



International Environmental
Law Research Centre

NEW COLLECTIVE POLICIES

Susette Biber-Klemm, Philippe Cullet & Katharina Kummer Peiry

Published in: S. Biber-Klemm & T. Cottier eds, *Rights to Plant Genetic Resources and Traditional Knowledge: Basic Issues and Perspectives* (Wallingford: CABI, 2006) p. 283-323.

This paper can be downloaded in PDF format from IELRC's website at
<http://www.ielrc.org/content/a0612.pdf>

7 New Collective Policies

Susette Biber-Klemm,^a Philippe Cullet^b and Katharina Kummer Peiry^c
^a*World Trade Institute, University of Berne, and Faculty of Law, University of Basel, Maiengasse 51, CH 4056 Basel, Switzerland;* ^b*School of Law, School of Oriental and African Studies, University of London, Thornhaugh Street, London WC1H 0XG, UK;* ^c*Kummer EcoConsult, Chemin de la Forêt 4, CH 1752 Villars-sur-Glane, Switzerland*

7.1 Introduction

This and the following chapter move on to consider a number of other aspects of the links between PGR and IPR. This chapter is divided in three sections that examine different areas which are linked to IPR but have not necessarily been directly integrated in discussions on TK and IPR. It considers issues concerning PGR and TK that are not assignable to a specific individual or group of persons. The first section examines the concept of farmers' rights, its development in international law and its relevance in the context of the protection of TK. The second section analyses issues related to access to PGR and examines both the legal framework provided by international law instruments – such as the Biodiversity Convention – and issues concerning contractual arrangements for access between private parties. Finally, the third section

considers the extent to which financial mechanisms, mooted in particular in the context of international environmental treaties, could be used as models for compensating TK holders.

7.2 Farmers' Rights¹

The rights that farmers have under international law – or absence thereof – with regard to diverse elements such as seeds and knowledge related to PGRFA, have been and remain contentious. First, in the context of the development of a protection regime for commercial plant breeders, what became known as the farmer's privilege is a simple recognition that plant breeders' rights are not absolute and do not stop farmers from using the protected variety that they have grown for further development.² Secondly, the rights of farmers can be con-

¹ Author: Philippe Cullet. Thanks to Dr Martin Girsberger for his detailed and specific comments on a previous version of this text.

² For further developments on the UPOV Convention, see Chapter 2, Section 2.3.4, this volume. The farmer's privilege is not included in this review of farmers' rights.

ceived as fully fledged rights over traditional knowledge (TK). This option has not been recognized in any international legal framework, but some developing countries have attempted to develop legal frameworks that provide for the rights of farmers over their TK.³ Thirdly, farmers' rights can be conceived as a form of compensation for services rendered by the community by all farmers to the conservation and enhancement of PGRFA over time. This is the option that has been developed over time in the context of the two main international legal instruments recognizing farmers' rights, the International Undertaking (IUPGR) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

At present, the ITPGRFA provides the only existing recognition of farmers' rights in a binding instrument. The ITPGRFA does not, however, provide a substantive definition of farmers' rights and in particular does not provide any form of property rights for farmers over their knowledge. As a result, farmers' rights at the international level are currently little more than a policy tool to foster the recognition of the contribution of farmers and farming communities in the overall conservation and development of plant genetic resources. Further elaboration of farmers' rights can only be found in specific domestic legal regimes. This section analyses the notion of farmers' rights as it has evolved in international law over the past couple of decades and examines the extent to which the existing notion of farmers' rights can contribute to the protection of TK.

7.2.1 Farmers' rights under the International Undertaking

Farmers' rights were first enshrined in a legal instrument whose primary intent was

to promote the free exchange of plant genetic resources. As noted in Chapter 2, the IUPGR, which promoted the management of plant genetic resources, on the basis of the principle of common heritage of humankind, proved unacceptable to some countries in its original form. The revised version of the IUPGR maintained a reference to common heritage as a basis for regulating plant genetic resources, but at the same time recognized the validity of claims over these resources. As a result, it accepts both plant breeders' rights and farmers' rights as valid claims over plant genetic resources and drastically narrows down the relevance of the concept of common heritage by recognizing states' sovereign rights over their plant genetic resources.

The IUPGR is rather unclear in its formulation of farmers' rights. It first specifically mentions that the basis for the concept of farmers' rights is the 'enormous contribution that farmers of all regions have made to the conservation and development of plant genetic resources, which constitute the basis of plant production throughout the world'.⁴ It further emphasizes that the context for the adoption of farmers' rights is the dichotomy between the role of farmers in developing countries in developing and maintaining plant genetic diversity and the need to access these resources for the purposes of conservation and plant breeding in the commercial sector.⁵ The specific definition of farmers' rights under the IUPGR reads as follows:

Farmers' Rights mean rights arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the International Community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of

³ See also Chapter 2, Section 2.3.3, this volume.

⁴ Res. 4/89, Agreed Interpretation of the International Undertaking, 29 Nov. 1989, Report of the Conference of FAO, 25th Session, Rome, 11–29 November 1989, Doc. C89/REP.

⁵ Res. 5/89, Farmers' Rights, 29 November 1989, Report of the Conference of FAO, 25th Session, Rome, 11–29 November 1989, Doc. C89/REP.

their contributions, as well as the attainment of the overall purposes of the International Undertaking.

This definition does not include the rights of farmers over their TK. In fact, what is provided in the IUPGR is little more than the recognition of the collective contribution of farming communities to the development and maintenance of agricultural biodiversity. This recognition is materialized through the provision of financial resources to ensure the conservation of plant genetic resources and the need for farmers to participate in the benefits from the use of their varieties in genetic engineering.

Insofar as the implementation of the recognition of farmers' contribution to plant genetic resource management is concerned, the rationale provided is that 'the best way to implement the concept of Farmers' Rights is to ensure the conservation, management and use of plant genetic resources, for the benefit of present and future generations of farmers'.⁶ The only specific implementation mechanism provided is the International Fund for Plant Genetic Resources. In keeping with the recognition that farmers' rights are vested in the international community and not in farmers themselves, the International Fund is conceived as a financial mechanism that rewards countries rather than individual farmers or farming communities. In fact, the Fund is generally conceived more along the lines of a development aid programme to developing countries for capacity building in the field of agricultural biotechnology than as a tool to reward individual farmers or farming communities for their contribution to the development or improvement of plant varieties.

On the whole, the system of farmers' rights provided in the IUPGR seeks to counterbalance the existence of plant breeders' rights and other IPR in the field of genetic engineering with some form of incentive and compensation for farmers. However, it stops short of defining any type of individual or collective property rights of farmers

over their TK. It only provides recognition of the contribution of farmers to the conservation and sustainable use of plant genetic resources. A general form of compensation is offered under the aegis of the International Fund, but even the material benefits from the International Fund are targeted in a very general manner and are not meant to directly reach specific farmers or farming communities that have made a specific contribution to the development and conservation of plant genetic resources. In practice, the concept of farmers' rights provided in the IUPGR has never had much impact, since the International Fund never became a reality because funds were not made available by donor countries. However, developments in the context of the undertaking have had an important influence on subsequent developments leading to the adoption of the ITPGRFA.

7.2.2 Farmers' rights under the International Treaty on PGRFA

The ITPGRFA addresses a number of important issues concerning the conservation and use of PGRFA. Farmers' rights are only one of many issues considered, but it is noteworthy that negotiations concerning the definition of farmers' rights constituted one of the important issues on which the successful completion of the treaty depended. In fact, one of the main goals of the revision of the IUPGR was the further development and concretization of farmers' rights. In the end, farmers' rights were retained as one of the important elements of the treaty, but negotiators stopped short of recognizing and comprehensively defining farmers' rights at the international level.

The concept of farmers' rights under the ITPGRFA has evolved, as compared to the first formulation in the context of the IUPGR, but a clear affiliation can still be seen. Most importantly, the ITPGRFA does not go beyond the concept of farmers' rights as a form of compensation for farmers' contribution to the development and mainte-

⁶ Res. 4/89, note 4 above, p. 284.

nance of agricultural biodiversity. It does not include property rights but provides, however, that member states are free to develop their own forms of protection.

The basis for the recognition of farmers' rights is again the

enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world.⁷

The Treaty does not provide any other definition of farmers' rights insofar as their protection at the international level is concerned. It only makes explicit the minimum level of protection of farmers' interests that should be protected. In effect, only existing rights of farmers to save, use, exchange and sell farm-saved seed/propagating material are protected under the Treaty.⁸ Further, even these residual rights are protected only to the extent that national law does not differ from the provisions of the Treaty.

Insofar as domestic law is concerned, the ITPGRFA provides that member states should in principle undertake to protect and promote farmers' rights. The Treaty highlights some of the areas that should be addressed in priority. This includes the protection of TK in the context of agricultural biodiversity, benefit sharing and participation in decision-making with regard to the management of agrobiological resources.⁹

7.2.3 Farmers' rights as a means to protect traditional knowledge

The preceding sections indicate that the concept of farmers' rights in international

law has a specific meaning in the context of the IUPGR and the ITPGRFA. In the context of these two instruments, farmers' rights constitute in effect a policy decision at the international level to formally acknowledge the contribution of farmers and farming communities to the development and conservation of agricultural diversity. Apart from the call to member states to realize farmers' rights at the national level, the only practical consequence of this acknowledgment at the international level has been the progressive development of the notion of benefit-sharing, which focuses on ways to provide financial and other compensation for the farming community's contribution to fulfilling humankind's food needs. As such, the concept of benefit sharing is not specific to the case of farmers and has been developed more generally to compensate holders of TK for the use of this knowledge in different contexts.¹⁰

Despite the relative underdevelopment of farmers' rights in the two FAO instruments, it is noteworthy that a treaty that does not specifically focus on agriculture, like the Desertification Convention, indirectly considers farmers' rights through the lens of TK. The Desertification Convention is a typical treaty of the law of sustainable development. This implies that it takes a broad view of the environmental challenges linked to land degradation and includes agriculture among the important fields that must be taken into account to successfully address desertification. In this context, the recognition that state parties must not only promote and use TK, but also protect it, is significant.¹¹ In this sense, the Desertification Convention constitutes another instrument indirectly promoting the development of farmers' rights at the national level as part of the more general protection of TK. The importance of the Desertification Con-

⁷ Article 9.1 of the International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3 November 2001 [hereafter ITPGRFA].

⁸ Article 9.3 of the ITPGRFA.

⁹ Article 9.2 of the ITPGRFA.

¹⁰ Further examination of benefit-sharing is undertaken in Section 7.3 of this chapter.

¹¹ See Article 18 of the Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Paris, 17 June 1994, 33 *ILM* 1328 (1994).

vention in this area stems from its recognition of a need to *protect* TK rather than the more limited aim of compensation for services rendered, as is the case under the ITP-GRFA.

The limits of the concept of farmers' rights at the international level are no bar to their further development at the national level. In fact, this is what the ITPGRFA calls for. At the national level, farmers' rights have been conceived as a tool for implementing benefit sharing in accordance with developments at the international level. Some countries have, however, attempted to go beyond this limited notion of farmers' rights, while a number of others are still developing legal frameworks in this area. It is therefore useful to review some of the options that countries have chosen, or may choose, to implement the notion of farmers' rights in their legislation.

In some countries, like India, the development of farmers' rights has taken a route that focuses at least in part on the individual rights of farmers to their varieties. Since this individual right aspect was covered in Chapter 5, this section does not consider it again. In fact, one of the important contributions of the concept of farmers' rights is the recognition that innovation and incremental improvements in the field of agricultural biodiversity cannot always be assigned to a particular individual or group. In such cases, traditional notions of IPR are not particularly well suited to offer protection for this TK. Farmers' rights thus constitute an interesting departure point to developing rights that could be collective in scope. There have been a number of proposals seeking to grant property rights to local communities or other groups.¹² The challenge has already been taken up by some countries like Venezuela, which has instituted a system that distinguishes the rights of TK holders and individual IPR in cases where knowledge is developed incre-

mentally.¹³ In other words, the Venezuelan law goes further than merely acknowledging the importance of biodiversity-related TK with the usual compensation for conservation of biological resources, and specifically recognizes the associated rights of indigenous and local communities.¹⁴ This tends to indicate that where knowledge acquisition is either collective or incremental, the concept of farmers' rights may offer opportunities to devise an alternative form of protection to the dominant intellectual property model.

Where collective rights are allocated, it is necessary to make sure that the benefits reach all the rights holders. Some countries have focused on exploring the possibility of assigning collective rights to local democratically elected bodies rather than to legally amorphous local communities. In countries with strong traditions of local democratic governance, as in India, which has a highly developed panchayat system, using them has obvious advantages since it guarantees to a certain extent that benefits arising from the assignment of property rights will at least in principle be shared with a measure of public accountability. This is in fact what the Indian Biodiversity Act attempts by requiring the setting up of biodiversity management committees in each panchayat whose functions include the promotion of conservation, sustainable use and documentation of TK.¹⁵

Beyond the collective rights dimension, farmers' rights may provide an interesting departure point for examining alternative forms of knowledge protection. Registration may, for instance, constitute a ground for differentiating farmer varieties from commercial breeders' varieties. This can be achieved by providing that protection for a farmer variety can only be obtained for varieties which are particular to a given locality. The rights that can be conferred include the right to develop,

¹² For instance, Biodiversity (Rights and Protection) Bill, 1998 (New Delhi: Research Foundation for Science, Technology and Ecology & Lawyers Collective, 1998).

¹³ Article 85, Venezuela, Ley de diversidad biológica, 27 October 1999.

¹⁴ Articles 13 and 84, Venezuela: Ley de diversidad biológica, 27 October 1999.

¹⁵ India: Biological Diversity Act, 2002.

produce, sell and export the protected variety.¹⁶ The distinguishing element is the non-exclusivity of the protection which is offered. This is due to the fact that exclusivity may not be practical in the fields of farmers' varieties since they may exist in more than one location and possibly more than one country. Another argument against exclusivity is the strong link between farmer varieties, agro-biodiversity management and food security. These links seem to preclude a focus on the commercial dimension of property rights at the expense of the broader goals of environmental conservation and food security. As a result, non-exclusive farmer rights could provide an alternative scheme whereby all rights holders are entitled to separately produce and commercialize their own products without infringing on the rights of other similarly placed rights holders.

Another interesting dimension of collective farmers' rights is that they can be used as a tool to take into account not only the commercialization of knowledge, but other goals as well. These include, for instance, agro-biodiversity management, biosafety and food security. The management of agro-biodiversity is particularly interesting insofar as diversity has historically been conserved and enhanced by farmers. This contribution of farmers is likely to remain important in the future.¹⁷ One of the central points with regard to agro-biodiversity and farmers' rights is that while farmers directly benefit from agro-biodiversity conservation, national governments and the international community also benefit in direct and indirect ways. This may require the sharing of conservation obligations on an equitable basis between all actors benefiting from the exploitation of agro-biodiversity, from farmers and local firms marketing seeds to

research institutions, private seed companies and states. In terms of property rights, this tends to indicate the need for farmers' rights that are appropriate to giving incentives to farmers not only to conserve existing agro-biodiversity and associated TK, but also incentives to further develop this knowledge.

Overall, the notion of farmers' rights is interesting because it fosters a broader understanding of the links between innovation, rights over knowledge, biodiversity conservation and the sustainable use of agro-biodiversity. While patents and plant breeders' rights are on the whole completely unlinked from concerns over conservation and sustainable use, farmers' rights are quite different and much more amenable to a broader perspective. This is now enshrined in the ITPGRFA, which clearly recognizes the links between conservation of plant genetic resources and the use that can be made, including the commercialization of products derived from plant genetic resources-related knowledge.

7.3 Reviewing Access Legislation¹⁸

7.3.1 Introduction

Both the CBD and the ITPGRFA enunciate the sovereignty of states over their genetic resources. Yet the exercise of sovereign rights is balanced by the obligation of donor states to facilitate access to their genetic resources. Both conventions provide frameworks to this end: the CBD establishes a basic regime on Access and Benefit Sharing (ABS) (Articles 1, 15, 16, 19; see Chapter 2, this volume); the ITPGRFA concretizes this ABS regime for a defined part of the resources by the Multilateral System (MLS) (see below). The concept of the sharing of

¹⁶ Note that Thailand has, for instance, adopted a farmers' rights regime which entitles the local legal entity to 'have the exclusive right to develop, study, conduct an experiment or research in, produce, sell, export or distribute by any means the propagating material [of the registered local domestic plant variety]'. See Section 47 of the Plant Varieties Protection Act, B.E. 2542 (1999).

¹⁷ See, for example, Article 9 of the ITPGRFA.

¹⁸ Author: Susette Biber-Klemm. I thank Alwin Kopse, Philippe Cullet and Michael Halewood for their thoughtful and inspiring comments and Danuta Szymura Berglas for her careful language editing.

benefits resulting from the use of PGR and TK is a response to the experiences in the exchange of this information and its appropriation due to different levels of protection of informational values in different countries (see Chapter 3, this volume).

The focus in the following discussion will be access to TK in the framework of the two instruments. TK can be associated either with wild or domesticated genetic resources, or – in the case of traditional PGRFA – be expressed in a product resulting from the use of TK.¹⁹ This means that the regulation of both the CBD and the ITPGRFA will be examined regarding the provisions for: (i) access to TK associated with PGR in general (CBD); (ii) TK associated with PGRFA (ITPGRFA); and (iii) access to the PGRFA themselves (ITPGRFA). The goal is to describe and evaluate ABS regimes as instruments for promoting trade in the informational values of TK and traditional PGRFA. The criteria for the evaluation of the ABS system are the goals discussed in Chapter 1, namely the goal of creation of incentives and economic means to support and maintain TK and traditional PGRFA. In this context it is important to take account of the findings of Young and Gunningham (1997) and of Swanson and Göschl (2000), who argue that incentives to maintain TK and PGRFA are best created at the level where the costs occur (see Chapter 4, this volume). In the case of the conservation and maintenance of TK and traditional PGRFA, these costs occur not only in the *ex situ* facilities but, as has been shown (Chapters 1 and 4), to a great degree also at the level of *in situ* conservation by traditional on-farm breeding. Therefore one of the key questions is to what degree the stakeholders at the level of local farming communities and indigenous peoples can be involved in the respective ABS regimes in order to benefit from the values they have created. In respect of PGRFA, the focus will therefore be put on access to *in situ*-maintained traditional PGRFA.

The second point will then be to evaluate the ABS system in view of its capacity to create benefits in a trade context. The thesis is that at present rather cumbersome procedures²⁰ ought to be rethought in order to be more market and trade supportive. Accordingly, the emphasis will not primarily be put onto the technicalities of the ABS system but rather the questions arising from its implementation at the interface between national and international trade and local stakeholders.

In the present discussion the trade aspects of genetic resources and TK are predominantly perceived as a North–South relationship, in that the biodiversity-rich countries of the South are the providers, and the industrialized countries of the North the recipients and users of the information. However, in evaluating the ABS system, it is to be kept in mind that the relationships of access to genetic resources and TK show a much more varied pattern. First, not only international, but also domestic trade relations, might be of importance, and secondly, exchange of genetic information and TK may also take place in a South–South or North–North relationship. The global interdependence of all players is in particular true for PGRFA, where all countries may have the role of both purchaser and provider.²¹ Finally, one should avoid the over-simplification that ‘less-developed’ necessarily equates with ‘biodiversity-rich’, and ‘industrialized’ with ‘biodiversity-poor’: an obvious example being Australia, which is both a developed country and one containing ‘mega biodiversity’ (see Chapter 2, this volume).

7.3.2 Legal background

In general

From the factual, legal and political point of view, access to (wild) genetic resources is

¹⁹ In the following, the term ‘information’ is meant to encompass both elements.

²⁰ See the case study on Peru in Chapter 2.

²¹ See Fowler *et al.* (2000).

different from access to TK and domesticated varieties of PGRFA, respectively. Whereas the primary right to regulate ownership of wild genetic resources is attributed to the sovereign state, in the case of TK associated with PGR there seems to be a common legal conviction that the right and competence to deal with the product of creativeness lies with its creators or holders.²² Thus it is considered inequitable and politically unfeasible for states to attempt to expropriate individual and collective rights of communities to their knowledge (Ruiz 1997, cited in Glowka, 1998, p. 37).

The question is whether the same can be said for varieties of PGRFA based on the understanding – confirmed by the last generation of scholarship – that maintenance and breeding of farmers' varieties involves technical know-how and creative skills (see Chapter 4, this volume). In the case of PGRFA, we find ourselves with the problem of creative information being embodied in a physical, self-propagating entity, which, moreover, can also be traded as a commodity. Plant Breeders' Rights are the solution to protect the informational value contained in varieties bred in formal, industrial processes. However, no such protection exists for the protection of informational value incorporated in farmers' varieties. The question, therefore, is whether compensation for the utilization of the informational value is possible on the basis of the ABS system.

The regulation of the CBD²³

The subject matter of the CBD is in principle all biological resources: wild and

domesticated, and related TK. However, the Conference concluding the convention delegated the issues regarding PGRFA to the negotiations in the framework of the revision process of the FAO IU on PGRFA, now the IT on PGRFA.²⁴ So the latter is primarily relevant for PGRFA, including wild relatives, and related TK, while the CBD covers the remaining wild biological resources and TK.

The regime of access to genetic resources as laid down by the CBD is based on a contractual approach. It encompasses the three elements of 'prior informed consent', 'mutually agreed terms' and the 'fair and equitable sharing of benefits' (Article 15). It is important to note that the authority for determining access to genetic resources is vested in the state and subject to national legislation. Thus the convention only entitles the providing state, and does not confer any rights to the individual holders of the PGR.

The same is true for the regulation of issues regarding access to TK associated with PGR. The implementation of the general principles that are stated in Article 8(j) of the CBD is referred to the national level. Yet the CBD does give some interpretative guidelines. States are – as far as possible and appropriate – to involve the holders of the TK in its wider application, and to encourage the equitable sharing of the benefits arising from its use.

In the follow-up process of the CBD, its ABS regime has been further developed. The 'Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation' (Bonn Guidelines)²⁵ provide a more detailed framework for the development of

²² See, for example, Article 27(2) of the Universal Declaration of Human Rights which states that 'Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author...', and Article 15 of the International Covenant on Economic, Social and Cultural Rights, which states that 'The States Parties to the present Covenant recognize the right of everyone ... to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.'

²³ For details see Chapter 2.

²⁴ International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3 November 2001 [hereafter ITPGRFA].

²⁵ Accepted as Decision VI/24 by the VI meeting of the Conference of the Parties, The Hague, The Netherlands (7–19 April 2002).

ABS regimes, including with particular reference to Article 8(j) on TK (Nos 1 and 9). One of the explicit goals is to 'contribute to the development ... of mechanisms and access and benefit-sharing regimes that recognise the protection of traditional knowledge ... in accordance with domestic laws and relevant international instruments'. The Guidelines assert the importance of the involvement of all relevant stakeholders in the ABS process, explicitly including indigenous and local communities. In particular, stakeholders should be integrated in the negotiation and implementation of ABS arrangements on the one hand, and in the development of national strategies, policies or regimes on ABS on the other. The provision of pertinent information and capacity-building is identified as an important measure in supporting negotiations (Nos 17–21).²⁶

Thus, the framework of the CBD presently evolves in the direction of strengthening the position of the (individual or community) holders, which in turn leads to the marketing problems discussed below.

*The regulation of ABS by the ITPGRFA*²⁷

The development of a regime regulating access to PGRFA is directly linked to the principle of state sovereignty over genetic resources. The reiteration of this principle in the CBD has prompted the revision of the IU (see Chapter 2, this volume). Accordingly the two Conventions are closely inter-related. The definition of the objectives of the treaty – conservation and sustainable use of PGRFA and the fair and equitable sharing of the benefits arising out of their use – corresponds to the CBD goals. The

goals of the IT are to be attained 'in harmony' with the CBD, and by closely linking the IT to the CBD (Article 1.2).

The ITPGRFA adopts the concept of the CBD that the authority for determining access to PGR rests with national governments and is subject to national legislation (Article 10.2), and also limits national sovereignty by the obligation to facilitate access for contracting parties.

Given this, and the recognition that PGRFA are a common concern of humankind, the treaty establishes a specific system of facilitated access to a selection of varieties specified in an Annex (Annex 1) to the Treaty, the so-called Multilateral System of Access and Benefit-Sharing (MLS) (Article 10).

Thus, within the ITPGRFA, two basic regimes exist for access to PGRFA and the sharing of the benefits resulting from their use: (i) the MLS for the Annex 1 material and, as the Treaty is silent on non-Annex 1 material, (ii) by default the more general principles of the basic ABS regime covering the remaining varieties.

THE MULTILATERAL SYSTEM

In the background of the MLS lies the insight into the global interdependence regarding PGRFA, or worded differently, in their common resource nature (Preamble para. 2 ITPGRFA). Accordingly, the MLS in some ways takes up the concept of PGR as being the common heritage of mankind, which at its outset ruled the IU (see Chapter 2, this volume), and adapts it to the system of state sovereignty. Consequently the goal of the MLS is to support the free flow of germplasm, and to bypass the complica-

²⁶ Some of the Contracting Parties are concerned about the voluntary character of the Guidelines. It is feared that due to their voluntary nature, they remain ineffective (see, for example, Brazil in IP/C/W/228, No. 34). Accordingly, the COP explicitly decided to keep the Guidelines under review, considering that they are but a first step of an evolutionary process (Dec. VI/24). The Plan of Implementation adopted by the World Summit on Sustainable Development in 2002 calls for action to negotiate an international regime to promote and safeguard the fair and equitable sharing of benefits (Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August–4 September 2002; A/CONF.199/20, chapter I, resolution 2, annex; see also Doc. UNEP/CBD/MYPOW/6, Nos. 1, 15–20). A regime is a 'set of principles, norms, rules and decision-making procedures' and not *per definition* a legally binding instrument, but might include binding norms (UNEP/CBD/MYPOW/6 No. 19).

²⁷ For an overview of the entire Treaty see Chapter 2, this volume.

tions, which might occur by the CBD ABS regime, between those that are parties to the treaty.

The system is based on the idea of solidarity and mutual benefit. The listed varieties are selected according to the criteria of food security and interdependence (Article 11.1); access is to be provided for research, breeding and training for food and agriculture; no IPR of any kind limiting facilitated access might be claimed on the PGRFA in the form received; and any fees imposed may cover only the minimal cost incurred in providing access. Access is to be granted expeditiously, and – of importance for our question – without the need to track individual accessions back to their origin. Together with the accession, all available passport data and other associated descriptive information are to be made available ‘subject to applicable law’. This information may well encompass TK elements. From this argument it follows that, if TK elements are included in the passport data of varieties integrated in the MLS and stored in an *ex situ* facility, there is no necessity for PIC to be given by the original holders of the knowledge for the transfer of the information.²⁸

Transfer of the PGRFA and associated information integrated in the MLS is facilitated by the utilization of standardized contracts, i.e. the standard material transfer agreement (MTA), which is also to apply to all subsequent transfers of the PGRFA it covers. The MTA is to be adopted by the Governing Body of the treaty.

As to benefit sharing, facilitated access to PGRFA included in the MLS is in itself considered to be a major benefit. Further types of benefit sharing include the

exchange of information; access to and transfer of technology; capacity-building; and the sharing of benefits arising from commercialization (Article 13.2).²⁹ There is a monetary benefit sharing clause that is triggered when a recipient of material from the MLS incorporates that material into a new product, and subsequently restricts access to the product to disallow its use for research purposes. In such cases, the party would be obliged to make a contribution to an international fund, at a rate yet to be established by the Governing Body, to be used to support conservation efforts (Article 13.3).

If the MLS is examined in view of the creation of direct incentives for local *in situ* conservators of traditional PGRFA, the following aspects must be considered.

The Multilateral System includes only PGRFAs that are under the management and control of the Contracting Parties and in the public domain. Natural and legal persons who are holders of listed varieties are thus not automatically part of the system, but are invited to include their varieties in order to participate in the system and have access to the stored resources. However, during a 2-year pilot period, access to the resources included in the MLS is to be granted to all legal and natural persons who are under the jurisdiction of a contracting party. The decision as to whether this regime will continue in the future is to be taken by the Governing Body at the end of the 2-year period.

The system seems to be primarily meant to provide facilitated access to the public *ex situ* collections of the listed varieties. Access to listed PGRFA in *in situ* conditions is to be provided according to national legislation, otherwise according to

²⁸ But PIC would be needed at the time of collecting the accessions *in situ*; PIC would have to encompass the fact that the knowledge is handed on without getting back to the original holder once the sample and the associated knowledge is integrated in the MLS (see also below). However, according to the research by IPGRI, at present there is very little ethnobotanical information stored in the passport data (Chapter 4, this volume).

²⁹ The Governing Body is mandated to determine the level of the payments. It may differentiate the levels of the payments for various categories of recipients who commercialize products resulting from the use of the PGRFA integrated in the System. In particular it may exempt small farmers in developing countries from payments (Article 13(d)(ii)).

standards set by the Governing Body of the Treaty (Article 12.3(h)).³⁰

The position of the small-scale farmers within this system of access and benefit-sharing at present is not clear. On the one hand, the access to *in situ* resources, either for collection for an *ex situ* facility or in the sense of direct bioprospecting, is not (yet) specified. On the other hand, at present it is not quite clear how these farmers will be able to benefit directly from the system.

As the treaty has only recently been concluded and come into force,³¹ the details are still in a state of flux. With regard to the strengthening of the position of the individual small-scale farmers, and farming communities or corporations within the MLS, the following points must be taken account of.

In view of access to PGRFA in *in situ* conditions,³² two goals are to be kept in mind. First, it must remain possible to collect *in situ* accessions and related additional information for integration into the MLS; and secondly, incentives must be created for the maintenance and further development of traditional PGRFA. This is bound to remain difficult as long as the legal position and benefit for the *in situ* breeders is not clear.³³

Two types of benefits can be imagined in this context. First, the benefits of the MLS itself; secondly, the benefits of marketing or selling traditional varieties which have been improved, such as in semi-

formal on-farm breeding (see Chapter 4, this volume), using a variety from an *ex situ* facility.

An initial question, therefore, is how to make the benefits of the MLS, namely, facilitated access in itself, the exchange of information, access to technology, capacity-building and the sharing of benefits of commercialization (Articles 31.1 and 13.2) *directly* beneficial for small-scale farmers, thus creating an incentive for them to contribute their varieties to the MLS.³⁴ This is part of the more general issue of how the challenge of extending the MLS to small-scale farmers and farming communities, and of making it directly operational and beneficial, can best be met at the legal, political and also practical levels.

Secondly, there is a need to clarify under which conditions varieties bred on the basis of varieties integrated in the system, or making use of them, can be commercialized by their breeders, such as on local or regional markets. Two regulations governing the MLS might be relevant: Article 12.3(b) prescribes that within the system varieties are to be exchanged 'free of charge'. Article 12.3(d) prescribes that no IPR of any kind limiting facilitated access might be claimed on the PGRFA in the form received. Thus, it can be concluded that only varieties 'in the form received' fall under the system and therefore must be exchanged free of charge. Accordingly, whether a variety can be commercialized

³⁰ It is submitted that in the case of absence of national legislation or standards set by the Governing Body, the CBD ABS regime applies.

³¹ In accordance with Article 28, the Treaty entered into force on the 90th day after the deposit of the 40th instrument of ratification, acceptance, approval or accession, provided that at least 20 instruments of ratification, acceptance, approval or accession have been deposited by Members of FAO. On 31 March 2004, 13 instruments (including the European Community) were deposited with the Director-General of FAO. Accordingly the date of entry into force was 29 June 2004.

³² As long as national legislation or subsidiary regulation by the Governing Body are lacking, access to these resources depends on the CBD ABS regime. See below.

³³ It seems that the present insecure legal situation, and the hope of gaining benefits from the ABS procedures, prevents farmers donating their varieties.

³⁴ There is at present no indication as to how the facilitated access of holders of *in situ* resources will be handled after the expiry of the 2-year trial period of facilitated access. If access to the system is being restricted, without including the *in situ* preserved PGRFA, access by local farmers or farming communities would be limited to communities maintaining *ex situ* collections of their seeds and integrating these collections into the system. It is submitted that, in any case, facilitated access should be granted for small-scale farmers, their communities and organizations.

depends on the term ‘in the form received from the system’, which is highly in need of interpretation.

It seems that this wording allows for the IPR or other protection of ‘new forms’ of varieties that are developed on the basis of materials received from the MLS. The question in this case is what would be the criteria to define a ‘new form’? Do they correspond to the PBR or patenting criteria? In this case traditionally bred landraces would in any case remain under the prescriptions of the system and under its obligation to facilitate exchange. It is submitted that for reasons of equity, means ought to be found to recognize ‘new forms’ (contra Article 12.3(d))³⁵ of varieties developed by farmers traditionally breeding on the basis of a MLS variety received from an *ex situ* facility. This would provide a legitimization to limit the facilitated access and allow the breeder to sell his variety to interested formal breeders or in regional markets, thus rewarding his breeding efforts.

VARIETIES AND TK OUTSIDE THE MULTILATERAL SYSTEM

Given this, a rather complex pattern of access situations arises, as by far not all PGRFA are yet included in the MS.

For instance, the MLS is not applicable to:

- All varieties in countries which are not parties to the Treaty (unless they are held in public international institutions which volunteer that they are in the MLS).
- Varieties which are not listed in Annex 1 and associated knowledge.
- Varieties in private *ex situ* facilities which are not integrated in the MS.
- Varieties *in situ* and associated knowledge.
- Varieties protected by intellectual property rights.
- Materials under development.³⁶

It is submitted that in these cases if the country is a signatory to the CBD, then the rules of the CBD regime on ABS apply. The CBD provisions on ABS cover access to PGR of all kinds, so they can thus be considered as a general and subsidiary rule. This solution is supported by Article 1 of the ITPGRFA that points out the need to closely link the IT to the CBD.

With a view to *in situ* accessions, it can therefore be argued that in the absence of national legislation or specification by the Governing Body of the ITPGRFA, access to and collection of accessions *in situ* is submitted to the ABS regime of the CBD. That means that for each accession the conditions of this system are to be fulfilled. As for the varieties which are included in the MLS and collected to be stored in an *ex situ* facility, this also encompasses the informed consent to future facilitated access, which means, first, that neither the accession nor associated TK is to be tracked back to its original holders; and, secondly, that the sharing of benefits follows the rules of the MLS.

In this context, the question arises as to how the collection from *in situ* resources for *ex situ* facilities and other uses can be made operational in the future. First, whether it is possible to find the means and consensus to simplify the PIC requirements for those PGRFA and, secondly, what would be the benefit to the holders of *in situ* resources for contributing their varieties to *ex situ* facilities? It is submitted that in order to create an incentive for granting access, it is necessary that some sort of benefit accrues directly to the donors of the germplasm.

Conclusions and discussion

The contractual ABS system is highly complex and diverse, covering various subject matters, a great variety of stakeholders and different systems for ruling ABS.

The CBD system, which is applicable

³⁵ From the rather obscure formulation of Article 12.3(d) it seems to follow that the interdiction to limit the facilitated access covers only the varieties as received by the *ex situ* facility and not changed by any breeding efforts (cases of ‘pure’ biopiracy).

³⁶ For further exemptions see Articles 11–13 ITPGRFA.

for PGR (including PGRFA and TK), can be used as the basis upon which to establish national frameworks to facilitate bilateral contractual agreements negotiated between the involved stakeholders. The corresponding provisions regulating ABS are directed to the Contracting Parties, and their implementation is explicitly subject to national legislation. Thus, the details for the operation of the system – such as the determination of the stakeholders to be involved in the negotiations, the procedures and the sharing of benefits between the stakeholders of the providing countries – mostly need to be defined on the national level, the Bonn Guidelines giving some interpretative assistance to this end. This is also true for the holders of *in situ* traditional PGRFA and associated TK.

Notwithstanding the provisions of the Bonn Guidelines and the greater degree of differentiation provided by the ITPGRFA, many questions remain, in particular regarding the involvement of grassroots stakeholders. The main question is, of course, how to implement the system of ABS on both the national and international level, and also to make it rewarding for small-scale farmers. With regard to the MLS it is to be asked how to make the system work for local stakeholders. In order to be supportive of the *in situ* maintenance of diversity of PGRFA it is essential that the advantages of the system, be they the access to *ex situ* collections or the other benefits provided by the system, have a low threshold of accessibility for farmers, their communities and organizations.

With regard to operationalizing the ABS system for PGRFA not otherwise inte-

grated into the system, the challenge will be to create standardized instruments (MTAs) which allow for transparent and swift negotiations.³⁷ Supporting institutions, such as clearing house mechanisms or private collecting societies (Chapter 6) could prove useful to facilitating information in support of the marketing and the conclusion of contracts.

7.3.3 The ABS system at the interface with markets: issues to consider

Introduction

Bilateral contractual instruments for the management of ABS to TK associated with PGR and traditional PGRFA have the advantage of adaptive flexibility, allowing for solutions to be determined on a case-by-case basis according to the needs of the parties.

However, up to now, few success stories have been reported relating to both the integration of local people in the ABS process and their sharing of benefits. The operation of the principles proves to be difficult in practice.³⁸

The following problem areas can be identified in the context of international trade:

- The marketability of the goods and the information *per se*.
- The identification of the relevant stakeholders and their integration into the process and the possible inequality of the negotiating partners.

³⁷ It has been suggested that the FAO code of conduct should be referred to for the basic elements of such agreements.

³⁸ See, for example, the Case Studies on Access to Genetic Resources and Benefit Sharing of the CBD (<http://www.biodiv.org/programmes/socia-eco/benefit/case-studies>). The major part of the studies treats institutional matters or describes projects. The same is true for WIPO's contracts database: <http://www.wipo.int/globalissues/databases/contracts/summaries/ind> One (or maximum two) model agreements out of 16 are about the cooperation between a research institute and a holder of TK (Model Agreement between the National Institute for Pharmaceutical Research and Development, Nigeria and a consultant Herbalist, 1997); the actual agreements published on the website all involve governmental agencies, research institutes and companies. But see the initiatives in India (Case study, Chapter 3 and the description of the initiatives of SRISTI/Honeybee and the National Innovation Foundation in Chapter 7 (Registration)). Compare also Ruiz Muller (2000).

- The internationality of the trade relations and the limited reach of national legislation, which could bring about problems of control, implementation and enforcement.
- The dichotomy between the rationale to protect PGR and associated TK from illegitimate use on the one hand and the wish to promote and facilitate trade on the other.

It is submitted that further measures are essential to meet the goal of successful ABS arrangements, such as the development of markets, information and capacity-building, and also the establishment of supportive measures on the side of the recipients. These will be discussed in the following section.

Further, the (contractual) ABS system itself seems not to be without controversy. The respective positions of the USA and Brazil, as expressed in their statements to the Council for TRIPS in regard to review of the provisions of Article 27.3(b), may serve as an example for two opposite positions:³⁹

The US is in favour of the instruments of bilateral contracts on ABS backed by national or local legislation. It perceives the contracts as means to make clear from the start (all of) the conditions for access, including the rights and duties of parties involved as well as additional issues such as questions of court jurisdiction, and conditions to be met by contracts concluded with third parties.⁴⁰

Brazil claims that a contractual approach is clearly insufficient to protect transfer of TK. It points out that bilateral contracts are not easily enforceable, in particular in international trade relationships.⁴¹ Furthermore, it argues that there is no way to ensure that the consent received from the

communities is an informed one, neither that the benefit sharing will be fair and equitable, as they may be the result of negotiations between unequal parties. It is submitted that only a proprietary protection will ensure that market forces will operate to generate fairness and equity.⁴²

An important step in the future evolution of the ABS regime is the recommendation of the Johannesburg World Summit to negotiate a binding instrument or binding instruments for its concretization and implementation. It will also be crucial that in this process the aspects of the market and the marketing of PGRs and TK are taken account of.

Value of PGRFA and TK and the creation of markets

The value of PGR, PGRFA and associated TK for research and development in industrial production processes is controversial (see Chapter 1, this volume).

In the pharmaceutical sector, industries show some interest in TK as a 'potentially valuable source of creativity and invention outside the communities from which the knowledge originates' (WBCSD/WZB, 2003). However, some firms like Novartis point out that 'the potential contribution of bio-prospecting to the biotechnology industry and the communities involved may not be as substantial ... as previously believed' (1999, p. 5).⁴³ Accordingly, Baruffol (2003) concludes that, even if natural compounds and their derivatives may continue to be of interest for the pharmaceutical industry, 'bioprospecting, at least within the next years, will not have the potential to create ... conservation incentives to a larger extent' (p. 112).

³⁹ WTO, Council for TRIPS. The Protection of Traditional Knowledge and Folklore: Summary of Issues raised and Points made. IP/C/W/370, 8 August 2002, No. 23.

⁴⁰ WTO Doc. IP/C/W/209, Review of the Provisions of Article 27.3(b): Further views of the United States, p. 6.

⁴¹ WTO Doc. IP/C/W/228, No. 23. Compare also the statement by India: 'the time, effort and money involved in getting individual patents examined and revoked in foreign patent offices is prohibitive' (WT/CTE/W/156, No. 10).

⁴² WTO Doc. IP/C/W/228, Review of Article 27.3(b), Communication from Brazil, No. 34.

⁴³ See also the statements in Baruffol (2002, p. 112).

For PGRFA, Correa (2000) draws a similar conclusion. He maintains that the market value produced by the gene flow from farmers' varieties to privately marketed cultivars is very modest,⁴⁴ and concludes that 'though it is expected that the demand for primitive materials may increase in the future ... it would be unrealistic to think that substantial value may be derived from current gene flow of farmers' varieties held in *in-situ* conditions' (p. 10). The International Association of Plant Breeders (ASSINSEL) points out that genetic diversity in landraces and wild species represents resources with limited present value for breeding purposes for most species. It is argued that they require a great deal of time and effort to explore, investments which – as a rule – commercial breeders cannot afford (1998, p. 1). From this it can be concluded that the benefits resulting from industrial companies prospecting PGR, PGRFA and additional TK will be less substantial than formerly expected or hoped for.

Therefore, it is submitted that the generation of benefits first requires the development of respective markets. In this context, two aspects are perceived as being essential: first, it seems to be crucial not only to market the genetic, biochemical or informational resource as such, but also to identify and develop markets for primary, semi-processed and processed products, produced on the basis of the biological resources and their associated TK. Accordingly, the markets for the 'raw' products need not only to be situated in an international ('South–North') context, but production chains and markets for processed products may also be created and found on

the local, regional and national level.⁴⁵ This line of thought indicates that the issue of access to genetic resources and associated TK might not only be an issue in the international North–South context, but also on the local or national level. From this follows, secondly, that 'benefits' may not exclusively consist of direct, economic remuneration and compensation, but may also be generated by the sharing of the outcomes of (cooperative) research, which allows for the generation of a value-added product in the provider country itself.

The creation of markets and successful marketing, including the exploitation of instruments to support the marketing of particularly high-value or high-quality products, such as geographical indications, trade marks and labelling, all need to be evaluated and the option to create supporting measures in the framework of the world trade order are to be assessed (Chapters 6 and 8, this volume).

Marketing and access legislation

Important factors influencing the market for genetic resources and associated TK are the transaction costs and legal security in view of the legitimacy of the transaction.⁴⁶ Novartis, for example, cautions against too complicated access procedures and points out the connection between access legislation and marketability of the information: 'if access to biodiversity becomes too bureaucratic, time consuming and expensive, then the importance of biodiversity may become limited to research and academic arenas, instead of market-oriented industrial applications' (Novartis, 1999).⁴⁷

⁴⁴ According to one study, materials from *ex situ* gene banks contributed 3% of the germplasm used by industrial breeders, and materials from *in situ* conservation areas a further 1% (Swanson and Luxmoore, cited in Correa, 2000, p. 10).

⁴⁵ See Gupta (1999/2000) Securing traditional knowledge and contemporary innovations: can global trade links help grassroots innovation? See also as examples the initiatives of community-based commercial cultivation of indigenous medicinal plants by the International Centre of Insect Physiology and Ecology (ICIPE) and the University of Nairobi (<http://www.icipe.org>).

⁴⁶ No pharmaceutical company finds favourable, after having carefully negotiated a contract with a community, acquired the information, and developed a product, to be then 'in the last minute' accused of biopiracy.

⁴⁷ See also WBCSD-WZB (2002, pp. 18–23, in particular Nos 76 and 77).

In this context, Cabrera Medaglia (2003) points out that – instead of promoting access – the national regulations of some countries have focused more on defensive measures, introducing strict controls to prevent ‘biopiracy’. This generates high transaction costs and bureaucratic procedures and the absence of applications for access. He argues that ‘as long as the idea persists that access represents a way of colonialism instead of a mechanism for the generation of appropriate joint initiatives for all participating parties, the possibilities of generating desirable results will be much more limited’. That means, first, that in order to promote the marketing of TK and PGRFA, access procedures must be transparent, flexible and as simple as possible.⁴⁸ They must assure legal security in providing a clear legal basis for the transaction, and designate the parties to be integrated on the provider side in the negotiation and conclusion of the contract.

The question is whether ways can be found to make these criteria compatible with the option to integrate the grassroots providers of the information into the process. It is suggested that such integration might even be advantageous: the assent of all stakeholders could be secured, mutual trust created and the risk of (political) opposition minimized.

However, specific conditions must be fulfilled in order not to complicate the procedure: the process and its participants, including the holders or owners of the resources, must be defined clearly. From the perspective of the communities or individual holders of the information, it would be advantageous to clearly identify the marketable information; this might in particular be the case where the information is integrated in a sacred, spiritual context. Documentation and registration might be a suitable means to this end (see (d), below

and Chapter 6). Further, the competencies and decision processes within the communities must be established.⁴⁹

Control on the side of the users of the information

According to Cabrera Medaglia (2003), there exists a connection between the defensive access legislation of donor states and the lack of control mechanisms on the side of the users of the information. He maintains that implementation problems are the reason behind the defensive, ‘draconian’ and prohibitive access regulations adopted by the provider countries to prevent biopiracy.

The problem is that bilateral contractual agreements on ABS are effective only between the parties to the contract: third parties are not bound by their terms. Therefore it is difficult for the providing party to follow the R&D process, to be aware of possible resulting IPR and to control the legitimate use of the information by its recipients. This is true for state agencies of the providing countries,⁵⁰ but even more so for providers at the community level.

The same is also true for the control of benefit-sharing agreements. Apart from any up-front payments, a fair sharing of the benefits requires the disclosure of acquired benefits and transparency with a view to net gains, which is all based on mutual trust.

Decision 391 of the Andean Pact countries provides for sanctions of infractions against its provisions outside the Andean Community. According to Articles 46 and 47 and the second complementary provision, illicitly attributed property rights must not be acknowledged within the Andean Community, and further access to PGR and TK by the violator can be denied. This solution, which applies only to the

⁴⁸ This is in particular true for access for academic research; the ITPGRFA might provide valuable inspiration to this end.

⁴⁹ See, for example, the Novartis-Uzachi case, where it was an important prerequisite for success that the communities had established decision processes in the management of their natural resources. Baruffol (2003, p. 114).

⁵⁰ See Communication from Brazil to the Review of Article 27.3 TRIPS (IP/C/W/228) No. 24.

Member States of the Cartagena Agreement, illustrates the imperfection of the system in view of the international or global dimension of the interests involved and the international character of the markets.

In sum: the implementation problems brought about by the internationality of the issue and the details of the contractual solution encompass not only the control of the legitimate use of the information, but also the question of bringing about fairness in the sharing of benefits.

The proposed remedy is the adoption of control measures on the side of the recipients and users of the information. It is argued that this would enable the providers to streamline their legislation in a more user-friendly way, supporting the building of trust and the generation of joint initiatives for all participating parties.⁵¹

This conclusion is furthermore backed by an equity argument. It is submitted that the principle of equity demands that the burden of regulating ABS be borne by both providers of genetic resources and TK and the recipients. This is a strong argument for the obligation to create supportive measures, such as the control of the legitimate access to genetic resources and related TK, to be applied on the side of the recipients.

The designation and integration of holders of TK, including capacity-building

Another problem of the contractual approach is that we have to deal with a complex situation involving a variety of stakeholders on different political levels and in different countries. As mentioned above, in order to determine participation in access negotiations, it is crucial to determine the holders of TK and/or PGRFA. The absence or uncertainty regarding ownership implies difficulties in securing PIC.

This issue has two aspects: on the one

hand, the original owners or holders of the information must be determined; and on the other hand, transparency is to be secured throughout the process, which might imply various 'layers' of stakeholders.

THE NECESSITY OF IDENTIFYING THE HOLDERS OF THE INFORMATION

The approach for identifying or designating the holders or owners of PGRFA seems to differ from that applied to associated TK.

The issue is complex because of the great variety of possible situations. The nature of TK, access to it and competence over it all depend on the social, environmental and cultural context in which it is found. It might be in some cases that farmers' varieties can be clearly allocated to specific farming communities (see Chapter 4, this volume), whereas TK associated with medicinal plants is considered to be common to an entire biogeographical region. On the other hand, medicinal TK can be entirely in the hands of one individual shaman, whereas PGRFA may not even be specifically considered as the result of a creative process.

Whereas it seems to be generally acknowledged that the negotiation of an ABS contract has to include the holders of the knowledge, and that contracts must be based on their prior informed consent and on terms mutually agreed with them,⁵² this is not always the case for the on-farm-bred PGRFA. For instance, in the Andean Common Regime on Access to Genetic Resources⁵³, the rights over all genetic resources are considered to belong to the patrimony of the Nation of each Member Country. They are – as 'goods of the Nation' – assigned to the state, independent of the legal regime applicable to the biological resources, meaning the physical entity that

⁵¹ See CBD COP Dec. V/26, No. 4, reiterated in COP CBD Dec. VI/24, No. 8 (c).

⁵² See, for example, Guidelines Nos. 17 ff.; Peru, Law No. 27811 on the Protection of Collective Knowledge of Indigenous Peoples derived from Biological Resources, Chapter 2, this volume; Costa Rica, Law on Biological Diversity, described in Cabrera Medaglia (2003).

⁵³ Decision 391 'Common Regime on Access to Genetic Resources', Commission of the Cartagena Agreement, July 1996.

contains them or the associated knowledge.⁵⁴ Similarly, in Costa Rica, genetic and biochemical wild and domesticated resources apparently belong to the state (Cabrera Medaglia, 2003).

However, it is also maintained that in the case of PGRFA⁵⁵ the farmers or traditional on-farm breeders ought to be designated as the holders of their varieties wherever possible, particularly in the case of semi-formal on-farm breeding of traditional varieties. As discussed earlier, this would allow their participation in the contractual ABS system or in the MS.

The creation of registration systems, possibly combined with a licensing system, is proposed to resolve the problem of the identification and allocation of associated TK to its holders (Chapter 6).

THE NECESSITY OF TRANSPARENCY IN TRADE

In respect of companies and research institutes seeking access, the body responsible for negotiations is the agency designated by the state. The problem frequently is that both within purchasing and providing countries several 'layers' of stakeholder exist, and the information is passed on by several intermediary institutions or agencies.⁵⁶ In order to be able to verify the legitimacy of the access it is necessary to make such procedures transparent. Proposed instruments to do this include certificates of origin, or licensing systems⁵⁷ to prove the legitimacy of acquisition, and thus guarantee legal security. In all these systems, however, the tracing of processes and the proof of legitimacy are bound to be compli-

cated. In any case, a great amount of capacity-building is necessary, not only on the side of the holders of TK, but also on the side of intermediary agencies and purchasers.

7.3.4 Conclusions

The application of the system of ABS to TK reveals a highly complex situation. Despite interpretative assistance provided by the Bonn Guidelines and the more exact differentiation found in the ITPGRFA, many questions remain unanswered, especially regarding the involvement of grassroots stakeholders. The management of ABS of TK associated with PGR and traditional PGRFA in bilateral contractual instruments has the advantage of flexibility, which allows its adaptation to different situations, on a case-by-case basis. However, until the present time few success stories have been reported relating to either the sharing of benefits or to the integration of local people, and, as described above, the operation of the principles proves to be difficult in practice and it has the negative impact of actually discouraging exchanges of materials that are essential to breeding, research and conservation.

Approaches for the solution of these problems might lie in the further evolution of the Bonn Guidelines and, within the ITPGRFA, in the implementation of farmers' rights and the further development of the elements of the Multilateral System (Material Transfer Agreements and Funding System).

⁵⁴ See in detail Rosell (1997). Rosell takes a critical approach to this solution, stating that the property rights regime envisaged by the Decision might be less effective than one based on private property rights. 'From a policy point of view, Decision 391 could have gone further towards recognizing the individual as the owner of the genetic resource, so as to benefit directly the national who has conserved and made available the resource. This in turn might have enhanced the control and enforcement mechanisms which constitute its weak aspects' (p. 282).

⁵⁵ As to the problems of allocation of traditionally 'on farm'-bred varieties see Chapter 4, this volume.

⁵⁶ Example of Zimbabwe: Local healers transmitted information and plant samples to the local university. The local university transmitted the samples to a Swiss university. The Swiss university sold the results of research to an American company.

⁵⁷ Tobin (1997, p. 337); Peruvian Law No. 27811 on the protection of the collective traditional knowledge of indigenous peoples, Articles 25–33. Certificates of origin to prove the legitimate acquisition of a good are a common instrument to control, for example, trade in endangered species.

It is submitted that a broad variety of supporting measures are needed to allow the providers of TK and traditional PGRFA to increase the benefits received from their resources and wisdom. The following points are considered to be essential:

- Instruments and institutions for the clear identification of local stakeholders are to be created, such as documentation, registration and *sui generis erga omnes* rights.⁵⁸ It is necessary to support a bottom-up approach, where the entitled stakeholders are clearly designated and integrated in the instruments.
- Capacity-building measures are necessary for both the providers and purchasers of the biological resources.
- The obligation by the providers and providing countries to facilitate access must be balanced against the obligation of recipients to create control instruments. Control instruments (for legitimate access) are to be created either on the national or international level (or both).
- Technology transfer is to be furthered, in particular to support the development of processed products and to encourage trade on the local, regional and/or international level. Instruments to support trade in high-level products should be evaluated and the options within WTO assessed.
- It might be advisable to find means to assess the cost-benefit ratio of measures, e.g. the potential market value of the resources in question in particular countries, so as not to go down the route of expensive regulation for no return benefits.

7.4 Financial Mechanisms for Compensation of Non-assignable Traditional Plant Genetic Resources and Traditional Knowledge⁵⁹

7.4.1 The role of a future financial mechanism in the context of access to genetic resources

Aims and functions of a future financial mechanism

This section examines the possibility of establishing an international mechanism for providing financial resources for the valuation of TK associated with PGR and traditional PGRFA, where neither IPR nor *sui generis* rights can be allocated.⁶⁰ In the absence of allocated rights, the challenge will be to design a financial mechanism that can substitute the compensation of TK holders through the exercise of the relevant rights by these holders. Ways and means must be found to generate financial means and to direct them to the holders of the knowledge in a way that supports the preservation and maintenance of TK, the promotion of its wider application with the approval and involvement of the holders, and the equitable sharing of the benefits, as set out in Article 8(j) of the Convention on Biological Diversity (CBD). Ultimately, the financial mechanism should contribute to furthering the aims of the CBD as they relate to plant genetic resources, and those of the ITPGRFA, namely the conservation and sustainable use of the genetic resource base and the equitable sharing of benefits derived from it.

In order to achieve this overarching objective, the mechanism should fulfil the specific functions outlined below.

First, a central function of a future financial mechanism will be to promote the equitable sharing of benefits derived from plant genetic resources, and to compensate

⁵⁸ See WTO IP/C/W/370, 24–28.

⁵⁹ Author: Katharina Kummer Peiry. I wish to thank Juliette Voïnov, Martin Girsberger and Susette Biber-Klemm for their input and comments on earlier drafts of this section.

⁶⁰ The problem of allocation of intellectual property rights and *sui generis* rights is discussed in Chapter 4, this volume.

holders of TK associated with PGR and traditional PGRFA for the service they provide to users of the resources and to the international community at large. As far as the financial burden of contributing to the mechanism is concerned, this should be shared among interested persons and entities in a manner that is perceived as fair and equitable by all. This will enhance the legitimacy of the mechanism and the willingness of actors to contribute to it. Criteria to be considered in equitable burden sharing include the financial capacities of the actors on the one hand and the extent of their use of the resources on the other.

Secondly, sufficient financial means, the availability of which is assured on a long-term basis, are indispensable for a functioning financial mechanism. Without such a basis, a mechanism is not able to operate in accordance with an ongoing work plan and budget. In addition, projects aimed at sustainable resource management often have a long life span. An important element of the predictability of funding is quantification of the incoming funds. The creation of a broad financial basis also calls for the inclusion of as many sources of funding as possible. In building a financial mechanism, a central question thus concerns the means by which the most funding can be generated in the most reliable and predictable manner.

Thirdly, a future financial mechanism should ideally influence the behaviour of relevant actors by creating incentives for preserving and maintaining TK associated with PGR and traditional PGRFA. This includes the valuation and support of efforts at conservation and sustainable use of plant genetic resources, and the empowerment of TK holders. In accordance with the nature of the mechanism, these incentives will be of a financial nature. The mechanism should provide the appropriate incentives both for users of PGR and PGRFA, who are the prospective contributors to the mechanism, and for holders of TK associated with PGR and traditional PGRFA, who are the prospective recipients. As regards users, the creation of incentives for the private sector (in particular, relevant

industry depending on access to specific resources) to contribute to the mechanism is a particularly important aim.

Elements of a future financial mechanism

If an international financial mechanism is to be established for the purpose of achieving the above aims and functions, the following elements of the mechanism will need to be defined.

First, as the financial mechanism is to operate at the international level, it should be established in an international framework, either as part of an existing international body or as an independent international institution. The mechanism should be established by an international legal instrument, which would constitute the legal basis of its operation. As a minimum, it needs to feature an executive body with the competence of generating financial means, in general by collecting contributions, and of disbursing funds to recipients. It should also have a supreme organ to which the executive body is accountable. Rules must be elaborated for the generation, administration and disbursement of funds. This will include a procedure for submission of claims and for decisions regarding the disbursement of funds. Depending on the size of the operation, the body will need to be supported by a secretariat. The future mechanism must have a legal personality recognized by all parties involved in its operation. As it will be established at the international level, this must include recognition by the legal systems of participating states.

Secondly, the sources of funding and the methods of generating funds must be defined. There are various possible avenues. In view of achieving a stable and predictable financial basis, the most obvious is the establishment of a system by which defined contributors (states and/or private entities) must make regular financial contributions to the financial mechanism. This can be done, for example, by using a scale of assessment setting out criteria for the level of contribution, in accordance with the financial position of the

contributor.⁶¹ Another method to be considered is a levy on a certain type of activity or on the use or consumption of a certain type of good. In the present case, this would mean any direct or indirect use of TK associated with PGR and traditional PGRFA. This approach has the advantage of placing the financial burden on the persons benefiting directly from the pertinent activity, and making the size of the contribution directly dependent on the extent of economic benefit derived from the TK and resulting genetic resources. This would constitute a contribution to equitable burden sharing.

Thirdly, the contributing entities must be defined. Bearing in mind the function of compensating holders of TK associated with PGR and traditional PGRFA, for their service to those using the resulting resources, contributors to the financial mechanism should be entities that reasonably can be assigned financial responsibility in this context. An obvious motivation for assigning such responsibility is the fact that the contributor directly or indirectly benefits from TK associated with PGR and traditional PGRFA. This is the case for any 'user' of such knowledge, notably private enterprises (for instance, seed companies) and research institutions. The motivation for assuming financial obligations could also be the more general role of the state in ensuring the protection of fundamental interests of its nationals as well as the conservation and sustainable management of its genetic resources base. Thus it would be conceivable also to devise a system by which contributions are made by states (Girsberger, 1998). In view of achieving a broad financial basis, the establishment of a financial mechanism involving contributions both by states and by private entities may be the most efficient approach.

Fourthly, the claimants need to be defined. As the mechanism has the function of providing financial compensation to

holders of TK associated with PGR and traditional PGRFA, in cases where the allocation of traditional or *sui generis* IPR is not possible, the definition of the claimants should not be too restrictive. At the substantive level, it should be possible to define as claimant any entity that is either a holder of TK, or working to promote the interests of TK holders, independently of whether or not the entity in question assumes a recognized legal form, in order to accommodate the often informal character of TK holders. At the procedural level, however, it will be necessary to define the holder as a natural or legal person, in particular for the purposes of the procedure to be established for the submission of claims and the disbursement of funds. In order to reconcile these conflicting needs, it will be necessary to find a way of designating persons or organizations as formal representatives of relevant informal communities, and to require appropriate legitimization. Hence claimants could be defined as organizations formed by holders of TK associated with PGR and traditional PGRFA (for instance, village council or similar), or NGOs with a recognized curriculum in the pertinent field.⁶² In the case of utilization of generally known information in the context of PGR (for instance, neem), it is conceivable that entire countries, provinces or communities be defined as recipients. The verification of a claimant's legitimacy will be one of the tasks of the body operating the fund.

Fifthly, it will be necessary to define the criteria for disbursement of funds. The flow of financial resources must be designed so as to support the aims as outlined above. In view of the often informal nature of holders of TK associated with PGR and PGRFA, and traditional PGRFA, which may make representation by a natural or legal person necessary, it is important that such representatives can only obtain funding for activities that demonstrably support the aims. An approach to be investigated is to

⁶¹ This is the method of defining contributions to certain UN institutions or conventions by member states. The UN scale of assessment is based on the GNP of the states.

⁶² Girsberger (1998, p. 308) mentions the possibility of claimants being NGOs representing holders of Farmers' Rights.

disburse funds for the implementation of programmes or projects that promote one or more of the aims outlined above. Such projects would have to be submitted to the body administering the fund, which would determine whether or not the project met the criteria.⁶³

7.4.2 Analysis of existing mechanisms as possible models

This paragraph analyses a number of existing multilateral financial mechanisms in international law, with a view to establishing their potential usefulness as models for a future financial mechanism for TK associated with PGR and traditional PGRFA, taking into account the aims discussed above. Emphasis is placed on financial mechanisms that feature the elements discussed above. Where it is considered to be of particular interest, instruments will also be discussed that are not financial mechanisms but include one or more of the above elements. The following paragraphs discuss two different types of financial mechanisms used in international environmental law, namely assistance funds and compensation funds, as well as the Flexible Mechanisms of the Kyoto Protocol, which may provide some interesting insights. It then goes on to provide an overview of pertinent ongoing work within the framework of FAO.

There are a variety of existing and prospective financial mechanisms in international environmental law. Their structure and functioning are conceptually different in accordance with the aims for which they have been established. The following fundamentally different purposes of a mechanism of this type can be distinguished.

Financial mechanisms aiming at the provision of assistance to developing and transitional countries ('assistance funds')

This type of financial mechanism is used in the field of environmental protection. Its

aim is generally to assist recipient states in meeting their obligations under international law, and to develop or strengthen their capacities and infrastructure for adopting environmental protection measures at the national level. Where the mechanism is established in the framework of an MEA, its function is to assist party states in the implementation of that MEA at the national level. Assistance funds are established by an international legal instrument, and operated by a multilateral organization. The establishing instrument determines their management and administration, as well as the means of generating funds and the criteria for distribution. Both donors and recipients can only be states: this type of fund does not provide for contributions or claims by non-state entities. The establishing instrument defines donor and recipient states, and the scale of assessment for contributions of donor states and the criteria for financing activities in recipient states. As a general rule, donor states are industrialized countries, whereas recipient states are developing countries and countries with economies in transition. Where the financial mechanism is linked to an MEA, only contracting parties can be donors and recipients.

Special types of assistance funds are trust funds for particular activities to be carried out in the framework of an MEA. These funds also aim at supporting the implementation of the MEA, but their focus is narrower: they support activities related to the operation of the MEA and the participation of a particular category of countries in these activities. Examples of MEAs establishing trust funds are the conventions for which UNEP acts as Secretariat, including the CBD, the Basel Convention on hazardous wastes, CITES, and the Vienna Convention and its Montreal Protocol on ozone-depleting substances. A trust fund has also been established for the Climate Convention and its Kyoto Protocol. Under the Kyoto Protocol, a number of funds to support climate-related activities are to be established after its entry into force.⁶⁴ This type of trust fund

⁶³ For a similar line of argument see Girsberger (1998, p. 308).

⁶⁴ COP Decision 5/CP.6 (2001), Section I.

is established and operated as a part of the institutional framework of the relevant agreement; no special body is established for this purpose.

In some cases, the entire budget of a convention is financed through a trust fund, to which all contracting parties contribute in accordance with an agreed scale of assessment (for instance, Basel Convention, CBD, CITES, ozone treaties). In these cases, the budget is determined by the Conference of the Parties (COP). By contrast, contributions to trust funds established for special purposes are usually voluntary. Such trust funds support a fairly narrow and clearly defined range of activities. Beneficiaries are usually developing countries, in some cases including countries with economies in transition. Purposes for which special trust funds are set up include the participation of developing and transition countries in negotiating meetings within the framework of the convention (Climate Convention, CBD, Basel Convention), technical assistance to developing countries (Basel Convention, Ramsar Convention on wetlands), and financing of special Secretariat support to Parties, for instance, workshops, seminars and websites (Climate Convention).⁶⁵

THE GLOBAL ENVIRONMENTAL FACILITY⁶⁶

The Global Environmental Facility (GEF) was established in 1991 and restructured in 1994 through the adoption of the Instrument for the Establishment of the Restructured Global Environment Facility ('the Instrument'). The Instrument lays down the fundamental principles of the operation of the GEF, including, *inter alia*, governance and structure, principles of decision-making, beneficiaries, as well as contributions of participating countries during the first replenishment period (from 1994 to 1997).

The objective of the restructured GEF is

to serve as a mechanism for international cooperation for the purpose of providing new and additional grant and concessional funding to meet the agreed global environmental needs in the following focal areas: (i) global warming/climate change; (ii) pollution of international waters; (iii) loss of biological diversity; (iv) depletion of the stratospheric ozone layer; (v) persistent organic pollutants; and (vi) land degradation. The GEF supports activities in the above areas through projects on a grant or concessional basis. The projects and other activities are generally carried out in cooperation with the institutional mechanism of the conventions addressing the issues in question, where such a convention exists.

The GEF is jointly operated by the World Bank, the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). Its principal mechanism is the GEF Trust Fund. Other features are the independent Scientific and Technical Advisory Panel to assist in the development of criteria for project selection and to review and comment on project proposals, and the Small Grants Programme for NGOs. There are also additional co-financing agreements. The World Bank carries out the secretariat functions for the GEF and is Trustee of the GEF Trust Fund. It is also responsible for the GEF-financed investment projects. UNDP provides technical assistance, identifies projects and runs the Small Grants Programme for NGOs. UNEP provides the secretariat for the Scientific and Technical Advisory Panel and contributes environmental experience. Any member state of the UN or of any of its specialized agencies may become a participant in the GEF by depositing an instrument of participation in accordance with the Instrument. With 174 participants (as of April 2003), membership of the GEF is nearly universal.

⁶⁵ This is discussed by Ten Kate and Lasén Diaz (1997, p. 289); in the *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 92 (Climate), p. 108 (Basel Convention), p. 169 (CBD) and p. 174 (CITES); and by Bragdon (2001, p. 2).

⁶⁶ See Glowka *et al.* (1994, p. 107); *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 220; GEF website: <http://www.gefweb.org>

The governing bodies of the GEF are the Assembly and the Council. The Assembly, in which all participating states are represented, reviews the general policies of the GEF, and evaluates its operation on the basis of reports submitted by the Council. The Council is the main governing body, responsible for developing, adopting and evaluating the operational policies and programmes for GEF-financed activities. It is composed of 32 members (16 from developing countries, 14 from developed countries and two from Central and Eastern European countries).

In accordance with the Instrument, beneficiaries of the GEF are the countries eligible to borrow from the World Bank, or eligible for technical assistance from UNDP, i.e. countries with a per capita income of less than US\$4000 per year. The following principal criteria for project selection (grants) are applied: (i) the project must benefit the global environment, and (ii) the project must be innovative.

Any country (developed, developing or transitional) can pledge contributions to the GEF in accordance with the criteria laid down in the Instrument. Contributions by developed countries as laid down in Annex C to the Instrument are roughly in line with a formula based on their shares in the World Bank's International Development Association. For the second replenishment, 28 countries announced pledges to the GEF Trust Fund, including ten developing countries.

In accordance with Article I para. 6 of the Instrument, the GEF operates the multilateral financial mechanisms of several environmental conventions. In operating the financial mechanism of a convention, the GEF carries out projects and other activities related to the aims, priority areas and work programmes of the convention in question. These activities are determined in close cooperation between

the COP to the agreements in question and the Council of the GEF. The COP to the multilateral agreements, in accordance with the applicable provisions of the agreements, regularly provides guidance to the GEF with respect to the operation of the financial mechanism, and the Council of the GEF regularly reports to the COP of the agreements on activities carried out and planned in accordance with guidance received. Under the UN Framework Convention on Climate Change (Climate Convention), the COP has adopted a number of decisions providing guidance to the GEF in fulfilling its function as the financial mechanism of the Convention, in accordance with its Articles 11 and 21 and with Article I para. 6 of the GEF Instrument.⁶⁷ At its second session in 1996, the COP adopted a Decision that brought into force a Memorandum of Understanding between the COP and the GEF Council concerning operation of the financial mechanism by the GEF on an interim basis.⁶⁸ At its fourth session in 1998, the COP designated the GEF as the entity operating the financial mechanism on a permanent basis, subject to review every four years.⁶⁹ The GEF is also available to meet the agreed full costs of activities under Article 12 of the Climate Convention. Investment projects financed by the GEF under the Climate Convention focus on the reduction of greenhouse gas emissions by increasing energy efficiency and the use of renewable energies, as well as support to developing countries to implement the Convention and to prepare national communications to the COP. The GEF also promotes bilateral and multilateral co-financing and the leveraging of private sector participation and resources. In its role as the operating entity of the financial mechanism of the Climate Convention, the GEF has to date provided about US\$1.125 billion in the form of grants from the GEF Trust Fund for climate change projects in

⁶⁷ Cf. COP Decisions 10/CP.1, 11/CP.1, 12/1 (1995), 10/CP.2, 11/CP.2 (1996), 2/CP.4, 12/CP.4 (1998), and 8/CP.5 (1999).

⁶⁸ COP Decision 12/CP.2 (1996).

⁶⁹ COP Decision 3/CP.4 (1998).

non-Annex I countries.⁷⁰ In accordance with Article 11 of the Kyoto Protocol, financial assistance to developing countries adopting measures under the Protocol is to be provided, *inter alia*, through the GEF as the financial mechanism of the Climate Convention.⁷¹ This task of the GEF will become operational after the entry into force of the Protocol.

On an interim basis, the GEF also operates the financial mechanism of the CBD and its Cartagena Protocol on Biosafety, and that of the Stockholm Convention on Persistent Organic Pollutants (POPs), as provided in these agreements. The modalities are largely the same as under the Climate Convention.

THE MULTILATERAL FUND OF THE MONTREAL
PROTOCOL ON SUBSTANCES THAT DEplete THE
OZONE LAYER⁷²

The Multilateral Fund of the Montreal Protocol is the best-known example of a financial mechanism set up within the framework of an MEA to assist developing country parties in complying with their obligations under the agreement in question. Its establishment in the early 1990s was considered a major breakthrough in favour of developing countries, which generally prefer an independent financial mechanism to a mechanism under the responsibility of the Bretton Woods Institutions, including the GEF (Lang, 1992). Indeed, the Multilateral Fund of the Montreal Protocol remains the only independent financial mechanism in a multilateral environmental agreement to date, later treaties having entrusted the operation of their financial mechanism to the GEF (see above). In accordance with Article 10 of the Montreal Protocol, which forms part of the so-called London Amendment of 1990, the

Fund was established initially on an interim basis to meet agreed incremental costs to developing countries of implementing the control measures of the Protocol. In 1993, the Multilateral Fund was established on a permanent basis. The implementing agencies are UNEP, UNDP, the World Bank and – as of 1992 – UNIDO, with UNEP also serving as treasurer. Contrary to the treaties discussed in the previous section, the Montreal Protocol does not entrust the governing of the financial mechanism to an outside UN institution, but assigns this function to the Executive Committee, which is composed of Parties to the Protocol. The Meeting of the Parties (MOP) to the Montreal Protocol periodically approves a three-year budget of roughly US\$500 million.

Beneficiaries of the Multilateral Fund are Parties that benefit from a more favourable schedule under Article 5 of the Montreal Protocol (i.e. Parties that are developing countries and have a yearly per capita consumption of less than 0.3 kg of CFCs and halons). Contributions are made by Parties that do not operate under Article 5, in accordance with the UN scale of assessment. Other Parties may contribute on a voluntary basis. The Fund has been replenished four times to date: US\$240 million (1991–1993), US\$455 million (1994–1996), US\$466 million (1997–1999) and US\$440 million (2000–2002). As at 28 February 2001, the contributions made to the Multilateral Fund by some 32 non-Article 5 countries amounted to US\$1.22 billion.

The Executive Committee of the Multilateral Fund, in which 14 Parties are represented (seven Article 5 and seven non-Article 5 countries), governs the operation of the Fund. It is elected by the MOP for one calendar year. The positions of

⁷⁰ The countries not listed in Annex I of the Climate Convention comprise all developing countries parties to the Convention.

⁷¹ See *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 90 ff.; UNFCCC website: <http://www.unfccc.de>

⁷² On the Multilateral Fund of the Montreal Protocol, see generally *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 98; website of the Ozone Fund: <http://www.unep.org/ozone/finances.shtml>

Chairperson and Vice-Chairperson alternate between the two groups of countries. The Executive Committee is responsible for the development of operational policies of the Fund, criteria for project eligibility as well as other guidelines and administrative arrangements, monitoring of the implementation of these policies, approval of implementing agencies' business plans and work programmes, approval of expenditures for investment projects and other activities, allocation and disbursement of resources, and the monitoring and evaluation of performance.

The Fund Secretariat was established in 1991 to assist the Executive Committee in the discharge of its functions. Its activities include the development of a 3-year plan and budget as well as a system for disbursement, the management of the business planning cycle of the Fund, the monitoring of expenditures and activities of the implementing agencies, the preparation of policy papers and other documents, the review and assessment of investment projects, country programmes and the business plans and work programmes of the implementing agencies, liaising between the Committee, governments and implementing agencies, and servicing meetings of the Executive Committee. The Secretariat also carries out the function of monitoring and evaluating the effectiveness of the Fund, which was introduced by the Executive Committee in May 1997. The Secretariat thus has important substantive functions in the operation of the Fund, which go far beyond the administrative and supporting functions generally entrusted to secretariats of international agreements and institutions.

OTHER ASSISTANCE FUNDS IN THE ENVIRONMENTAL FIELD

Additional assistance funds include notably the World Heritage Fund of the UNESCO Convention Concerning the Pro-

tection of the World Cultural and Natural Heritage, the Small Grants Fund of the Ramsar Convention on wetlands, and the Global Mechanism of the UN Convention to Combat Desertification (Bragdon, 2001). The objective of these mechanisms is to fund projects in developing countries to support the implementation of the agreement in question. The institutional structure and management of funds are similar to the Montreal Protocol Fund. Some funds provide for assessed obligatory contributions from industrialized states parties to the MEA, which are generally rather modest. However, the larger part of the contributions is of a voluntary nature. Accordingly, the financial basis is generally more modest than that of the Montreal Protocol Fund.⁷³

ASSISTANCE FUNDS AS MODELS FOR PLANT GENETIC RESOURCES AND TRADITIONAL KNOWLEDGE

Funds of this type feature all the elements discussed above. As far as the institutional infrastructure governing the mechanism is concerned, the existing assistance funds may well have a certain model function for equivalent efforts in the field of PGR. In terms of generating a stable and predictable financial basis, the system of compulsory contributions based on a scale of assessment could also provide a useful model.

The function of assistance funds, however, is a different one from that underlying a future mechanism for PGR, namely capacity-building for states to undertake environmental protection activities at the national level. Consequently, states are the only actors in this type of financial mechanism, and the mechanisms depend entirely on contributions from states, whether on a compulsory or on a voluntary basis. In order to fulfil the function of compensating TK holders who often have an informal character and are nearly always non-state actors, appropriate changes would therefore need to be made if the concept of an assis-

⁷³ The 1997 Budget of the UNESCO Fund was US\$3.5 million: the yearly budget of the Global Mechanism of the Desertification Convention is similar, and that of the Ramsar Small Grants Fund is a few hundred thousand Swiss francs. See Bragdon (2001).

tance fund were to be used as a model.

Another constraint is the absence of incentives for contributors. As discussed above, an important factor in devising a financial mechanism for plant genetic resources is the creation of incentives for preserving the genetic resource base. Also, a financial mechanism is likely to be more successful if there is a direct or indirect benefit flowing from contribution. By contrast, the assistance funds offer no incentives for contributors. Donor states derive no concrete benefit from their contribution, but contribute on the basis of the concept of a historical and economic responsibility of the richer towards the poorer states, and of the shared interest in the conservation of the natural resources of the globe. The absence of direct incentives makes this mechanism inherently less attractive for donors. As far as recipients are concerned, an assistance fund does provide certain incentives for acting in accordance with the aims of an MEA, as only pertinent activities are financially supported in the recipient state.

Precedents show that the establishment of an assistance fund is generally a difficult issue in international negotiations, and one that creates a fundamental North–South divide. Developing countries usually favour an independent financial mechanism, as in the Montreal Protocol, an attitude in part due to these countries' inherent mistrust of the GEF. Developing countries also generally want to endow the fund with far-reaching responsibilities. Arguing that they lack capacities for implementing MEAs, they strongly support making the extent of their implementation of a given treaty dependent on the level of funding they receive from the mechanism.

Developed countries, on the other hand, are usually opposed to the establishment of an assistance fund. Since such mechanisms are generally administered by a body with equal representation of recipient and donor countries, as in the case of the Multilateral Fund of the Montreal Protocol, or with a majority of recipient countries, as in case of the GEF, developed countries feel

they would be contributing to a mechanism over which they do not have control. They are also reluctant towards the creation of new institutional infrastructure with the resulting additional costs and bureaucracy. Developed countries therefore generally prefer existing bilateral channels, namely overseas development cooperation, to be used for financial support of implementation of an MEA by developing and transition countries. In addition, budget cuts in many government administrations in recent years have led to a reduction of the amount of money available for international financial mechanisms, which is an additional reason for prevailing reluctance on the part of most developed countries. This political difficulty should also be taken into account if this type of financial mechanism were to be considered as a model.

Financial mechanisms forming part of a treaty system on civil liability for environmental damage caused by potentially hazardous activities ('compensation funds')⁷⁴

The financial mechanisms discussed in this paragraph, often referred to as 'compensation funds', are designed to supplement an international civil liability regime through provision of compensation to persons having sustained damage as a result of a potentially hazardous transaction, in cases where compensation is unavailable or only partly available under the civil liability provisions. They are established within the framework of an international legal regime on civil liability for damage caused by potentially hazardous activities, either by the treaty addressing civil liability, or by a separate treaty that has a link to the civil liability treaty. The objectives of a compensation fund are to ensure adequate compensation of victims of environmental damage, and to spread the financial burden of compensation among the potential perpetrators of damage (Doeker and Gehring, 1992; Kummer, 1995/1999). In this respect, it fulfils a similar function to insurance.

There is an inherent close relationship

⁷⁴ For an analysis see Kummer (1995/1999, p. 252 ff.).

between the civil liability agreement and the compensation fund. The civil liability agreement sets out the obligation of the perpetrator of damage, generally an operator carrying out a potentially hazardous activity, to pay compensation to persons having suffered damage as a result of that activity, if his liability is established. This approach constitutes a unification of laws, designed to overcome the procedural obstacles inherent in the perpetrator and the victim being subject to the jurisdiction of different countries with different legal systems. An international agreement on civil liability is self-executing, i.e. creates enforceable rights and obligations for private persons under the jurisdiction of contracting parties to the treaty. The liable persons, as well as the victims, are generally private persons. The state as such does not have a role except where it is the perpetrator (for instance, as operator of a hazardous installation) or the victim of damage (for instance, as owner of contaminated land).

As a general rule, civil liability treaties establish a financial limit of liability of the operator. In addition, there is usually an exclusion clause, for instance, where damage is the result of *force majeure*, armed conflict or acts of terrorism. Also, practical reasons may make it impossible to obtain full compensation under the liability regime: for instance, where the identity of the perpetrator is not known, the perpetrator cannot be held liable in accordance with the liability treaty, the damage exceeds the financial ceiling set by the regime and/or compulsory insurance, or the liable operator is unable to meet his financial obligations. Thus, in some instances, full compensation for damage sustained is not available under a civil liability treaty. In these cases, the role of the fund is to replace or supplement the compensation received under the liability treaty.

Due to its aims and nature, compensation funds directly involve private persons, in contrast to the assistance funds

described previously. In accordance with the nature of a civil liability agreement, the contributors to a compensation fund, as well as the claimants, are natural or legal persons under the jurisdiction of a contracting party. The state can be a contributor or a claimant if it is an operator, or if it has suffered damage. Otherwise, the state may have the role of facilitator, i.e. by collecting funds from the contributors and forwarding them to the compensation fund. However, it is also possible for the international institution operating the fund to collect the contributions without the involvement of national authorities.

Compensation funds have a legal personality that is recognized by the legal systems of the contracting parties to the constituting international legal instrument. The constituting instrument determines the criteria for contributions, conditions for disbursement of funds and the claims procedure. Contributions are made by operators that are potentially liable under the corresponding regime, often levied on the goods or services they provide. Claimants are persons having suffered damage as a result of a hazardous activity who do not receive full compensation under the corresponding liability agreement. Most compensation funds place a limit on the amount to be paid in a single incident.

The funds have an institutional infrastructure established by the constituting treaty. This normally consists of an executive body responsible for making decisions regarding collection and disbursement of financial means; a supervisory body consisting of all parties to the establishing agreement, which determines the policy and management criteria, and gives guidance to the executive body; and a secretariat responsible for administrative matters.

In practice, both international agreements on civil liability for environmental damage and compensation funds established within their framework have proved so far to be difficult to negotiate.⁷⁵ Only the

⁷⁵ For an overview of ongoing work in international fora and difficulties encountered, see the Synthesis of developments in the field of liability and redress prepared by the Secretariat of the Convention on Biological Diversity (Document UNEP/CBD/COP/5/16, 1 March 2000).

International Oil Pollution Compensation Funds discussed below are based on a legal instrument that has entered into force; they are thus the only ones that have been in operation for a number of years. The other instruments are not operational, and there is hence no possibility of judging their effectiveness in practice.

THE INTERNATIONAL OIL POLLUTION COMPENSATION FUNDS (IOPC FUNDS)⁷⁶

The first IOPC Fund was set up under the 1971 Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage (1971 Fund Convention), which supplements the 1969 Convention on Civil Liability for Oil Pollution Damage. Both conventions were adopted under the auspices of the IMO. Prior to entry into force of these instruments, the oil industry established its own funding schemes, namely the Tanker Owners' Voluntary Agreement concerning Liability for Oil Pollution (TOVALOP, 1968) and the Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL, 1971), both financed by cargo interests. The industry schemes covered nearly 90% of the world tanker fleet within a short time, which shows the degree of support from the relevant industry for this type of scheme.

In 1992, both the 1969 and the 1971 Conventions were amended by respective Protocols. The amended instruments are known as the 1992 Civil Liability Convention (CLC) and the 1992 Fund Convention (FC), which set up the 1992 IOPC Fund. The amended Conventions entered into force in 1996. The industry schemes TOVALOP and CRISTAL, having become obsolete with the entry into force of the amended Conventions, were terminated in 1997. After a transitional period, during which both the 1971 Fund and the 1992 Fund were operational concurrently, the 1992 regime replaced the 'old' 1969/71

regime. On 24 May 2002, the 1971 Fund Convention ceased to be in force. The fundamental aims, structure and mode of operation basically remain the same. This discussion focuses on the 1992 IOPC Fund.

The 1992 IOPC Fund covers damage occurring in connection with the bulk transportation of oil by sea. It has a dual aim: first, to provide a compensation system supplementary to the system established by the 1992 CLC, in order to ensure full compensation to victims of damage caused by persistent oil spilled from laden tankers; and secondly, to distribute the economic burden among the shipping industry and cargo interests. Compensation from the Fund can be claimed in cases where full compensation is not available under the CLC. As the CLC permits ship owners to limit their liability under certain conditions, this may be the case where the actual damage sustained goes beyond the limit established. It may also be the case if the tanker owner cannot be identified, or is insolvent and uninsured, or is exonerated from liability under the provisions of the CLC.

The IOPC Fund is an international organization with legal personality, independent of IMO or other UN organizations. Every Party to the Convention automatically becomes a member of the Fund.

The Fund is financed by levies on certain types of oil carried by sea. These are collected by the Fund directly from the entities that receive oil after sea transport, which can be private or state-owned companies, or a state itself. Annual contributions are levied on entities receiving more than 150,000 tons of crude oil and/or heavy fuel oil in a party state, after sea transport, during a calendar year. The contributions are determined in proportion to the quantity received, and on the basis of anticipated payments of compensation and estimated administrative expenses during the forthcoming year. Each party must communicate annually to the Fund Secretariat a

⁷⁶ For a further discussion see Doeker and Gehring (1992, p. 418); Rengifo (1997); Report in the *Yearbook of International Cooperation on Environment and Development 1999/2000*, pp. 128–129; Gold (1999, p. 31); and White (2001).

list of oil-receiving entities under its jurisdiction, and the amount of oil received by each. These lists are confidential, and are closely monitored by the Secretariat. The Fund Convention does not provide for contributions by states except where they are oil-receiving entities.

Persons having suffered pollution damage in a state that is a party to the Convention may make a claim against the IOPC Fund for compensation. Under the 1992 Fund Convention, the maximum amount of compensation payable from the Fund for a single incident, including the amount paid by the ship owner or his insurer under the 1992 CLC, is 135 million SDR⁷⁷ (about US\$174 million). Where at least three party states have received at least 600 million tons of oil in the previous year, the limit may be increased to 200 million SDR (about US\$257). Under a 2000 Amendment that entered into force in 2003, the maximum was increased to 203 million SDR (about US\$260 million) for a single incident.

The institutional infrastructure consists of the Assembly as the supreme governing body of the Fund, composed of all parties to the Fund Convention; the Executive Committee, composed of 15 members, with the main function of approving settlement of claims, to the extent that the Director is not authorized to do so; and the Secretariat headed by the Director, responsible for the conduct of business, including collection of contributions and settlement of claims up to a certain amount.

The CLC Convention has been ratified by 91 countries, representing 91% of the world tonnage, and the 1992 Fund Convention has been ratified by 85 countries, representing 87% of the world tonnage.⁷⁸ In this respect, the system can thus be considered successful (White, 1999).

COMPENSATION FUNDS TO BE ESTABLISHED UNDER THE HNS AND BASEL CONVENTIONS

Under the International Convention on Liability and Compensation in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS) of 1996, a compensation fund is to be established to supplement the liability provisions under the Convention.⁷⁹ The HNS Convention covers potentially hazardous chemical substances transported by sea. The objectives, mode of operation and structure are similar to the IOPC Funds. As only two states have ratified the Convention,⁸⁰ it has not yet entered into force, and it is increasingly unlikely that the HNS Fund will ever become operational.

Under the Basel Convention on hazardous wastes, two types of funds with the purpose of compensating damage caused by hazardous wastes have been under consideration for many years, although neither is likely to be established in the foreseeable future. The first fund under discussion is a compensation fund to be set up in the framework of the 1999 Protocol on civil liability to the Basel Convention, with a structure, mode of operation and objectives similar to the IOPC and HNS Funds. However, when adopting the Protocol, states were unable to agree on an explicit legal basis for a compensation fund. The second prospective mechanism is a so-called revolving fund, for which Article 14 para. 2 of the Convention provides the legal basis. This fund would provide financial resources for emergency measures in the event of damage caused by hazardous wastes. The parties to the Convention would contribute on the basis of a scale of assessment. After settlement of the liability claim, the revolving fund would have the right of recourse to the liable person

⁷⁷ The 1992 Fund Convention uses the Special Drawing Right (SDR), defined by the International Monetary Fund as a unit of account. As of October 2001, the applicable exchange rate was 1 SDR = US\$1.287.

⁷⁸ Data as of February 2003. See list of ratifications published on the IMO website: <http://www.imo.org>

⁷⁹ On the HNS Convention and Compensation Fund, see generally Rengifo (1997) and the *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 130. The information provided here has been obtained from the IMO website: <http://www.imo.org>

⁸⁰ See status of Conventions published on the IMO website: <http://www.imo.org>

or the compensation fund, as the case may be.⁸¹

COMPENSATION FUNDS AS MODELS FOR PLANT GENETIC RESOURCES AND TRADITIONAL KNOWLEDGE
As is the case with the assistance funds analysed above, the compensation funds feature all the necessary institutional elements outlined previously (pp. 302–303). The fundamental difference between this type of mechanism and a potential mechanism in the context of PGR is that this type of fund is tied to the concept of liability and compensation: funds are disbursed in the event of damage caused by acts entailing civil liability. The element of providing an incentive for recipients of funds to adhere to a certain manner of behaviour is thus absent in this context. As concerns incentives for contributors, these are directly linked to the related legal regime establishing civil liability. Within this framework, the funds serve as insurance, and there is thus an incentive for industry to participate, as the example of the IOPC Fund demonstrates. This can, however, not be easily replicated in the context of PGR, and incentives would therefore need to be created by other means.

In addition, two features of the compensation funds appear interesting in the context of a future mechanism for PGR, namely the involvement of private entities both as contributors and as claimants, and the generation of funds through levies on specified activities carried out by the relevant industry. In this sense, the compensation funds appear to be better placed to serve as potential models of a future mechanism for PGR than the assistance funds. It should be noted, however, that the disbursement of funds requires the status of a legal or natural person, on the one hand, and a clearly defined claim, established under the corresponding civil liability regime, on the other. In this sense, adjustments would need to be made if this type of fund were to serve as a model for the area of TK associated with PGR and traditional

PGRFA. As in the case of an assistance fund, the political difficulties inherent in adopting such an instrument should not be underestimated. As stated above, the IOPC Fund, though obviously successful, remains the only financial mechanism of this type that is actually operational. As the analysis shows, this is in large part due to the interest of the oil industry itself, which set up its own scheme even before the entry into force of the intergovernmental scheme.

*Mechanisms to provide incentives for implementation under the Kyoto Protocol*⁸²

The Kyoto Protocol to the Climate Convention provides three market-based instruments, the so-called Flexible Mechanisms or 'Flex Mex', to promote the aim of reducing the emissions of greenhouse gases by providing incentives to states and to private entities to act in conformity with this aim. In contrast to the mechanisms discussed above, these instruments are not financial mechanisms. They do not feature a multilateral fund, and adopt a fundamentally different approach to the problem of providing incentives. However, the underlying concepts may be interesting *vis-à-vis* a future financial mechanism in the context of PGR. In particular, the approach taken by the Kyoto mechanisms to the problem of providing incentives to the private sector to contribute to the solution of an environmental problem is worthy of investigation, as this has been identified as one of the functions of a future financial mechanism for PGR.

The Flex Mex comprise Joint Implementation (JI) (Article 6), the Clean Development Mechanism (CDM) (Article 12) and Emissions Trading (Article 17). In accordance with the relevant provisions of the Protocol, the modalities and operation of JI and the CDM will be elaborated by the COP to the Convention serving as the Meeting of the Parties to the Protocol (COP/MOP), and those of Emissions Trading by the COP to the Convention. The Kyoto Protocol has not

⁸¹ For a more detailed discussion see among others Kummer (1995/1999, p. 253).

⁸² See Arquít Niederberger (1998, p. 9) and Yamin (1999, p. 265).

yet entered into force,⁸³ but the COP has been working on the elaboration of the modalities of all three Flex Mex for the last few years,⁸⁴ with the aim of developing the mechanisms prior to entry into force of the Protocol⁸⁵ and laying down the concrete rights and obligations of countries in this context in a sufficiently clear way to provide a basis for ratification. At the resumed sixth session of the COP, held in Bonn in July 2001 (COP 6), and at the seventh session, held in Marrakesh in November 2001 (COP 7), agreement was reached on the modalities of the mechanisms (generally referred to as the Bonn Agreement and the Marrakesh Accords, respectively). The COP has prepared relevant decisions for adoption by the COP/MOP after entry into force of the Protocol.⁸⁶

In view of this situation, the Flex Mex can at the present time be discussed only in a theoretical way. It is not possible to assess their functioning in practice, as they are not as yet operational.

Under the Kyoto Protocol, only a specific category of countries, namely developed countries and countries with economies in transition, have quantified obligations to reduce greenhouse gas emissions. These countries are listed in Annex I to the Climate Convention. The reduction obligations allocated to each Annex I country are specified in Annex B to the Protocol, and can be measured in quantified units. In other words, every Annex I country must achieve a certain number of quantified units within a given time period. The Flex

Mex provide the possibility for countries to exchange these units. The terms designating the units and their definitions are distinct for each of the three mechanisms: they are denominated as Emission Reduction Units (ERUs) in the context of JI, as Certified Emission Reductions (CERs) in the context of the CDM and as Assigned Amount Units (AAUs) in the context of Emissions Trading. In addition, COP 7 agreed to identify as Removal Units (RMUs) net greenhouse gas removals resulting from sinks activities.

The concept underlying this system is to couch the reduction units in a tradable form. This allows a Party to fulfil a part of its reduction obligations by assisting another Party in meeting its own obligations, or to exchange ERUs against a financial contribution.⁸⁷ As Parties may impose corresponding obligations on their nationals, including industry, the possibility of trade-offs or financial compensation may provide an incentive for the private sector to comply with these obligations.

JOINT IMPLEMENTATION

Joint Implementation (JI), regulated in Article 6 of the Kyoto Protocol, is a mechanism by which an Annex I country, through a pertinent project, supports activities in another Annex I country, by which a certain number of ERUs are achieved, either by reducing greenhouse gas emissions or by enhancing sinks. Through provision of this support, the donor country may fulfil part

⁸³ In accordance with Article 25, the Kyoto Protocol will enter into force upon ratification by 55 countries, including industrialized countries accounting for at least 55% of the total carbon dioxide emissions for 1990 from this group. As of July 2003, 111 countries, including industrialized countries accounting for 44.2% of the emissions, had ratified the Protocol (see UNFCCC website: <http://www.unfccc.int>).

⁸⁴ At COP 4 in 1998, Parties agreed on a work programme to elaborate principles, modalities, rules and guidelines on all three mechanisms, with priority to be given to the Clean Development Mechanism, for submission to COP 6 (COP Decision 7/CP.4 (1998), the so-called Buenos Aires Plan of Action). COP 6 was held in two parts in November 2000 and July 2001, respectively. The so-called Bonn Agreement, adopted in July 2001, provided the basis for finalizing the modalities of the mechanisms at COP 7 in November 2001 in the framework of the so-called Marrakesh Accords (COP Decision 5/CP.6 (2001)).

⁸⁵ See, for example, UNFCCC Press Release 'Bonn Decisions Promise to Speed Action on Climate Change' (27 July 2001); Yamin (1999, p. 268).

⁸⁶ See the text of the Marrakesh Accords, available on the UNFCCC website: <http://www.unfccc.int>

⁸⁷ For a full analysis of the quantified units defined under the Kyoto Protocol, and of the nature of countries' rights to them, see Yamin (1999, p. 268).

of its own reduction commitment, i.e. the number of ERUs achieved through the project is in part allocated to the donor country. The project can be financed from state or private sources in the donor country. This mechanism is likely to be applied primarily between more developed and less developed countries of the Annex I category, namely between Western industrialized countries and Central and Eastern European countries with economies in transition. A project must meet the following conditions to qualify for JI:

- It must be approved by the countries involved.
- It must be proved that the reduction in emissions by sources, or the enhancement of removals by sinks, is additional to what would have occurred without the project.
- The countries involved must have met their obligations to set up a national system for estimating emissions (Article 5) and to have submitted inventories and national communications (Article 7) under the Kyoto Protocol.
- Acquisition of ERUs by the donor country must be supplemental to reductions achieved by domestic action, i.e. domestic action shall constitute a 'significant element' of the effort made by each Party to reduce its emissions.

The incentive for donor countries and their industries lies in the fact that in a recipient country with a less developed economy and infrastructure, a given financial investment will achieve a more substantive reduction of greenhouse gas emissions than in the donor country itself. The concept of JI has initially been subject to criticism, based on the argument that this possibility detracts from the more developed countries' domestic obligations at the expense of less developed countries (Gupta, 1999/2000).

THE CLEAN DEVELOPMENT MECHANISM

The establishment of the CDM (Article 12) will enable Annex I Parties to implement projects that reduce greenhouse gas emissions or enhance sinks in non-Annex I Parties, which do not have reduction obligations under the Protocol, and to credit the reductions achieved in this manner to the achievement of their own reduction targets. The CDM thus allows developed countries to achieve a part of their reduction commitments through projects in developing countries, with the additional goal of assisting non-Annex I Parties in achieving sustainable development and contributing to the ultimate objective of the Climate Convention. Under the CDM, emission reductions generated by project activities in non-Annex I Parties will be certified by operational entities designated by the COP/MOP, on the basis of measurable criteria. These reductions are denoted as Certified Emission Reductions (CERs). The CDM will be supervised by the Executive Board of the mechanism. A 'share of the proceeds', i.e. a part of the CERs generated under a CDM project, will be used to assist particularly vulnerable developing countries in meeting the costs of adaptation.

The CDM can be seen as the counterpart of JI: both are an extension and further development of the AIJ pilot phase, but JI takes place among Annex I Parties, whereas the CDM allows for joint projects between Annex I and non-Annex I Parties. The incentives for donor states and their industry is essentially the same as in the case of JI. Like JI, the concept of a CDM was initially criticized by some developing countries, with the argument that it constitutes a way for developed countries to solve a problem for which they are primarily responsible in the developing world instead of seeking domestic solutions.⁸⁸

EMISSIONS TRADING

Emissions Trading, as set out in Article 17, permits an Annex I Party to transfer AAUs,

⁸⁸ See, for example, Centre for Science and Environment India: *The Kyoto Protocol – What It Says*, New Delhi (1998, p. 10).

i.e. a part of the quantified units of reduction that Party is in a position to achieve during the commitment period, to another Annex I Party. This permits the second Party to add the so acquired AAUs to its own emission reduction. In general, the first Party will receive payment for this service.

Like the other mechanisms, the concept of Emissions Trading is not undisputed, since it basically provides the possibility for a country to transfer its obligations under the Protocol to another country. Emissions Trading is likely to be of interest to countries that – for reasons of economic decline – achieve an emission reduction greater than their commitment under the Protocol, the so-called ‘hot air’ (which is the case for a number of Central and Eastern European countries following the collapse of the former Soviet Union), and to countries that have difficulties in achieving their reduction targets without resorting to expensive and politically difficult domestic measures, and hence prefer to acquire AAUs at a lower cost (which is the case for some developed Western states).

THE ROLE OF NON-STATE ACTORS

If the Flex Mex are to become truly market-based instruments, concrete ways will need to be designed to involve non-state actors, in particular private companies and other investors, in their application. In other words, it must be possible for non-state actors to exercise the rights and duties pertaining to the allocation of the quantified units under the three mechanisms. In order to create a true incentive, private entities will have to be able to obtain the financial benefits to be gained by the application of the mechanisms.

The obvious way of involving private actors is through the domestic legislation of the Parties to the Protocol. This is expressly provided by the Kyoto Protocol in Articles 6 para. 3 (for JI) and 12 para. 9 (for the CDM), as well as in the respective guide-

lines for all three mechanisms. The alternative option of giving non-state actors standing under international law, their actions to be subject to control by the COP/MOP, has a weak basis both in theory and in practice (Yamin, 1999). Accordingly, states will need to enact domestic legislation, under which private actors under their jurisdiction can apply the mechanisms of the Kyoto Protocol. In order to comply with its emission reduction obligations, an Annex I state will impose corresponding obligations on its subjects by domestic law. By the same token, the Kyoto mechanisms can be transposed into national law, and non-state actors can be assigned the corresponding rights. Thus, a company in an Annex I Party initiating or supporting a project in another state Party to the Protocol, which contributes to emission reductions in that state, will be able to deduct the reductions achieved from its own national reduction obligation in accordance with JI (if the project is carried out in an Annex I Party) or the CDM (if it is carried out in a non-Annex I Party). Likewise, non-state actors will be able to acquire or sell AAUs under the Emissions Trading system. Involvement of national actors requires a national emissions inventory that includes reductions achieved by non-state actors under the Kyoto mechanisms.⁸⁹ In Switzerland, the legal basis for the involvement of private actors has been created with the new CO₂ Law, which entered into force in May 2000.

The functioning of this concept in practice can only be fully assessed once the Kyoto Protocol is in force and all Annex I Parties have enacted and implemented relevant national legislation.

THE KYOTO MECHANISMS AS MODELS FOR PLANT GENETIC RESOURCES AND TRADITIONAL KNOWLEDGE
As stated above, the main interest in the Kyoto mechanisms in the context of a future financial mechanism for plant genetic resources is the way in which financial incentives are created for the imple-

⁸⁹ For a more detailed discussion of the role of the private sector using the Swiss example, see Arquit Niederberger (1998, p. 9).

mentation of an international agreement both for states and for private entities. This is the element that may possibly have a model function in that context. As is the case with the depletion of the genetic resource base and related TK, climate change is an area where it is not possible to clearly identify actors that are entitled to financial compensation. This is a fundamental difference for issues such as oil pollution or contamination with hazardous materials, where an approach based on civil liability and compensation can be taken. With genetic resources as with the global climate, the interest in protection, for the individual, is thus a fairly abstract and long-term one, and methods for ensuring protection must be adjusted to this reality. The approach of providing economic incentives instead of assigning liability for damage caused is thus a concept to be considered. A prerequisite for the use of this concept as a model is a substantive obligation to private entities that can be fulfilled through a financial contribution, as is the case in the Kyoto mechanisms. This type of obligation has yet to be created in the context of plant genetic resources.

More specifically, the concept of providing an economic incentive in the shape of the CDM, and imposing a levy on the proceeds from this mechanism as a contribution to a fund which is to be used for the support of adaptation measures, may be a very interesting approach that is as well adapted to the nature of the problem of genetic resources as it is for climate change. The nature and functioning of the fund will need to be further developed, possibly through reliance on models elaborated elsewhere in this study.

Relevant work in the framework of the FAO

The issue of a financial mechanism for PGR has thus far been addressed only in a very preliminary fashion within the framework

of the FAO. Under the International Undertaking on Plant Genetic Resources (IU), a non-binding instrument adopted by the FAO Conference in 1983, the FAO Fund for Plant Genetic Resources was established on an interim basis in 1988. Donors (governments, NGOs and individuals) were to contribute to the Fund to support plant genetic resource conservation and use. By Resolution 4/89 adopted in 1989, the FAO Conference agreed that the conservation, management and use of plant genetic resources could be achieved through financial mechanisms, in particular the FAO Fund for Plant Genetic Resources. However, no contributions have been made to date, and the Fund has therefore never become operational. In 1991, the FAO Conference by Resolution 3/91 approved Annex III to the IU, which endorsed the concept of implementing Farmers' Rights through an international fund on plant genetic resources to support conservation and utilization programmes, particularly in developing countries. The priorities of the fund are to be overseen by the FAO CGRFA.⁹⁰ The Secretariat of the FAO CGRFA considers that the FAO Fund for Plant Genetic Resources should assume the role of this mechanism. However, no further work has been undertaken to render it operational, and it therefore remains 'dead letter'.⁹¹

In November 2001, the FAO Conference adopted the ITPGRFA, a binding legal instrument elaborated by the CGRFA.⁹² The Treaty constitutes a revision of the IU. One of the core elements of the ITPGRFA is the establishment of the Multilateral System for Facilitated ABS, in which the resources listed in Annex I shall be included. One of the aims of the System is to share monetary benefits of these resources through a financial mechanism, which is to be established in accordance with Article 19.3(f).

Unlike the CBD, which set up a financial mechanism from the beginning (see

⁹⁰ Girsberger (1998, p. 304), *Yearbook of International Cooperation on Environment and Development 1999/2000*, p. 181.

⁹¹ Information received from the Secretariat of the FAO/CGRFA, December 2001.

⁹² For a detailed discussion of the ITPGRFA see Chapter 2, this volume.

point 1 above), the ITPGRFA addresses the issue of funding in a much more preliminary way. Articles 18 and 19 constitute enabling provisions for a funding strategy and a financial mechanism. Article 18 sets out a number of elements of a financial strategy to be elaborated by the Parties. The purpose of the strategy is to promote the support by developed countries of efforts to implement the ITPGRFA undertaken by developing and transition countries. Article 19 para. 3(f) mandates the Governing Body of the Treaty to 'establish, as needed, an appropriate mechanism, such as a Trust Account, for receiving and utilizing financial resources that will accrue to it for purposes of implementing this Treaty'. Finally, Article 13.2(d) states that sharing of monetary benefits resulting from the use of plant genetic resources included in the Multilateral System should be subject to payment of an equitable share of the benefits into a future mechanism, to be established under Article 19.3(f).

Article 19.3(f) is an enabling provision of the more open variety: the wording 'as needed' and 'appropriate' leaves it to the Governing Body to decide what form of mechanism would be appropriate. The provision does not provide much guidance concerning elements of such a mechanism. The wording of Article 19.3(f) ('for the purposes of implementing this Treaty') does give an indication that the type of fund to be established may be what has been termed here an assistance fund. Article 13.2(d) points in the direction of a similar method to the one to be used in the context of the CDM under the Kyoto Protocol, namely the generation of funds through levies on benefits derived from related economic transactions.

As in equivalent discussions in the context of most MEAs, there is fundamental disagreement between industrialized and developing countries as to whether or not a financial mechanism should be established.

However, the issue did not figure among the prominent topics in the debates leading to the adoption of the ITPGRFA.

By a Resolution on interim arrangements,⁹³ the FAO Conference mandated the CGRFA to act as Interim Committee pending the entry into force of the Treaty, at which time the Governing Body will be established. The Resolution outlines a number of priority actions to be undertaken by the Interim Committee, concluding with the general clause 'perform such other functions as may be necessary for the effective implementation' of the Treaty. As work on a future financial mechanism does not figure on the list of priority actions, but comes within the purview of the general clause, one may conclude that the Conference did not consider this a priority. As the financial strategy is to be adopted by the Governing Body of the Treaty at its first meeting, the issue will be addressed at the second meeting of the Interim Committee.⁹⁴

7.4.3 Options for a financial mechanism in the context of access to genetic resources

Based on the above discussion, we may derive a number of central elements and options for a future financial mechanism from existing models.

Structure, organization and legal personality

As is the case of all the existing financial mechanisms that have been discussed, an international legal instrument should establish the future mechanism for plant genetic resources. It should be endowed with a legal personality recognized by all contracting parties to the instrument in question, and all parties should be members of the mechanism. Its infrastructure should comprise an assembly as supreme governing body, consisting of all members, an executive body to direct the generation and attri-

⁹³ Conference Resolution 3/2001, 3 November 2001, Section B. Interim Arrangements, para. 3 (published on the FAO website: <http://www.fao.org>).

⁹⁴ Provisional work programme of the Interim Committee at its second meeting (Doc. CGRFA/MIC/-1/02/9, October 2002).

bution of financial resources, and a secretariat. All assistance funds and compensation funds discussed could serve as models in this respect.

The question arises as to whether a new legal instrument should be negotiated for this purpose and a new mechanism established, or whether the functions of the financial mechanism could be attributed to an existing mechanism. The latter would be more efficient in terms of avoiding duplication of efforts and resources. It would, however, presuppose the existence of a financial mechanism with a similar scope, structure, aims and functions. None of the mechanisms established in environmental law that are described above would meet this requirement: the assistance funds do not provide for a role of private entities as contributors and recipients of funding, and the compensation funds are conceptually tied to a legal instrument on civil liability and compensation. The only feasible option seems to be the attribution of the pertinent functions to the financial mechanism to be established within the framework of the ITPGRFA. As substantive work on this mechanism has yet to begin, there may be sufficient leeway to accommodate the functions discussed here. This would of course be subject to decision by the Governing Body of the ITPGRFA. It must also be noted that the ITPGRFA – and hence also its financial mechanism – applies to plant genetic resources for food and agriculture only, whereas the scope of the mechanism discussed here should cover all plant genetic resources. Should the difference in scope between the ITPGRFA and the future financial mechanism be considered too significant an obstacle, the option of establishing separate funds in the framework of different related treaties could be investigated. Thus, a mechanism for plant genetic resources food and agriculture could be set up in the framework of the ITPGRFA, a mechanism for other types of plant genetic resources in the framework of the CBD.

Generation of funds: contributors

In order to achieve stability and predictability, a compulsory contribution to

the mechanism on a regular basis should be instituted. In view of the creation of a broad financial basis, the funds should be derived from as many sources as possible. However, the concepts of fair and equitable distribution of the financial burden and creation of incentives call for collecting funds specifically from persons and entities benefiting from the resources. Equally, the contributions should be based on criteria such as the financial situation of the contributor (in this context, exemptions could be provided for specific actors such as small farmers in developing countries) and the extent of the use of resources. In this respect, the assistance funds cannot provide guidance, being based on the concept of assistance to states lacking financial capacity by more affluent states, and excluding private entities as contributors and as recipients of funding. The compensation funds, on the other hand, could serve as models in this respect. In particular, the system by which contributions are levied on specific activities is a more useful model than the scale of assessment for contributions used by the assistance funds, which takes into account only the financial status of the contributor. An option to be considered would thus be to levy contributions on plant genetic resources accessed or used by a given entity, which could be a private enterprise or a government institution. If this were envisaged at the international level, the difficulty would be that this would require monitoring of the access to and use of the resources. An institution to undertake this task, as well as a relevant procedure, would have to be created. The same international legal instrument that establishes the financial mechanism could establish this. If the functions of the mechanism were assigned to the financial mechanism of the ITPGRFA, this problem could largely be avoided, as the Treaty's Multilateral System for Facilitated ABS creates the framework for tracking resources, and the future financial mechanism of the ITPGRFA will administer funds derived from resources included in the Multilateral System. Should this solution be pursued, issues of political acceptability and scope would

arise, as mentioned above. Alternatively, levies could be considered as a method for states to generate resources to pay their contributions to the financial mechanism. While this would need to be addressed at the national level and is thus beyond the scope of this study, it would be an interesting option for states to investigate.

As concerns creating incentives for financial efforts that go beyond paying contributions for the access to certain resources, the concept underlying the mechanisms of the Kyoto Protocol could be of interest as a model. The Kyoto Protocol establishes concrete obligations that can be imposed on private entities, coupled with the possibility of fulfilling these obligations through the provision of financial resources – for instance, funding of a project in another country. In the case of JI and the CDM, the incentive lies especially in the fact that it is often more cost-effective to implement the obligations by financing projects through these mechanisms than by adopting direct emission reduction measures. In sum, the incentive lies in the fact that contributing to the mechanism is a simpler or more cost-effective way for the contributors to meet their obligations. This approach presupposes an international legal instrument imposing obligations on states and providing for states in turn to impose obligations on their nationals, which the nationals may then implement through contributing to, or participating in, a pertinent mechanism. An equivalent obligation remains to be established in a future regime on PGR.

Disbursement of funds: claimants

The absence of clearly defined claimants or recipients of financial means, due to the fact that traditional or *sui generis* rights cannot be allocated, is not accommodated by the concept of the compensation funds, which function on the basis of claims submitted by persons having suffered damage. The assistance funds could serve as models in that they provide funding for projects in a certain field that are submitted by

national authorities, rather than disbursing funds to individuals. This concept could be developed in the present context. In this respect, the Adaptation Fund to be established under the CDM of the Kyoto Protocol, which will use financial means generated by levies on proceeds of the CDM for supporting concrete adaptation projects and programmes in developing countries, could be a useful precedent. The system used by the Montreal Protocol Fund and the GEF to assess and approve pertinent projects would also be interesting. Accordingly, a system could be established under which potential recipient countries would be defined on the basis of criteria that ensured equitable access to the funds, such as their financial capacity, the amount and nature of genetic resources held under their national jurisdiction, and the presence of local or indigenous communities that are TK holders in their territory. The national authorities of these countries would be eligible to submit project proposals to the executive body of the mechanism for possible funding. The projects would have to be proven to benefit TK holders who are producers of genetic resources, and to support the aims outlined in the first section of this chapter; this would be verified by the executive body as part of the decision-making process. Projects approved by the mechanism for funding would be carried out by competent national authorities, or under their responsibility. The authorities would be accountable to the financial mechanism. This approach would support the aim of providing incentives for the valuation of TK and conservation and sustainable use of genetic resources, since only projects that further these aims would be financed by the mechanism.

7.4.4 Conclusions and recommendations

As a first conclusion, it should be noted that a future financial mechanism that could substitute financial compensation of TK holders in cases where traditional or *sui generis* IPR cannot be allocated, would need to be established by an international

legal instrument. The negotiation of such an instrument and the establishment of the requisite institutional infrastructure would require the relevant political will of the international community, the leadership of an international organization and financial resources that may be considerable. The general wariness of the international community in relation to the establishment of new international mechanisms would be a factor to be taken into account. The required infrastructure would comprise a supreme body made up of all member states, an executive body and a secretariat. In this respect, there are a number of precedents in international environmental law that could serve as models.

An alternative would be to assign the functions of such a mechanism to an existing institution established in the framework of an existing international legal instrument. The most obvious choice would be the ITPGRFA, which establishes a legal basis for a financial mechanism. The necessary adjustments would have to be made, in particular as concerns the scope of the Treaty. A pertinent decision would need to be taken by the Governing Body of the ITPGRFA. Alternatively, the establishment of separate mechanisms within more than one international legal instrument in accordance with their respective scope could be considered. Apart from the ITPGRFA, an obvious candidate is the CBD.

In order to create a broad, predictable and stable financial basis, indispensable to the success of the mechanism, the legal instrument establishing the fund should set out an obligation to users of genetic resources – whether private entities or government institutions – to make contributions to the fund. The levels of contribution

could be detailed on the basis of criteria that take into account the aim of equitable sharing of the financial burden, such as the amount and type of resources used, and possibly the financial situation of the contributor. In order to create an incentive to users of the resources to contribute, contributions could be levied on the amount and nature of resources used. Existing compensation funds could serve as models in this respect. This could also be envisaged at the national level, as a means for states to generate their contribution to the fund. Looking to the future, a further incentive to contribute to the fund could be created if substantive obligations imposed on private entities by an international legal instrument could be met by making financial contributions, as in the Flexible Mechanisms of the Kyoto Protocol.

As regards disbursement of funds, the legal instrument should designate a category of countries that could submit relevant projects to the mechanism for funding. Criteria for designating countries as recipients should include financial capacity below a measurable level, the amount and nature of resources held or generated under their national jurisdiction, and the presence of indigenous or local communities that are TK holders. The projects submitted would have to be proven to benefit holders of TK and support the fundamental aims of the mechanism. The decision on funding would be taken by the executive body based on these criteria. The projects would be carried out under the responsibility of the competent government authorities, which would be accountable to the financial mechanism. The assistance funds and the Adaptation Fund of the Kyoto Protocol could serve as models in this respect.

Bibliography

- Arquit Niederberger, A. (1998) Marktwirtschaftliche Anreize für den Klimaschutz: Fallbeispiel 'Joint Implementation'. *Bankverein/Der Monat* Nr. 4.
- ASSINSEL (1998) Position on access to plant genetic resources for food and agriculture and the equitable sharing of benefits arising from their use. <http://www.worldseed.org./multie.htm>
- Baruffol, U. (2003) Contractual regulation of access to information on biodiversity for scientific and

- commercial use – the Novartis-UZACHI Biolead Project. Contribution 30: Forest Science, Swiss Federal Institute of Technology, Zürich (on file with author).
- Blakeney, M. (2002) Protection of plant varieties and farmers' rights. *European Intellectual Property Review* 24, 9.
- Bragdon, S.H. (2001) Financing treaty operations and implementation: a survey of mechanisms. FAO Background Study Paper No. 13.
- Cabrera Medaglia, J.A. (2003) Access to genetic resources, protection of traditional knowledge and intellectual property rights: lessons learned from the Costa Rican experience. WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, Fifth Session, Geneva, 7–15 July 2003, advance copy (on file with author).
- Correa, C. (2000) Options for the implementation of farmers' rights at the national level. South Centre, Geneva, T.R.A.D.E. Working Paper No. 8.
- Doeker, G. and Gehring, T. (1992) Liability for environmental damage. In: Sand, P.H. (ed.) *The Effectiveness of International Environmental Agreements*. Grotius, Cambridge, UK.
- Dutfield, G. (2001) TRIPS-related aspects of traditional knowledge. *Case Western Reserve Journal of International Law* 33, 233.
- Esquinas-Alcázar, J. (1996) The realisation of farmer's rights. In: Swaminathan, M.S. (ed.) *Agrobiodiversity and Farmers' Rights*. Konark Publishers, New Delhi, India, p. 2.
- Fowler, C., Smale, M. and Gaiji, S. (2000) Germplasm flows between developing countries and the CGIAR: an initial assessment. Paper prepared for the Global Forum on Agricultural Research, FAO and IPGRI, Rome. <http://www.sgrp.cgiar.org/GermplasmFLowsgfar0065.pdf>
- Girsberger, M.A. (1998) The Protection of Traditional Plant Genetic Resources for Food and Agriculture and Related Know-How by Intellectual Property Rights in International Law. Berne, Switzerland.
- Girsberger, M.A. (1999) *Biodiversity and the Concept of Farmers' Rights in International Law – Factual Background and Legal Analysis*. Peter Lang, Berne, Switzerland.
- Glowka, L. (1998) *A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources*. IUCN, Gland, Switzerland.
- Glowka, L. *et al.* (1994) *A Guide to the Convention on Biological Diversity*. IUCN, Gland, Switzerland.
- Gold, E. (1999) Liability and compensation for ship-source marine pollution. *Yearbook of International Cooperation on Environment and Development 1999/2000*. Earthscan, London, pp. 31–38.
- Gupta, J. (1999/2000) Evaluation of the climate change regime and related developments. *Yearbook of International Cooperation on Environment and Development 1999/2000*. Earthscan, London, pp. 19–30.
- Kummer, K. (1995/1999) *International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules*. Oxford University Press, Oxford, UK.
- Lang, W. (1992) Ozone layer. *Yearbook of International Environmental Law* 3, 225.
- Novartis (1999) Bio-prospecting and benefit sharing. Report of a UNED-UK/Novartis Workshop hosted by the Rockefeller Foundation New York. Towards Earth Summit III-2002.
- Rengifo, A. (1997) The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996. *Review of European Community & International Environmental Law* 6, 191–197.
- Rosell, M. (1997) Access to genetic resources: a critical approach to Decision 391 'Common Regime on Access to Genetic Resources' of the Commission of the Cartagena Agreement. *Review of European Community & International Environmental Law* 6, 274–283.
- Ruiz Muller, M. (2000) ¿Es necesario un nuevo marco jurídico para la bioprospección en la región andina? Breve revisión crítica de la Decisión 391. In: *Serie de Política y Derecho Ambiental* 14 (February), 1–8. Sociedad Peruana de Derecho Ambiental, Lima, Peru.
- Seiler, A., van den Daele, W. and Döbert, R. (2003) Protection of Traditional Knowledge. Deliberations from a Transnational Stakeholder Dialogue Between Pharmaceutical Companies and Civil Society Organizations. Wissenschaftszentrum Berlin (WZB) Discussion Paper No. SPIV 2003–102.
- Swaminathan, M.S. (ed.) (1995) *Farmers' Rights and Plant Genetic Resources – Recognition & Reward*. Macmillan, Madras, India.
- Swanson, T. and Göschl, T. (2000) Property rights issues involving plant genetic resources: implications of ownership for economic efficiency. *Ecological Economics* 32, 75–92.
- Ten Kate, K. and Lasén Diaz, C. (1997) The undertaking revisited – A commentary on the revision of the International Undertaking on Plant Genetic Resources for Food and Agriculture. *Review of European Community & International Environmental Law* 6, 284–292.

-
- Tobin, B. (1997) Certificates of origin: a role for IPR regimes in securing prior informed consent. In: Mugabe, J. *et al.* (eds) *Access to Genetic Resources. Strategies for Sharing Benefits*. IUCN, Bonn, Germany.
- WBCSD/WZB Stakeholder Dialogue Process on the Issues of Intellectual Property Rights in Biotechnology: Summary Report (2003) Available at: http://www.wz-berlin.de/ipr-dialogue/wbcسد_wzb_final_report.pdf
- White, I.C. (1999) Oil spill compensation. Available at: <http://www.itopf.com>
- White, I.C. (2001) The International Oil Pollution Compensation Fund: Explanatory Note prepared by the 1992 Fund Secretariat. London, available at <http://www.imo.org>
- Yamin, F. (1999) Equity, entitlements and property rights under the Kyoto Protocol: the shape of 'things' to come. *Review of European Community & International Environmental Law* 8, 265–274. *Yearbook of International Cooperation on Environment and Development 1999/2000*. Earthscan, London.
- Young, M. and Gunningham (1997) Mixing instruments and institutional arrangements for optimal biodiversity conservation. In: *Investing in Biological Diversity*. OECD, Paris, pp. 141–165.