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The Convention on Biological Diversity: A Viable Instrument for Conservation and Sustainable Use?

G. Kristin Rosendal

Introduction

The International Convention on Biological Diversity entered into force on 29 December 1993, having achieved the required thirty ratifications three months earlier. This article traces the main challenges in the process leading to the BioConvention, and examines whether some of the same stumbling-blocks may reappear further along the road. An essential controversy revolves around wildlife and habitat *preservation* versus *utilization* of biological diversity. This is inherently linked to the dispute over property rights to genetic resources. I will examine this conflict, and then follow the debate on property rights through those international forums in which it has been most prominent: briefly reviewing the debate in the United Nations Food and Agricultural Organization (FAO) and the General Agreement on Tariffs and Trade (GATT), and more extensively covering the negotiation process and the signing of the Convention on Biological Diversity in Rio de Janeiro. Finally, I will consider the remaining challenges and future prospects for the BioConvention, focusing on three topics: (1) the articles in the Convention concerning biotechnology and intellectual property rights; (2) how the developing countries might use the framework of the BioConvention to improve their bargaining position with a view to biodiversity prospecting deals; and (3) the prospects concerning the financial mechanism (GEF). First, however, a brief introduction to the nature of the problem as well as its historical background is in order.

Biological diversity is a broad concept, embodying as it does the variability among all living organisms, including diversity within species, among species, and among ecosystems. Genetic resources are the hereditary material (genes) in all animals, plants, and micro-organisms; the concept refers to genetic material with actual or potential use or value for humanity. Genetic diversity or variability is a necessary condition to sustain vitality in both wild and domesticated plants and animals, and also for the development of new and improved products.[1]

The conservation of biological diversity constitutes one of today's greatest challenges, as environmental degradation world-wide has led to species extinction at a hitherto unprecedented rate. Estimates of the number of existing species in the world vary from about 5 to 100 million,[2] of which only some 1.4 million have been described scientifically.[3] As the new biotechnologies make it possible to utilize the full potential of the world's genetic resources (it is now possible to transfer any gene into any organism), the economic incentive to conserve biological diversity increases.[4] Hence, the interest in genetic material is arising from environmental concerns, as well as being based on technological developments. By the year 2000 farm-level sales of products of agricultural biotechnology are expected to have reached some US$100 billion; the value of global trade in plant-based pharmaceuticals was estimated at US$20 billion for the year 1986.[5] Apart from the ethical and aesthetic value of species diversity, we should note that mankind depends on genetic resources for food, medicines, and for raw materials in the chemical industries.

The international debate on genetic resources is concerned not only with conservation, but just as much with the distribution of benefits derived from using this material. The main bulk of the global genetic resources is found in the Third World, but it is the developed countries that possess the (bio)technology to exploit these resources. This potential conflict was realized by the World Commission on Environment and Development which urged: 'Industrialized nations seeking to reap some of the economic benefits of genetic resources should support the efforts of the Third World nations to conserve species' and 'developing countries must be ensured an equitable share of the economic profit from the use of genes for commercial purposes'.[6]

The BioConvention is not the first international treaty to address species or habitat conservation, but it is the first to address conservation of all biological diversity and the first to include sustainable utilization of these resources. There exist a great many agreements pertaining to international co-operation on the conservation of various species of plants and animals and their habitats. The Ramsar Convention on Wetlands is one of the most important global measures concerned with habitat protection (Ramsar, 1971). For the Arctic area, there is the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR, Canberra, 1980). Whales (ICRW, Washington, 1946) and tuna (ICCAT, Rio de Janeiro, 1966) have their own Conventions. Another example is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Washington, DC, 1973).

Until the early 1980s the focus for both national and international conservation work was still on wild species of plants and animals. An important shift came when the question of access to and control over plant genetic resources was raised by governments of the developing world. The forum for this heated debate was the UN Food and Agricultural Organization (FAO); the result was the FAO International Undertaking on plant genetic resources, then representing the most comprehensive agreement in terms of linking genetic resources conservation to social and economic concerns.[7] In 1989 the UN Environment Programme (UNEP) was given the formal mandate of negotiating what was to become the all-encompassing Convention on biological diversity, which was adopted in Nairobi in May and signed in June at the 1992 UN Conference on Environment and Development in Rio de Janeiro.[8] A first crucial question was whether to include both wild and domesticated species. In the background lurked the question of property rights to genetic resources.

Genetic Resources: Properties and Property Rights

Genetic resources are generally defined as genetic material of actual or potential value.[9] The world's genetic resources are raw materials for biotechnology. With the advent of the new biotechnologies has come an increased realization of the value of genetic resources. In the 1970s the transnational seed and chemical corporations started applying these new technologies in plant breeding and agrochemicals, and in the course of the 1980s the biotechnology industry grew big. This realization has had a profound impact on the understanding of property rights to genetic resources. The story begins with the principle of a common heritage of mankind and ends with patents and state sovereignty.

Common property resources are usually defined by their character of non-rivalry and non-exclusiveness. Non-rivalry implies that it is possible for more than one person to use or consume the good without diminishing the amount available to others. Non-exclusiveness indicates that it is hard to exclude others from using or consuming the good. The air we breathe is generally regarded as an example of a non-rival and non-exclusive good. This used to be the case with clean water as well, but its character of non-rivalry is rapidly declining in many parts of the world. The combined case of non-exclusiveness and rivalry may give rise to problems of collective action, unless some kind of management regime can be established to control access to the resource in question.[10]

Basic to the idea of common heritage is always an element of non-exclusiveness or open access: the absence of well-defined property rights. This was the case with ocean fisheries in the past century, in the Grotian doctrine of the freedom of the high seas.[11] Common heritage, however, is not necessarily identical with the idea of open access as practised under the high seas doctrine.[12] Open access merely implies that no one can be excluded from using the resources, save by lack of economic and technological capacity. Conversely, the common heritage principle may imply that everyone (all mankind) has a right to benefit from exploitation of the resources.

In international negotiations the common heritage principle was first introduced at the UN Conference on the Law of the Sea (UNCLOS) in 1967 by the Maltese ambassador to the UN, Arvid Pardo, as a guiding principle in governing the exploitation of minerals on the deep sea-bed. Both in the UNCLOS negotiations and later in the Antarctic Treaty negotiations, the idea was to secure greater equity between developed and developing countries in the exploitation of a 'common' resource. The majority of industrialized states objected to the principle as being legally diffuse and practically impossible.

All along, however, the principle of common heritage did constitute the international regime for exchange of and access to plant genetic resources, in other words, seeds. International gene-banks were stocked with seeds from the most commonly used food plants, these seeds were primarily collected from the extensive variation found in the Third World, and the gene-banks were based on the principle of open access. 'Technically', the collection of seed samples was considered by all as a non-rival and non-exclusive activity. Moreover, no one questioned this practice on moral grounds, as the seeds of our most utilized food plants were seen to be of basic significance to all mankind.

While most gene-banks still operate on the basis of open access to genetic resources, the common heritage regime for genetic resources is rapidly becoming a thing of the past. This change may be traced back to the 1930s, with the introduction of hybridization, tailored to secure exclusive rights to superior plant varieties. More recently, the regime change has come about swiftly, primarily as a reaction to the introduction of intellectual property rights for organic material, which allow private ownership to genetic resources through patents or plant breeders' rights. Prior to this development it became necessary to change, or rather reinterpret, national patent laws.

The moral notion that food and medicinals should be excluded from patentability because of their fundamental importance to basic human needs is rapidly losing ground. On the other hand, there have also been technical barriers to patentability. National and international patent legislation draws no a priori distinction between various sectors of technology. Traditionally, it is true, the patent system was limited to technologies dealing with non-organic material.

Biological material was regarded as natural products rather than industrial products—discoveries rather than inventions.[13] Biological products or processes were originally excluded from patentability on the grounds that such inventions could not meet all the requisite patent criteria. For an invention to be patented, it must meet four fundamental criteria. First, the invention must be novel, meaning basically that it has not been published anywhere before. Secondly, there is the criterion of non-obviousness—the invention must display an inventive step. The third criterion states that the invention must have an industrial application—a practical utility. One function of this utility requirement is to distinguish between basic research, considered to belong to the public domain, and applied technology, which is eligible for patenting. Finally, the patent application must fulfil the criterion of reproducibility, in the sense that it must describe the invention in such detail that other experts may repeat the experiment and arrive at the same results. In addition to these criteria, patent legislation commonly excludes from patentability inventions whose utilization would run counter to 'public order or morality'.

The barriers represented by these patent criteria have now been largely overcome by developments in the new biotechnologies. These developments have not only made patenting a practical possibility: they have also created a need for it, from the perspective of the US, Japanese, and West-European biotechnology industries. Research in biotechnology often involves high costs, as compared to traditional breeding methods. Competition is fierce, and research is increasingly being carried out by the private sector. The biotechnology sector has been arguing strongly for compensation in terms of royalties, along the lines of other fields of technology.

The principal ruling on the patentability of biological material appeared in the German Federal Supreme Court in 1969 (the Red Dove Case), which determined that a breeding process for animals was indeed patentable.[14] In the Chakrabaty Case of 1980 the US Supreme Court of Justice decided, by five against four, to allow industrial patents for naturally occurring living matter, including both asexually and sexually reproduced plants.[15] A judge from this case was later employed by the EC Commission in drawing up its formulation of a directive on industrial patents in biotechnology.

Plant varieties can be protected by 'plant breeders' rights', as under the US Plant Variety Protection Act of 1970. Intellectual property rights may also be granted through the 'plant breeders' rights' of the 1961 UPOV Convention (the Union for the Protection of New Varieties of Plants). In order to be subject to UPOV protection, a plant variety must be 'uniform, stable and distinct from existing varieties'. In order to attain protection by breeders' rights or patents, some kind of systematic breeding is required. This is seldom the case with Third World breeders' lines, however.

This controversy is not confined to the agricultural sector. There is a growing awareness that the largely unexplored components of biodiversity may conceal treasures, for example, of great medicinal value. A much-cited case from medicine is the Rosy Periwinkle, a native plant of Jamaica and Madagascar. Two components from the plant have been turned into a medicine for treatment of Hodgkin's Disease and certain types of leukaemia by the US pharmaceutical firm Eli Lilly. The company's annual return on the invention is about £60 million, none of which is returned to the country of origin.[16]

As patenting was catching on rapidly in the industrialized world, the governments of developing countries started to question whether the common heritage principle would eventually apply solely to resources from the South. They reasoned that the elaborated material of the industrialized countries was based largely on material from the South, and should thus also be seen as part of the common heritage. This view met with strong resistance from the industrialized countries, who argued that such an arrangement would not be compatible with Northern 'breeders' rights' and patent legislation.

Third World governments abandoned the claim for an all-embracing common heritage regime and turned the argument around. Their new line of argumentation was to claim *national sovereignty* over their genetic heritage, regarding it as a national asset along the lines of other natural resources, like oil and minerals. Genetic resources differ, however, from oil and minerals in being non-rival and largely non-exclusive goods. Nor is species distribution necessarily confined to national borders. These characteristics will obviously hamper state control over genetic resources. Nevertheless, national sovereignty ended up as the only passageway for reaching consensus about property rights between the North and the South.

The next section traces this international debate through the international forums in which it took place during the 1980s and early 1990s.

International Cacophony

FAO and the Undertaking for Plant Genetic Resources

The issue of control and access to genetic material was first put on the FAO agenda by Mexico in 1981. Third World governments and NGOs started questioning the one-way, free-of-charge flow of genetic resources from the South to the North.17 This resulted in, among other things, a non-binding International Undertaking and a Fund for Plant Genetic Resources.

It was seen as a great victory for the developing world

when the Undertaking of 1983 laid down the principle that *all* categories of plant genetic resources should be subject to free exchange for exploration, preservation, evaluation, plant breeding, and scientific research. Article 1 of the Undertaking declared that genetic resources were the 'heritage of mankind and consequently should be available without restrictions'. Responding to the emerging regime of intellectual property rights, however, an *Agreed Interpretation* of the Undertaking was signed in 1989. With regard to elaborated material subject to legal protection under national legislation, this material was to be made available 'on mutually agreed terms', according to the reinterpreted Undertaking. Basically, such 'mutually agreed terms' signify an acceptance of payment for legally protected varieties. Since the Agreed Interpretation regarded intellectual property rights as compatible with the Undertaking, the developing countries abandoned the 'common heritage of mankind' strategy.

The main idea of the FAO Fund for Plant Genetic Resources is crystallized in the concept of 'farmers' rights', meant to represent a counterpart to 'plant breeders' rights'. The Fund aims to provide compensation for 'the enormous contributions generations of farmers have made to the conservation, selection, domestication and development of plant genetic resources. If breeders, who provide the finishing touches to this process, can secure a title and handsome profits for their efforts, then the farmers too should receive compensation . . .'.[18] The promotion of this idea can be credited largely to the International Coalition for Development Action (ICDA), an NGO which played a central role in informing developing countries about their common interests and thus facilitated the maintenance of a strong Third World alliance.[19]

The fact that 'farmers' rights' was put on the agenda and achieved consensus is still regarded as a Third World victory. To date, however, the concept has had little practical effect. This may primarily be put down to the inability of the FAO Fund to attract funding, basically due to widespread scepticism about FAO among donor countries. Another explanation may be found in the difficulties inherent in applying the concept to practical policy. First, there is the problem of tracing the 'contributor' to whom compensation should be made. These plant genetic resources have not been subject to systematic breeding, and rarely fulfil, for example, the UPOV criteria of stability and uniformity—on the contrary, their greatest value lies in their evolving diversity. Over the years seeds have crossed so many borders and been developed in such diverse parts of the world that such a system would be hard to design, let alone administer. As the FAO Global System on Plant Genetic Resources was not cast in a legally binding mould, the parties are presently discussing whether to include relevant parts of it in protocols under the BioConvention.

Trade-Related Aspects of Intellectual Property Rights (TRIPs) in GATT

While the developing world seemed to find approval for some of its argumentation in FAO, the issue was dealt with in a somewhat different manner elsewhere. Although Third World governments may have achieved some kind of stronghold in international development assistance agencies, industrialized countries generally dominate the forums on economy and trade. Most significantly, questions concerning the widening scope of industrial patents were brought up in the Uruguay Round of TRIPs in GATT.

This discussion soon became one of the fiercest arenas for the North–South patent controversy. The USA, Japan, and the EC advocated the principle that all countries should provide and respect intellectual property protection in all technical fields—including biotechnology. Disregarding this principle would constitute a contravention of GATT regulations, making the offending country liable to economic sanctions.

Third World governments have been strongly opposed to these proposals, maintaining that patents benefit those states that are already technologically and economically strong.[20] This is a point hard to refute, as Third World countries hold no more than 1 to 3 per cent of all patents world-wide.[21] In the initial rounds, India argued against patenting of plant and animal varieties as well as food and pharmaceutical products, citing concern for basic human needs.[22] For a great many developing countries this is not merely a matter of contesting theoretical principles. With the introduction of industrial patents, access to improved breeding material may be hampered, as prices for seed increase.[23] Some fear that patents will place constraints on technology transfers in general. As the Uruguay Round drew to a close in December 1993 most Third World delegations had resigned, but grass-roots organizations were still mobilized in large numbers: Indian farmers, Latin American pharmaceuticals manufacturers, and Guyami Indians demonstrated in Geneva against the patent regime proposed in GATT.

The opposition has had some success in GATT. The final agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), grants the parties the right to exclude from patentability (a) diagnostic, therapeutic, and surgical methods for the treatment of humans and animals, and (b) plants and animals other than micro-organisms.[24] The parties are bound to introduce some kind of intellectual property rights for plants, however, as TRIPs require members to provide for the protection of plant varieties, either by patents, or by an effective *sui generis* system.

The latter part of the TRIPs agreement has prompted the farmers' movement in India, among others, to propose that such a *sui generis* system should focus on the rights of farmers in protecting and improving plant genetic resources:

'Common Intellectual Property Rights.'[25] As to whether the new GATT regulations on patenting will have harmful effects for Third World farmers, the answer is probably no, in the short-term. The inherent threat in the expanding patent legislation—that farmers must pay royalties for reusing seeds—is still a long way from being enforceable. A far more harmful effect of the GATT patent regulations is that they bolster a North–South conflict line in an issue-area where common solutions and co-operation are of paramount importance.

The BioConvention: Negotiation Process

The BioConvention was negotiated by a UNEP *ad hoc* Working Group of legal and technical experts, which later changed its name to the Intergovernmental Negotiating Committee (INC). The first meeting in the *ad hoc* group drew experts from twenty-five countries, as well as some NGO observers (including the World Conservation Union (IUCN) and World Wide Fund for Nature (WWF) and IGOs (such as FAO). The number of delegates expanded rapidly. Negotiations started in November 1989, and the BioConvention was signed by 153 countries and the European Community at UNCED in Rio de Janeiro on 5 June 1992.

When the issue of biodiversity was first moved to UNEP several parties suspected that this was in fact an attempt to un-link the politicized plant genetic resources debate in FAO from the more traditional values of wildlife conservation in protected areas. That is exactly what it was: an attempt, led by the USA and the IUCN, to retain a focus on *in situ* conservation, rather than tackle the controversial issue of 'sustainable use of biological resources'. Their fears were legitimate enough, as linking these packages would clearly cause hotter negotiations. The USA hoped that the move to UNEP would quench the fire, and refused to include any mention of biotechnology or to talk about the value of genetic resources. Obviously, the controversy concerning conservation and sustainable utilization of biological resources was further fired by the consequences this would eventually have for financing: first, because putting a price-tag on biodiversity might disclose how profits in the agricultural and pharmaceutical sectors in the North are extracted from genetic resources from the South. Secondly, because the new perspectives draw attention to biodiversity in a much wider sense and could lead to stricter regulations on agricultural and forestry practices in all parts of the world.

Environmental and wildlife management NGOs like IUCN and WWF feared that no conservation agreement would in the end be reached, either for wild or domesticated species, if the latter was to be included in the negotiations.[26] Hence, the first IUCN draft convention presented to the participants reflected the Western traditions of nature conservation in full. The role of IUCN was also symptomatic of the NGOs represented as observers in the UNEP negotiations. These were mainly concerned with habitat and species protection, rather than what had been the case in FAO, where the International Coalition for Development Action (ICDA) helped to advocate the interests of Third World farmers.

The UNEP agenda was characterized by a high degree of flexibility, and participants kept adding on new elements. Nevertheless, for a long time the agenda was dominated by a focus on protecting biological 'hot-spots' like tropical rainforests and other places of high biological diversity. It was primarily the Nordic delegations which emphasized the development aspects and an improved utilization of resources as a means to provide incentives for better conservation of natural species or habitats. They also stressed that biodiversity conservation is essential in all countries, regardless of the number of species—thus trying to counter the bias towards tropical forests. Eventually the developed countries realized that putting off these issues would mean that the developing countries, especially countries like Brazil and Malaysia, would not join the BioConvention. And, as the main bulk of biodiversity is located in the tropics, negotiations simply could not proceed without them.

The BioConvention: Negotiation Output

As of June 1994 the Biodiversity Convention has been signed by 167 states and the European Community, and has been ratified by sixty-four. The objective of the Convention is twofold:

- to ensure conservation and sustainable use of biological diversity; and
- to promote a fair and equitable sharing of the benefits arising from the utilization of genetic resources.

The Convention sets out obligations and objectives for nations to combat the destruction of plant and animal species and ecosystems. Among other things, the Contracting Parties shall integrate conservation and sustainable use of biological diversity into relevant sectoral plans and policies and develop systems of protected areas. The international community is given the responsibility for conserving biodiversity in developing countries, including the most environmentally vulnerable, such as those with arid and semi-arid zones, and coastal or mountainous areas. Each Contracting Party is to present reports on the measures it has taken towards implementing the provisions of the Convention and how effective these have been in meeting the objectives. It is left to each Party to decide on which measures are most effective to conserve biodiversity. Furthermore, the Contracting Parties agree to respect, preserve, and maintain knowledge and practices of indigenous and local communities, and encourage the equitable sharing of the benefits arising from

the utilization of such knowledge and practices.

The BioConvention states that each country has the sovereign authority to determine access to its genetic resources, that access to genetic resources requires prior informed consent and must be on mutually agreed terms, and that a country providing genetic resources is entitled to benefit from the commercial use of its resources. The Convention envisages three basic mechanisms by which a country may benefit from the use of its genetic resources: participation in the research using the resources, receiving technology which embodies or utilizes the resources, and sharing the financial benefits realized from commercial exploitation of the genetic material or resource. This sovereignty does not include genetic material in international gene-banks which was collected prior to the Convention entering into force.

In Article 39 the Global Environment Facility (GEF) of the United Nations Environment Programme, the United Nations Development Programme, and the World Bank is accepted as the interim financial mechanism of the Convention. It is up to the Conference of the Parties to decide on policy, programme priorities, and eligibility criteria relating to access to the financial mechanism.

As far as patenting is concerned, the Convention stipulates that technology transfers 'shall be provided on terms which recognize, and are consistent with, the adequate and effective protection of intellectual property rights'. Seeking to reconcile the conflicting interests in the patent issue, the BioConvention states that the Contracting Parties shall co-operate to ensure that intellectual property rights *'do not run counter to its objectives*' (emphasis added). This sentence was one of the main reasons why US president George Bush refused to sign the BioConvention in Rio. Moreover, this is still a major concern with the current Clinton administration, as the decision to sign the Convention was followed by an interpretative statement addressing intellectual property rights as well as the provisions for financial mechanisms.

As regards links to biotechnology, the final version of the Convention also sought to smoke out another controversial issue. As the USA was fervently opposed to international regulations on 'living modified organisms resulting from biotechnology', it was left to the Parties to consider the 'need for, and modalities of' a protocol on biosafety in the future.

The BioConvention: An Assessment

Before considering the remaining challenges and future prospects of the BioConvention, a brief assessment of the negotiation output is in order: how was it possible to reach agreement on this Convention in spite of the high conflict level?

Negotiations at the international level are inherently riddled by the lack of authority to implement mechanisms for control and sanctions. Consequently, unless the parties involved feel comfortable about the solutions, there is always the chance that they may opt for free-rider strategies (according to which the optimal situation is that in which everybody contributes, except themselves). According to current theories in political science some of these shortcomings of the international system may be mitigated by designing well-functioning forums for negotiations, geared towards achieving agreement from relevant parties.[27] Lacking this, formal decisions will be of little effect in the implementation phase. If the parties do not regard rules and regulations as legitimate, they cannot be counted on to comply with them.

Concerning the negotiations leading up to the BioConvention, a striking question is how could the parties manage to achieve consensus in the face of what were apparently insurmountable differences. One external complicating factor here was clearly the ongoing and contrary process in GATT. Three factors seem to have encouraged consensus. First, the negotiation forum itself may be credited for some of the success. As the negotiations proceeded, the UNEP secretariat was able to integrate controversial items, one after another, into the agenda. Thus, the conflict level was raised, but in order to secure the agreement of all relevant parties (especially the multi-diversity tropical countries) this was accepted as a necessary move. Secondly, as June 1992 and UNCED were approaching, the chairman of the Intergovernmental Negotiating Committee and the executive director of UNEP set up small working groups focused on reaching consensus on the issues still remaining.[28] This may also have boosted the overall contractual environment. Thirdly, the Nordic countries maintained the confidence of the developing countries, and helped to present several compromise formulations which seem to have played an important role in conciliating the parties.

The final Convention does represent a delicately balanced package deal with many relatively vague formulations. The real test of its success will obviously come in the implementation phase. Only then will it be possible to determine with greater certainty whether the new bio-regime may be successful in appeasing the underlying conflicts, or whether the Convention will become a useless international instrument for affecting state behaviour. This is not to say that evaluating the implementation phase will be a straightforward matter: The objectives of the Convention do not include any tangible standards for measuring activity. Hence, any conclusions regarding improvement of conservation efforts and improved equality in sharing will have to be approached in a qualitative manner. The next section will look at some of the major leads which may affect future developments.

Remaining Challenges and Future Prospects

The BioConvention and the Biotechnology Industry

One crucial test for the future implementation and development of the BioConvention is probably linked to whether industrialized states regard the treaty primarily as a threat or as a possible advantage for their growing biotechnology industries. The USA has signed but not yet ratified the Convention, although it is expected to do so shortly in order to attend the first meeting of the Conference of the Parties in November/December 1994.

Let us look at the US behaviour as a test case. The US government is still fighting the BioConvention on several important points. First, its ratification will be accompanied by a statement of interpretation, seeking to tone down any articles that may seem to put restrictions on biotechnology industry. Such statements are not uncommon in international treaties, but in this case it may have the serious effect of upsetting the delicate equilibrium of the BioConvention. Secondly, the US government is still arguing against a protocol on biosafety. While the USA was alone in this argumentation initially,[29] it now seems that others may follow. The Convention parties are split as to whether to aim for non-binding guide-lines on biosafety or a legally binding protocol.[30] The need for a biosafety protocol stems from the realization that environmental consequences of releases of genetically modified organisms are non-reversible and unpredictable. It is feared that strict regulations at 'home' may lead transnational corporations to use developing countries, where legislation and the administrative capacity are weaker, as testing grounds.[31]

Despite these controversies, the US government seems willing to ratify the BioConvention. Why? First, explanations may be sought by applying a power-based, cost\benefit analysis of US policy, looking at how it deals with the possible threats and advantages in the Convention: the reinterpretative statement may thus be seen as a way to circumvent the perceived threats in the BioConvention; that is, refuting the costs which the USA fears might be put on its biotechnology industries, while retaining the benefits associated with the Convention. In this perspective the USA is powerful enough to get away with this policy, as no other state can pressure it to ratify the Convention as it is.

This approach does not, however, explain why the USA should bother to ratify. If the power-based explanation were taken to its logical extreme, the USA might as well do without an international convention on biological diversity. The crucial point is what indeed are the benefits of the BioConvention to the USA, as well as other powerful industrialized countries. The major benefit seems clear enough: 'access to genetic resources.' At face value, this could mean that our structural power perspective might still hold: the gene-rich developing countries have greatly increased their power, to the extent that they are able to pressure the USA into the fold (see, for example, the case of Venezuela in the next section). In a short-term perspective, however, with free access to genetic material in most of the world's gene-banks, this is hardly an adequate picture of the power relations between gene-exporting and gene-importing countries. Rather, a major benefit of the BioConvention seems to lie in gene-importing countries being accepted as legitimate partners in international transactions with genetic resources. Thus, the Convention may come to have some influence as an international instrument for affecting state behaviour. If the US government chooses to ratify, this implies that it does not appreciate the idea of being (solely) left out of the international agreement. It would hurt its 'green image' as well as leaving it with no possibility of making an impact on further developments of the Convention.

This would seem to go some way towards explaining why the US government may choose to ratify—but not fully why it was so reluctant to sign in the first place. While the 'real' benefits of the Convention may not be explicitly realized, there may also be reason to believe that the threats have been exaggerated.[32] At the May 1992 meeting where the BioConvention was adopted, the US negotiating delegation hoped and believed that the Convention would prove acceptable to the US government. One week later, however, the Bush Administration backed out in Rio. This may partly be explained by a 'contextual interpretation': the combined effect of the formulations in the BioConvention became too much for the Bush Administration, even though it might have been willing to swallow each article separately (UNCLOS is an example of this same phenomenon).

Part of that explanation may also be found at the domestic level.[33] First, there is the US bureaucratic style in dealing with international agreements. Typically, the US government is very cautious in committing itself to international agreements, but once it has done so it has a relatively high score on compliance. Secondly, the domestic decision-making process was characterized by internal bargaining and a high conflict level between different agencies. Illustrative of the internal strife within the US administration was the US biotechnology industry and its main political supporters (then US vice-president Dan Quayle and his Council on Competitiveness) whose influence won through in the final round. Their fears, however, appear to have been loosely founded. The US government refused to sign the Biodiversity Convention, mainly because of its formulations on intellectual property rights. There are several reasons why the Biodiversity Convention is unlikely to impose severe limitations on biotechnology companies. Patenting in biotechnology is becoming increasingly widespread, and

there are thus no indications that the Convention has had any prior diminishing effects on this practice. This is linked to the increasing privatization in the agricultural sector,[34] and may be observed in several developing countries, even some of the most zealous in opposing the international patent quest in the GATT Uruguay Round. Today most of those developing countries that can manage to sustain a patent system, like India, Brazil, and Mexico, are well on the way to accepting parts of it.[35]

For various reasons, however, the patent question may in fact not constitute such a serious constraint to implementation of the Convention. As the patent-system reaches world-wide acceptance, it will be increasingly hard to side with the US biotechnology industry in arguing that they alone will be harmed by the Convention's regulations on biotechnology. The crucial question is whether the delicate balance in the BioConvention can be kept up—whether the combined regime of patents and national sovereignty over genetic resources will become viable. It seems a safe bet that if only one part of the deal is honoured, exchange of and access to genetic material will come to involve considerable future conflict.

The BioConvention as a Framework for Bio-prospecting Deals

A significant loss of biodiversity would affect all sectors of human activity. As with the case of climate change, it is clear that a single nation cannot deal with the issue adequately by itself. However, while global environmental issues like these have gained significant awareness in industrialized countries, Third World governments maintain that alleviation of poverty continues to be their overriding concern. In the least developed countries (LDCs) the costs of conservation activities may prove to be too high, as these may undermine basic human needs today.[36] This pertains both to wildlife conservation and to conservation of domesticated biological resources. It is thus pertinent to ask whether governments as well as local populations in developing countries may be able to benefit from the formulations in the BioConvention, in order to strengthen conservation and use of biodiversity.

Donor governments tend to prefer bilateral arrangements—especially when these can be arranged without the impediment of international regulations. This position was also noticeable in the biodiversity negotiations. There are already a number of bilateral deals in effect in the biodiversity field. Most popularly quoted is the contract between the US multinational corporation, Merck & Co. Pharmaceuticals, and the Costa Rican National Institute of Biodiversity. The latter provides plant and animal species for drug research which Merck gets exclusive rights to develop; in return Merck pays US$1 million as well as royalties for any drug developed. Training of local 'parataxonomists' and institutional capacity-building are also part of the deal. In the environmental and developmental NGO community there is still dispute concerning the quality of the contract. All the same, this raises the question of whether the developing countries need a framework convention for concluding such deals, since this deal already existed prior to the BioConvention.

That the BioConvention is seen as an important instrument in this respect was clear from the reaction of Venezuela when US president Bush refused to sign the Convention in Rio. As a direct response Venezuela proclaimed that it would stop signing new agreements with US scientific institutions, collecting and screening biodiversity in the country.[37] There are also examples of this concept gaining ground among collecting agencies. The UK Royal Botanic Gardens at Kew now states that any net profits derived from collaboration will be shared equally between itself and the supplier. There is also the case of Biotics, a private British for-profit company that acts as a broker between companies and in-country collectors, granting the latter 50 per cent of Biotics' royalties.[38]

From the legalistic perspective one of the most relevant formulations in the BioConvention is linked to the principle of *prior informed consent*. It indicates that the country providing genetic resources must provide national legislation regulating the appropriation of genetic material.[39] A weak point in this regulation is that in order to turn down a request for genetic material, the providing country, depending on its national legal system, may have to refer to such legal provisions. In the absence of such provisions, there is still a substantial risk that the gene-flow must continue free of charge.[40] Obviously, this may represent an impediment to governments, especially in LDCs, which lack the administrative capacity both to enact and to enforce a legal framework. There will be a need for specially designated bodies to conduct the deals, and to establish information databases on the genetic material. Moreover, the providing country will have to set priorities with regard to compensation mechanisms for its genetic material, as well as making clear the relationship to genetic resources held by local communities and gene-banks.

In view of the problems facing Third World governments in connection with enforcing catch quotas for foreign fisheries under UNCLOS, the problems regarding regulation of genes are striking. In addition to the general administrative burdens, the non-exclusive character of genetic resources further complicates control of their movements. This is partly negated, however, by the need for a user to obtain information about the genetic material in question. Without this, it may be difficult to screen genetic material for potentially valuable and interesting traits in secrecy.

This brings to light another aspect in which gene exchange

differs from deals on catch quotas: the rights and knowledge of local communities. The 200-mile exclusive zones, which include the fish stocks within them, are generally regarded as state property, so rights to control access and levels of exploitation of fish are usually vested exclusively in government. Genetic resources, on the other hand, may have been developed through the work of local communities of farmers; or their valuable medicinal traits may be known only to indigenous or local communities. Government authority over their utilization may thus be more seriously questioned. Throughout history local people have often been victimized as global and national interest has been spurred in these resources: the western ideology of traditional wildlife management views man as an alien element in preservation areas, and central governments may increase their control over natural resources and groups within the population by employing the ideology, legitimacy, and technology of Western preservation ideology.[41]

The BioConvention mentions explicitly that the Contracting Parties shall respect, preserve, and maintain knowledge and practices of indigenous and local communities, and encourage the equitable sharing of the benefits arising from the utilization of such knowledge and practices. A probable interpretation of the BioConvention is that governments may regulate the activities of their citizens regarding export of genetic material. Enforcement is less clear, as this brings up the tricky question of interference in domestic affairs, as well as how to identify who should be rewarded. One approach to ensuring the interests of local and indigenous people may be to include and elaborate the FAO principle of 'farmers' rights' in a protocol under the BioConvention. This principle applies to collectives and not individuals, but it would have to be expanded outside the area of plant genetic resources and agriculture to include, among others, the forestry sector. A more general approach could be to link the concept of compensation to capacity building at the local level.

User countries may also improve the effectiveness of the *prior informed consent* principle by enacting national legislation on the import side: along the lines of the rules governing international trade in endangered species of flora and fauna (CITES), national legislation could be tailored to prohibit illegal import of genetic resources, that is, collections conflicting with prior informed consent export rules in the providing country. Likewise, companies and other importers could be obliged to keep records of imported genetic material, in order to facilitate monitoring by government authorities. Another interesting suggestion is to require patent applications to give information about how genetic material was obtained.[42] Efforts to fight the expanding scope of patent legislation has so far hardly been rewarded. A more promising avenue may be to direct attention to what can be done with the legislation itself.

Finally, the parties to the BioConvention will have to consider the legal vacuum surrounding genetic resources in international gene-banks. Biological materials collected prior to the Convention's coming into force are not covered by the Convention, and are thus still subject to the principle of free access for all. These resources, obtained largely from farmers in developing countries, represent important breeding material for improvement of world food production. Third World governments and environmental and developmental NGOs argue that this genetic material should be included in the FAO Global System on Plant Genetic Resources with the intention of developing a protocol to the BioConvention on 'farmers' rights' to place such material under democratic intergovernmental governance. A similar proposal was included in the Nairobi Final Act, adopted by the parties negotiating the BioConvention.[43] An agreement between FAO and the Consultative Group on International Agricultural Research is anticipated on this issue, aimed at making the germ-plasm in international agricultural research centres part of the FAO international network of gene-banks. Gene-banks within this network are based on the principles of making genetic material available for breeding and research while respecting the rights of the providers of germ-plasm.[44] Environmental and developmental NGOs have warned against the World Bank taking over leadership of international germ-plasm collections, fearing a loss of intergovernmental control over this valuable material.[45]

National legislation is an important vehicle for enhancing implementation of the objectives in the BioConvention. Institution and capacity building in developing countries must be strengthened in order to increase their ability to reap benefits from their own valuable resources. Ideally, contracts on biodiversity prospecting should include components of technology transfers, institution building, and environmental concerns as compensation for access to genetic resources. The Merck–Costa Rica deal does integrate these different components, though some still object that there should be more of each component. Payment mechanisms such as these will hardly suffice to secure full conservation and sustainable use of genetic resources (whatever this may mean). Moreover, there is a renewed danger that the developing countries may become increasingly segregated in the scramble for biodiversity prospecting deals. It would seem, however, that if the BioConvention could succeed in strengthening equity in international gene transactions, this would legitimize its other objectives with the developing world.

Prospects Concerning the Financial Mechanism

The possibilities for Third World governments to achieve compensation from external use of genetic resources may,

at least for the time being, still be limited. The major source of income for conservation will obviously come from direct funding from bi- and multilateral sources.

The North–South controversy over funding was barely resolved by the compromise that the Global Environment Facility (GEF) of the World Bank, UNDP, and UNEP should be used for an interim period, and on condition that it become more democratic. The latter condition was a concession to Third World governments who would have preferred a new funding mechanism over which they could have more control. This reflects the fundamental conflict regarding the South's concern about national sovereignty over its own natural resources, and the North's claim for some degree of conditionality tied to its spending on global environmental projects.

One main reason why GEF was accepted for an interim period despite certain shortcomings in its democratic structure was its assumed ability to attract major funding. In its pilot stage, GEF has already been active in financing several global environmental projects: besides biodiversity, it covers climate change, international waterways, and ozone depletion. The important question is whether GEF will prove to be a suitable tool for the conservation of biodiversity. This concerns criteria for funding of projects in the GEF portfolio and whether GEF can be adjusted to reach small-scale farmers who are so central in growing and maintaining a diversity of food crops in the fields.

GEF has already been active in funding global environmental projects for four years. Reporting on their review of the GEF biodiversity portfolio, however, a group of experts agreed there were various shortcomings:[46] among others, that projects take too little consideration of the expertise and interests of local people, and that GEF has been biased towards biodiversity protection through the establishment of protected areas. This bias is related to the traditional approach of the agencies operating GEF: the World Bank deals mainly with large-scale programmes, whereas what is beliveed to be needed for biodiversity conservation is small-scale, community-based projects. A crucial factor in the further development of the GEF mechanism would seem to be its 'Small Grants Programme' for NGOs, which so far constitute only 2–3 per cent of the total GEF portfolio.

A major concern at the first intergovernmental follow-up meeting on the BioConvention held in October 1993, was to provide input to the GEF meeting the following December.[47] The parties did not succeed in this objective. There was some agreement that biodiversity conservation can scarcely be understood in terms of 'global benefits' versus 'national benefits', but as yet no solution has been reached for dealing with the concept of 'incremental costs' in GEF. These incremental costs are intended as an incentive for developing countries to include in projects a global conservation benefit which may not be in their immediate national interest. This division seems to work fairly well in projects concerned with ozone depletion and climate change, but in the biodiversity area, the separation of national and global benefits rarely make sense.

Some examples may illustrate how it may seem that 'some benefits are more global than others':

- By establishing a wildlife reserve to conserve threatened or endemic species of trees or animals, a country may lose revenue from timber extraction, as well as contracting extra costs in terms of resettlement of local populations originally living in the area. On the positive side, the country may gain revenue through increased tourism. The deficit in this budget (the difference between lost revenue from timber and gained revenue from tourism) constitutes the incremental costs, and will most likely be accepted as a global benefit component.
- By continued use of a diversity of local varieties of rice plants, instead of the widespread introduction of uniform, high-yielding rice varieties, a country might experience an economic loss in terms of reduced yields. In this budget one must first subtract the lower costs of input factors in the first place (less costly seeds, less need for pesticides). The conservation component of the activity is the benefits derived from conserving a large variety of food plants in the field, securing breeding material for the future: how much of this benefit can be counted as a national benefit, and what part of it is truly global?

As the debate has worn on, some of the G77 governments have begun to complain that 'global benefits' in fact equal 'Northern benefits'. Rather, they claim, global benefits in biodiversity projects should be defined as national benefits. This would erase any semblance of conditionality—and is thus obviously out of the question for Northern governments. The central dilemma remains: how to define global benefits in biodiversity conservation in line with the precautionary principle, that is, without risking a bias towards biological 'hot-spots', at the expense of biodiversity of less immediate economic value. The BioConvention itself does not prescribe global benefits as a criterion; rather, funding is tied to fulfilment of the objectives of the BioConvention. What it does is provide a basis for setting priorities in biodiversity conservation: including high diversity and high numbers of endemic and threatened species, as well as species or habitats of social, economic, cultural, or scientific importance. This comes closer than the notion of 'global benefits' with regard to guaranteeing a diversity of projects in the GEF portfolio.

Currently, the bottom line in GEF is to maintain the division between development aid and biodiversity conservation. This issue was much debated during a recent inter-

governmental meeting on scientific aspects of the BioConvention.[48] India, Brazil, and Malaysia argued against scientific input providing a basis for setting priorities about conservation projects (primarily in terms of GEF financing). As the most resourceful among the developing countries, they insist on having political control over GEF money in terms of development, rather than accepting what they claim to be Western scientific priorities. In the end, the parties of the Convention are expected to have the final say regarding programme priorities and eligibility criteria for GEF funding. This question will be further debated in November/December at the first Conference of the Parties.

Concluding Remarks

Biotechnology regulations, equitable sharing through compensation for use of genetic resources, and criteria for financial transfers for conservation projects—these remain linked and controversial issues. With regard to biotechnology regulations, a crucial question is whether the US government will succeed in blocking the development of a biosafety protocol under the BioConvention. There is also the question of whether Northern governments will comply with the new regime regulating access to and exchange of genetic resources and technology. As far as compensation mechanisms for access to genetic resources are concerned, it is now up to national governments to enact appropriate legislation. The North–South conflict on funding of biodiversity projects basically concerns the perennial question of sovereignty versus conditionality.

Whether compensation for use of genetic resources will become a viable concept depends on whether the new dual property rights regime of the BioConvention will take hold. New policies on equitable sharing adopted by Britain's Royal Botanic Gardens at Kew and by Biotics are indications that these ideas are catching on. Such a system will also depend on the capacity of Third World governments to enact and enforce appropriate legislation. As long as the developed countries have free access to germ-plasm through international gene-banks, they have an incentive to remain free-riders in reaping the benefits from genetic resources. Tracing germ-plasm back to its origin is scarcely feasible in all cases, so what is needed is a general system of recording how the material was obtained. This could be developed in a protocol to the Convention. An important incentive for Northern governments to enact legislation in line with the principle of prior informed consent, however, would be for them to be considered legitimate purchasers of genetic resources. This is basically a question of the strength of the new bio-regime in establishing common norms which the actors in gene transactions can find acceptable and fair. In terms of the larger related picture regarding prospects for a new economic world order, this idea might seem far-fetched, but it could have a viable chance within a limited issue-area.

The funding for conservation and compensation for use of genetic resources may lead to discord among developing countries, as they differ in terms of gene and species richness and also with regard to technological capacity. In the aftermath of UNCED many fear that the least developed, gene-poor countries will be left increasingly at the losing end—in two respects: limited funding for biodiversity conservation, and reduced access to improved breeding material. As the GEF evaluation has demonstrated, there is a tendency to disregard the potential importance of genetic resources in arid and semi-arid areas, and to focus on tropical rainforests instead. The explanation is most likely found in the old paradigm of wildlife conservation, which still links 'global benefits' to biodiversity 'hot-spots'. For biodiversity conservation in a long-term perspective, this does not bode well for the implementation of the Biodiversity Convention. Unlike the FAO debate, there are few rallying factors available for the G77, for example, in the form of NGOs. As NGO representation gained legitimacy and increased during and following UNCED, so has the plurality of their voices, and thus their difficulties in rallying around common goals. The schism between wildlife conservation and agricultural biodiversity (like on-farm conservation and the use of traditional food plants) still constitute a hurdle in this respect. If environmental and developmental NGOs are to have a positive impact on biodiversity conservation in a long-term perspective, the old dispute between wildlife conservation and agricultural biodiversity will have to be laid to rest.

Discontent with the financial aspects of the BioConvention is not restricted to gene-poor countries. Biologically rich countries like Brazil and Malaysia are expected to become the greatest beneficiaries from the North's focus on global environmental issues, but they have no desire to be told what to do with this money. The sovereignty issue looms large in this part of the follow-up of the BioConvention, as the North is unlikely to accept financial obligations without conditionality. Donor governments cannot be expected to abandon their demand for scientific criteria as a basis for setting priorities in biodiversity conservation. A pertinent lesson from the forestry sector is that the temperate countries of the North must commit themselves to the same standards of conservation and sustainable utilization as they request from the tropical countries, in order to gain legitimacy and credibility for their argumentation. In this way the conditionality/sovereignty trap may be evaded.

Applying a long-term perspective to biodiversity conservation, compensation for use of genetic resources is probably more important than direct funding of piecemeal wildlife conservation measures. It is also more important to integrate biodiversity perspectives into the large social sectors of

agriculture, forestry, and fisheries, than to establish small islands of preservation areas. If biodiversity conservation is necessary for future use, this may certainly be most effectively reflected by how we use it today. Biodiversity conservation is essentially about the ability to engage in a diversity of activities at the same time. Considerable scientific uncertainty remains regarding the relationship between species and ecosystems, and about what happens when small or larger parts of diversity disappear. Some priorities will certainly have to be made; but with the present scientific uncertainty, it may prove just as dangerous to neglect plant genetic resources in Mali as animal species of the Amazon jungle. Additional resources resulting from UNCED, as well as conventional development aid, need to be strengthened to integrate sustainable use of genetic resources. This may include the use of traditional plants in agriculture, as well as the development of incentives for integrated methods for agri-forestry and aqua-culture.

In this perspective, GEF funding is indeed necessary, but far from sufficient. Even though resources for overall conservation are strained, GEF should still be made available also for projects outside the traditional preservation portfolio. The GEF concepts of incremental costs and cost efficiency must be treated with utmost care in relation to biodiversity projects. Moreover, the very nature of the biodiversity complex makes it more natural to concentrate on small-scale projects rather than big, top-down ones. Likewise, GEF should also be used for capacity building. The overall benefits from helping developing countries to secure revenue from the utilization of genetic resources may prove to be the best investment for ensuring their future.

Notes and References

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