Advanced Studies (UNU/IAS). Retrieved from the World Wide Web 25 March 2002. <http://www.ias.unu.edu/binaries/NYPrepComReport3.pdf>

54 See Lehmann, V., 2001: "New models for public-private partnerships in drug development." *Biotechnology and Development Monitor*, 46, 2-7.

Regarding international treaties, one bottleneck will be the position of the USA. When President George W. Bush entered the White House in 2001, his administration abandoned several international agreements, such as the Kyoto Protocol and the Biological Weapons Convention. The attacks of 11 September 2001 made it painfully obvious that the world's wealthiest nation cannot retreat from the outside world. Yet other than coalition building for future military endeavors, recent policy efforts of the Bush administration are dominated by unilateralism. This reaction does not allow for any optimism regarding a more multilateral approach to environmental or trade issues.

Such concerns have been aggravated in Spring 2002, when the USA imposed taxes on imported steel to protect domestic steel producers, which has set the tone for more, rather than less trade conflicts. Interestingly, this latest move reflects that trade and environment *do* form a unit. Now the USA makes it clear that, for trade as for environment, it first and foremost follows its own interests. The conflict therefore does not so much stem from environment vs. trade-related international treaties, but from a US unilateralist position.

The increased tariffs on steel imports may be disputed as good or bad trade policies. They are, however, not within reach of a rational debate of good or bad science. Likewise, environmental concerns and trade law are both connected by intertwined political interests. Considerations of the USA as to whether or not it should confront Europe on GMOs before the WTO dispute settlement body are presently more dominated by trade concerns as a consequence of the U.S. tariffs on European steel and the subsequent retaliation measures than by any new scientific evidence regarding the dangers of GMOs. Ultimately, international law is always subject to political consideration. The decision whether or not to appeal to the WTO for trade law violations is never merely legalistic, but also a matter of political costs for doing so.⁵⁵

⁵⁵ Although several cases of dispute settlement against Europe have gained the largest part of the attention, the USA is often approaching trade problems from a bilateral perspective. For instance, when in June 2001 China imposed new laws governing bio-engineered food imports that would have affected the export of U.S.-GMOs, the USA but successfully bilaterally lobbied for an overhaul of the legislation. In light of the recent accession of China, a direct confrontation in front of the WTO dispute settlement mechanisms would have sent a wrong political signal.

8.2 Precaution through international civil societies

Such political costs are increasingly influenced by the multi-faceted forces of civil societies. Over the years, they have gained weight in different fora and arenas, including, but not entirely relying on international law. In this regard, strategies to strengthen the PP regarding biotechnology can learn from and will build on the struggle around the use of genetic resources and the TRIPS Agreement. When transnational pharmaceutical companies challenged South Africa's right, granted by the TRIPS Agreement of the WTO, to override patents on AIDS drugs, they had to surrender to an international outburst of discontent.⁵⁶

An example of where the precautionary approach has indeed been fruitful, has been the so-called 'terminator technology'⁵⁷ which prevents plants from producing fertile offspring. The campaign to stop the development of this technology has been precautionary in the broadest meaning of the PP. While the technology is still in its infancy, *Monsanto* (USA), one of the largest commercial developers, already had to promise not to commercialize it. Despite legislative loopholes and contradictions – many of the most important biotechnology companies still investigate on similar techniques for seed sterility – global public awareness makes it very unlikely that this technology will reach the market.

The success of this campaign, the transformation of the role of nation-states, as well as the resilience of the USA to abide by international treaties has shed light on different approaches to increase pressure for environmental and sustainable development purposes. Next to the arena of international treaties, it is worth considering if such aims could be promoted more effectively by initiatives to directly approach the private commercial actors. This strategy is pursued within already existing initiatives, such as those against child labor or for fair trade. Presently, a large part of the activity of GMO-critics is directed against *Monsanto* as the most prominent player in agrobiotechnology. For various tactical and strategic reasons, however, a more encompassing aim would be to

56 "Activists jubilant in S Africa drug case." (2001). *Financial Times*, April 20. p. 6.

57 See Lehmann, V.(1998). "Patent on seed sterility threatens seed saving." *Biotechnology and Development Monitor*, 35, pp. 6-8.

approach the entire industry with a positive offer. This is the case, for instance, in the timber industry with a labeling for environmentally sustainable timber production.

As the recently discovered case of transgenic corn DNA crossing into landraces in the center of its origin of biodiversity proves⁵⁸, the application of genetic engineering can have different levels of ecological impact. Calls for a case-by-case assessment of GMOs therefore should not only take into account the technique by which the organisms are altered, but also the geo-ecological environment in which they are released. Ultimately, this translates into sovereignty of countries to decide whether or not to allow the deliberate release of GMO's.

In this regard, there is no alternative to capacity building and efforts of policy makers, international development organizations and donor organizations. All are necessary and welcome. Yet the capability and infrastructure to assess the risk may not necessarily lead to a rejection of advanced techniques. Many developing countries are eager to make use of the new technologies and withholding it from a mere perspective of environmental concern is easily rejected as condescending. For instance Cuba, although widely praised for its efforts in organic agriculture, has also launched an ambitious R&D program on genetic engineering to tackle its agricultural problems.⁵⁹

Ultimately, conflicts about genetic modification cannot easily be analyzed and resolved by pitting 'U.S.-sound-science' against 'European precaution'. In the future, a 'by nature ambiguous' concept like the PP can only play a meaningful role when extended from being simply a tool for risk management to also being an element of risk assessment and risk communication. Only those mechanisms will be successful, which are inevitably both local *and* global, and which acknowledge that it is difficult to find a consensus on the right amount of precaution.

58 Quist, D. and I.H. Chapela (2001). "Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico." *Nature*, 414, November 29. pp. 541-543.

59 Cubans might be the first to eat genetically modified fish. See Lehmann, V. (2000). "Cuba's agrobiotechnology: Diverse agenda in times of limited food production." *Biotechnology and Development Monitor*, 42, 18-21.

9 Appendix

Treaties with provisions for the Precautionary Principle

Rio Declaration on Environment and Development, UNEP, 1992, Principle 15:

“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

Convention on Biological Diversity, UNEP, 1992, 9th preambular paragraph:

“Noting...that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.”

Cartagena Protocol on Biosafety UNEP, 2000, Article 10, Paragraph 6:

“Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of the living modified organism in question...in order to avoid or minimize such potential adverse effects.”

WTO Agreement on Sanitary and Phytosanitary Measures (SPS), Article 5.7

“In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organizations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members shall seek to obtain the additional information necessary for a more objective assessment of risk and review the sanitary or phytosanitary measure accordingly within a reasonable period of time.”