

The Precautionary Principle: Dealing with controversy

by

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International agreements such as the *Convention on Biological Diversity* and its appendix, the *Cartagena Protocol on Biosafety* are meant to settle debates on biodiversity and biosafety. However, the recently agreed CPB cannot be effectively applied without a constructive analysis of underlying controversies about biosafety assessment. The *Precautionary Principle* does not solve these controversies. In fact it depends on the transparency of scientific and public debates.

The Convention on Biological Diversity (CBD) begins its preamble with a general statement about the importance of biodiversity. The Contracting Parties (CPs) declare that they are “*conscious of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components.*” However, this appreciation also raises questions of how to implement the conservation of biodiversity in a complex field of conflicting interests.

The general challenge can be summarized by the question of what knowledge and insight will be necessary and sufficient to preserve biodiversity. Without a constructive analysis of existing scientific and public controversies, the implementation of the CBD and its appendix, the *Cartagena Protocol on Biosafety* (CPB) will be obstructed by recurring stalemates of interpretation.

Article 11 of the CBD states that “each Contracting Party shall, *as far as possible and as appropriate*, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity” (emphasis added). This is obviously a laudable intention but in practice the disclaimer, as well as others in the CBD, leaves considerable freedom of interpretation to the CPs. For an agreement with so many disclaiming qualifications to be effective, it is necessary to limit the freedom of interpretation for individual CPs as much as possible.

Applying the Precautionary Principle

In the preamble to the CBD, the *Precautionary Principle* (PP) is adopted with the statement 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.*” The Contracting Parties to the CBD also acknowledge that they are “*aware of the general lack of information and knowledge regarding biological diversity and of the urgent need to develop scientific, technical and institutional capacities to provide the basic understanding upon which to plan and implement appropriate measures.*” The limited availability of relevant knowledge and insights is a challenge to the practical application of the PP.

The PP may seem to imply that scientific knowledge is not required for its application, but this conclusion is misleading. In practice, the PP can only be triggered when sufficient reason exists to expect that some specific course of action will lead to “*a threat of significant reduction or loss of biological diversity*”. Disagreement is likely to arise about what constitutes a sufficient reason for expecting such a threat. Policy-makers will find that even scientific researchers are in disagreement about a qualified assessment of possible threats to biological diversity. This implies that a method must be found to make these scientific disputes productive for the purpose of applying the PP.

In the scientific literature, there is profound controversy about adequate approaches to biosafety assessment. Some experts claim, for example, that genetic modification is only a more precise, and therefore quite safe, tool for enhancing agricultural crops. Other, equally qualified, experts claim that our present knowledge of genome and ecosystem

dynamics is too limited to even characterize the notion of ‘precision’ in this context.

Against this background of scientific controversy, we cannot expect the CPs to reach agreement without first creating clarity about the research questions that are assumed to be relevant and that constitute the methodological basis for precaution in relation to biodiversity conservation.

Sets of relevant questions

The dilemma underlying the practical application of the PP may be illustrated by the biosafety assessment of *genetically modified organisms* (GMOs). Biosafety experts are divided amongst themselves as to whether the application of GMOs in the field causes “a threat of significant reduction or loss of biological diversity”.

One expert may stress a multitude of possible benefits from GMOs, another expert may underline a number of possible costs. Potential benefits include enhanced food production; reduced use of pesticides; crops with in-built resistance to diseases, insects, drought or frost; biological treatment of environmental pollution; production of medicines etc. However, there is an equally extensive list of potential risks, such as accelerated loss of effective herbicides and pesticides; disturbance of ecosystems; genetic pollution; undesired effects to human health etc. What one expert may consider to be a likely threat, may be qualified by another expert as a merely hypothetical risk. On what basis can we consider either one of these expert views more legitimate than the other in a specific context?

This dilemma of scientific legitimacy is at the basis of any practical application of the PP and it also affects the implementation of the CPB. At the present stage of biosafety research it is critical to create an overview of the research questions that may be considered relevant for making sensible decision about the applications and products of biotechnology.

This inventory of relevant research questions may address such diverse issues as the susceptibility of non-target organisms and possible consequences for biodiversity as well as the expected contribution of genetic engineering to sustainable development. The availability of such *sets of relevant questions* (SRQs) for specified purposes would be an important step forward.

The urgent need for such clarity may be illustrated by the frequent use in biosafety controversies of generalizing analogies in order to represent problem definitions. Those stressing the possible risks of biotechnology often use the analogy of negative experiences with the introduction of exotic species in an ecosystem. Examples include the introduction of rabbits into Australia and the spread of the water hyacinth in Africa, threatening biodiversity and the social-economic interests of local populations by the disruption of ecosystems.

Those highlighting the possible benefits of biotechnology, on the other hand, tend to rely on familiarity with previous experiences in agricultural domestication. Their preferred analogy is that of centuries of development in ‘traditional breeding’ as an agricultural practice. In this view, modern biotechnology on the basis of genetic modification is essentially a more precise continuation of a practice that has always been part of agriculture.

While the latter analogy suggests that genetic modification is not expected to lead to “a threat of significant reduction or loss of biological diversity”, the former analogy implies one should be concerned about unexpected and unwanted effects.

How can these recurring and contested analogies, with their associated problem definitions, be made productive in the policy process? In their present form they will do little to advance the debate since the opposing viewpoints lack specificity and effectively obstruct the creation of transparency. Such generalizing approaches will promote the continuation of controversy and opposition. To overcome this stalemate, debate conditions should be created in which conflicting viewpoints can contribute to the necessary transparency and learning processes. The alternative analogies need not reflect an *either/or* evaluation, but can represent sources of inspiration for an *and/and* format of understanding ([see box 1](#)). This inclusive approach implies that other contexts of experience may also be used as sources of inspiration for transparency in biosafety assessment.

The complementing SRQs that may thus be specified can be used as separate *windows of concern* (WoCs) for the purpose of biodiversity conservation. These SRQs and the associated WoCs can be used as pragmatic tools that together may contribute to the required transparency on the possible effects of modern biotechnologies. The scheme provides an abstract presentation of a learning mechanism in which contested problem definitions can be brought together and compared in the form of specified research questions that are assumed to be relevant for a specific purpose of investigation.

By building an inventory of possibly relevant research questions for a biosafety assessment, and by focusing discussions on effective problem definitions, it will become possible for all stakeholders with their own respective interests to contribute to the required transparency. By representing opposing viewpoints in terms of underlying concerns and implied SRQs, existing controversies may be made constructive sources of insight for the purpose of biodiversity conservation ([see box 2](#)).



The abstract representation of two complementing *Windows of Concern* on the basis of *Sets of Relevant Questions*, illustrates how existing controversies about sufficient problem definitions may be used in one more inclusive discussion. It shows that alternative analogies can reflect *and/and* concerns instead of *either/or* concerns.

Protection or protectionism?

Another problem lurking beneath the surface of the CPB is the potential conflict of interest between environmental protection and economic protectionism. Too much caution on the side of environmental protection, for instance, could lead to economic protectionism if a country uses biosafety concerns to justify banning a product. Both from the point of view of WTO agreements and of the CBD and the CPB, the balance of decision making will be decided by the use of sufficient and reliable knowledge. Article 15 of the CPB specifies that “risk assessments undertaken pursuant to this Protocol shall be carried out in a scientifically sound manner.” Similarly, in relation to the *Sanitary and Phytosanitary Measures* (SPS) of the WTO from 1995, it is stressed that measures to ensure food safety and to protect the health of animals and plants should be based as far as possible on the analysis and assessment of objective and accurate scientific data. Both agreements refer to sound science or reliable research as a prerequisite for legitimizing protection as well as for safeguarding against protectionism. The SPS is critical of claims on possible threats to biodiversity conservation, stipulating that “members shall ensure that such measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary level”. In the CPB, countries are protected against each other with regard to the possibility of endangering biodiversity.

How can the precautionary principle be balanced with free trade as a concern of the WTO, given the overarching objective of preserving biodiversity? An important consideration in striking this balance is the fact that such treaties have first and foremost a legal status within international law. The objective is to create legal protection between the CPs. The countries become liable to each other by agreeing to the text, and can be held to that. The focus is much more on legal liability than on the scientific methodology that underlies a specific decision.

To give a legal agreement the necessary impact, however, effective mechanisms for ‘finding truth’ and thus of evaluating the factual or scientific status of a treaty are also necessary. A legal treaty gives instructions for the practical usage of established facts, but it does not give instructions for the assessment and interpretation of the scientific status of these facts. This becomes a problem in cases where there is controversy about the methodological status of claimed facts.

Transparency requires an effective learning structure

The CPB expresses an intention to apply the precautionary principle. At the same time, the PP is at risk of becoming an

empty legal shell as long as it is not supported by an effective mechanism for the assessment of possible undesirable impacts on biodiversity. Without such a learning mechanism it will continue to be possible, for example, to dismiss protective measures as unwarranted attempts at protectionism. European concerns about adequate biosafety policies have already generated threats of legal action from the United States.

Included in the CPB is the agreement to support a special *Biosafety Clearing-House* (BCH, [see also the article by Meyer](#)) mechanism as part of the general clearing-house mechanism under the CBD, which aims to:

- “facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms; and
- assist Parties to implement the Protocol, taking into account the special needs of developing country Parties, in particular the least developed and small island developing States among them, and countries with economies in transition as well as countries that are centres of origin and centres of genetic diversity.”

The BCH is still at an early stage of development and may evolve into a substantial tool for reaching the objective of biodiversity conservation. This will depend on the methodological format it selects to deal with conflicting expert opinions.

In its present format, the clearing-house mechanism does not effectively address the existence of scientific controversies about biosafety assessment and as such it does not provide an effective learning structure to enhance transparency. This implies that it now fails to sufficiently facilitate the international process of finding a precautionary balance between stressing the costs and stressing the benefits of biotechnology by taking both seriously. The proposed learning structure - on the basis of complementing concerns as specified by the associated SRQs - can be applied to enhance the required transparency in the scientific and public debates that are now developing in national and international arenas.

The CPs have agreed to stimulate public consciousness, and the open availability of information. The CPB stresses the importance of providing suitable facilities for this purpose. Article 23 of the CPB deals with “Public awareness and participation”, and stipulates that the Contracting Parties shall: “promote and facilitate public awareness, education and participation concerning the safe transfer, handling and use of living modified organisms [...]” and “the Parties shall, in accordance with their respective laws and regulations, consult the public in the decision-making process regarding living modified organisms and shall make the results of such decisions available to the public.”

An important practical challenge to the creation of policy transparency is the fact that the scientific knowledge centres are mainly located in the industrialized countries, whereas the greater part of the biodiversity to be protected is located in developing countries. This discrepancy has to be bridged by cooperation and by the use of an accessible international infrastructure from which less privileged countries can also benefit in their decision-making.

As an initial step towards meeting this challenge it will be useful to start developing an inventory of relevant research questions. This will enable all stakeholders to share their concerns and to take advantage of other viewpoints in the process of informing their own perspectives. The history of environmental awareness can be written as a history of newly raised questions which were found to be relevant for sustainability.

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A forum for relevant questions: SRQnet

To avoid the stalemates of existing controversies and to make the diverse contested problem definitions productive, an internet facility has been started in which concerns about biosafety assessment and biodiversity conservation can be shared as specified research questions with a concise argument for their relevance. This facility is intended as a resource for all who wish to express their specified concerns and for all who wish to compare their own problem definitions with developing scientific and public insights. It is located at <http://www.SRQnet.nl>.

The SRQnet does not provide room for generalizing opinions, nor does it intend to create consensus. It is a virtual forum to enhance transparency in the form of specified relevant questions, which may be consulted as well as contributed. Debate in this format focuses on the relevance of individual research questions, making it possible to exchange insights without hitting upon paralyzing stalemates. SRQnet is dedicated to mediating in ongoing controversies that may stand in the way of biodiversity conservation and sustainable development.

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