Fair shares or biopiracy?

Developing ethical criteria for the fair and equitable sharing of benefits from crop genetic resources

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1 Introduction

This thesis is a contribution to the international debate on "biopiracy", i.e. the perceived misappropriation of genetic resources. In the introductory chapter, I will illustrate the significance of biological and genetic resources, outline some current conflicts around their appropriation, and shortly explain the emerging international regulation of access to genetic resources and benefit sharing for their use. After presenting some prominent examples of claims of biopiracy, I will comment on the difficulties in defining "fair and equitable", and I will explain my attempt to close this gap by developing ethical criteria for benefit sharing on the basis of seven central study questions. In the last part of this introduction, I will briefly outline the structure of the remaining text and explain my use of certain terms that are central to the debate on access and benefit sharing.

1.1 Delineating the subject

1.1.1 Genetic resources and their use

From its very beginning, mankind has been dependent on a favourable natural environment, including a certain biological diversity. Humans have been utilizing organisms and biological material not only for direct consumption, but also e.g. as raw material for construction and decoration, source of heating energy, tools, clothes, drugs, and as cultural and spiritual objects. More indirectly, biological diversity provides so-called ecosystem services such as filtering air and water, recycling nutrients, decomposing wastes, and regulating local climate.

In recent years, a distinction has been introduced that is central to understanding the current discourse about misappropriation of such resources: biological resources vs. genetic resources. While there is no agreement on the exact definition of either term, in the context here the two categories will neither be regarded as mutually exclusive categories of material, nor as super- and subordinate concepts. Rather, as explained in more detail in chapter 1.4 below, I will base the distinction solely on the use of a biological entity. A biological resource, in this understanding, is a resource that is used in a rather unspecific way e.g. as firewood or for ecosystem services; its genetic characteristics are not central to its suitability for the respective use, and it could be replaced by organisms or biological material of other species. A genetic resource, in contrast, is used specifically on grounds of its genetic characteristics; there are few or no other species or varieties which could effectively replace it in this specific kind of use, e.g. in medicine or agriculture. This means that the same organism or material can constitute a biological resource or a genetic resource, depending on its use; the term genetic resource does not only refer to single genes or only to the DNA material of an organism or a species.

Among the major commercial sectors that currently use genetic resources are agriculture, plant breeding, crop protection, pharmaceutics, botanical medicine, ornamental horticulture, cosmetics, and other biotechnologies (Kate/Laird 1999: 2, Table 1.1). Still more important than these commercial sectors may be the use of genetic resources for subsistence purposes and in informal economies; the majority of people worldwide rely upon traditional crops and medicines. For many kinds of commercial exploitation, traditional use and traditional knowledge have been an essential indicator or filter for identifying interesting genetic resources or biological material (Mgbeoji 2006: 92-96): important drugs like morphine, cocaine, quinine, vincristin, birth control pills, and aspirin are based on natural products, with some of them still

not synthesizable in laboratories, but extracted from the actual plants. Main agricultural crops such as bananas, coffee, cotton, maize, potatoes, sugar, and tea similarly have long been utilized and developed regionally, before evolving into globally consumed products.[1]

During the course of history, countless conflicts have erupted and revolved around the access to and use of genetic resources:

> "The strength of nations has risen and fallen; great fortunes have been made and lost; and people have enjoyed plenty or suffered hunger at least in part because of who owned, controlled, used, and benefited from genetic diversity, and who did not." (Fowler/Mooney 1990: 200)

Although most domesticated plants and animals have a long history of being dispersed and exchanged across large geographical distances, there are a number of examples where the holders of certain organisms attempted to control access to them or to keep the knowledge on their use a secret. However, since it often takes only a few specimen or samples, together with the appropriate knowledge, to "export" such uses, previous monopolies e.g. on coffee (Ethiopia), natural rubber (Brazil), oil palm (West Africa), silk (China), sisal (Mexico), sugarcane (South East Asia), and tea (China) were eventually broken, with dramatic consequences for national and regional economies (Fowler/Mooney 1990: 93f, 104, 178-180). While these conflicts have a long history, various developments during the last decades, which I will not attempt to rate in their importance, have prompted a recent intensification of debates on the appropriation of genetic resources. Among them are

- the technical feasibility of DNA analysis, genetic engineering, and rapid screening for genetic material and biochemical substances,
- the extension of exclusive intellectual property rights to genetic resources and associated technologies,
- the loss of biodiversity in natural and anthropogenic ecosystems, and
- the stark global inequalities, i.e. the discrepancy of countries that mainly supply natural resources vs. countries that mainly consume such resources.

Most of these trends, which are doubtless interrelated[2], concern genetic resources more directly than biological resources (in the sense of the terms explained above). Since access to and appropriation of genetic resources is thus economically and strategically much more significant than the usually non-exclusive property in biological resources[3], contributions to the debate on "biopiracy", including this thesis, usually focus on genetic rather than on biological resources. Unfortunately, nomenclature

[1] Wertz (2005: 147) provides an informative example of the importance of traditional knowledge associated with a resource: maize is central to the native North Americans' culture; detailed knowledge on biology, crop management and processing was collected and transmitted orally e.g. via stories and myths. Among them are the refined processing skills embodied in the practice of "nixtamalization": maize grains are soaked and then cooked with lime or wood ashes, which releases the vitamin niacin; without this process, dietary deficiencies occur.

[2] In the words of Brand/Görg (2003: 46f): New technologies constitute new resources (e.g. biotechnology constitutes genetic resources) and provoke claims to new property rights in them. This observation corresponds to the Demsetz-Wagner-Principle of property rights theory (see ch. 4.4.3), according to which higher benefits e.g. in biotechnology and agriculture, together with lower transactions costs, e.g. by intellectual property rights for genetic resources, prompt new property systems (Lerch 1996: 67, 111).

[3] Similar as for their use, the appropriation of biological vs. genetic resources is not always clearly distinguishable, and the former may lead to the latter. An illustrative example is the purchase of a bag of peanuts for consumption (biological resource) vs. the purchase of a sample of specific peanuts in order to cross them with existing breeding material and to commercialise the resulting new variety (genetic resource; see ch. 1.4.2).

among authors differs and is sometimes confusing, one reason presumably being the imprecise definitions in the Convention on Biological Diversity (ch. 1.4).

1.1.2 Appropriation and misappropriation of genetic resources

In order to understand the current conflicts around the conceived misappropriation of genetic resources, as well as the argumentation in this thesis, it is helpful to regard the following, strongly simplified value creation chain:

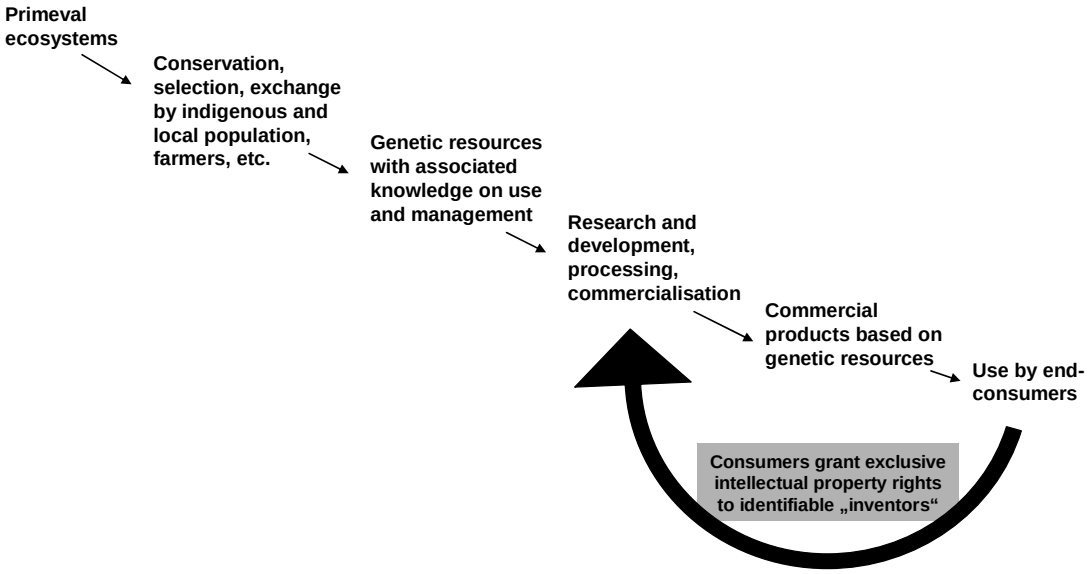

Figure 1: Simplified value creation chain for genetic resources

This chain may represent the development of a specific product, but can also be seen as a historical development and ongoing process reaching back far into the past for many genetic resources currently in use. Although not each product based on genetic resources may pass through all of these stages, the idealised value creation chain illustrates the significance of the knowledge that is associated with such resources and that often provides important contributions to commercial or scientific research and development, guiding the users' bioprospecting efforts. Claims of misappropriation generally arise where patents and similar exclusive intellectual property rights in genetic resources, which are commonly intended to encourage innovations, are perceived as too broad, or where such property rights and the commercial exploitation of resources are not accompanied by mechanisms that recognize and remunerate the contributions by previous holders of the utilized resources and associated knowledge.

In the 1980s, the conflicts about misappropriation of genetic resources were carried to the level of international institutions: at the Food and Agriculture Organization (FAO) of the United Nations, developing countries protested against their genetic resources being held in collections and gene banks in the North although originating in the South, and against traditional genetic resources being considered as common heritage, while "improved" varieties of the North were protected by intellectual property rights (Dutfield 2004: 4). The civil society organization ETC Group (formerly called RAFI) was the first to use the term "biopiracy" in commenting on the negotiations leading to the establishment of the World Trade Organization (WTO):

> "RAFI coined the term "biopiracy" in 1991, during the Uruguay round of GATT negotiations, when Northern industries were accusing the South of ram-

> pant trademark "piracy"." (Rural Advancement Foundation International (RAFI) 1998: 10)

During the following years, the term has been employed with different, although related, meanings: some authors consider all intellectual property rights (especially patents) in genetic resources or any form of privatisation and monopolisation of them as biopiracy (Harry/Kanehe 2005: 109; Shiva 2005: 16f), while for others, biopiracy is defined primarily by the neglect of the contributions and intellectual input by the original holders of resources and associated knowledge (cf. Hamilton 2006: 160; Mgbeoji 2006: 87f). Depending on one's view on this matter, there are two exemplary standpoints on how to prevent or rectify biopiracy, which can be characterized as a maximalist and a minimalist approach.[4]

Maximalist approach: Any privatisation and monopolisation of genetic resources and associated knowledge should be prevented, because the original holders or the society as a whole are deprived of at least part of the total value of the resources; genetic resources and associated knowledge should be available for free exchange benefiting everyone (e.g. GRAIN 2005b: 5f; Ribeiro 2005: 76). Regarding the value creation chain sketched above, this would mean a ban on all exclusive intellectual property rights related to genetic resources and associated knowledge.

Minimalist approach: The original holders of genetic resources and associated knowledge should adequately participate in the value creation based on their resources, for example by receiving a share of the benefits from commercialisation. Such an approach would require introducing an additional mechanism for remunerating the original holders of resources and knowledge.

1.1.3 International regulation of access to genetic resources and benefit sharing

While arguments can be found to justify both the maximalist and the minimalist positions mentioned above, international politics has been focusing on the attempt to devise mechanisms for benefit sharing while, in principle, accepting that genetic resources and associated knowledge can be subject to commodification and privatisation (as in the minimalist approach). Benefit sharing for genetic resources is one of the objectives of the UN Convention on Biological Diversity (CBD) of 1993, which states in its Article 1:

> "The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding."

In contrast to other international agreements, e.g. concerning the exploitation of resources on the moon or on the sea bed, which envisage a shared use of commonly owned resources (Jonge/Korthals 2006: 146-149), the CBD acknowledges national sovereignty over genetic resources as well as further existing (intellectual) property rights in them. Importantly, this implies a distinction between providers (legitimate original holders) and users of genetic resources, with benefit sharing taking place primarily between the identifiable provider of a certain genetic resource and the user accessing the resource. The ensuing political debate on such benefit sharing has di-

[4] I will employ this comparison of minimalist and maximalist approaches only for the limited purpose of clarifying two opposed viewpoints on the essence of biopiracy and benefit sharing; in reality, there are many in between.

versified into various aspects, the problems at issue here usually appearing under the heading of "access to genetic resources and benefit sharing" (abbreviated: ABS).

Despite more than 15 years of implementation efforts (see ch. 2.4), the main lines of conflicting political interests apparent already in the CBD text have hardly changed during this time: countries that harbour the greater part of the existing biological diversity, most of them developing countries, regard themselves as also bearing the main costs of conserving this diversity for the benefit of all mankind, without equivalent opportunities to reap benefits from its use in biotechnology, medicine, or agriculture – intellectual property rights on products based on genetic resources remain concentrated in developed countries.[5] Accordingly, in international negotiations, these provider countries tend to prioritise on national sovereignty over resources and on effective international benefit sharing mechanisms before facilitating access. In contrast, developed countries harbour the main commercial users of genetic resources and, consequently, are concerned about the ongoing loss of biodiversity in the developing world, as well as about potential restrictions on access to these resources by provider country legislation. Commercial users often argue that access restrictions impede desirable research and development, without which fewer benefits will arise which can then be shared. Users and user countries tend to call for conservation measures and for facilitated access by transparent and harmonized regulation in provider countries.[6]

Without anticipating the explanation in chapter 2 of the diversified international ABS framework developed, it suffices here to say that a standard case of access to genetic resources is envisaged where a provider (often the provider country or designated national authority) will enter into a private, bilateral ABS contract with the prospective user (e.g. a company or research institution).[7] The contract should contain the user's benefit sharing obligations, which form the additional mechanism for remunerating the providers that has above been mentioned as part of a minimalist approach to prevent biopiracy. It is important to note that this procedure is intended only for international access activities, i.e. where users and providers from different countries are involved, and not for domestic access to genetic resources. The enforcement of such private ABS contracts and of existing national ABS legislation, which is quite diverse in scope, content and preciseness, is attempted to be facilitated by a future International Regime on ABS (ch. 2.4.3). For a group of specific genetic resources used for food and agriculture, a specialized international treaty has already been negotiated (ch. 2.4.2). Since I will extensively criticize the conception of bene-

[5] Although user countries are often developed ones and vice versa, this is not necessarily so; examples for utilization of newly discovered genetic resources from developed countries are the enzyme Taq polymerase found in a thermophilic bacterium in Yellowstone National Park (USA), and the drug cyclosporin originating from a Norwegian National Park (Tvedt/Young 2007: 5, footnote 15).

[6] It remains disputed whether the main intention of benefit sharing in the CBD was to compensate provider countries for the costs of past conservation and breeding efforts, or, as many critics state, if it was a "business deal" or "bargain" between the (governments of) provider countries, who gained control of the flow of resources and a share of the profits, and mostly private users in industrial countries, who gained free access to resources and the opportunity to exclude others from their use with the help of intellectual property rights (e.g. Byström et al. 1999: 8; GRAIN 2005b: 6; Tvedt/Young 2007: xv). Only in the former case could providers expect additional funds for conservation purposes, while in the latter, benefit sharing is only a second step after access to certain resources has been granted.

[7] In an important deviation from this simplified standard case, *ex situ* collections of genetic resources are important intermediaries passing on genetic resources; they can serve both as provider and as user (Holm-Müller et al. 2005: 17). In a study on German users, Holm-Müller et al. (2005: 43) found that most users receive their material from trade partners resp. intermediaries, rather than e.g. from own collecting activities.

fit sharing regulated by private ABS contracts in my discussion of criteria for benefit sharing in chapter 4, I will here only add two quotations documenting a widespread dissatisfaction with the *status quo*:

> "At most, users who are outside of the source country may engage in benefit sharing with the source country. If he does not think the source country's law applies to him, a user will have no incentive to confirm this conclusion, and if he prefers not to comply with ABS he will not (cannot) be compelled." (Tvedt/Young 2007: 112)

Notwithstanding the emerging international regulation of benefit sharing, on a day-to-day basis, genetic resources often continue to be accessed without ABS contracts:

> "As things work now, most countries allow free access to their genetic resources. There are no negotiations about benefit-sharing related to the extraction and use of specific genetic resources. In most cases, this free access is not the result of reflection and deliberation but simply the result of inactivity. However, from a CBD perspective, such access is illegal and has to be considered and censured as biopiracy." (Frein/Meyer 2005: 128f).

Additionally considering that intellectual property rights in genetic resources are granted quite liberally, concerns about misappropriation seem justified. In the following chapter 1.1.4, several examples will illustrate the ongoing appropriation of genetic resources especially by patents, usually without contractual benefit sharing taking place.

1.1.4 Patent biopiracy?

In order to indicate the variety of biopiracy claims, I have compiled some recently discussed examples. According to the focus of my thesis (see ch. 1.2.3), they are from the area of crop genetic resources and cover cases where

- patents have been granted and later revoked as a result of formal appeals (Enola bean, high-oil maize),
- patents have been granted, but terminated by their holders following protest by civil society (Hawaiian taro, cupuaçu),
- patents have been granted and no action has yet been taken by civil society (brazzein),
- trademarks have been granted and later revoked as a result of formal appeals (cupuaçu), and
- specific foreign genetic resources are known to be of great worth in conventional breeding, and no law requires benefit sharing (Brazilian peanut).

I will at this point refrain from any evaluative remarks or ethical considerations as these examples are presented here merely for illustrative and explanatory purposes; they will be referred to again in chapter 4, where appropriate. In this short presentation, I will not include the two most prominent cases of alleged biopiracy, the South African Hoodia plant (*Hoodia gordonii*) and the Indian Neem tree (*Azadirachta indica*), since these plants are used mainly for medical and other non-food purposes. Another important case of contested claims to benefit sharing for genetic resources used in medical research is discussed mainly at the World Health Organization (WHO): influenza viruses and the respective vaccines and treatments are increasingly covered by patent applications from developed countries, while the virus samples necessary for their research and development are provided mainly by developing countries without compensation or benefit sharing.[8]

[8] The conflict at the WHO erupted when Indonesia stopped sharing its virus samples in 2007 and demanded a reform of the WHO system; the outcome of the ensuing negotiations is still open. For background information and current developments concerning this issue, see Hammond 2009, as well as the relevant websites e.g. of the WHO at *http://www.who.int/csr/disease/influenza/en/index.html*

1.1.4.1 Enola bean

In 1999, Larry Proctor was granted a patent by the US Patent Office (No. 5894079) for a variety of yellow beans (*Phaseolus vulgaris*) named Enola. According to the "detailed description of the invention" in the patent application[9], Proctor developed the new variety from a bean sample which he bought in a Mexican market and then allowed to self-pollinate; of the segregating population, individual plants were selected. Proctor describes the distinctly yellow colour of the seed, which remains relatively unchanged by season, and its presence throughout the entire seed coat as the main characteristics of the new variety. On the basis of this patent, shipments of Mexican yellow beans were hindered to enter the USA, Mexican farmers lost markets for yellow beans in the USA, and US farmers growing yellow beans were charged with patent infringement suits. In 2000, the International Center for Tropical Agriculture (CIAT, an International Agricultural Research Centre, see p. 53) filed a request for re-examination of the patent on the grounds of lacking novelty and non-obviousness, which resulted in a first rejection of the patent in 2003. In 2004, scientists showed that the Enola bean is genetically almost identical to pre-existing Mexican cultivars and supposedly was derived by direct selection within them (Pallottini et al. 2004), therefore being neither truly novel nor non-obvious. After a series of appeals by Proctor, the Board of Patent Appeals finally affirmed the rejection of the patent in 2008, and in 2009, the US Court of Appeals again confirmed its invalidity.[10]

1.1.4.2 High-oil maize

In 2000, the US company Du Pont was granted a patent by the European Patent Office (No. 744888, designated at Spain, France, Italy) for corn (i.e. maize) grains and products with improved oil composition. The patent claims corn grain with a total oil content of at least 6% of the total seed weight, in which at least 55% of the oil consists in oleic acid; both contents are higher than usually in maize. The claims extend further to e.g. the processed grains, use of the grains in food, animal feed, cooking, and industrial applications, and include a conventional method of breeding such corn. In 2001, the environmentalist organization Greenpeace Germany, the German catholic development organization Misereor, and the government of Mexico filed opposition against the patent for lack of novelty and of invention since maize varieties with such characteristics were already known and used e.g. in Mexico. In 2003, the patent was revoked in total by the patent office. Two similar patents on corn plants and products with improved oil composition, which differ in their exact claims, were granted to Du Pont in 2001 and 2004 by the US Patent Office (No. 6248939 and No. 6770801)[11].[12]

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and of the Third World Network at *http://www.twnside.org.sg/avian.flu_main.htm* (both last accessed 27.05.2009).

[9] The patent application is available via the patent database of the United States Patent and Trademark Office at *http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=5894079.PN.&OS=PN/5894079&RS=PN/5894079* (last accessed 27.05.2009).

[10] Unless indicated otherwise, information on the Enola bean case was taken from the ETC Group website, especially the news releases of April 29th 2008 at *http://www.etcgroup.org/en/materials/publications.html?pub_id=683*, of January 5th 2001 at *http://www.etcgroup.org/en/materials/publications.html?pub_id=286*, and of July 14th 2009 at *http://www.etcgroup.org/en/materials/publications.html?pub_id=756* (all last accessed 27.07.2009).

[11] The US patents are accessible via the patent database of the United States Patent and Trademark Office (search for the patent numbers) at *http://patft.uspto.gov/netahtml/PTO/search-bool.html* (last accessed 30.05.2009).

[12] Unless indicated otherwise, information on the high-oil maize case was taken from the website of the initiative No Patents on Seeds at *http://www.no-patents-on-seeds.org/index.php?option=com_*

1.1.4.3 Hawaiian taro

Taro (*Colocasia esculenta*) is a traditional staple food crop in Hawaii (and other tropical countries) grown primarily for its edible tubers; it also possesses cultural and spiritual significance. Originally from the Indo-Malayan peninsula, a few types were introduced to Hawaii centuries ago, where farmers adapted them to local conditions and developed several hundred varieties. The University of Hawaii filed patent applications for three taro varieties, Pa'akala, Pa'lehua, and Pauakea, in the USA in 1999 and at the World Intellectual Property Organization (WIPO; see ch. 2.3.3) in 2000; the US patents were granted in 2002.[13] All three varieties, which differ mainly in tuber colour, were produced by cross-pollination of two commercial cultivars, subsequent selection among the progeny for a plant with desirable properties, and its asexual reproduction. In 2005, native Hawaiians began to protest against the patenting of taro varieties and asked the university to withdraw the patents.

> "Hawaiians would never dream of patenting or genetically manipulating kalo [=taro]. Kalo is a gift handed down to us by our ancestors. Hawaiians believe kalo is the first born (named Haloa), and is our elder brother. We have a Kuleana or responsibility to honor, respect and protect Haloa, so he in turn will sustain us." (Walter Ritte, cited in a press release by the Center for Food Safety; see footnote 14)

Apart from taro patenting being regarded as violating cultural and spiritual values, it was argued that the patented varieties, since derived from existing varieties incorporating traditional cultivars, are not novel enough, and that the claimed properties had not been validated (Ritte/Kobayashi 2006). In 2006, the University of Hawaii released the three contested taro patents into the public domain, but did not stop patenting e.g. ornamental taros (Evans 2009: 19).[14]

1.1.4.4 Cupuaçu

The cupuaçu tree (*Theobroma grandiflorum*) is native to Brazil, where its fruit pulp is commonly used for juice, desserts, sweets etc. (Rehm/Espig 1991: 258). Its seeds may be an alternative to the seeds of the closely related cocoa tree (*Theobroma cacao*) in manufacturing chocolate and other cocoa-based products ("cupulate"). In 2000, Brazilian exporters of cupuaçu-based jam into Germany were challenged by the Japanese company Asahi Foods Co. Ltd., who had had the trademarks "Cupuacu" and "Cupulate" registered in the EU (No. 923151 and 915942)[15] and in the USA

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content&task=view&id=27&Itemid=20 (includes links to the patent, the opposition and decision documents), and from the news releases by the European Patent Office of February 7th 2003 at *http://www.epo.org/about-us/press/releases/archive/2003/07022003.html* and of February 12th 2003 at *http://www.epo.org/about-us/press/releases/archive/2003/12022003.html* (all last accessed 29.05. 2009).

[13] The US patents are accessible via the patent database of the United States Patent and Trademark Office (search for the patent numbers PP12772, PP12361, PP12342) at *http://patft.uspto.gov/netahtml/PTO/search-bool.html* (last accessed 28.05.2009). The patent applications at the WIPO are available via the WIPO patent database (search for the publication numbers 2001/030132, 2001/029180, 2001/029181) at *http://www.wipo.int/pctdb/en/* (last accessed 28.05.2009). Interestingly, the US patents documentation does not include information about the presumed withdrawal of the patent by the holder (see below).

[14] Unless indicated otherwise, information on the Hawaiian taro case was taken from Ritte/Freese (2006) and from a press release by the Center for Food Safety on January 12th 2006, available at *http://www.centerforfoodsafety.org/press_release1_12_20062.cfm* (last accessed 28.05.2009).

[15] The trademarks were filed in 1998 and registered in 1999; detailed information is available via the database of the Trade Marks and Designs Registration Office of the EU (search for "cupuacu" and "cupulate") at *http://oami.europa.eu/CTMOnline/RequestManager/en_DetailCTM_NoReg* (last accessed 27.05.2009).

(No. 75558710 and 75561934)[16]. The same company in 2002 filed for patent protection of the "fat originating in cupuassu seed, process for producing the same and use thereof" in the EU (No. 2000964765) and the USA (No. 10089640)[17]. The state of Brazil and the German BUKO Campaign against Biopiracy raised extensive publicity and challenged the patent applications and trademarks. In 2005, the application at the European Patent Office was withdrawn by the applicant, and the EU and US trademarks "Cupuacu" (but not "Cupulate") were cancelled.[18]

1.1.4.5 Brazzein

Brazzein is a sweet tasting protein contained in the berries of the West African plant *Pentadiplandra brazzeana*, and these berries are traditionally consumed by both people and animals in the region. A group of researchers at the University of Wisconsin isolated the protein and conducted research into its characteristics and properties, finding it to be 500 to 2000 times sweeter than sugar and a promising non-sugar sweetener for use in food and drinks, with taste and heat stability superior to that of many artificial sweeteners (Hellekant/Danilova 2005; Ming/Hellekant 1994). By slightly changing the amino acid sequence, its sweetness can be enhanced or removed, and it can be produced recombinantly by genetically engineered bacteria, yeast and plants (Assadi-Porter et al. 2000; Hellekant/Danilova 2005). Between 1994 and 2006, the Wisconsin Alumni Research Foundation was granted six different US patents on brazzein-based sweeteners.[19] Of four similar patent applications on brazzein-based sweeteners filed at the WIPO between 1994 and 2008 by the same foundation, one resulted in an EU patent (EP 1994908758), another one was withdrawn[20] at the European Patent Office (EP 2000911644), and the last one of 2008 probably has not passed the examination status yet.[21] Claims of the granted patents include:

- the sweet protein itself, named brazzein,
- a recombinant (i.e. genetically engineered) host capable of producing the sweetener,
- brazzein produced recombinantly,
- using brazzein for sweetening foods and beverages,
- the mix of brazzein with other sweeteners,
- various synthetically produced peptides with amino acid sequences slightly differing from that of naturally occurring brazzein, thereby conveying different taste profiles and sweetness strengths, and
- the DNA sequences capable of expressing brazzein and further indicated peptides.

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[16] The trademarks were filed in 1998 and registered in 2003; detailed information is available via the trademark database of the United States Patent and Trademark Office (search for "cupuacu" and "cupulate") at *http://www.uspto.gov/main/trademarks.htm* (last accessed 27.05.2009).

[17] The international patent application is available via the patent database of the World Intellectual Property Organization (search for the publication number WO 2001/025377) at *http://www.wipo.int/pctdb/en/* (last accessed 23.07.2009); details are only available in Japanese.

[18] Unless indicated otherwise, information on the Cupuaçu case was taken from the website of the *BUKO Campaign against Biopiracy* at *http://www.biopiraterie.de/index.php?id=298&L=1* (last accessed 27.05.2009).

[19] The US patents are available via the patent database of the United States Patent and Trademark Office (search for "brazzein" and "Wisconsin Alumni Research Foundation") at *http://patft.uspto.gov/netahtml/PTO/search-bool.html* (last accessed 28.05.2009).

[20] It is not clear if the term "withdrawn" in the WIPO database means that the patent holder or the patent office withdrew the patent.

[21] The international patent applications are available via the patent database of the World Intellectual Property Organization (search for the publication numbers WO 1994/019467, WO 1995/031547, WO 2000/061759, WO 2008/112475) at *http://www.wipo.int/pctdb/en/* (last accessed 28.05.2009).

While publishing their results in detail, the researchers remain vague about the origin of the samples they analysed:

> "In the 1980s, our attention was attracted to a West African plant, *Pentadiplandra brazzeana* (Hladik *et al.*, 1984). We obtained a small sample of smoke-dried berries in which we tentatively identified a sweet tasting protein, pentadin (van der Wel *et al.*, 1989). From a new and fresher sample of the berries' pulp we identified and isolated the major sweet principle of *P. brazzeana*, which we named brazzein (Ming and Hellekant, 1994). […] Indigenous people have known brazzein for centuries." (Hellekant/Danilova 2005: i88)

In 2007, the US company Natur Research Ingredients obtained the exclusive license from the Wisconsin Alumni Research Foundation to manufacture and distribute a brazzein-based sweetener under the trademark Cweet (Pree 2007; see also *http://www.cweet.com*).

1.1.4.6 Brazilian peanut

In 1952 Alan Beetle, a botanist at the University of Wyoming specialised in grasslands, went on a working mission to South America. During the journey, he purchased four samples of peanuts (*Arachis hypogaea*) at local markets in the Brazilian state of Rio Grande do Sul. On his return to the USA, he deposited them with the US Department of Agriculture, together with seed samples of grasses which were his primary target of investigation. In 1987, the tomato spotted wilt virus, a virus severely affecting peanut plants, occurred in the USA and has since become a widespread problem especially in Southern states. One of the peanuts of Beetle's purchase, called PI-203396, was found to be resistant to the virus, and subsequently was introduced into various varieties that today dominate US peanut fields and are protected by intellectual property rights. The value of this resistance for the US peanut crop has been estimated to amount to 200 million US Dollars annually (Peanut Crop Germplasm Committee 2004: 11).[22]

> "Although it is clear that little or nothing was returned to Brazil in exchange for the great service performed by its peanut germplasm, no laws were transgressed." (Edmonds Institute 2006: 3)

After these examples of the appropriation of genetic resources have complemented the more general introduction to the subject of my investigations, I will subsequently explain my approach and objective in more detail.

[22] Unless indicated otherwise, information on the Brazilian peanut case was taken from Edmonds Institute (2006).

1.2 Objective and study questions

1.2.1 Defining fair and equitable?

As has been mentioned above, a fragmentary framework of ABS regulation is in place that combines national legislation, international agreements, and private contracts. Since these are in large parts voluntary or not enforceable (see ch. 4.8), efforts are under way to close the gaps, to make different pieces of legislation compatible, and to negotiate a new International Regime on ABS. Most of these efforts, however, focus on the enforcement (especially across borders) of private ABS contracts and national legislation on ABS and intellectual property rights. Comparing this to the wording and spirit of the CBD, what remains missing in formal legislative and negotiation processes is a debate on what makes a certain benefit sharing agreement fair and equitable, or what procedural preconditions must be fulfilled. It seems to be implicitly assumed that the contract provisions are fair and equitable as long as an ABS contract is the result of free and informed consent by both parties. However, it is rather obvious that the negotiation process between a provider and a user, as well as its outcome, might not always meet this expectation – especially considering the lack of enforceability of contracts across borders and the fact that most users do not have to disclose the source of genetic resources they utilize. Similarly, at the international level, it is not difficult to imagine that negotiations of governments of rich and powerful states with those of poor and small ones may not lead to completely fair and equitable international agreements. Furthermore, the provisions in ABS contracts often affect stakeholders other than the contract parties, without them having a say in the negotiations between user and provider. I have already referred to the ambiguity of whether benefit sharing is conceived as a remuneration for granting access, or (also) for past contributions to conservation and development of resources.

While such aspects are discussed in detail in chapter 4, they are mentioned here in order to illustrate the need for a renewed, fundamental approach to the question which benefit sharing is fair and equitable. Although the subject of ABS has been discussed for quite a number of years now, there are few attempts so far to define or interpret the concept “fair and equitable” itself. One exception is the study by Byström et al. (1999), who discuss some possible interpretations (see p. 19) and conclude that the use of “fair and equitable” in the CBD implies a clear objective regarding the sharing of benefits from genetic resources and the inclusion of “the whole range of factors influencing how and where benefits flow” (Byström et al. 1999: 75). The authors put forward a tentative list of criteria for fair and equitable benefit sharing that includes many of the demands mentioned here[23], but, although they argue on the basis of ethical considerations in their chapter 4 (pp. 20-25), their justifications remain rather short and sketchy. Tvedt/Young (2007: 87f) similarly interpret the concept “fair and equitable” as reaching beyond freely negotiated ABS contracts, with the CBD requiring benefit sharing “beyond the vain attempt to assign a specific value to a specific genetic resource” (Tvedt/Young 2007: 88). I agree with these authors that a more comprehensive approach, backed by ethical theory, is necessary to determine what is fair and equitable in the context of sharing benefits from the use of genetic resources. If progress could be made on this issue and, possibly, a common understanding could be reached, procedures and outcomes of ABS contracts, of national ABS legislation, and of international agreements could be evaluated and criti-

[23] Such demands are e.g. participation, capacity building, conservation and sustainable use of biodiversity, disclosure of origin, and respect for basic human rights, customary law and value systems (Byström et al. 1999: 27).

cized on a sound basis, and proposals for addressing potential shortcomings could gain transparency and legitimacy.

> "It may be extremely difficult to agree on whether a specific outcome is equitable. But it can still be possible to agree on *means* that are likely to render the outcome more equitable, and on *indications* of the degree to which a specific outcome is equitable." (Byström et al. 1999: 24)

On the meaning of "fair and equitable"

Although the "fair and equitable sharing of the benefits arising out of the utilization of genetic resources" is one of the three objectives of the Convention on Biological Diversity, the term "fair and equitable" is not defined in the Convention or in any of the ensuing international agreements, nor is it commonly used in international law (Byström et al. 1999: 20). *The New Oxford Dictionary of English* (1998) offers the following definitions:

- fair: "treating people equally without favouritism or discrimination"; "just or appropriate in the circumstances"
- equitable: "fair and impartial"; as a legal term: "valid in equity as distinct from law"
- equity: "the quality of being fair and impartial"; as a legal term: "a branch of law that developed alongside common law in order to remedy some of its defects in fairness and justice, formerly administered in special courts"

According to the entry "fairness" in the *Encyclopedia of Ethics* (Simmons 1992: 355), the core concept of fairness is a certain kind of right ordering of distributive processes or practices; it is strongly associated with ideas like equality, proportionality, reciprocity, impartiality, and justice. A "fair share" is thus "an equal share or a share that is proportional to one's possession of those properties which are relevant to the distributive intent". Non-moral meanings of the term are straightness, beauty, flawlessness, and proper proportion.

Byström et al. (1999: 21-25) identify three possible approaches to interpreting "fair and equitable" in the context of the CBD:

- a market approach with focus on the distribution process, where the outcome of an agreement is considered fair if the parties have reached it voluntarily and its outcome cannot be judged objectively,
- an equality approach with focus on the distribution outcome, where equity requires a certain degree of equality, and a
- relation-based approach, where mutual understanding of the desired outcome and mutual affirmation of the equivalence of worldviews define fairness and equitability.

Box 1: On the meaning of "fair and equitable"

1.2.2 Seven central study questions

In the following section, I will formulate central study questions as a starting point for my investigations, all of which I regard as indispensable if all factors influencing the flows of benefits are to be considered. After shortly explaining them here, I will list them again below.

In order to approach the subject broadly, I will begin by recapitulating the aims of regulating access and benefit sharing in general:

What are the long-term aims of access and benefit sharing regulation?

Issues that have to be clarified at this level are e.g. in how far the loss of crop genetic resources or the global inequalities in resource distribution should be considered in ABS regulation. More precisely, it has then to be determined what purposes the individual acts of benefit sharing should serve:

Which medium- and short-term purposes should benefit sharing serve, e.g. in order to reach the above aims?

An answer to this question should incorporate findings concerning the users' demand for fresh and existing genetic resources and associated knowledge, their role in product development, and the needs of providers. Since benefit sharing currently is based mainly on ABS contracts between identifiable providers and users of a given resource, the fairness and equitability of such benefit sharing cannot be discussed without a debate on property rights in genetic resources and associated knowledge:

How should legitimate property rights in genetic resources and associated knowledge be construed?

In the present context, the main subjects of this debate will be the general legitimacy of (especially intellectual) property rights in such resources and knowledge, as well as their concrete advantages and disadvantages with regard to the utilization of the genetic resources and associated knowledge they cover. After these more general questions have been answered, the act of benefit sharing itself can be addressed. If a more comprehensive benefit sharing than through private ABS contracts alone is aimed at, it is necessary to determine who is to share and who is to receive such benefits:

Who should be required to share benefits?

Who should receive benefits?

Critical points of debate will concern the various uses of genetic resources and associated knowledge, and who is to be considered as providing them. The last of my questions regarding substantial fairness and equitability in benefit sharing is the one often considered as the most important, i.e. what benefit sharing should actually consist of:

What elements should benefit sharing include?

Against the background of the answers to the previous questions, certain kinds of benefits will emerge as more important and more adequate than others. Eventually, the demands elaborated in discussing these questions should be put into practice via certain instruments and measures, whose design is the subject of my last study question:

How can the demands of justice that have been identified above be implemented into national and international policy?

I will address adequate participation and self-determination, as well as concrete instruments for designing and enforcing global benefit sharing that extends beyond private ABS contracts.

My investigations in the subsequent chapters will thus be guided by the following seven central study questions:

1. What are the **long-term aims** of access and benefit sharing regulation?
2. Which **medium- and short-term purposes** should benefit sharing serve, e.g. in order to reach the above aims?
3. How should legitimate **property rights** in genetic resources and associated knowledge be construed?
4. **Who** should be required to **share** benefits?
5. **Who** should **receive** benefits?
6. What **elements** should benefit sharing include?
7. How can the demands of justice that have been identified above be **implemented** into national and international policy?

Of course, each of these questions could easily be the sole subject of a much more extensive analysis, but since they are strongly interrelated, and their investigation from an explicitly ethical viewpoint, as attempted here, is rather new, I find it important and worthwhile to include all of them into my considerations.

1.2.3 On scope and intention

As a drawback to this broad, ethical approach to benefit sharing, it will not be possible to go into all legal, economic, and implementation details. Furthermore, due to my focus on benefit sharing, I will comment less extensively on the access to genetic resources, i.e. such problems as

- who is eligible to grant access,
- what are the exact conditions of "prior informed consent" by providers entering into an ABS contract, and
- which are potential minimum standards for access.

I will further limit the scope of my discussion by focusing on plant genetic resources for food and agriculture, for which I will use the shorter term *crop genetic resources*. Conceived rather broadly, this group of genetic resources includes cultivated plants, their ancestors and wild relatives, as well as wild plants used as food and fodder plants; it comprises the levels of species, populations, breeding lines, varieties, and genes. In this broad definition, they are not only those plants found on conventional agricultural fields, but also crops grown in home gardens, in agro-forestry systems, or collected for food and feed use from semi-wild habitats; these are common practices especially in the tropics and subtropics (see e.g. Mitchell/Hanstad 2004). The characteristics and utilization of crop genetic resources often differ from those of genetic resources used in medicine and other sectors; some problems (e.g. the conservation of intraspecific diversity) affect crop genetic resources more than the others, and benefit sharing for their use will be shown to require other mechanisms than a simple sharing of royalties, which may be feasible for genetic resources used pharmaceutically.[24] Even the distinction between providers and users of genetic resources is often more difficult for agricultural than for medical genetic resources: farmers, breeders, and *ex situ* collections continuously exchange seeds and other biological material and often are both provider and user; even farmers in industrial countries can be important providers of traditional genetic resources such as landraces. Although the largest market share of products from genetic resources (about 50%) is attributed to agricultural products (Kate/Laird 1999: 2, Table 1.1), the debate on benefit sharing often focuses on the use of genetic resources in healthcare and

[24] The awareness of certain specific problems concerning crop genetic resources is evident e.g. in the adoption of the *International Treaty on Plant Genetic Resources for Food and Agriculture* (ITPGR, see ch. 2.4.2).

pharmaceutics - a gap which I will attempt to bridge. Of course, the two groups of agricultural and pharmaceutical genetic resources cannot always be separated; one important overlap is nutraceuticals[25], which I will not discuss explicitly. Further sectors using genetic resources (horticulture, cosmetics etc.) have been mentioned above and will be left out of consideration here, as will animal genetic resources.

In the debate on benefit sharing, which is often dominated by political rather than scientific contributions, answers to such questions as the seven cited above are frequently formulated as claims, demands, and protest; justifications and theoretical reflection tend to remain vague. Negotiations such as the ones for the International Regime on ABS at times are more reminding of a bazaar than of coherent argumentation; this obviously tempts participants to initially state maximum demands in their own interest quasi as "bargaining chips", which can then be exchanged for concessions or compromises in other areas.[26] While such an approach is, of course, legitimate in the political process, a profound discussion of potential ethical justifications for the various standpoints could significantly advance the debate and could liberate it from revolving around certain conflicting positions that continue to be repeated by the various participants and stakeholder groups. As a contribution to such a debate on justification and motivation, I will approach the above questions on the basis of rather general conceptions of justice, especially the approaches by John Rawls and Thomas Pogge. Although these authors hardly address the use of genetic resources specifically, I will attempt to identify some of their principal analyses and conclusions as being applicable to the debate on fair and equitable benefit sharing and, thus, as fruitful for answering the seven study questions of this thesis. If ethical justifications of certain political positions can be made plausible, this may provide for additional resonance in the debates concerning national legislation, as well as in the negotiations on an International Regime on ABS.

In summary, thus, the aim of this thesis is to employ theoretical conceptions of justice for developing and discussing ethical criteria for a fair and equitable benefit sharing in the utilization of crop genetic resources, as required by the Convention on Biological Diversity, and concretised in seven central study questions. As for the title question of "fair shares or biopiracy?", these criteria for benefit sharing will provide a certain guidance, but obviously no definitive and general answer to the question which cases of appropriation of certain resources should be termed biopiracy and which should not. My focus on benefit sharing implies an acceptance that, in certain cases, appropriation of genetic resources takes place and can be justified if it follows certain requirements. Such a standpoint obviously is in contrast to the "maximalist" approach mentioned in chapter 1.1.2 that any privatisation of genetic resources and associated knowledge constitutes an act of biopiracy and cannot be rectified by any benefit sharing. However, there are probably few who subscribe to such a standpoint, which would make institutional benefit sharing largely superfluous, and which also (at the moment) seems beyond all feasible outcomes of international ABS negotia-

[25] The term *nutraceutical* was coined in 1979 by Stephen DeFelice for "food, or parts of food, that provide medical or health benefits, including the prevention and treatment of disease"; related terms with slightly differing meanings are dietary supplement, functional food, or medical food (Brower 1998: 728). Examples for such nutritionally or medicinally enhanced foods are cereals supplemented with vitamins or minerals, transgenic grains with altered oil composition, milk from transgenic animals that contains human enzymes, or bananas containing a vaccine (Brower 1998: 728, 730).

[26] My evaluation of the negotiations for the International Regime on ABS in this and later chapters is based primarily on personal observations at the sixth and seventh meeting of the CBD Working Group on Access and Benefit-Sharing (see ch. 2.4.3). These meetings took place in January 2008 in Geneva and in April 2009 in Paris, respectively.

tions. On the other hand, since I will conceive benefit sharing as a broad concept including multilateral benefit sharing for resources accessed in the past, and since I will derive rather strict limitations for intellectual property rights in genetic resources and associated knowledge, the kind of benefit sharing I envisage may be acceptable to most stakeholders protesting against biopiracy. At the end of my considerations, biopiracy may be considered as those acts of appropriation of genetic resources and associated knowledge where no benefits have been shared, or where their sharing violates important demands expressed in the criteria I will develop. Nevertheless, I will in the following largely avoid the expression *biopiracy* in favour of the less tendentious term *misappropriation* or more specific notions (see ch. 1.4.7).

1.3 Outline of the thesis

The remaining part of this thesis will be arranged as follows: after explaining my use of certain central terms in chapter 1.4, I will give an overview of the central international agreements governing the use of genetic resources in chapter 2, including a short *excursus* on the state of national ABS legislation (ch. 2.5). Starting with the CBD (ch. 2.2), I will further discuss the World Trade Organization (especially its TRIPS-Agreement), the World Intellectual Property Organization, and the International Union for the Protection of New Varieties of Plants as the main international organizations where intellectual property rights for genetic resources are designed (ch. 2.3). Chapter 2.4 will then be dedicated to the implementation of benefit sharing by the Bonn Guidelines, the International Treaty on Plant Genetic Resources for Food and Agriculture, and the International Regime on Access and Benefit Sharing as the most relevant global fora. I will mostly abstain from criticising the various pieces of legislation in chapter 2, reserving their evaluation for chapter 5.

In chapter 3, I will develop a framework of specific ethical principles for fairness and equity in the context of benefit sharing. The notion of justice will be given a central role in my considerations, because it is the philosophical term corresponding most closely to the notion "fair and equitable". After giving a short account of justice as a philosophical concept in chapter 3.2, I will focus on the approaches of John Rawls (ch. 3.3) and Thomas Pogge (ch. 3.5). For each of them, I will outline the theory and its implications for the subject under discussion, then identify which concepts and ethical demands I will adopt, and from these deduce my own principles of justice in benefit sharing (listed in chapter 3.7). Despite the undeniable theoretical differences between Rawls' and Pogge's conceptions, I expect the derived principles to be applicable without contradictions or inconsistencies for the limited purpose of this thesis.

Representing the core of my argumentation, in chapter 4 the principles of justice will be applied to the concrete problems of benefit sharing for crop genetic resources and associated knowledge. While many of the resulting concrete criteria for fair and equitable benefit sharing will correspond with demands found in the political and public debate, my aim is to base such claims on adequate ethical principles. The headings of chapters 4.2 to 4.8 recapitulate the seven central study questions, with their respective subheadings indicating the answers that I will identify as consistent with the principles of justice and covering the main issues of contention. In some cases, it will be necessary to extend the discussion to related topics and background information; although this results in varying length and complexity of the chapters, it implies no evidence of differential importance. In the concluding synopsis in chapter 4.9, I will consolidate the criteria into a coherent conception of fair and equitable benefit sharing, including a proposal for a flowchart integrating the envisaged procedures (see p. 231). While the criteria and proposals I will put forward are far from the *status quo* and quite demanding upon users of genetic resources and associated knowledge, I regard them as justifiable, if the principles of justice derived from Rawls' and Pogge's approaches are taken seriously.

On the basis of the criteria I have developed, I will add some evaluative remarks on the existing international legislation in chapter 5, focusing on those pieces that are most specific for the benefit sharing from crop genetic resources and where there is still scope for negotiation and implementation. For the most part, the legislative framework will be found to not adequately reflect concerns of justice as expressed in the criteria developed in chapter 4, and questions of priority between the different

legislative fora remain unsolved. In a short conclusion in chapter 6, I will recapitulate the most important results of the thesis and relate them to some of the issues of debate illustrated in this introduction.

1.4 Use of central terms

In addition to the glossary at the end of this thesis (ch. 10), I would like here to address some issues of terminological debate and to clarify my own use of these contested terms. The debates referred to will to some extent be further addressed in the following chapters.

1.4.1 Access and benefit sharing

In accordance with current international use, I will refer to access to genetic resources and benefit sharing (abbreviated ABS) rather generally as the broad topic of my investigations. Since benefit sharing for genetic resources cannot take place without some kind of previous access to these resources, discussing benefit sharing necessarily involves discussing certain aspects of access. For pragmatic reasons, I will consider as *access* to a genetic resource any case where a genetic resource is acquired by a prospective user from an identifiable provider or from the public domain, independent of whether any property rights or other rights to the resource are conferred in this process. In how far such actions result in obligations for benefit sharing will be discussed in detail in chapter 4.5. *Benefit sharing* itself can be monetary or non-monetary, unilateral or multilateral; the term will be used quite broadly for any transfer of material or immaterial goods by the users of genetic resources in exchange for these uses.

1.4.2 Biological and genetic resources

Article 2 of the CBD defines genetic resources as a subset of biological resources:

> "'Biological resources' includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity."
>
> "'Genetic resources' means genetic material [i.e. any material of plant, animal, microbial or other origin containing functional units of heredity] of actual or potential value."

These definitions, however, are widely considered to lack sufficient clarity for their unambiguous distinction and legal application. Especially the definition of genetic resources is to a certain extent misleading since it seems to refer only to the material resources and not to the contained genetic information. In literature, a range of viewpoints can be found that conceive genetic resources as either

- purely material (e.g. a sample or extract),
- purely immaterial/intangible (e.g. genetic information), or
- as comprising both material and immaterial components.

Especially in the context of crop genetic resources, I find the third variant most conclusive since the actual or potential value of these resources very often neither consists only in the physical object itself (e.g. the individual grain), nor merely in the genetic information or the agronomic characteristics of a crop, but can only be realized by their combined availability e.g. in a cultivated variety or in a gene identified as conveying certain phenotypic qualities. This combination, however, is also one reason for contested issues of ownership over these resources, because conventional property rights usually apply either to material or to immaterial (e.g. intellectual) property (cf. Tvedt/Young 2007: 78).

For the discussion of access to such resources and the sharing of benefits arising from their utilization (cf. CBD Art. 1), I find it helpful to base the distinction of biological vs. genetic resources not on the type of resource itself, but rather on its use (cf. Dross/Wolff 2005: 50f; Henne 1998: 41; Young 2004: 281f): a resource or specimen is then used as a *biological resource* if it is used in a rather unspecific way

e.g. as firewood, construction material, decoration, or for ecosystem services; its genetic characteristics are not central to its suitability for the respective use, and it could be replaced by organisms or biological material of other species.[27] The use of a resource for

- breeding new varieties and other genetic modification,
- further propagation and cultivation,
- identifying and extracting certain (novel) chemical compounds,
- taxonomic research and conservation, or for
- technical innovations based on that material,

on the other hand, would usually constitute it as a *genetic resource*, whose specific utility is based on its heritable characteristics.[28] These definitions imply that the same organism or material can constitute a biological resource or a genetic resource, depending on its use, and can even change its character from one to the other over time. This aspect becomes especially relevant for answering the question of when (for which products, for which uses, at which point in time) benefit sharing is required. Both biological and genetic resources, together with abiotic resources such as air and water, are parts of natural resources, a term which I will mention in the discussion of ethical theory in chapter 3.

The distinction between biological and genetic resources is not only observable in the ways such resources are utilized, but also in the ways they are appropriated: the (non-exclusive) appropriation of biological resources may e.g. consist in purchasing a bag of peanuts or a bundle of firewood for consumption, or herbs for preparing an infusion for treating a cold. An appropriation of genetic resources, in contrast, would e.g. be

- identifying a gene for drought resistance in rice and claiming a patent for it,
- extracting a pharmaceutically active compound from a traditional herbal remedy and commercialising it as a drug (possibly after manufacturing it synthetically), or
- buying a sample of specific peanuts or peanut plants, crossing them with existing breeding material, and commercialising the resulting new variety.

1.4.3 Country of origin / source country / country providing genetic resources

In Article 2, the CBD distinguishes

- the country of origin of a genetic resource, i.e. a country which possesses this genetic resource in *in situ* conditions, from
- the country providing a genetic resource, i.e. the country actually supplying the resource from within its boundaries.

The providing country, in literature also called source country, thus is not necessarily a country of origin for a specific resource, but may harbour it in an *ex situ* collection, and might even have acquired the resource illegitimately before the CBD entered into force. Of course, illegitimate appropriation of a resource in the past might also have occurred where resources are today found *in situ* since habitats (especially agro-ecological ones) are often suitable for crops not originating from the immediate surroundings. Today's agriculture is to a large extent based on resources that were at

[27] Food and feed consumption is usually included in this enumeration of utilization as biological resources. However, I will show in chapter 4.5.4 that some uses as food and fodder can very well be considered as utilization of genetic resources, i.e. if they are chosen because of their specific heritable characteristics.

[28] This list is adopted from the *Report of the Meeting of the Group of Legal and Technical Experts on Concepts, Terms, Working Definitions and Sectoral Approaches* of December 2008, which had been commissioned by the CBD; it is available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-02-en.pdf* (last accessed 16.06.2009).

some point in time introduced from other countries and even continents – an issue which makes fair and equitable benefit sharing for crop genetic resources especially demanding, and which will be raised repeatedly in the following chapters. For practical purposes, I will adopt the CBD definitions despite their lack of precision and introduce one extra term, resulting in the following classification:

- Country of origin: any country currently possessing the genetic resource *in situ*
- Provider country = source country: country actually supplying the genetic resource to a user interested in accessing it
- Specimen provenance: "real" origin of an individual specimen or sample, i.e. the country or region where the specimen or its progenitors or parental lines (from which it was propagated or reproduced) were originally collected.

1.4.4 Developing Country

The classification of countries as developing countries, developed countries, and countries in transition, which can be found in literature, is somewhat arbitrary. Furthermore, the whole concept is ethically questionable in suggesting a somewhat linear, progressive socio-economic development placing some (currently internationally dominant) countries at the "top" and others at the "bottom". However, in the absence of more adequate and unprejudiced notions, I will use the term *developing country* broadly for those countries with a relatively low standard of living, low gross domestic product, and low per capita income, which are often combined with a low level of industrialization. The antonym is *developed country* or *industrial(ized) country*, referring at least (but not always exclusively) to the OECD countries, i.e. Australia, most European countries, Japan, New Zealand, North America, and South Korea.

1.4.5 Indigenous and local communities

Neither of these two terms often used in some combination in the context of access and benefit sharing is adequately defined in official international documents such as the CBD; often, they are understood as rather broad concepts of communities other than national populations. For the purpose of this thesis, I will consider as *indigenous communities* such communities that belong to an indigenous people according to the definition below. The broader notion *local communities* further encompasses communities that are locally distinguishable e.g. by customs, language, or their use of resources, without necessarily considering themselves as indigenous. Due to their distinctness (and, sometimes, political and economic marginalization), both kinds of communities often hold special local ecological and agricultural (traditional) knowledge and contribute to the conservation of local resources.

1.4.6 Indigenous peoples

Even in the *United Nations Declaration on the Rights of Indigenous Peoples*[29] that has been adopted in 2007, its central subject of indigenous peoples remains undefined. Groups commonly referred to as indigenous peoples include, among others, Aborigines (Australia), Inuit (polar regions), Maori (New Zealand), Mayas (Central America), and Saami (Northern Europe); there are many more who are less well known. International legal documents mostly seem to adopt the view expressed in a background paper by the UN Secretariat of the Permanent Forum on Indigenous Issues (2004): according to this report, one reason for the lack of a universal definition is the reluctance of indigenous organizations to accept formal definitions by states or

[29] The Declaration is available at *http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf* (last accessed 09.03.2009); it is discussed in more detail in chapter 4.8.7.2.

governments, and the most widely accepted working definition, which will also be employed here, is the one by Martínez Cobo (1986, § 379), then Special Rapporteur of the UN Sub-Commission on Prevention of Discrimination and Protection of Minorities:

> "Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system."

I will thus use the term broadly for ethnic groups regarding themselves as indigenous peoples.

1.4.7 Misappropriation

I will employ the term rather broadly for the illegitimate appropriation of genetic resources and associated knowledge. Since it is often impossible to objectively (without an *a priori* normative framework[30]) determine whether an act of access to genetic resources qualifies as an appropriation at all and if it is legitimate or not, for the time being, I will use the term misappropriation in a strictly descriptive way: an act of misappropriation has occurred if it is considered illegitimate by the original holders of the resource or knowledge, independent of whether it was legal according to applicable law and of whether the original holders' ownership is legally recognized.

1.4.8 Traditional knowledge and knowledge associated with genetic resources

The utilization and management of genetic resources is often linked to "knowledge, innovations and practices of indigenous and local communities" (cf. CBD Art. 8j; see also the definition of local and indigenous communities above). Most current literature on access and benefit sharing subsumes these under the term *traditional knowledge* (TK), and this rather broad concept will also be employed here.[31] Traditional knowledge is often, though not in each case, characterised by being

- based on accumulated experience,
- transmitted orally resp. informally from generation to generation,
- specific for a certain traditional surrounding and cultural identity,
- of local reference,
- confined to certain knowledge holders and/or cultural or spiritual practices,
- regarded as common or communal "property", and
- holistic, i.e. incorporating physical, mental, and spiritual aspects.

These qualities are often understood as distinguishing traditional knowledge from "scientific", "academic" or "Western" knowledge. However, traditional knowledge can very well be scientific, empirical and innovative; its holders may live in urban surroundings or Western societies (Dutfield 2004: 93f). The conception of traditional or indigenous knowledge as principally different from scientific or Western knowledge assumes a sharp distinction between the respective populations and cultures,

[30] My own principles for fair and equitable benefit sharing which I will develop in chapter 3 will provide such a framework, so that I will be able towards the closing of this thesis to identify misappropriation more specifically according to these standards.

[31] Some authors instead refer to "ethnobotanical" or "indigenous" knowledge, focusing on specific aspects of traditional knowledge as understood here. Others criticize the concept of traditional knowledge as still too narrow and favour such notions as "collective bio-cultural heritage" (International Institute for Environment and Development 2008: 1).

which even in most developing countries does not exist (any more), and such a distinction may force traditional and indigenous communities by definition into a traditional, non-Western, "underdeveloped" position, where they must remain in order to keep their culture "original" and e.g. be eligible for benefit sharing. Therefore, I regard this distinction as questionable, and it can only mark two extremes between which various types of knowledge could be positioned. It is true, however, that these two opposed types of knowledge are e.g. unequally suited for certain concepts of intellectual property rights, giving rise to several difficulties discussed in chapter 4.4.5.7. I will use the term *traditional knowledge* only for knowledge that basically shows the characteristics listed above; if this is not the case, or if various kinds of knowledge are addressed, I will simply refer to *knowledge*.

In the context of access and benefit sharing for genetic resources, usually only such knowledge that is associated with the genetic resource is addressed. This is indicated by the common use of the term *associated (traditional) knowledge*, which I will adopt. Given the focus on crop genetic resources, this associated knowledge will mostly concern the characteristics, management, and use of crops, rather than e.g. medicinal, herbal, cosmetic knowledge or knowledge on animal husbandry.

2 Outlining the international legislative framework

2.1 Approach and objective

Access and benefit sharing for genetic resources are regulated at various legislative levels. There are several international agreements in place, which are to be implemented into national legislation by the signatory states. Progress in this implementation is varying among countries and between the different agreements, also because countries continue to join by ratifying them. I will here give an overview of the central international agreements governing the use of genetic resources. While keeping up to date with all the intricate ongoing elaborations and follow-up negotiations is impossible within the scope of the thesis, I will summarize the original agreements and present the main developments up to May 2009, when work on this chapter had to be finalized.[32] In presenting the agreements and responsible institutions, I am following a more or less chronological order since the efforts and criticism regarding the implementation of the CBD as the central forum for biodiversity policymaking cannot be understood without the parallel developments in other fora, especially those concerned with intellectual property rights. In a concluding *excursus*, some national ABS legislation will be presented in brief. I will mostly abstain from criticising the various pieces of legislation here since I will reserve my own evaluation for chapter 5, after I have developed the criteria for fair and equitable benefit sharing in chapter 4. However, in some instances it will be necessary to already hint at some unclarities or points of contention in order to facilitate understanding of the implementation process. In the elaboration of criteria further below, I will take into account the present state of international legislation documented here insofar as it has provoked various conflicts around the access to and use of genetic resources. However, with the exception of the CBD benefit sharing objective as the basis for my thesis, I will not take the legislative *status quo* as a given framework for the development of ethical criteria, but rather attempt to integrate into my considerations possible alternatives, reforms and supplements, especially in chapter 4.8.

The following table is a short overview of the pieces of legislation analyzed below, intended for a first orientation on their subject matter and objectives, as well as on the number of countries that are parties to them (as of May 2009):

Piece of legislation	**Subject matter**	**Objectives/Content**	**Parties**
CBD (1993)	Biodiversity incl. genetic resources; traditional knowledge	Conservation and sustainable use of biodiversity; fair and equitable benefit sharing for genetic resources and traditional knowledge	190
TRIPS (1995)	Inventions, trademarks, industrial designs, geographical indications, copyright, designs of integrated circuits, undisclosed information	Reduction of distortions and impediments to international trade; promotion of effective and adequate protection of intellectual property rights	153
WIPO Treaties	Inventions	Streamlining of patent application	141 /

[32] For similar reasons, it would be even more problematic to refer to national ABS legislation, which is rapidly evolving and will briefly be commented on in chapter 2.5.

(1970-2005)		procedures	19
UPOV-Convention (1968 – 1998)	New, distinct, uniform and stable plant varieties	Protection of new varieties of plants	67
Bonn Guidelines (2002)	As CBD, excluding human genetic resources	Operationalization of the ABS provisions of the CBD; assistance in implementing policy measures and in negotiating access agreements; non-binding	190
ITPGR (2004)	Plant genetic resources for food and agriculture	Conservation and sustainable use of the said resources; fair and equitable benefit sharing for them	120
International Regime on ABS (in negotiation)	Genetic resources; traditional knowledge (to be determined)	Implementation of the ABS provisions of the CBD (to be determined)	

Table 1: Pieces of legislation analyzed

For general understanding, it is important to know that international agreements such as the ones above initially are only between states; this means that individuals, corporations and other private entities are not immediately bound by them, even though many obligations therein may ultimately be addressed at e.g. private users of genetic resources (cf. Dross/Wolff 2005: 16, 19, 49; Young 2004: 274). In order to become effective for these private entities, international agreements have to be implemented into national law in a ratification process of varying length, and the resulting national legislation can vary widely within the limits or above the minimum agreed internationally. A further important difference to the national legislative process is that among sovereign states, decisions can usually only be made by consensus, and no country can be forced to accede after an agreement has been finalised. Both these characteristics of international legislation can be problematic especially for its successful enforcement, as will become apparent at various points in the ensuing discussion, and they are one reason for the qualification “subject to national legislation“, which repeatedly occurs e.g. in the CBD and the ITPGR. Among the various international agreements, it is not always clear which one can assume priority: while under the Vienna Convention on the Law of Treaties, later treaties between the same parties dealing with the same subject matter supersede the provisions of earlier treaties, wording to the contrary may be included in the later treaty (Moore/Tymowski 2005: 26f). In addition, many of the treaties considered here are neither between exactly the same parties, nor do they deal with exactly the same subject matter.

2.2 Starting point: The Convention on Biological Diversity (CBD)

The United Nations Conference on Environment and Development (UNCED), which took place in 1992 in Rio de Janeiro, adopted the Convention on Biological Diversity as one of its major documents. It entered into force in December 1993 and as of May 2009, 190 states were Parties to it.[33] It is implemented through regular (by now, biennial) meetings of the Conference of the Parties (COP), which is the governing body of the Convention and decides by consensus.

In its preamble, the CBD explicitly recognizes sovereign rights of states over their biological resources, as opposed to the view that these resources should be regarded as common heritage of mankind and be freely accessible to everyone.[34] Domestic access to genetic resources (i.e. access by users within a provider country) is not regulated under the CBD (Tvedt/Young 2007: 2). While national sovereignty does not necessarily imply full property rights, it does grant the right to regulate access to and use of all biological resources within the limits of its national jurisdiction (Art. 4a) e.g. via the new instrument of ABS contracts. In turn, the states are assigned the responsibility for conserving their biological resources and using them sustainably. Following the preamble, the objectives of the CBD are stated in Article 1 as the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the use of genetic resources (see p. 10). Article 15 is central to questions of access and benefit sharing and demands (emphasis added):

> "1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.
> 2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.
> 3. For the purpose of this Convention, the genetic resources being provided by a Contracting Party, as referred to in this Article and Articles 16 and 19, are only those that are provided by Contracting Parties that are countries of origin of such resources or by the Parties that have acquired the genetic resources in accordance with this Convention.

[33] The only non-member states are Andorra, the Holy See, Iraq, Somalia, and the USA (cf. *http://www.cbd.int/convention/parties/list/*, last accessed 25.05.2009). The USA is the only country to have signed, but not ratified the CBD, which entitles it to participate in negotiations without being bound to the corresponding duties (Brand/Görg 2003: 58). The text of the CBD is available at *http://www.cbd.int/convention/convention.shtml* (last accessed 25.05.2009). Interestingly, as Feit (2008: 57) notes, industrial countries favoured a narrower title for the Convention that focused on the protection of biological diversity, while developing countries insisted on the broader term *Convention on Biological Diversity*.

[34] Some authors claim that before the CBD, genetic resources were conceived as common heritage of mankind and access to them was free (e.g. Dross/Wolff 2005: 11), but this view is controversial (see e.g. Dutfield 2004: 10; Mgbeoji 2006: 97f). As Stoll (2004: 75-78) notes, international law had granted states national sovereignty over their natural resources (e.g. oil) already before the CBD, which merely acknowledged this, primarily at the instigation of developing countries. The legally non-binding FAO *International Undertaking for Plant Genetic Resources for Food and Agriculture* of 1983 (see ch. 2.4.2), however, had initially introduced the concept of (crop) genetic resources as heritage of mankind. This understanding was revised in subsequent (pre-CBD) FAO resolutions and the "communal" property aspect curtailed, but free international exchange of crop genetic resources remained common among state-controlled institutions. In the course of the CBD negotiation process, the term *common heritage* was replaced by the assertion of national sovereignty over biological resources, although their conservation remains a "common concern of humankind" (CBD Preamble).

> 4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.
> 5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.
> 6. Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.
> 7. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms."

It is worth noting here that the CBD does not provide precise definitions for essential terms in this benefit sharing provision, such as "mutually agreed terms", "prior informed consent" or even "genetic resources" (see ch. 1.4.2). This has led to considerable unclarities as to for which resources and for which uses benefit sharing is necessary, and what is to be considered as benefit "arising from the utilization" of a genetic resource. Since the CBD provisions concern only those access activities taking place after it entered into force, previous access to and appropriation of genetic resources (and, thus, their legitimation) remain beyond consideration; this concerns especially pre-CBD *ex situ* collections (Moore/Tymowski 2005: 9-11).

Article 16 calls upon the contracting parties to facilitate access to and transfer of technologies relevant to the conservation and sustainable use of biodiversity (16.1). Developing countries shall be granted most favourable and preferential terms, in consideration of existing intellectual property rights (16.2), but with a view to the private sector facilitating access to, joint development and transfer of technology in developing countries (16.4). Articles 19.1 and 19.2 on biotechnology call specifically for participation in biotechnological research activities and for priority access to results by provider (especially developing) countries.

Article 8, which is generally concerned with *in situ* conservation, in paragraph (j) demands to preserve traditional knowledge[35] and to encourage benefit sharing specifically for those benefits arising from its utilization:

> "Each Contracting Party shall, as far as possible and as appropriate: […]Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices".

This paragraph has had a major legal and political impact, because it is the first international legal document to state an (albeit limited) right of local and indigenous communities to their traditional knowledge – in contrast to rights to genetic resources, which remain with the national government, unless it provides otherwise (cf. Stoll 2004: 82). The rights of indigenous communities were affirmed again in 2007 with the adoption of the *United Nations Declaration on the Rights of Indigenous*

[35] For a definition of traditional knowledge, see ch. 1.4.8.

Peoples.[36] In order to implement these commitments and related CBD provisions, an *Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions* was established by the Conference of the Parties in 1998.[37]

In Articles 20 and 21, a financial mechanism is established to provide funding for the fulfilment of the CBD objectives, especially to developing countries, on a grant or concessional basis. Article 20.4 explicitly relates the CBD commitments by developing countries to the financial commitments by developed countries:

> "The extent to which developing country Parties will effectively implement their commitments under this Convention will depend on the effective implementation by developed country Parties of their commitments under this Convention related to financial resources and transfer of technology and will take fully into account the fact that economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties."

In ensuing decisions, the COP mandated the Global Environment Facility (GEF) to operate the CBD's financial mechanism.[38] The GEF addresses six global environmental issues, among them biodiversity. Projects eligible for funding must reflect national or regional priorities, must have the support of the country or countries involved, and must improve the global environment or advance the prospect of reducing risks to it. In relation to ABS measures, the GEF is to support capacity building, assessment of existing measures, formulation of mechanisms and policies, and the implementation of the Bonn Guidelines (see ch. 2.4.1). For the related task of financing the *ex situ* conservation of resources, the Global Crop Diversity Trust was established in 2004 by the ITPGR (see ch. 2.4.2.2).

The CBD was one of the first binding international agreements concerning biological resources and of a very broad scope. Many inadequacies have been pointed out since it entered into force, parts of which have been tackled by the subsequent implementation process. Of special interest here is the Working Group on Access and Benefit Sharing (see ch. 2.4.3), whose subject has proven one of the most contested within the CBD. Apart from the conflicts arising from the divergent interests among parties, one reason for its faltering implementation is the need to reconcile the CBD with numerous other international agreements that have followed since, some of which will be examined below.

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[36] The text of the Declaration is available at *http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf* (last accessed 09.03.2009); see also ch. 4.8.7.2.

[37] The Working Group has met five times since, with the sixth meeting scheduled for November 2009. Among other tasks, it is supposed to investigate possibilities for *sui generis* systems for the protection of traditional knowledge and for halting its loss, as well as to contribute to the negotiation of the international regime on ABS. This information is taken from the website of the Working Group at *http://www.cbd.int/convention/wg8j.shtml* (last accessed 25.05.2009).

[38] This arrangement is initially mentioned in Art. 39 CBD as an interim solution. The ensuing COP decisions are available at *http://www.cbd.int/financial/guidance.shtml* (last accessed 03.08.2009). The GEF today is an independent financial mechanism for international environmental conventions which provides grants and generates co-financing for projects in developing countries and countries with economies in transition since 1991. Implementing agencies are the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the World Bank, with contributions from seven other international organizations as executing agencies. For the period of 2006 to 2009, the GEF will receive a total of 3.13 billion US Dollars from 32 donor countries. This information was taken from *http://www.gefweb.org/What_is_the_GEF/what_is_the_gef.html* (last accessed 25.05.2009).

2.3 International legislation on intellectual property rights for genetic resources

Discussing questions like whose consent is needed for accessing genetic resources, who is required to share benefits, and for which resources, is not possible without referring to the existing property rights that are involved. For genetic resources, the central rights are those of intellectual property, which will be discussed in detail in chapter 4.4.5; here, I will give an overview of the current international regulation of such rights. Developments in the global regulation of intellectual property rights, with a focus on development issues, are documented e.g. in the *Intellectual Property Quarterly Update* published online by the South Centre[39].

2.3.1 The World Trade Organization (WTO)

Before discussing the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) as the central piece of international legislation on intellectual property rights, it is necessary to recapitulate some facts about the World Trade Organization (WTO): it was established in 1995 as successor to the General Agreement on Tariffs and Trade (GATT). As of May 2009, it had 153 members, with additional 30 governments in observer status.[40] It is not an independent organization, but is understood as a forum where member countries carry out negotiations with the principle aim to facilitate international trade. The WTO's decision-making body, the Ministerial Conference, usually meets every two years, with decisions typically by consensus rather than by majority vote (World Trade Organization 2003: 10). Agreements are usually negotiated in "Rounds", i.e. members either approve or reject a whole bundle of decisions in different sectors. An overview of the WTO legal texts, from which the following information is adopted unless stated otherwise, is available at *http://www.wto.org/english/docs_e/legal_e/legal_e.htm* (last accessed 07.07.2009). The main agreements of 1995, concluded after the "Uruguay Round" of trade negotiations 1986 to 1994, cover goods (GATT), services (GATS), and intellectual property rights (TRIPS, see below). The additional *Agreement on Agriculture* aims to advance market orientation in agricultural trade and obliges all countries, except least-developed ones, to reduce tariffs on agricultural products, reduce support measures with an impact on trade, and reduce export subsidies. New negotiations especially on agriculture and services and on the special needs of developing countries started at the Ministerial Conference in 2001 in Doha ("Doha Round"), but failed to come to their planned conclusion by the end of 2005, when the most recent Ministerial Conference took place in Hong Kong. A WTO "mini-ministerial" on outstanding implementation issues in the Doha Round was held in July 2008, but arrived at no consensus (South Centre and Center for International Environmental Law 2008b: 12).

Critics often argue that the WTO places priority on commercial interests at the cost of development, human rights or environmental issues, and that lobbies and richer countries dictate the terms of negotiations in an intransparent manner (e.g. Mahnkopf 2005; Nilles 2003: 216, 219; Seiler 2000: 16; Wissen 2003: 131). In a brochure of 2003, the WTO secretariat explicitly rejects these claims, referring to the democratic and consensual decision-making process and the one-state-one-vote principle in negotiations (World Trade Organization 2003). Only the fact that the WTO possesses

[39] The publication is available at *http://www.southcentre.org/index.php?option=com_content&task=category&sectionid=8&id=50&Itemid=102* (last accessed 25.05.2009).

[40] For the list of members and observers, see *http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm* (last accessed 25.05.2009).

one of the most effective enforcement mechanisms among international organizations seems to remain undisputed.[41] However, the principle of compensation through sanctions by wronged states again quite obviously favours industrial countries, which would hardly be affected by economic sanctions imposed by a developing country.

2.3.2 The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)

The body of legislation that is most often regarded as opposing the aims and intentions of the CBD and that provoked serious confrontations between developing and industrial countries is the so-called TRIPS-Agreement, which is available at *http://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm* (last accessed 07.07. 2009). It integrates all relevant previous international conventions and existing instruments of commercial protection rights, with the exception of breeders' rights and utility models (Seiler 2000: 7). Member states are required to grant patents for all technical inventions; the only possible exemptions are

- danger to *ordre public* or morality,
- methods for medical treatment,
- plants and animals, but not micro-organisms or microbiological processes. The term micro-organism remains undefined in TRIPS; some patent offices apply it to all entities below visibility, which includes single plant cells (Seiler 2000: 34).

Plant varieties, however, must be protected either by patents or by an effective *sui generis* system (or both).[42] The relevant Article 27 on patentable subject matter reads as follows:

> "1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step [= are non-obvious] and are capable of industrial application [= useful]. […] patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.
> 2. Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect ordre public or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.
> 3. Members may also exclude from patentability:
> (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;
> (b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement."

[41] Consultation, mediation and conciliation are preferred means of dispute settlement in the WTO; if this is not possible, a panel of independent experts proposes a solution to the Dispute Settlement Body. If parties to a dispute subsequently cannot agree to compensation, this Body can grant authorization to suspend concessions or other obligations to the party failing the agreements. Such sanctions should affect the same sector of the WTO agreement that is at issue in the conflict, but as an exception can even be made under another agreement.

[42] Such a *sui generis* system has not been adequately defined in TRIPS; it is mostly assumed that UPOV 1991 (see ch. 2.3.4) fulfils this requirement and should serve as a model for other *sui generis* systems (Seiler 2000: 25; Seiler/Dutfield 2001: 44).

A product patent according to TRIPS generally covers the making, using, offering for sale, selling and importing of the product (Art. 28.1a). According to Seiler (2000: 27f), this leaves the extent of patents on living material not clearly defined, e.g. concerning resulting products (derivatives) or reproduced plant material. Article 29.1 requires patent applicants to "disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art". Compulsory licensing is allowed under certain strict conditions in Article 31.[43] The TRIPS-Agreement allows a transition period of five years for developing countries (i.e. until 01.01.2000) and eleven years for least developed countries (i.e. until 01.01.2006). In 2005, the transition period for least developed countries was extended until 2012 (Kaiser 2006: 1175).[44]

Strong intellectual property rights as formulated in TRIPS are obviously in the interest of industrial countries, which export technology-intensive products and aim at maintaining their technological lead. According to World Bank estimates, developing countries, on the other hand, will face additional annual costs of about 60 billion US Dollars for royalties arising from TRIPS implementation (Frein 2007: 274). The developing countries initially rejected the high protection standards, and it is claimed that they were rather directly coerced to agree especially by the USA (Cosbey 2004; Nilles 2003: 214; Seiler 2000: 19). The still ongoing review of Article 27.3 by the WTO TRIPS Council, which was initially planned for 1999, illustrates the divergent interests of developing and developed countries: while many of the former challenge the article's content itself, the latter merely aim to monitor the implementation into national legislation (Lasén Díaz 2005: 13; Nilles 2003: 214; Wissen 2003: 133). By 2008, there were two main disagreements among TRIPS parties: while various developed countries aimed at better and extended protection of geographical indications, a large group of especially developing countries demanded clarification of the relationship between TRIPS and the CBD, e.g. in the form of a disclosure requirement in patent applications (Abbott 2008: 1-3; see also p. 211). The USA remained the main opponent of both proposals (South Centre and Center for International Environmental Law 2008b: 12).

2.3.3 The World Intellectual Property Organization (WIPO)

In addition to the WTO, international intellectual property legislation is also coordinated at the World Intellectual Property Organization (WIPO). The following information is found on its website at *http://www.wipo.int/about-wipo/en/what_is_wipo.html* (last accessed 25.05.2009): The WIPO is a specialized agency of the United Nations with the aim to harmonize intellectual property legislation and to develop an international intellectual property system. It was established in 1967 and meanwhile (May 2009) has 184 member states whose governments determine strategies and activities at annual meetings at the WIPO Secretariat in Geneva, Switzer-

[43] Following a 2003 decision to clarify TRIPS Article 31, the WTO in December 2005 decided on a TRIPS amendment (to be ratified by members by 2009) to allow the import of patented pharmaceutical products without authorization of the right holder (i.e. compulsory licensing) in order to address public health needs (see WTO Fact Sheet of September 2006; available at *http://www.wto.org/english/tratop_e/trips_e/tripsfactsheet_pharma_2006_e.pdf*, especially p. 5-6; last accessed 03.08.2009). However, countries have been very reluctant in making use of this possibility, presumably due to pressure by industry and industrial countries; a first notification reached the WTO in July 2007 concerning imports of Canadian HIV/AIDS medicine to Rwanda (cf. Gerhardsen 2007).

[44] These transition periods, according to Seiler (2000: 15), have been granted in return for similar transition periods for industrial countries to open their markets for agricultural and textiles. The further extension for least developed countries has allowed the industrial countries to still not fully open their agricultural and textile markets.

land. Among others, the WIPO features a *Standing Committee on the Law of Patents* working since 1998 on the international harmonization of patent law, which negotiated the *Patent Law Treaty* (PLT). This treaty, which was adopted in 2000 and entered into force in April 2005, presently (May 2009) has 19 contracting parties and aims to streamline formal procedures for patent application. A previous important document is the *Patent Cooperation Treaty* (PCT) of 1970 (last modified in 2001, 141 contracting parties as of May 2009): it introduced an international patent application that can be filed in a national or regional[45] patent office or at the WIPO and that, after examination, is forwarded to all national patent offices the applicant has identified. However, the patents granted by this procedure are still of national resp. regional scope; a "world patent" does not exist at the moment. In contrast to the WTO, the WIPO does not have a dispute settlement mechanism; this has prompted the developed countries to push for a binding IPR regime within the WTO rather than the WIPO (Dutfield 2004: 132).

2.3.3.1 The Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC)

In 2000, the WIPO installed the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore as a forum for debating intellectual property, traditional knowledge, genetic resources, and traditional cultural expressions/folklore.[46] Meeting once or twice per year, the IGC is currently discussing two sets of draft provisions for the enhanced protection of

a) traditional knowledge, and
b) traditional cultural expressions/ expressions of folklore

against misappropriation and misuse. While these draft provisions, which were prepared by the WIPO secretariat, have no formal status, they are meant to illustrate some potential perspectives and approaches. I will not consider the draft provisions for traditional cultural expressions/ expressions of folklore since they do not directly concern the use of genetic resources.[47] As the drafts are still in development, I will refer to the most recent version of the draft on traditional knowledge, contained in document WIPO/GRTKF/IC/9/5 of January 2006 with the title *The protection of traditional knowledge: revised objectives and principles* (World Intellectual Property Organization 2006b).[48] Article 1 of the draft calls for protecting traditional knowledge against misappropriation, which is defined very broadly as its unfair or illicit acquisition or utilization. Such protection may be implemented through various legal instruments, including individual or collective property rights in accordance with national and international laws (Art. 2). Registers of traditional knowledge can be useful and may be associated with specific forms of protection (Art. 11). Protection should at least be available for traditional knowledge that is transmitted between generations, distinctively associated with a community, and integral to its cultural identity (Art. 4); it should directly benefit the collective and individual knowledge holders (Art. 5). Benefits from commercial use (also of traditional knowledge already

[45] Existing regional patent offices are the African Intellectual Property Organization (OAPI), the African Regional Intellectual Property Organization (ARIPO), the Eurasian Patent Organization (EAPO), and the European Patent Office (EPO). For information on the countries concerned, see *http://www.wipo.int/pct/en/texts/pdf/reg_des.pdf* (last accessed 10.09.2009).

[46] Information on the IGC is available on its website at *http://www.wipo.int/tk/en* (last accessed 25.05.2009).

[47] Traditional cultural expressions or expressions of folklore in this context refer to forms in which traditional culture and knowledge are expressed, such as legends, symbols, music, performances, and productions of art (World Intellectual Property Organization 2006a: 11).

[48] The draft is available online at *http://www.wipo.int/edocs/mdocs/tk/en/wipo_grtkf_ic_9/wipo_grtkf_ic_9_5.pdf* (last accessed 25.05.2009).

in the public domain, Art. 8.2) should be shared fairly and equitably, with possibly only non-monetary benefits in the case of non-commercial use (Art. 6.1, 6.2). Users should indicate the source of traditional knowledge (Art. 6.3) and obtain prior informed consent from its holders, subject to national laws (Art. 7.1). The protection of traditional knowledge should be implemented in such a way as not to hinder the continued customary use and exchange by its holders (Art. 8.1). Where traditional knowledge is associated with genetic resources, it should be accessed and used in accordance with national laws concerning these genetic resources (Art. 12).

While it is evident from this document that the IGC is working rather intensively on matters of intellectual property rights for traditional knowledge, it has hitherto provided less specific guidance on such rights for genetic resources. According to the relevant website[49], the IGC's work on genetic resources concentrates on

- defensive protection aiming to prevent wrongly granted patents e.g. by improved search tools for patent examiners,
- capacity building on intellectual property aspects of ABS, and
- disclosure requirements in patent applications.

Similar to other fora where issues of intellectual property rights are discussed, progress in the IGC is slow: there is little movement in the positions of participating countries, with especially developing countries stressing the need for binding international instruments for protecting traditional knowledge and cultural expressions (South Centre and Center for International Environmental Law 2008a: 11; South Centre and Center for International Environmental Law 2008c: 17). It is still open if the outcome of the IGC will be a binding instrument (opposed by industrial countries) or a non-binding agreement; its relationship to other agreements is complex (Cabrera Medaglia 2009: 13; The Center for International Environmental Law 2007: 8). During its last meeting within its current mandate in June/July 2009, the IGC could not agree on a proposal to the WIPO General Assembly concerning its future work, in particular, whether to aim at a binding instrument; the committee's future thus remains unclear (Mara 2009).

2.3.3.2 Issues of applicability

Comparing the ongoing work at the WIPO to the provisions set forth in TRIPS, certain inconsistencies are obvious. A general unclarity as to the legal priority of TRIPS, the WIPO, or the CBD is persisting even among experts, which is aggravated by the fact that various actors assign the problem of intellectual property rights in genetic resources to different fora, following their specific interests (cf. Brand 2007: 18; Wissen 2003): roughly, developing countries attempt to integrate CBD objectives into TRIPS as the most powerful instrument (e.g. by introducing mandatory disclosures for patent applications), while industrial countries aim to resolve disputed issues of intellectual property rights within the WIPO (e.g. by elaborating new instruments for the protection of traditional knowledge). This "forum-shifting" has had the effect that the results of negotiations at the WIPO, TRIPS, and the CBD remain largely unconnected, with the evolving International Regime on ABS (see ch. 2.4.3) hitherto unable to resolve this rivalry. Nilles (2003: 216) points out that TRIPS-conform patent applications could even explicitly (in breach of CBD provisions) admit that a genetic resource was stolen without risking revocation of the patent.

[49] This website is *http://www.wipo.int/tk/en/genetic* (last accessed 25.05.2009).

2.3.4 The International Convention for the Protection of New Varieties of Plants

The International Convention for the Protection of New Varieties of Plants, also called UPOV Convention, was signed in Paris in 1961 and entered into force in 1968. It established the Geneva-based International Union for the Protection of New Varieties of Plants, known as UPOV after its French name (Union internationale pour la protection des obtentions végétales). UPOV provides an international system of plant variety protection (PVP) as a kind of intellectual property right, with UPOV members enjoying access to varieties produced throughout all UPOV member countries (International Union for the Protection of New Varieties of Plants 2005: 9). Many non-member countries of UPOV have their own national legislation for plant variety protection, some of them in the style of the UPOV Conventions (Seiler 2000: 29). The UPOV Convention was revised slightly in 1972 and 1978; the last revision in 1991 was more comprehensive and prompted at least partly by the widespread introduction of patents on living organisms in the meantime. It entered into force in April 1998 and is since then compulsory for new members (The World Bank 2006: 6). All UPOV-Conventions are available at *http://www.upov.int/en/publications/list_publications.htm* (last accessed 07.07.2009); general information is provided in publication no. 437 on the same website. As of May 2009, 67 countries and territories are members of UPOV and send representatives into its Council. Following an agreement with the WIPO, the Director General of the WIPO is Secretary-General of UPOV.[50]

Plant variety protection (PVP) after the UPOV Convention of 1991 confers a certain type of intellectual property right adapted to the special needs of plant breeders and is generally considered a *sui generis* system in the sense of Article 27.3b of the TRIPS Agreement (see above). Varieties can be protected if they are distinct, uniform, stable[51] and new (Art. 6-9). Plant variety protection by UPOV is independent in each member country, but in any case forbids the production, multiplication and marketing without authorisation of the breeder of the protected variety, as well as of essentially derived varieties, for 20 years (Art. 14, 19). It is less extensive than patent protection insofar as no authorisation by the breeder is required for use for private, research or non-commercial purposes, and for breeding of further new varieties (Art. 15.1). The latter exception is termed the "breeders' exemption" and was introduced to advance further variety improvement. A plant breeder in this sense is any person who bred, or discovered and developed, a variety, as well as their employers or successors (Art. 1.iv).[52] Another exception to the breeder's exclusive rights, albeit optional for each UPOV member, and within "reasonable limits and subject to the safe-

[50] The close connection between the WIPO and UPOV is further confirmed by the fact that they are housed in the same building in Geneva (no. 34 chemin des Colombettes).

[51] These three criteria are often summarized as DUS criteria. For the criteria of distinctness, UPOV has clarified: "UPOV members are recommended to be prepared to take into account not only knowledge that exists in documented form, but also the knowledge of relevant communities around the world […]", and "commonly known varieties which are not protectable may, however, still be varieties […] from which a candidate variety must be clearly distinguished. This means, for example, that land races which are capable of satisfying the definition of "variety," […] should be regarded as varieties of common knowledge for distinctness purposes" (International Union for the Protection of New Varieties of Plants 2002: 7).

[52] This implies that even a farmer who selects next year's seeds from his harvest may classify as a breeder, and that a mere discovery does not make a variety eligible for PVP (cf. *The UPOV System of Plant Variety Protection* IV(a) at *http://www.upov.int/en/about/upov_system.htm*, last accessed 03.08.2009).

guarding of the legitimate interests of the breeder", is the "farmers' privilege", meaning the permission to use seeds saved from the previous harvest (Art. 15.2).

Especially the breeders' exemption and the farmers' privilege, which are both not recognized in patent law, are contested by the seed industry.[53] The farmers' privilege was already curtailed in UPOV 1991 vs. UPOV 1978, while breeders' intellectual property rights have been gradually strengthened e.g. by extending them to harvested material and to essentially derived varieties. Another change to UPOV 1978 is that double protection of a variety with PVP and patents is possible where patents on plant varieties are allowed in national legislation (GRAIN 2007: 7, 9). For a comparison of relevant details of UPOV 1978, UPOV 1991 and US patents, see also The World Bank (2006: 7). Dhar (2002: 16) as well as Moore/Tymowski (2005: 69f) compare the UPOV Conventions of 1961, 1978, and 1991.

GRAIN (2007) has analysed and critically evaluated the probable outline of the next UPOV reform. On the industry's "wish list" on the road to more patent-like PVP are

- the further restriction of the farmers' privilege, or at least an effective enforcement of royalty payments on all farm-saved seeds[54],
- tighter limits to the breeders' exemption, and
- longer protection periods and broader scope of protected products.

GRAIN (2007: 12) claims that this would amount to an extension of the breeders' rights without equivalently raising protection criteria. Main positions of the seed industry on matters of IPRs for crop genetic resources can be studied on the websites of the International Seed Federation (ISF) at *http://www.worldseed.org* and of the European Seed Association (ESA) at *http://www.euroseeds.org* (last accessed 03.08.2009).

[53] For example, Buanec (2005: 6) urges UPOV to enforce more effectively its limit on farm-saved seeds by reviewing all existing national laws of UPOV members regarding this issue. The EU in its Council Regulation (EC) No. 2100/94 has limited the farmers' privilege to certain species and requires the payment of an "equitable remuneration" to the breeder, except for "small farmers" (Art. 14.3).

[54] At present, such royalties are collected in several European countries on more or less voluntary terms.

History of intellectual property rights in crop genetic resources

Effective intellectual property rights on crop genetic resources are a rather recent phenomenon. GRAIN (2007: 2-9; similarly: Dhar 2002: 3-5) provides the following account of the development leading to the present situation: early initiatives for intellectual property protection for agricultural products were taken by breeders and the seed industry in the late 19th century. While the USA introduced patents for asexually propagated plants in its *Plant Patent Act* in 1930, European countries favoured specialised systems for seed control and plant variety protection and introduced various national instruments during the first decades of the 20th century. In 1961, five European countries (Belgium, France, West Germany, Italy, the Netherlands; Dhar 2002: 8) agreed on the rather weak intellectual property rights in the initial UPOV-Convention (see below). In the USA, it was not until 1970 that the *Plant Varieties Protection Act* applied plant breeders' rights also to sexually propagated crops. Patents on other living organisms were only widely introduced with the advent of biotechnology, and initially were used mainly by companies involved in genetic engineering. Following a court ruling in 1985, crop plants in the USA are principally eligible not only for protection under the Plant Patent Act and the Plant Variety Protection Act, but also for utility patent protection (Dhar 2002: 12). Unsatisfied with the coexistence of strong IPRs for genetically engineered crops and weaker IPRs for conventional crops, the conventional seed industry has since demanded to strengthen UPOV. After a period of extensive mergers and acquisitions in the agro-chemical-pharmaceutical industry, the main multinational companies are now producing genetically engineered as well as conventional crops, and strengthening UPOV is now in the interest of the whole seed industry. However, GRAIN expects UPOV-style PVP to remain an important alternative to patents, because abolishing it altogether in favour of patents would have the disadvantage of stricter protection criteria that are necessary for patents, such as the "inventive step" or "utility" (see ch. 4.4.5.1). Apart from PVP and patents, several weaker resp. non-exclusive intellectual property rights for crop genetic resources are established, such as trademarks or geographical indications (see ch. 4.4.5.4).

Box 2: History of intellectual property rights in crop genetic resources

2.4 Implementing the benefit sharing objective of the CBD

In the ongoing CBD implementation process, access and benefit sharing is one major issue and far from being resolved. The open questions regarding the ABS provisions of the CBD are being worked on in continuing implementation negotiations, which momentarily aim at an International Regime on ABS. The following chronology illustrates the rather slow progress so far within the CBD[55]:

May 1998	COP 4, Slovakia	Establishment of a Panel of Experts on ABS for developing basic concepts and exploring options for ABS on mutually agreed terms
October 1999	1st Meeting of the Panel of Experts on ABS, Costa Rica	Broad conclusions on prior informed consent, mutually agreed terms, information needs, capacity building
May 2000	COP 5, Kenya	Mandate to the Panel of Experts to assess experiences with ABS and possibilities for participation of stakeholders; Establishment of an Ad Hoc Open-ended Working Group on ABS
March 2001	2nd Meeting of the Panel of Experts on ABS, Canada	Consideration of experiences in ABS processes, stakeholder involvement, elements for guidelines
October 2001	1st Meeting of the Working Group on ABS, Germany	Draft guidelines on ABS in order to assist members and stakeholders with implementation of the CBD
April 2002	COP 6, Netherlands	Adoption of the *Bonn Guidelines*
September 2002	World Summit on Sustainable Development, South Africa	Call for action to negotiate within the CBD an international regime for benefit sharing and to promote implementation of the Bonn Guidelines
December 2003	2nd Meeting of the Working Group on ABS, Canada	Examination of outstanding ABS issues, e.g. enforcement measures, capacity building; recommendations on terms of reference for an International Regime on ABS
February 2004	COP 7, Malaysia	Mandate to the Working Group on ABS to negotiate the International Regime on ABS in order to implement Articles 15 and 8(j) and the three main objectives of the CBD (Decision VII 19 D[56]). Adoption of the voluntary *Akwé: Kon guidelines*[57] for conducting impact assessments for developments on areas used by indigenous communities, as well as several decisions to strengthen indigenous participation within the CBD (Decision VII 16[58]).

[55] Sources are the official CBD calendar of meetings at *http://www.cbd.int/meetings* (last accessed 19.02.2009) and the CBD websites on ABS, especially the introduction at *http://www.cbd.int/abs/intro.shtml*, the relevant COP decisions at *http://www.cbd.int/abs/decisions.shtml*, information on the overall development and process at *http://www.cbd.int/abs/pow.shtml*, and on the International Regime on ABS at *http://www.cbd.int/abs/regime.shtml* (all last accessed 03.08.2009).

[56] The decision is available at *http://www.cbd.int/decision/cop/?id=7756* (last accessed 03.08.2009).

[57] The guidelines are available at *http://www.cbd.int/doc/publications/akwe-brochure-en.pdf* (last accessed 03.08.2009).

[58] The decision is available at *http://www.cbd.int/decision/cop/?id=7753* (last accessed 08.08.2009).

February 2005	3rd Meeting of the Working Group on ABS, Thailand	Begin of negotiations for an International Regime on ABS; elaboration of text proposals in the annex to the final report of the 4th Meeting (called the "Granada text")
January/ February 2006	4th Meeting of the Working Group on ABS, Spain	
March 2006	COP 8, Brazil	Adoption of the text suggested in the annex of the final report of the 4th Meeting of the Working Group on ABS. Request to the Working Group on ABS to complete the work on the International Regime at the earliest possible time before 2010. Establishment of a group of experts to analyse options for an international certificate of origin/source/legal provenance. (Decision VIII 4[59])
January 2007	Meeting of the Group of Technical Experts on an Internationally Recognized Certificate of Origin/Source/Legal Provenance, Peru	Certificate of compliance with national law, combined with monitoring in user countries, is favoured over alternative options.[60]
October 2007	5th Meeting of the Working Group on ABS, Canada	Continuing negotiations for an International Regime on ABS; elaboration of text proposals in the annex to the final report of the 6th Meeting[61]
January 2008	6th Meeting of the Working Group on ABS, Switzerland	
May 2008	COP 9, Germany	Adoption of the text suggested in the annex of the final report of the 6th Meeting of the Working Group on ABS. Renewed request to complete the elaboration at the earliest possible time before 2010, with roadmap for negotiations of operational text. Establishment of groups of experts on (i) compliance, (ii) concepts, terms, working definitions and sectoral approaches, (iii) traditional knowledge associated with genetic

[59] The decision is available at *http://www.cbd.int/decision/cop/?id=11016* (last accessed 08.08.2009).
[60] The report of this expert meeting is available at *http://www.cbd.int/doc/meetings/abs/abswg-05/official/abswg-05-07-en.pdf* (last accessed 19.02.2009).
[61] The report is available at *http://www.cbd.int/doc/meetings/cop/cop-09/official/cop-09-06-en.pdf* (last accessed 19.02.2009).
[62] The decision is available at *http://www.cbd.int/decisions/?m=COP-09&id=11655&lg=0* (last accessed 19.02.2009).

		resources. (Decision IX 12[62])
December 2008	Meeting of the Group of Legal and Technical Experts on Concepts, Terms, Working Definitions and Sectoral Approaches, Namibia	Definitions in the CBD should be clarified, but not renegotiated. Differentiated ABS approaches according to user sector are necessary.[63]
January 2009	Meeting of the Group of Legal and Technical Experts on Compliance, Japan	Compliance could be facilitated e.g. by awareness raising, minimum benefit sharing requirements, certificates of compliance, disclosure obligations, obligations to comply with national ABS laws, facilitated enforcement across jurisdictions.[64]
April 2009	7th Meeting of the Working Group on ABS, France	Continuing negotiations of operational text for an International Regime on ABS, especially on objective, scope, compliance, access, fair and equitable benefit sharing[65]

Table 2: Chronology of implementing benefit sharing

Two further meetings of the Working Group on ABS will follow in November 2009 and March 2010, prior to COP 10 in October 2010, when the International Regime is supposed to be finalized.

In the following section, the Bonn Guidelines, the envisaged International Regime, as well as the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) shall be examined more closely.[66] Although the latter has evolved under the roof of the FAO rather than the CBD and hence might not necessarily be conceived as implementing the ABS objectives of the CBD, I am nevertheless discussing it in this chapter, because its negotiation has been strongly motivated by the parallel progress (or rather non-progress) in the CBD implementation process. The exact relationship between the two fora remains disputed.

2.4.1 The Bonn Guidelines

The legally non-binding Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, so called after the location of the meeting for the first draft in 2001, were adopted at the CBD COP 6 in 2002 and are available at *http://www.cbd.int/doc/publications/cbd-bonn-gdls-en.pdf* (last accessed 03.08.2009).

The Bonn Guidelines are conceived as inputs for the national implementation of ABS measures, especially CBD Articles 8j, 10c, 15, 16, and 19, as well as for bilateral ABS contracts (Art. 1). Pursuant to Article 15 of the CBD, parties to the Guidelines shall designate national focal points for matters of ABS (Art. 13). Responsibili-

[63] The report of this expert meeting is available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-02-en.pdf* (last accessed 19.02.2009).
[64] The report of this expert meeting is available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-03-en.pdf* (last accessed 19.02.2009).
[65] The final report, whose annex includes the *status quo* of operational text, is available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-08-en.pdf* (last accessed 25.05.2009).
[66] For more detailed explanations of and comments on international ABS legislation, see e.g. the ABS Series of the IUCN Environmental Law Centre, available at *http://iucn.org/resources/publications* (last accessed 12.02.2009).

ties for providers and users of genetic resources are outlined in Article 16; since only governments are parties to the Bonn Guidelines (as to the CBD) they must take extra measures to implement these provisions nationally for users under their jurisdiction. Stakeholders, e.g. indigenous and local communities, are to participate in the national ABS implementation process (Art. 17-21). Access to genetic resources and benefit sharing shall be facilitated and shall be subject to prior informed consent (PIC) by the contracting Party providing such resources resp. by its competent national authority (Art. 24; cf. CBD Art. 15.5); PIC from indigenous and local communities shall be obtained "as appropriate to the circumstances and subject to domestic law" (Art. 26). For changes of resource use, new PIC may be required (Art. 34). Following PIC, parties and stakeholders can establish mutually agreed terms (MAT) (Art. 41), of which standardised material transfer agreements are an example (Art. 42; cf. Annex I). MATs should respect ethical concerns of the parties and guarantee the continued customary use of genetic resources (Art. 43). They could also detail the benefit sharing arrangements (Art. 45). Near-term, medium-term and long-term benefits should be considered (Art. 47); their receivers are specified in Article 48:

> "Pursuant to mutually agreed terms established following prior informed consent, benefits should be shared fairly and equitably with all those who have been identified as having contributed to the resource management, scientific and/or commercial process. The latter may include governmental, non-governmental or academic institutions and indigenous and local communities. Benefits should be directed in such a way as to promote conservation and sustainable use of biological diversity." (Art. 48)

The Bonn Guidelines repeatedly stress the importance of knowledge transfer and joint research including the possibility of joint intellectual property rights (e.g. Art. 43, 50). Compliance with benefit sharing measures should be monitored and verified (Art. 55-58). Annex II suggests some possible types of benefits, among them
Monetary benefits:

- payments per access/ per sample/ per milestone/ in advance,
- royalties (= license fees),
- payments to trust funds for conservation of biodiversity,
- research funding,
- joint ventures and ownership of IPRs, and

non-monetary benefits:

- joint research and development,
- cooperation in education and training,
- admittance to *ex situ* resources ,
- access to databases, inventories etc.,
- transfer of knowledge and technology,
- capacity building for providers and administration, and
- participatory research/ research directed towards priority needs of the provider.

2.4.2 The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

Continuing ambiguity and perceived conflicts between the CBD and TRIPS were one reason for adopting the ITPGR (formerly the FAO *International Undertaking on Plant Genetic Resources*[67]) through the FAO Conference in November 2001 after

[67] The International Undertaking had been adopted by the FAO in 1983 as a non legally-binding agreement, based on the principle of plant genetic resources as a heritage of mankind, which should be available without restriction – a concept which some (especially developed) countries never agreed to

seven years of negotiations. Further motivations were the unsettled issue of pre-CBD *ex situ* collections, as well as the declining exchange of resources after the CBD entered into force: countries were preoccupied with protecting their genetic resources against misuse, and bilateral ABS contracts entailed high transaction costs (Jonge/Korthals 2006: 148; Moore/Tymowski 2005: 10f). The ITPGR entered into force in June 2004, but implementation details have still to be agreed upon by regular meetings of the Governing Body, which is composed of all Parties and decides by consensus. According to the website of the Treaty at *http://www.planttreaty.org* (last accessed 25.05.2009), 120 countries are parties as of May 2009.[68] I will cover this treaty rather extensively, because it is the most specific one for the subject of crop genetic resources, and some of its features are similar to what I will suggest in chapter 4.8.

2.4.2.1 Text of the Treaty

In accordance with aims and content of the CBD[69], but specified for crop genetic resources[70] and closely linked to the FAO (Art. 1), the ITPGR calls on the parties to inventory their crop genetic resources, to conserve them *in situ* and *ex situ*, and to promote their sustainable use, e.g. by supporting appropriate efforts by indigenous and local communities and farmers (Art. 5, 6). It acknowledges the contributions of farmers in conserving and improving plant genetic resources and demands the promotion of farmers' rights[71], e.g. through protection of associated traditional knowledge, participation in benefit sharing and in the national decision-making process, with the qualifications "as appropriate" and "subject to national legislation" (Art. 9.1, 9.2). The farmers' privilege is referred to in Article 9.3, but formulated as being subject to national law.[72] While the ITPGR generally covers all crop genetic resources, its Articles 10-13 specifically establish a *Multilateral System of Access and Benefit Sharing* for 35 food and 29 forage crops (species or genera), which are listed in its Annex I[73]:

(Moore/Tymowski 2005: 6). Hence, in 1989 and 1991 the FAO adopted a series of *Agreed Interpretations* of the Undertaking, e.g. recognizing that Plant Breeders Rights under UPOV were compatible with the Undertaking, recognizing farmers' contributions and farmers' rights, and recognizing national sovereignty over resources (Moore/Tymowski 2005: 8, 21f).

[68] As with the CBD, the USA as an important user country of crop genetic resources has signed, but not ratified the ITPGR.

[69] This accordance refers e.g. to the sovereign rights of states over their crop genetic resources and the authority of national governments to determine access to them.

[70] The ITPGR does not cover trade in commodities (conceived as use of biological resources), nor resources used for other purposes than food and agriculture (Moore/Tymowski 2005: 33, 35).

[71] The concept of farmers' rights originated in FAO debates as a means to reward farmers for past contributions in conservation and breeding and to balance plant breeders' rights (Moore/Tymowski 2005: 67). Since farmers' rights have, however, hitherto remained a rather vague concept, I will avoid the term in favour of its more specific components such as entitlements to benefit sharing.

[72] Acceding to Moore/Tymowski (2005: 15), the farmers' privilege was a hotly contested issue in negotiations.

[73] Important food crops in Annex I include oat (*Avena sativa*), beet (*Beta* spp.), *Brassica* and related genera of oilseed and vegetable crops, pigeon pea (*Cajanus cajan*), chickpea (*Cicer arietinum*), coconut (*Cocos nucifera*), taro (*Colocasia esculenta*), yams (*Dioscorea* spp.), barley (*Hordeum vulgare*), sweet potato (*Ipomoea* spp.), lentil (*Lens culinaris*), cassava (*Manihot esculenta*), banana and plantain (*Musa x paradisiaca*), rice (*Oryza sativa*), pearl millet (*Pennisetum americanum*), beans (*Phaseolus* spp.), garden/field pea (*Pisum sativum*), rye (*Secale cereale*), potato and eggplant (*Solanum* spp.), sorghum (*Sorghum bicolor*), wheat (*Triticum* spp. and others), faba bean (*Vicia faba*), cowpea and related beans (*Vigna* spp.), maize (*Zea mays*); scientific names are according to Rehm/Espig (1991). Important missing crops are e.g. cocoa, coffee, grape, oil palm, olive, peanut, rubber, soybean, sugar cane, taro, tea, and tomato; during negotiations, parties excluded them according to their perceived national interests (Halewood/Nnadozie 2008: 135f; Meienberg 2006: 1; Mgbeoji 2006: 117; Moore/Tymowski 2005: 15, 82).

> "The Multilateral System, as identified in Article 11.1, shall include all plant genetic resources for food and agriculture listed in Annex I that are under the management and control of the Contracting Parties and in the public domain. With a view to achieving the fullest possible coverage of the Multilateral System, the Contracting Parties invite all other holders of the plant genetic resources for food and agriculture listed in Annex I to include these plant genetic resources for food and agriculture in the Multilateral System." (Art. 11.2)

The multilateral system thus essentially covers crop genetic resources that are managed and controlled by national governments and are not protected by intellectual property rights; it does not apply to semi-public and private collections, such as universities, independent research institutes or companies, although they are encouraged to join (Moore/Tymowski 2005: 84). *In situ* resources that are not located on publicly owned land can only be included into the multilateral system by the respective private land owner (Moore/Tymowski 2005: 74). The multilateral system shall further include the *ex situ* collections of Annex I crops held by the International Agricultural Research Centres of the CGIAR (see p. 53), as well as by other entities that agree to contribute their resources (Art. 11.5, 15.1a).[74] Importantly, the scope of the multilateral system does not distinguish between material acquired before or after the ITPGR entered into force (Moore/Tymowski 2005: 82). According to Article 11.4, the facilitated access established by the ITPGR for private entities, independent of whether they in turn make their collections available, shall be reviewed after two years. However, the Governing Body has delayed this assessment in its first three meetings, and at present, the multilateral system essentially covers mainly national and international public *ex situ* collections. While these collections had mostly provided their material freely in the past, this open access policy had become more difficult under the ABS regimes evolving in response to the CBD, and the ITPGR has thus partly re-established free resp. facilitated access to them.

For all resources assigned to the multilateral system, access by individuals, institutions and other legal persons "for the purpose of utilization and conservation for research, breeding and training for food and agriculture" (i.e. not for pharmaceutical purposes etc.) shall be facilitated (Art. 12.3a), under the provision that no rights limiting access to these resources are claimed for the resources in the form received. Article 12.3d is the one most often mentioned in debates on IPRs and the ITPGR; it reads:

> "Recipients shall not claim any intellectual property or other rights that limit the facilitated access to the plant genetic resources for food and agriculture, or their genetic parts or components, in the form received from the Multilateral System".

Since the term "in the form received" is not clearly defined, some regard the isolation of an unaltered gene enough to render the material different from the form received and hence, patentable. The question has remained unresolved so far in the implementation process, as has the question of which intellectual property rights would "limit the facilitated access", considering that PVP usually does allow for a research and breeders' exemption (Moore/Tymowski 2005: 92). The ITPGR repeatedly acknowledges its provisions to not infringe upon relevant existing international agreements, national laws or property rights, e.g. in Article 12.3f:

> "Access to plant genetic resources for food and agriculture protected by intellectual and other property rights shall be consistent with relevant international agreements, and with relevant national laws".

[74] Since the CGIAR and other *ex situ* collections are legal persons and not states, they are not directly bound by the Treaty, but are called upon to sign agreements with the ITPGR Governing Body (Moore/Tymowski 2005: 17).

Another unresolved question and possible loophole are access activities and transfers taking place only domestically, as they are not regulated under the ITPGR (or the CBD) (Moore/Tymowski 2005: 88).

While the multilateral system renders it unnecessary to negotiate new, bilateral ABS contracts for each access to these resources, the exchange of genetic resources should be accompanied by a material transfer agreement (MTA) in order to ensure the standards set by the ITPGR (Art. 12.4) and to facilitate tracking of resources. Benefit sharing in the multilateral system (in addition to the benefit of mutually facilitated access) shall consist in information exchange, transfer of technology and know-how, capacity building, and the sharing of monetary and other benefits from commercialisation (Art. 13). While non-monetary benefits such as information exchange, technology transfer, and capacity building are presented mainly as the responsibility of contracting parties (i.e. countries), benefits from commercialisation (Art. 13.2d) are to be shared also by recipients of genetic resources from the multilateral system. The centre of many controversies, Article 13.2d (ii) reads:

> "The Contracting Parties agree that […] a recipient who commercializes a product that is a plant genetic resource for food and agriculture and that incorporates material accessed from the Multilateral System, shall pay to the mechanism referred to in Article 19.3f, an equitable share of the benefits arising from the commercialization of that product, except whenever such a product is available without restriction to others for further research and breeding […].
> The Governing Body shall, at its first meeting, determine the level, form and manner of the payment, in line with commercial practice. The Governing Body may decide to establish different levels of payment for various categories of recipients […]. The Governing Body may, from time to time, review the levels of payment with a view to achieving fair and equitable sharing of benefits, and it may also assess, within a period of five years from the entry into force of this Treaty, whether the mandatory payment requirement […] shall apply also in cases where such commercialized products are available without restriction to others for further research and breeding."

Article 13.3 specifies the recipients of benefits from the multilateral system:

> "The Contracting Parties agree that benefits arising from the use of plant genetic resources for food and agriculture that are shared under the Multilateral System should flow primarily, directly and indirectly, to farmers in all countries, especially in developing countries, and countries with economies in transition, who conserve and sustainably utilize plant genetic resources for food and agriculture."

Article 13.6 is relevant in the context of this thesis, because I will attempt an ethical justification for a similar proposal in chapter 4.5.4:

> "The Contracting Parties shall consider modalities of a strategy of voluntary benefit-sharing contributions whereby Food Processing Industries that benefit from plant genetic resources for food and agriculture shall contribute to the Multilateral System."

According to Article 18, the funding strategy for implementing the ITPGR shall include funding by the contracting parties, from voluntary contributions from other sources, and from benefit sharing after Article 13.2d. In the case of non-compliance, no punitive legal measures for enforcing the treaty are available (Art. 21, 22); disputes arising under ITPGR-related material transfer agreements are to be resolved by the Contracting Parties within national jurisdiction (Art. 12.5). All provisions are, again, subject to national legislation, and national sovereignty of genetic resources is acknowledged (e.g. Art. 10.1).

2.4.2.2 Implementation of the Treaty

During its first session in June 2006 (official report: Food and Agriculture Organization 2006), the Governing Body of the ITPGR approved a funding strategy as well as a Standard Material Transfer Agreement (SMTA), which recipients of genetic resources from the multilateral system have to fill out as the only prerequisite to access.[75] The SMTA sets the share of benefits at 1.1% of the net sales of products which are not available without restriction (cf. Art. 13.2d (ii) ITPGR). The exact wording in Annex 2 (rate and modalities of payment) is:

> "If a Recipient, its affiliates, contractors, licensees, and lessees, commercializes a Product or Products, then the Recipient shall pay one point-one percent (1.1%) of the Sales of the Product or Products less thirty percent (30%); except that no payment shall be due on any Product or Products that:
> (a) are available without restriction[76] to others for further research and breeding […];
> (b) have been purchased or otherwise obtained from another person or entity who either has already made payment on the Product or Products or is exempt from the obligation to make payment pursuant to subparagraph (a) above;
> (c) are sold or traded as a commodity."

The Governing Body signed an agreement with the Global Crop Diversity Trust to serve as an essential element of the funding strategy of the ITPGR. The Global Crop Diversity Trust, which was from 2002 to 2004 known as the Global Conservation Trust, was established in 2004 as an independent international organisation with the aim to provide permanent funding for *ex situ* conservation.[77] It receives policy guidance from the Governing Body of the ITPGR; donors are developing and developed country governments, civil society, the private sector, farmers' organizations, and individuals.

The Governing Body held its second session in October/November 2007; for the official report see Food and Agriculture Organization (2007). Main issues of the meeting were budget and funding questions, which could not be completely resolved because of persisting disagreements mainly along the lines of industrial countries (prioritising access compliance mechanisms) vs. developing countries (prioritising funding strategies) (cf. Brooke et al. 2007: 11f). The Governing Body further approved a revision of the SMTA used by the CGIAR Centres (see p. 53) to the effect that its provisions do not preclude the use of the SMTA also for transfers of non-Annex I material collected before the ITPGR entered into force; this enables CGIAR Centres to employ the same version of the SMTA for both kinds of resources. While access to resources under the multilateral system, especially those held by the CGIAR Centres, has been successfully (re-)facilitated with the help of the SMTA[78], benefit sharing has progressed more slowly: the first operating element of the ITPGR's funding strategy was the Global Crop Diversity Trust, which is confined to *ex situ* conservation. In December 2008, the first call for proposals to the benefit

[75] The SMTA is available at *ftp://ftp.fao.org/ag/cgrfa/gb1/SMTAe.pdf* (last accessed 08.08.2009).
[76] In Article 2, the SMTA defines this as being "available for research and breeding without any legal or contractual obligations, or technological restrictions" – it remains unclear if this is fulfilled e.g. by PVPs including a breeders' and research exemption, such as UPOV 1991 (cf. Moore/Tymowski 2005: 111).
[77] More information on the Global Crop Diversity Trust is available on its website *http://www.croptrust.org* (last accessed 08.08.2009): it was founded by the FAO and Bioversity International and is currently hosted in Rome. Information on some of its previous grants is available at *http://www.croptrust.org/main/trust.php?itemid=68* (last accessed 08.08.2009). The agreement with the ITPGR Governing Body is available at *http://www.croptrust.org/documents/Signed%20 Relationship%20Agreement.pdf* (last accessed 08.08.2009).
[78] According to Bhatti (2009: 6), there are at least 600 transfers under ITPGR SMTAs per day.

fund, which currently consists of voluntary contributions by Norway, Switzerland, Italy, and Spain, was issued[79]; organizations could apply for grants up to 50,000 US Dollars in the areas of information exchange, technology transfer, capacity building, *in situ* conservation and management, and sustainable use. During the third session of the Governing Body in June 2009, grants to eleven projects (chosen out of 471 pre-proposals) were announced; most of these projects are carried out by publicly funded institutions (Saez 2009). The Governing Body further agreed to a financial target of 116 million US Dollars for the benefit sharing fund for the years 2009 to 2014 (Chiarolla et al. 2009: 6). The official report of the third session was not yet available at the time of writing (see *http://www.planttreaty.org*). It is generally agreed that the ITPGR is of growing importance internationally, that it enjoys rather broad acceptance, and that the use of its SMTA is increasingly extended beyond Annex I genetic resources (e.g. Bulmer 2009: 9).

[79] The call is available at *ftp://ftp.fao.org/ag/agp/planttreaty/funding/cfp08_e.pdf* (last accessed 19.02.2009).

The Consultative Group on International Agricultural Research

The largest public *ex situ* collections of crop genetic resources are the gene banks of the Consultative Group on International Agricultural Research (CGIAR), an alliance of various institutions and organizations created in 1971 and currently supporting 15 International Centres for Agricultural Research. According to the Consultative Group's website at *http://www.cgiar.org* (last accessed 03.08.2009), their common aims are food security, poverty reduction, and environmental sustainability in developing countries; results such as new crop varieties are freely available to the public, with the vast majority of the seed samples distributed going to universities and national agricultural research institutions. The Centres specialize in certain species (e.g. CIMMYT in Mexico for maize and wheat, IRRI in the Philippines for rice), in certain regions (e.g. ICRISAT in India for the semi-arid tropics), or in certain subjects (e.g. Bioversity International in Italy for plant genetic resources). Eleven of these Centres maintain gene banks with together more than 600,000 samples of plant genetic resources, constituting an important inventory for present and future breeding efforts. The CGIAR collections were placed under the auspices of the FAO in 1994; the International Agricultural Research Centres remain trustees (Brand/Görg 2003: 124).

In October 2006, the eleven CGIAR Centres holding *ex situ* genetic resources agreed to place their collections within the purview of the ITPGR, authorizing its Governing Body to provide future policy guidance. The generic agreement between the Centres and the FAO, acting on behalf of the Governing Body, is available at *http://www.cgiar.org/pdf/model_agreement_centers_2007.pdf* (last accessed 03.08. 2009). Since January 2007, genetic resources of crops listed in Annex I of the ITPGR are made available within its multilateral system, utilizing the ITPGR's Standard Material Transfer Agreement; in November 2007, the Governing Body decided to extend the SMTA to non-Annex I genetic resources held by the CGIAR Centres.

Box 3: The Consultative Group on International Agricultural Research

2.4.3 The International Regime on Access and Benefit Sharing

As mentioned above, the Ad Hoc Open-ended Working Group on ABS was mandated by the CBD COP 7 in 2004 to elaborate an International Regime on ABS with the aim of implementing its Articles 15 and 8j, as well as its three main objectives (CBD Art. 1). According to GRAIN (2005b: 10), main initiators of the negotiations for such a regime had been the provider countries, especially the *Group of Like-Minded Megadiverse Countries*[80]. Cooperating with other institutions and considering existing instruments and processes, the Working Group shall complete negotiations at the earliest possible time before the tenth meeting of the COP in 2010 in Japan. The International Regime could include one or more instruments within a set of rules and procedures that are legally binding or non-binding. Although it can be said that a kind of ABS regime already exists in so far as there are international (especially the ITPGR), regional and national laws and policies, as well as contractual agreements, in place (Young 2004: 271f), the term *International Regime on ABS* usually refers to the ongoing negotiations within the Working Group on ABS with their still open outcome. Contrary to the agreements discussed previously, I will here include some evaluative remarks that are necessary for understanding the international debate and my lines of argument in chapter 4. Unless indicated otherwise, my comments are based on my own experiences during visits to the sixth and seventh meeting of the Working Group. Progress in these negotiations is rather slow; main agenda items in its third to seventh meeting (2005 to 2009) have remained largely the same and encompass the following[81]:

Nature of the Regime: One or more instruments? Legally binding (e.g. a Protocol to the CBD) or non-binding?

Scope of the Regime: Inclusion of derivatives and products of genetic resources? Exclusion of specific uses of pathogens (see influenza viruses, ch. 1.1.4)? Inclusion of human genetic resources?[82] The inclusion of traditional knowledge associated with genetic resources, which is implied in the Working Group's mandate by COP 7, is commonly accepted. The Regime should be coherent with the ITPGR; genetic resources covered by the multilateral system of the ITPGR will probably be excluded from the scope of the Regime.

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[80] This lobby group of countries currently consists of Bolivia, Brazil, China, Colombia, Costa Rica, the Democratic Republic of Congo, Ecuador, India, Indonesia, Kenya, Madagascar, Malaysia, Mexico, Peru, Philippines, South Africa, and Venezuela (see *http://www.lmmc.nic.in*; last accessed 19.05.2009).

[81] The information was compiled from the final reports of the third, fourth, fifth, sixth, and seventh meeting. The fifth meeting ended without the adoption of text on substantial matters; in the other final reports, such text is found in the Annexes. The five reports employed are available at *http://www.cbd.int/doc/meetings/abs/abswg-03/official/abswg-03-07-en.pdf*, *http://www.cbd.int/doc/meetings/cop/cop-08/official/cop-08-06-en.pdf*, *http://www.cbd.int/doc/meetings/abs/abswg-05/official/abswg-05-08-en.pdf*, *http://www.cbd.int/doc/meetings/cop/cop-09/official/cop-09-06-en.pdf*, and *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-08-en.pdf*, respectively (all last accessed 11.05.2009). Question marks in the above text indicate points of persisting debate.

[82] The recurring debate on whether human genetic resources should be within the scope of the international ABS regime is an illustrative example of seemingly inefficient negotiation procedures since the CBD already explicitly excludes them from its scope and all negotiating parties seem to continue to support this view. Similarly, parties' submissions continue to refer to other resources outside the scope of the CBD, such as resources acquired before the CBD entered into force and resources beyond national jurisdiction, especially marine genetic resources (e.g. Venezuela on page 19 of the final report of seventh meeting). While it might indeed be desirable to extend benefit sharing to these resources (see ch. 4.5.1), it is obvious that these suggestions will not be commonly agreed to – possibly, they are submitted as "bargaining chips" to be given up in exchange for other demands.

Objectives of the Regime: Prevent misappropriation and misuse? Facilitate or regulate access? Ensure fair and equitable benefit sharing? Secure or support compliance?

Main potential components of the Regime: Measures to enforce / encourage / monitor compliance, potentially in the form of internationally recognized certificates of source / origin / legal provenance and their disclosure in IPR applications and/or at other check points (see ch. 4.8.5). Instruments of monetary and non-monetary benefit sharing. Measures to promote capacity building and technology transfer. Measures to facilitate or to regulate access? Authority to grant access and receive benefits with government authorities and/or with indigenous and local communities? Multilateral benefit sharing in cases of unclear origin and in transboundary situations? Standardisation of national ABS legislation and/or of ABS contracts? Measures to protect rights to associated traditional knowledge and ensure participation of indigenous and local communities? Differentiation of commercial vs. non-commercial research and uses? Dispute settlement mechanism? Financial mechanism?

Terms and definitions: Terms to be defined are e.g. biological and genetic resources, derivatives and products, commercial and non-commercial research, and misappropriation.

The reports of the Working Group meetings usually mention various options for the content of these items, based on submissions by the parties, either formulated as parallel options or as one text containing square brackets around disputed formulations.[83] So far, no substantial consensus is discernible on many of them, and consensual formulations often remain too unspecific to evaluate their potential impact – arguably, this is not surprising, given the persisting unclarities about central definitions and use of terms, which make it difficult to formulate corresponding instruments. With the exception of certificates of source / origin / legal provenance, there are few substantial suggestions for new, innovative instruments. Instead, the debate revolves around concepts already present in the CBD text and thus presumably principally acknowledged by all parties, so that the crucial but still largely unresolved questions are which concrete measures are to be devised and whether they should be implemented at the national or at the international level. Possibly for strategic reasons, parties often remain entrenched in their positions, which can be roughly grouped into a provider-country-approach (esp. developing countries) and a user-country-approach (esp. developed countries).[84] The following, simplified overview exemplifies some main differences in these positions:

[83] This can result in formulations hardly comprehensible to non-experts, such as the following: "[Parties requiring]Prior informed consent for access to [their] [genetic resources][biological resources][, their derivatives][and products] [and/or associated traditional knowledge], where applicable, [shall][should] be obtained [according to the access and benefit-sharing requirements of][from] [the Party] [country of origin or Party that has acquired the genetic resources [, their derivatives][and products] [in accordance with the Convention] providing such resources[, their derivatives][and products] [and/or associated traditional knowledge] [through its competent national authority(ies)][, [as defined in (…),]] unless otherwise determined by that Party." (final report of the seventh meeting of the Working Group on ABS, p. 24)

[84] The user-country-approach is often expressed by representatives of Australia, Canada, the EU, Japan, and New Zealand. While the content of individual statements and submissions by the negotiating parties is usually not conveyed in the final reports of the Working Group meetings, the "Notes from the Co-Chairs on Proposals made at WGABS-5", where no consensual substantive text could be agreed upon, provide an insight by attributing the listed submissions and comments to the parties who authored them. They are available at *http://www.cbd.int/doc/meetings/abs/abswg-06/information/abswg-06-inf-02-en.pdf* (last accessed 08.08.2009). A further source of information on the individual countries' submissions and statements is the *Earth Negotiations Bulletin*, especially its

User/developed countries propose	**Provider/developing countries propose**
narrower scope of the Regime	wider scope of the Regime
facilitated and harmonized/standardised access, e.g. via model clauses	regulation of access and prevention of misappropriation, e.g. via certificates
encouraging compliance	enforcing compliance, e.g. via certificates
non-binding nature or mixed	binding nature, e.g. ABS Protocol
IPR questions to be treated at WIPO or TRIPS	IPR questions to be tackled by ABS Regime

The background to these and similar opposed propositions may be contrary views concerning the current global regulation of resource use, trade, and property rights: those who are of the opinion that the *status quo* is largely fair and, at most, may need some minor corrections in order to avoid abuses and violations, will obviously have grave difficulties in finding compromises with those who, to the contrary, regard the *status quo* as *per se* unjust and work towards radical reforms, and vice versa. Given the interrelatedness of many of the topics concerned, and the fact that any outcome would have to be accepted unanimously, it seems likely that negotiations will continue at least until October 2010 (the envisaged deadline), and that the International Regime will either consist of essentially non-binding measures, or of binding but weak ones. Either way, the regime will probably focus on compliance with national ABS legislation, rather than developing strong stand-alone international regulations.

From the presentation of the central international agreements in this chapter, it is obvious that the use of genetic resources is subject to quite a number of different legislative fora, which will also affect any attempt to fairly and equitably share benefits arising from such use. However, I will not take the legislative *status quo* as a given framework for my considerations, but will approach the matter from the more abstract standpoint of ethical theory and in chapter 3 derive some general principles of justice in the use of genetic resources. After then applying these principles to the development of more concrete criteria of fair and equitable benefit sharing, I will return to the existing legislation in chapter 5, where it will be evaluated on the basis of these criteria.

(ongoing) Volume 9 on biological diversity and plant genetic resources. It is available at *http://www.iisd.ca/vol09* (last accessed 15.04.2009).

2.5 Excursus: *National ABS legislation*

The necessity of more precise, consistent and international regulation is also illustrated by the current, dissatisfying state of national ABS legislation. Although evaluating the existing and rapidly evolving body of national legislation is not the aim of my thesis, I will here give a short overview of the few comparative studies published so far on aspects concerning national ABS legislation. My summary is based mainly on the following literature on existing and drafted legislation:

- Carrizosa et al. 2004 (41 resp. 12 countries[85]; various authors)
- Dross/Wolff 2005 (9 countries/regions[86])
- Lewis-Lettington/Mwanyiki 2006 (8 countries/regions[87]; various authors)
- Seiler/Dutfield 2001 (5 countries/regions[88])

Current ABS legislation and policies are also available at the websites of the CBD[89] and GRAIN[90], and a workshop documentation by Kamau/Winter (2009) provides first-hand information on the development of ABS laws especially in Brazil (revision of initial legislation), China, Kenya, and South Africa. Detailed recommendations on the design and implementation of national access legislation are further compiled by Cabrera Medaglia/López Silva (2007).

National policy-making on access to genetic resources is developing rapidly, especially in countries regarding themselves as provider rather than user country, but provisions to ensure benefit sharing and user-side measures in general are lacking behind (Tvedt/Young 2007: 11, 129). Developing ABS laws is found to be a long and challenging process, as there are many stakeholders and many possibilities to either incorporate ABS policy into existing laws, or to introduce new legislation (Carrizosa 2004d: 51, 65). Local legal capacity is often inadequate (Cabrera Medaglia 2006: 101; Nnadozie 2006a: 112; Nnadozie 2006b: 127). Most countries are still in the policymaking process or have not even started work on ABS legislation (Carrizosa 2004d: 63; Dross/Wolff 2005: 44; Lewis-Lettington/Mwanyiki 2006: 1; Young 2004: 275, 277, 286). Carrizosa (2004c: 1, 5; 2004b: 9, 43) found only nine of the 41 countries studied had installed ABS legislation; further 26 countries were developing them. Groups of countries with a common effort for ABS are the Andean Community (Decision 391), several Central American countries (Draft Protocol) and ASEAN (Framework Agreement). The first countries to develop national ABS legislation were the Philippines 1995, the Andean Community 1996, and Costa Rica 1998. But even these are still struggling with conceptual and operational difficulties and reforms of ABS laws (Carrizosa 2004b: 40; Carrizosa 2004d: 51).

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[85] From 2001 until mid-2004, 41 Pacific Rim countries were compared and more than 60 experts consulted in this as yet broadest survey (McGuire/Scanlon 2004: ix). Carrizosa (2004: 12-39) analysed existing or drafted ABS policies of twelve of these: Australia, Colombia, Ecuador, Peru, Costa Rica, Malaysia, Mexico, Nicaragua, Philippines, Samoa, Thailand, and the USA.

[86] Those are the Andean Community, the Association of South East Asian Nations (ASEAN), Australia, Brazil, Costa Rica, India, the Organization of African Unity (OAU), the Philippines, and South Africa.

[87] The authors studied Central America, Costa Rica, El Salvador, Ghana, Malawi, Nigeria, South Africa, and Uganda.

[88] The analysis covers the Andean Community, Costa Rica, the Philippines, India, and the OAU African Model Legislation. Furthermore, the Third World Network Model Contract and some proposed voluntary guidelines were analysed.

[89] The relevant website is *http://www.cbd.int/programmes/socio-eco/benefit/measures.aspx* (last accessed 06.07.2009).

[90] The relevant website is *http://www.grain.org/br/* (last accessed 06.07.2009).

Many laws and resulting access procedures are rather complicated, bureaucratic, difficult to implement and need further clarification or definition of terms (Carrizosa 2004b: 17f, 40; Dross/Wolff 2005: 43, 99; Lewis-Lettington/Mwanyiki 2006: 1; Wynberg 2006: 150). Virtually in no provider country with legislation in place does it function effectively, even according to the countries themselves (Tvedt/Young 2007: 1). Especially questions of property rights in genetic resources, and the protection of traditional knowledge were found to be controversial and often still unresolved issues which are tackled by a wide variety of instruments (Carrizosa 2004a: 296; Carrizosa 2004b: 33, 40; Carrizosa 2004c: 4; Carrizosa 2004d: 65; Seiler/Dutfield 2001: 101). None of the states analyzed by Carrizosa has established a specific property rights system for the information component of genetic resources; their legal status is defined by the physical entity (Carrizosa 2004b: 14). On the other hand, Seiler/Dutfield (2001: 101) found that some instruments do separate the ownership of genetic materials from that of biological resources. Most of the countries studied by Carrizosa either have or aim to have provisions for a community rights system to protect indigenous knowledge (Carrizosa 2004b: 33). Dross/Wolff (2005: 79), Seiler/Dutfield (2001: 100), and Ruiz Muller (2006: 31) are more sceptical of adequate consideration of traditional knowledge in ABS laws. Most laws and policies attempt to avoid negative impacts on biodiversity and promote its conservation (Carrizosa 2004b: 36, 39f); instruments are trust funds, technology transfer, and research (Carrizosa 2004b: 36; Dross/Wolff 2005: 63; Seiler/Dutfield 2001: 100). However, while most countries regard trust funds as useful for the equitable distribution of benefits, there is obviously little experience so far (Carrizosa 2004b: 29; Dross/Wolff 2005: 64).

Potential users of genetic resources often have to negotiate with agents at various administrative levels and with several providers of resources and knowledge (Carrizosa 2004b: 17f). Some ABS instruments differentiate between commercial and non-commercial research (Carrizosa 2004b: 23; Seiler/Dutfield 2001: 99). While the CBD only requires prior informed consent by government authorities, most but not all policies require it also from indigenous peoples resp. local communities and landowners concerned (Carrizosa 2004b: 22f, 25; Dross/Wolff 2005: 43, 79; Seiler/Dutfield 2001: 99). Procedures are often complicated and expensive (Carrizosa 2004b: 25). The benefits envisaged in existing ABS laws are of great diversity, reflecting the suggestions of the Bonn Guidelines (cf. Carrizosa 2004b: 26, 28; Dross/Wolff 2005: 43). While Carrizosa (2004b: 29) criticizes the focus on royalties instead of non-monetary benefits, Dross/Wolff (2005: 43) find that non-monetary benefits gain importance. Some countries set minimum criteria, but mostly benefits are a matter of negotiation between the contracting parties and hence depend on their negotiating skills:

> "Whether agreements are fair and equitable is a subjective issue that lies in the eye of the beholder (or the negotiator)." (Carrizosa 2004b: 29)

Although ABS laws mostly propose certain monitoring and enforcement measures, their implementation so far is regarded as poor (Carrizosa 2004b: 38f; Dross/Wolff 2005: 44, 66; Nnadozie 2006a: 113).

Concerning the supposed aim of fair and equitable benefit sharing, Brush and Carrizosa remain sceptic of the overall success of national legislation hitherto:

> "It is impossible at this time to determine whether the implementation of ABS policies has been successful in meeting the overarching goals of the CBD beyond providing access to biological resources (i.e., providing benefit sharing and achieving conservation of biological diversity)." (Brush/Carrizosa 2004: 67)

Similar concern is voiced by GRAIN (2005b: 7) in stating that “access legislation did not provide the means to beat the biopirates. On the contrary, it created the need to enter into partnership with them.” Their (and many other authors’) scepticism reinforces the claims in chapter 4.8.2 that global instruments and minimum standards are essential for achieving a certain justice in the access to and use of genetic resources. Whether they are negotiated within existing fora or as a new international ABS regime should be of secondary importance.

Contracts concluded within the new national ABS regimes

Few ABS contracts have yet been concluded within the new legal frameworks, and little benefit sharing from them has taken place (GRAIN 2005b: 11; Kamau/Winter 2009; Lewis-Lettington/Munyi 2006: 167; Ruiz Muller 2006: 31; Tvedt/Young 2007: 73). Analysing the concrete implementation of ABS policies in the surveyed Pacific Rim countries, Brush/Carrizosa found information on only 22 bioprospecting projects having been approved under ABS laws and policies between 1991 and 2004 (Brush/Carrizosa 2004: 67; 76-78). Of these, only two are regarded as successful, with mixed success experienced by another six projects. The two successful ones are the

- Merck-INBio agreement (Costa Rica 1991): The pre-CBD contract between the pharmaceutical company Merck and the National Biodiversity Institute of Costa Rica (INBio) was probably the first comprehensive and influential benefit-sharing agreement and has since provoked much discussion and criticism. For background and more details see e.g. Cabrera Medaglia (2004a), Cabrera Medaglia (2004b), and Reid et al. (1993).
- Yellowstone-Diversa agreement (USA 1997): Diversa Corporation was granted access to thermophilic micro-organisms in Yellowstone National Park in exchange for an up-front payment of 100,000 US Dollars, additional royalties based on a percentage of revenues, and technical support (Scott 2004: 187).

In Mexico, the only project actually carried out was between the civil society organization UZACHI and the Sandoz Corporation; three others (UNAM-Diversa, Maya ICBG, Latin American ICBG) were challenged politically and suspended (Brush/Carrizosa 2004: 70-72). In the Philippines, only two out of 33 proposed projects were carried out (Brush/Carrizosa 2004: 72), and no new projects have been proposed since 1998 (Brush/Carrizosa 2004: 73). Brush/Carrizosa (2004: 68, 73) conclude that the successful projects involved organisations with mutual interests, decentralized and flexible national policies, and grew out of personal networks. When projects failed, it was related to legal uncertainty, uncertainty over local authority, social controversy and institutional complexity in the case of Mexico, and centralization, high negotiation costs, high expectations about economic benefits, lack of technical capacity and expertise in the case of Colombia (Brush/Carrizosa 2004: 72f).

Box 4: Contracts concluded within the new national ABS regimes

3 Deriving general principles of justice in benefit sharing from two contemporary conceptions of justice

3.1 Approach and objective

The existing international legislative framework discussed in the previous chapter is the interim result of policy-making across the world and at very different political and administrative levels. Even though it plays an important role in the debate on access to and use of genetic resources, it remains fragmentary and ambiguous and offers no justifications for the various interpretations of fairness and equity in benefit sharing that have emerged.[91] The legislative framework as a political *status quo* therefore can provide little normative guidance on the seven central study questions formulated in chapter 1.2.2. For defining what fair and equitable benefit sharing would consist of, it is thus first necessary to develop a framework of specifically ethical principles for fairness and equity in the context of the questions posed, which I will attempt in this chapter. These principles can then be employed to answer the study questions and to evaluate the legislative framework in chapter 5. They could also be guidelines for the emerging International Regime on Access and Benefit Sharing that is slowly gaining form. In order to avoid confusion, I will use the term "principles" for the more abstract ethical guidelines developed here, while referring to "criteria" for the more concrete conclusions drawn in chapter 4 as answers to the study questions.

The principles to be developed here have to address various aspects of legitimate access to and use of genetic resources, and of the distribution of costs and benefits within and among communities, states and regions. This focus of interest suggests an approach within the range of social ethics, rather than e.g. of environmental ethics, which focuses on questions like the philosophical relationship between humans and nature or on the normative value of non-human natural entities.[92] The notion of justice will be given a central role in my considerations on fair and equitable benefit sharing, because it is the philosophical term corresponding most closely to the notion "fair and equitable". Among the existing variety of theories of justice, the problems at hand require a global approach from the outset since genetic resources are often used outside their source country or country of origin, and benefits of their use will have to cross national borders. Furthermore, the principles of justice to be developed here cannot be restricted to international justice in a narrow sense, i.e. justice between nations, since fair and equitable benefit sharing will be shown to be not only required among nation-states, but also across national borders e.g. between farmers, indigenous and local communities, companies, and consumers.

As there are hardly any established theories of justice focusing on global problems and natural resources, I will draw mainly on the works of John Rawls and Thomas Pogge. Rawls' *Justice as Fairness* is arguably the most important, most influential and best justified theory of justice of the 20th century, and Pogge prominently refers to Rawls, suggesting certain amendments and corrections to his theory. Rawls' theory of justice, in my opinion, convinces especially on account of its justification: as a

[91] The lack of a common understanding becomes obvious e.g. in the negotiations in the ABS Working Group, where parties are still debating the possibility and content of common definitions of such central terms as "genetic resources", "derivatives", or "misappropriation".

[92] Areas of common concern in both ethical approaches would be the conservation of natural resources and the consideration of future generations, which I will address within social justice.

contractarian approach, it succeeds in deriving substantial and concrete ethical norms for the political realm without relying on ultimately metaphysical foundations.[93] His approach has the further advantage of concentrating on the basic social structure as the primary subject of his political conception of justice, corresponding with my aim of rather general principles for institutional and procedural justice in benefit sharing. However, Rawls' theory of justice shows some important deficits (discussed in more detail in chapter 3.4): it is primarily formulated as ideal theory for liberal Western nation-states with high regard for individual liberties, whereas benefit sharing in the real world takes place across very different kinds of countries and cultures. Furthermore, Rawls' principles for international justice as well as the way he derives them are not very convincing, and they address mostly political relations between isolated states. Hence, I will adopt from Rawls especially his way of reasoning and justification, but only some of his principles and views on concrete matters.

In criticizing Rawls, Pogge provides interesting conclusions that differ from Rawls' principles, especially for international justice. While Pogge does not develop a full theory of justice, he provides a convincing analysis of the current, obviously unjust world order as well as several lines of justification for the ethical duties of those advantaged by this global order. His approach is much more concrete than Rawls' and focuses more on the non-ideal world, while Rawls primarily addresses ideal theory. Although I will adopt his criticism of Rawls especially concerning global justice, I do not conceive Pogge's conclusions as necessarily incompatible with Rawls' contractual approach or with his principles of domestic justice for Western liberal societies. Such a combination of (partly opposing) theories obviously cannot yield one alternative, consistent and complete theory of justice, but will be shown to be able to provide adequately justified principles of justice for the questions posed here.

I will first give a short account of justice as a philosophical concept, before focusing on the authors mentioned above. For each of them, I will outline the theory and its implications for the subject at hand, then identify which concepts and ethical demands I will adopt, and from these deduce my own principles of justice in benefit sharing. The demands and principles which I will identify are not intended as comprehensive summaries of the authors' approaches, but will be selected according to their relevance for the central study questions formulated in chapter 1.2.2. After formulating the resulting principles within the context of the various authors' approaches, I will present a complete list of them at the end of this chapter, and will then apply them in answering the seven study questions in chapter 4.

[93] Contractarian vs. teleological theories of justice will be characterised in chapter 3.2.2.1.

3.2 Justice as philosophical concept

3.2.1 Dimensions of justice

The term *justice* has been playing a central role in philosophy since antiquity, and I will not attempt to fully recapitulate its history and the variety of conceptions developed in the course of time, beginning with Plato and Aristotle. Rather, I will follow Höffe's suggestion in classifying the dimensions of justice as follows (2002: 80-84): at a first level, an objective understanding of justice can be distinguished from a subjective one. While the former is concerned with political and social institutions, the law and the state, the latter refers to justice as a personal virtue. Since I am here concerned with the institutional framework rather than with individual morals and dispositions, I will leave aside justice as a personal virtue and focus on the abovementioned objective understanding of justice. For the purposes of the ensuing discussion, I will again follow Höffe (2002: 82-84), according to whom this institutional dimension covers

a) distributive justice, i.e. the distribution of rights, duties, goods and burdens, either as equal shares or according to each one's achievements or needs,
b) commutative justice, i.e. the exchange of goods, powers, securities, liberties, opportunities etc. of the same value,
c) corrective justice, i.e. penalties for crimes and compensation of damages, and
d) procedural justice, i.e. fair procedures.[94]

In the development of principles and criteria of justice in benefit sharing on the basis of Rawls' and Pogge's theories, I will refer to all four of them – sometimes explicitly, sometimes only implicitly. It is further important to note that these categories are often overlapping: Höffe argues that many cases which are usually treated as a matter of distributive justice can also be conceived as a matter of commutative justice. Not only money, goods, and services, but also power, security, liberties, and opportunities can be exchanged. Furthermore, these exchanges may not always happen directly, but can span over time or take place among more than two parties, as in the case of public education or social security systems (Höffe 2002: 83; Höffe 2004: 85-87).

It could be argued that the question of adequate benefit sharing should primarily be treated as one of direct exchanges between the individual providers and users of a genetic resource, possibly spelled out in an individual ABS contract. However, I will attempt to illustrate on various occasions below (ch. 4.2.2, 4.3.1, 4.4.4, 4.6) why the matter of access to and use of genetic resources should not be left merely to private bilateral contracts between providers and users. In short, any price agreed in such a (more or less) freely negotiated contract would be unjust towards both the general public and other directly affected stakeholders. Hence, the subject should be tackled by a broader approach incorporating considerations of distributive, commutative, corrective, and procedural justice that exceed the individual exchange addressed in private ABS contracts.

3.2.2 Contemporary theories of justice

Among philosophical approaches, there is a great variety of definitions of what is just and unjust. While many of them focus on distributive justice, aspects of commutative, corrective, and procedural justice are often incorporated. Since neither the

[94] These four categories are translated from Höffe; he uses the terms "austeilende oder distributive Gerechtigkeit", "Tauschgerechtigkeit", "korrektive Gerechtigkeit", and "Verfahrensgerechtigkeit".

justification nor the differentiation or criticism of the various theories of justice is feasible within the scope of this overview, I will here only mention some distinctions and characterisations that are necessary for understanding the following discussion, e.g. because Rawls and Pogge refer to them. Some of the theories of justice identified here will be discussed again in chapter 4.4.2, where they will be compared in more detail with regard to their concepts of property rights.

3.2.2.1 Teleological vs. contractarian theories

I adopt this differentiation from Rawls, who characterizes his theory of justice as a special case of contractarian theory. Contractarianism, in his account, belongs to the group of deontological theories, which Rawls defines in opposition to teleological theories: while the latter aim at maximising the good with the definition of the good independent of the definition of the right[95], the former, including his own approach, regard the right as prior to the good (Rawls 1999b: 22, 25f). Not referring to any universal truths about the good, contractarian theories such as Rawls' attempt to justify moral norms on the basis of some kind of explicit or implicit contract among well-informed rational agents concerning the basic rules and institutions of society. An actual or hypothetical consent procedure among those affected is assumed to yield agreements concerning e.g. moral norms or legitimate governments. Historically, social contract theories developed alongside shifts from feudal and status-oriented to democratic and autonomy-oriented societies (Becker 1992: 1171). The idea goes back to Thomas Hobbes (1588-1679); it was further developed by John Locke (1632-1704), Jean-Jacques Rousseau (1712-1778), Immanuel Kant (1724-1804), and prominently revived by Rawls (D'Agostino/Gaus 2008; see below).

3.2.2.2 Libertarianism, utilitarianism, egalitarianism

At the level of substantive principles of justice, a common classification of the prevailing approaches distinguishes utilitarianism, libertarianism, and egalitarianism.[96]

Libertarian distributive principles do not demand a certain distributive pattern, but define as just merely a certain sort of acquisitions and exchanges (Lamont/Favor 2008). Just distributions, then, are those that are arrived at via just actions by individuals; institutional redistribution is unnecessary or even illegitimate. According to Robert Nozick, the most prominent contemporary advocate of libertarianism, no one is entitled to a holding except if it was acquired in accordance with the principles of justice in acquisition or transfer (Nozick 1974: 151). For the justification of the principle of just acquisitions, Nozick refers to John Locke's theory of self-ownership (see ch. 4.4.2.1). Robert Nozick is explicitly criticized by Rawls.

Utilitarianism as a consequentialist ethical theory bases moral judgments solely on the evaluation of the probable consequences of an act resp. a rule. For utilitarians, the morally desirable consequences are those that maximize utility, and the first main proponents Jeremy Bentham (1748-1832) and John S. Mill (1806-1873) understood utilitarianism as a form of social criticism and institutional reform (Lyons 1992: 1262). Sidgwick (1838-1900) introduced the following main differentiations (cf. Birnbacher 2002: 99; Lyons 1992: 1263):

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[95] As examples of teleological doctrines that all aim at maximizing the good, Rawls (1999 TJ: 22) mentions utilitarianism (good = satisfaction of rational desire), perfectionism (good = realization of human excellence), hedonism (good = pleasure), and eudaimonism (good = happiness).

[96] Although communitarianism is often cited as another important contemporary philosophical approach, I will not consider it here since it is not necessary for understanding the discussion of the theories of justice in this chapter.

Considering whose utility is to be maximised,

- sum total utilitarianism (maximize aggregated utility) can be distinguished from
- average utilitarianism (maximize per capita utility).

At the level of which actions are considered,

- act utilitarianism (criterion of utility is applied to specific acts) can be distinguished from
- rule utilitarianism (criterion of utility is applied to the rules that acts have to obey; those rules must be obeyed despite possibly disadvantageous consequences in an individual case).

Utilitarian approaches further differ in their definition of utility (pleasure, welfare, fulfilment of preferences etc.) as well as in their views on interpersonal comparability and empirical measurability of utility. More general objections to utilitarian theory are based on its contra-intuitive conclusions[97], on the neglect of moral values such as fairness and human dignity, on the missing differentiation between basic and expensive preferences, and on the neglect of personal liberties and responsibilities as *a priori* values (cf. Buchanan 1992: 657). For Rawls' criticism of utilitarian principles, see chapter 3.3.1.

Egalitarianism subsumes theories favouring the equality and demanding equal treatment of all moral beings. Just distributions are defined by comparison of people's endowments; equality is the non-derivable moral objective and end in itself (Krebs 2000: 8, 10). While all egalitarian theories state a basic moral equality of all humans, their main difference is what exactly is to follow from this equality, i.e. which parameters are to be equalized in a just society: welfare, resources, liberties, primary goods, functionings, opportunity etc. (Krebs 2000: 7; Roemer 1996: 7f). Since most contemporary theories of justice demand equality in at least one of these respects, egalitarianism can be regarded as encompassing quite contradictory approaches to social justice. On the basis of social contract theory, Rawls arrives at conclusions incorporating egalitarian and liberal aspects. By their critics, egalitarianists are accused of placing too much value on pure equality, rather than on human rights or people's needs (Krebs 2000: 18). Furthermore, egalitarianism is said to be insensitive to self-inflicted harm and to disregard other principles of justice like the principle of merit, of qualification, or of free exchange that are well established (Krebs 2000: 21).[98]

3.2.2.3 Amartya Sen's capability approach

Amartya Kumar Sen, born 1933 in Santiniketan (India), received the 1998 Nobel Prize in economic sciences for his contributions to welfare economics.[99] Reintegrating ethical questions in economic theory, he has taught economics and philosophy in the USA, England, and India (Wagner 2000). The impact of his so-called capability approach on current development politics is illustrated exemplarily by the fact that

[97] An example for such a contra-intuitive conclusion is the fact that an individual could be required to sacrifice him-/herself for the greater aggregated benefits of others. There is an ongoing philosophical debate concerning whether and how the interest of minorities can be adequately considered in utilitarianism. Rainer Trapp, for example, proposes such a defence of utilitarianism and calls his variant "Gerechtigkeitsutilitarismus" (justice-utilitarianism; see Trapp 1988). For a discussion of Trapp's approach, which is beyond the scope of this thesis, see Gesang (1998).

[98] Krebs (2000: 7f, 15f, 32) pictures the contemporary philosophy of justice as dualism of mainstream egalitarianism in its various forms versus its critics, the non-egalitarianists, who demand certain absolute, minimum standards of welfare for all.

[99] For more details, see *http://nobelprize.org/nobel_prizes/economics/laureates/1998* (last accessed 08.08.2009).

the UNDP's annual Human Development Reports carry his handwriting, especially in the calculation of the Human Development Index (HDI).[100] Sen criticizes the prevalent theories of justice on grounds of their "informational bases", i.e. the information on which their evaluative judgments and interpersonal comparisons rely (Sen 1999: 85), resp. in which metric individual shares should be defined. He introduces the new informational base of *capabilities* as the most adequate indicator for personal well-being, in a "natural extension of Rawls's concern with primary goods, shifting attention from goods to what goods do to human beings" (Sen 1982a: 368). Capabilities represent the substantive freedoms to choose a life one has reason to value (Sen 1999: 74) and should be distinguished from the actually chosen lives and from actual achievements (Sen 1990: 116f). A person's capability set represents the alternative combinations of functionings from which he/she can choose, with functionings being the concrete living conditions a person may value (Sen 1990: 114; Sen 1999: 75). These living conditions may include being adequately nourished, being free from avoidable disease, longevity, literacy, being able to take part in the life of the community, having self-respect, and being able to choose (Sen 1999: 75f; 132). Sen remains vague, however, about the envisaged distribution of capabilities, e.g. if his approach aims at equality of capabilities, at a sufficient level of capabilities, or gives priority to the capabilities of the disadvantaged (cf. Table 3). In Sen's opinion, development strategies should not focus solely on economic growth, but should aim at the expansion of people's political freedoms, economic facilities, social opportunities such as education and health care, transparency guarantees, and protective security (Sen 1999: 38-40). "Their relevance for development does not have to be freshly established through their indirect contribution to the growth of GNP or to the promotion of industrialization" (Sen 1999: 5).

3.2.2.4 Thomas Pogge's matrix of principles of distributive justice

Due to its illustrative power, I will here include a classification portrayed shortly by Thomas Pogge in his critique of the capability approach (Pogge 2002a). Instead of a one-dimensional classification of approaches to distributive justice, he suggests a two-dimensional matrix of <u>how</u> to distribute (i.e. the distribution pattern) and <u>what</u> to distribute (i.e. the space or metric in which individual shares should be defined). Such a matrix yields at least nine different possibilities for a substantial principle of distributive justice:

[100] For more details, see *http://hdr.undp.org* (last accessed 08.08.2009).

	Equalitarianism (equal shares to everyone)	Sufficientarianism (individual shares must exceed a certain threshold)	Prioritarianism (unequal shares must benefit the least advantaged)
Welfarism (shares defined as welfare or utility)			
Resourcism (shares defined as resources or primary goods)		Pogge's principle of basic global justice	Rawls' difference principle
Capability approach (shares defined as capabilities)			

Table 3: Matrix of principles of distributive justice after Thomas Pogge (own illustration based on Pogge 2002a)

All of them can be termed egalitarian in the (weak) sense that they give equal consideration to all individuals in morally important respects (Pogge 2002a: 3) – a view common to almost all contemporary approaches to social justice (Pogge 2002a: 6).[101] While the perspectives of some authors can be unambiguously assigned to one of these nine possibilities, other authors' approaches remain dubious concerning one of the two dimensions, making comparisons and discussion difficult. The capability approach as formulated by Amartya Sen, for example, lacks in specificity concerning the desirable distribution pattern and hence, in Pogge's opinion, does not identify any resulting substantial principles of social justice (Pogge 2002a: 61). Pogge unfortunately does not discuss in detail all nine possible principles of distributive justice that can be derived from this matrix, and I will thus in the following refer to it mainly to clarify the two dimensions of distribution pattern and distribution metric.

After these preliminary remarks which are necessary for the ensuing discussion, I will now focus on the illustration and evaluation of Rawls' and Pogge's views, in order to formulate valid principles for justice in benefit sharing.

[101] There are, of course, more than these nine possibilities for a substantial principle of distributive justice, but they are less egalitarian: for example, a column could be added for a principle of aggregation that maximises the sum (of welfare, resources, or capabilities) (cf. Pogge 2003: 121).

3.3 John Rawls: Justice as Fairness

John Bordley Rawls was born 1921 in Baltimore (Maryland, USA) and died 2002 in Lexington (Massachusetts, USA). As a political philosopher at various universities in the USA, he developed a set of principles of justice on the basis of social contract theory. With his main work *A Theory of Justice* (1971) John Rawls quickly gained international attention and has since become one of the most influential and commented contemporary writers on justice and liberalism. I will here refer to the slightly revised edition of 1999 (Rawls 1999b, here abbreviated TJ), which contains revisions made already in 1975 for translations of the original version.[102] In 2001, Rawls additionally published *Justice as Fairness: A Restatement* (Rawls 2001, abbreviated JaFR), which I will cite only where its contents deviate from those of the 1999 edition of *A Theory of Justice*. The *Restatement* originated as lecture series on political philosophy at Harvard in the 1980s (JaFR: xii); it incorporates further corrections of some faults in the 1971 book and connects it with the main ideas in Rawls' essays since 1974 (JaFR: xv). Rawls' considerations on the special subject of international justice are compiled in *The Law of Peoples* (Rawls 1999a, abbreviated LoP) - a small volume that met with extensive criticism e.g. by Thomas Pogge (see ch. 3.4.7, 3.4.8).

3.3.1 Philosophical roots and intentions of Rawls' approach

Rawls' intention in developing his own account of a theory of justice is to formulate an alternative to the contemporarily prevailing moral conceptions of utilitarianism and intuitionism (TJ: 3).[103] He presents an abstraction of the theory of a social contract, based on Locke, Rousseau, and especially Kant (TJ: 10). However, Rawls does not attempt to present a complete contract theory, which would include an entire ethical system, but confines himself to the one virtue of justice (TJ: 15), which he conceives as the most fundamental social virtue:

> "Justice is the first virtue of social institutions, […] laws and institutions no matter how efficient and well-arranged must be reformed or abolished if they are unjust. Each person possesses an inviolability founded on justice that even the welfare of society as a whole cannot override." (TJ: 3)

In the *Restatement*, he clarifies that he conceives justice as fairness not as a comprehensive moral doctrine (such as e.g. utilitarianism), but as a political conception of justice (JaFR: 14, 19, 107).[104] It can accommodate citizen's diverse conceptions of the good that are associated with comprehensive doctrines held by the individuals, as it is to cover the basic structure of society and not the internal rules of institutions

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[102] Rawls' efforts to integrate points of criticism, sometimes at the cost of diverging from earlier statements, were criticised as unnecessary e.g. by Pogge (1989: 4f), who has also attempted to refocus the Rawlsian discussion on concrete political issues (see below).

[103] Rawls criticizes that utilitarianism, as a teleological doctrine, aims at maximising the good (here: utility, satisfaction of desire) independently of the right (TJ: 22). For Rawls, to the contrary, "the concept of right is prior to that of the good" (TJ: 347; for a full account of his theory of the good see pp. 347-396). Parties in the original position would choose justice as fairness over utilitarianism because

- highest-order interests are best protected by the basic liberties covered by Rawls' first principle (TJ: 152),
- justice as fairness requires less identification with the common interest and less self-sacrifice (TJ: 154f), and
- justice as fairness better supports people's self-respect (TJ: 155f).

Intuitionism, on the other hand, in Rawls' opinion cannot prioritize among the plurality of personal principles (TJ: 30, 34, 36) and neglects the fact that one's ideas of justice are influenced by situation and custom (TJ: 31). Although Rawls rejects intuitionism as an ethical theory, he emphasizes that any viable theory has to account for our shared basic intuitions (TJ: 4, 35).

[104] Rawls even titled one of his essays *Justice as Fairness: Political Not Metaphysical* (1985).

and associations within society such as churches, companies, or families (JaFR: 10, 141).[105] Rawls is, however, not neutral in this approach to existing political regimes: he understands his theory as a philosophical conception for a constitutional democracy (TJ: xi), and rather than attempting to strike a balance between existing doctrines, he starts from a constitutional democratic regime as reasonably just and worth defending (JaFR: 37).

Rawls' theory of justice covers the characteristics of the basic social institutions, i.e. the principal political, economic and social arrangements like parliaments, trials, markets or property regimes (TJ: 6, 47f).[106] These arrangements are to distribute fundamental rights and duties, as well as the benefits and burdens of social cooperation (TJ: 4, 6, 9, 15). Its focus on the institutions of the basic structure implies that for justice as fairness, the problem is not how to distribute or to allocate a given bundle of commodities among persons who did not cooperate to produce these commodities - this would in Rawls' view be merely allocative justice (JaFR: 50). Rather, citizens "are seen as cooperating to produce the social resources on which their claims are made", and the problem is how to regulate the institutions "so that a fair, efficient, and productive system of social cooperation can be maintained over time" (JaFR: 50). As criticized e.g. by Pogge, Rawls addresses his principles of justice only at the domestic level of "well-ordered" societies, which he regards here as an isolated system (TJ: 7) with different principles prevailing at the international level (see ch. 3.3.5).

The following paragraphs illustrate Rawls' account of how the rules for these institutions can be derived and what their content might be. Although Rawls' approach will play a slightly less prominent role than Pogge's in the formulation of principles for justice in benefit sharing, I will here present his theory quite comprehensively. This is important to understand his conclusions on some concrete matters of interest (such as property rights), as well as to follow other authors' argumentation in criticizing e.g. Rawls' conception of justice at the international vs. the domestic level. Furthermore, several of Rawls' insights, even if I will not formulate them as definite principles, will prove valuable in the discussion of fair benefit sharing in chapter 4.

3.3.2 The original position

Rawls does not state that his principles of justice are necessary truths; in his opinion, a "conception of justice cannot be deduced from self-evident premises or conditions on principles; instead, its justification is a matter of the mutual support of many considerations, of everything fitting together into one coherent view" (TJ: 19). He attempts to identify principles of justice that "free and rational persons concerned to further their own interests would accept in an initial position of equality" (TJ: 10).

[105] Parents, for example, are not required to treat their children (or friends their friends) according to the difference principle (JaFR: 73). These communities are, however, bound by constraints arising indirectly from the principles of justice and just background institutions: churches may excommunicate heretics, but must not burn them; universities have to aim at fair equality of opportunity etc. (JaFR: 10f). Rawls emphasizes that it is vital and rational that citizens hold comprehensive doctrines they consider true, but at the same time agree that it would be unreasonable to use political power to enforce these doctrines (JaFR: 184).

[106] In § 18-19 and 51-59 of *A Theory of Justice*, Rawls discusses several principles of justice for individuals, which are of less interest here because my focus will be on social institutions.

He illustrates this hypothetical original position of equality and mutual disinterest[107] with his famous metaphor of the veil of ignorance[108]:

> "Among the essential features of this situation is that no one knows his place in society, his class position or social status, nor does any one know his fortune in the distribution of natural assets and abilities, his intelligence, strength, and the like. I shall even assume that the parties do not know their conceptions of the good or their special psychological propensities. The principles of justice are chosen behind a veil of ignorance." (TJ: 11)

Parties are even not to know the exact economic, political, and cultural features of the society they live in, nor which generation they belong to (TJ: 118, see also below), and are not influenced by envy, spite, the will to dominate, or peculiarly high risk aversion (JaFR: 87). They do, however, know the general facts about human society, politics, economics, social organization, and psychology (TJ: 119, 137) – the veil merely removes differences in bargaining advantages and situates the parties symmetrically and as free and equal persons (JaFR: 87). Knowing that, in real life, an individual's life prospects are affected by contingencies of social class, native endowments and good or ill fortune, parties will address inequalities in these by justice as fairness (JaFR: 55). In his account of the original position, Rawls does not try to enumerate and consider all possible principles that the parties might take into account; rather, they are meant to receive a limited list of principles to choose from, including the prevailing conceptions of political justice found in tradition (TJ: 107; JaFR: 83). Remarkably, Rawls excludes general egoism as a possible choice in the original position since this "is what the parties would be stuck with if they were unable to reach an understanding" (TJ: 118) – a result that strikingly resembles outcomes in negotiations for international agreements (see ch. 4.8.7).

Since the original position is construed as fair, agreements reached in this initial situation are also fair (TJ: 11) and should not contradict the basic intuitive judgments (TJ: 17). For finding the most favoured description of the initial situation, one goes back and forth between altering the contractual conditions and changing one's judgments, called "reflective equilibrium": "The person making the judgment is presumed, then, to have the ability, the opportunity, and the desire to reach a correct decision" (TJ: 42). All reasonable and rational citizens should be able to endorse this public justification of the principles of justice and affirm them from within their comprehensive doctrines, thus achieving an overlapping consensus of reasonable doctrines that recognize the principles of justice "as the shared content through which their several views coincide" (JaFR: 29, 33, 195).[109] It is important to note that Rawls does not imply any factual gathering and agreement among actual persons for his version of the social contract, but formulates a thought experiment, a perspective that anyone at any time can adopt, where agreements are sought under certain imposed conditions (TJ: 120).

3.3.3 Two principles of justice

In Rawls' opinion, rational persons in the original position would choose, as a first step, the principle of equal distribution of e.g. basic liberties, opportunities, income

[107] Although Rawls is aware that mutual disinterest is not the prevailing standpoint in actual societies, he nevertheless assumes no stronger interpersonal ties, so that the principles of justice agreed upon do not depend upon unnecessarily strong assumptions (TJ: 111, 127).

[108] Rawls does not claim to have invented this original position, but rather assumes that it is implicit e.g. in Kant's categorical imperative (TJ: 118).

[109] Rawls concedes that there is no guarantee that such an overlapping consensus can be found between the comprehensive doctrines existing in a concrete society (JaFR: 37) – a problem which he, in my opinion, fails to solve.

and wealth (TJ: 130). They would then consider efficiency, organization, and technology and come to the conclusion that certain economic inequalities (according to authority and responsibility) can be allowed if this is to everybody's advantage compared to an equal distribution (TJ: 130f). As a result, the following principles of justice for institutions would be agreed upon:

1. "Each person has the same indefeasible claim to a fully adequate scheme of equal basic liberties, which scheme is compatible with the same scheme of liberties for all" (JaFR: 42).
   Such basic liberties are
   - political liberty (active and passive right to vote), freedom of speech and assembly,
   - freedom of thought and liberty of conscience ,
   - freedom and integrity of the person,
   - the right to hold personal property (not necessarily property in means of production), and
   - freedom from arbitrary arrest and seizure (TJ: 53).

   Rawls' approach shares these liberties with libertarian theories of justice (LoP: 49).

2. "Social and economic inequalities are to satisfy two conditions: first, they are to be attached to offices and positions open to all under conditions of fair equality of opportunity [e.g. by way of an appropriate education]; and second, they are to be to the greatest benefit of the least-advantaged members of society (the difference principle)" (JaFR: 42f).
   In other words: "All social values […] are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone's advantage" (TJ: 54), or "the higher expectations of those better situated are just if and only if they work as part of a scheme which improves the expectations of the least advantaged members of society" (TJ: 65). No one deserves a favoured starting place in society due to natural endowments, social contingencies, or moral desert[110], but rather than completely eliminating inequalities, their role is "to attract people to positions where they are most needed from a social point of view; to cover the costs of acquiring skills and educating abilities, to encourage them to accept the burdens of particular responsibilities" (JaFR: 78).[111]

For prioritisation, these principles are lexically ordered, meaning that one principle has to be satisfied before moving to the next: the first is prior to the second; within the second, fair equality of opportunity is prior to the difference principle (TJ: 53, 77; JaFR: 43). This ordering implies a priority of liberty in the sense that basic liberties

[110] Rawls explicitly rejects the view that income or wealth should be distributed according to moral desert or intrinsic worth (TJ: 273): this concept only emerges within certain comprehensive doctrines after principles of justice and morals have been introduced, but cannot be accommodated within Rawls' political conception of justice, which defines justice by a person's legitimate expectations and entitlements (TJ: 275f; JaFR: 77).

[111] Rawls does not explicate how great these differences should be allowed to become. Employing an empirical approach of comparing present inequalities in different countries, Radermacher (2005: 82-90) found an "optimal" (in terms of social coherence) distribution in developed countries to be one where the lowest incomes amount to 50 to 65% of the average income. He observes that currently, developing countries as well as the world as a whole remain drastically below this margin of desirable equality.

can be restricted only for the sake of other basic liberties (TJ: 214), and a priority of justice over efficiency and pure material welfare (TJ: 266).

> "For example, the equal political liberties cannot be denied to certain groups on the grounds that their having these liberties may enable them to block policies needed for economic growth and efficiency." (JaFR: 47)

Such prioritisation might even require inefficient changes in the pursuit of justice, if e.g. a certain situation is deemed efficient but unjust (TJ: 69). Rawls gives the example of a slave economy: such an economy might be quite efficient in terms of economic output, but would nevertheless be severely unjust and should be reformed, even if freeing the slaves would mean a decline in economic efficiency (TJ: 61). Where the priority of justice is not followed, it must be shown that the "victims" would suffer even more if the priority of justice was followed (TJ: 264). In reply to critics pointing out that certain material means are often a necessary condition to exercise those basic rights and liberties given priority by Rawls (e.g. Sen 1999: 64), he concedes in the *Restatement* that his first principle of justice "may be preceded by a lexically prior principle requiring that basic needs be met" (JaFR: 44, footnote 7).[112] He further clarifies that the priority of the first principle does not mean a priority of liberty as such, "as if the exercise of something called "liberty" had a pre-eminent value and were the main, if not the sole, end of political and social justice" (JaFR: 44).

The subject of interpersonal comparisons in Rawls' concept are primary goods, which are those social conditions and all-purpose means that are generally necessary for framing and executing one's plan of life (TJ: 380; JaFR: 57).

> "These goods are things citizens need as free and equal persons living a complete life; they are not things it is simply rational to want or desire, or to prefer or even to crave." (JaFR: 58)

While in *A Theory of Justice* (TJ: 54, 79) Rawls distinguishes between social and natural primary goods[113], in the *Restatement* (JaFR: 58f), he instead favours the following enumeration:

- basic rights and liberties, e.g. freedom of thought, liberty of conscience, right to hold personal property,
- freedom of movement and of occupation,
- powers and prerogatives of offices and positions of authority and responsibility,
- income and wealth as all-purpose means, and
- social bases of self-respect[114].

It is considered secondary what use a person makes of these primary goods (TJ: 80) - this (perceived) indifference as to which "functionings" a person is actually able to achieve with a given set of primary goods is a main point of Sen's criticism of Rawls, which will be addressed in more detail in chapter 3.4.4.

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[112] In *Theory of Justice*, Rawls instead offers the following view: if poverty and ignorance hinder a person to take advantage of his/her rights and opportunities, the worth of liberty to that person (albeit not the liberty itself) is diminished, and compensation can be achieved through the difference principle (TJ: 179).

[113] Social primary goods are rights, liberties, opportunities, wealth, income, self-respect; *prima facie* they have to be distributed equally. Natural primary goods are health, vigour, intelligence, imagination; they are not directly under social control, and inequalities have to a certain extent be compensated for.

[114] While *A Theory of Justice* is ambiguous on this, in the *Restatement* Rawls distinguishes between self-respect itself and its social bases (p. 60, footnote 27), one of which would be the right to personal property, together with the ability to exercise it (p. 114).

3.3.3.1 The difference principle in detail

Commonly known as the *difference principle*, the second part of Rawls' second principle singles out from various similarly efficient (but unequal) situations the one which most benefits the least advantaged (TJ: 65). In the *Restatement*, Rawls presents the following graph for explanation:

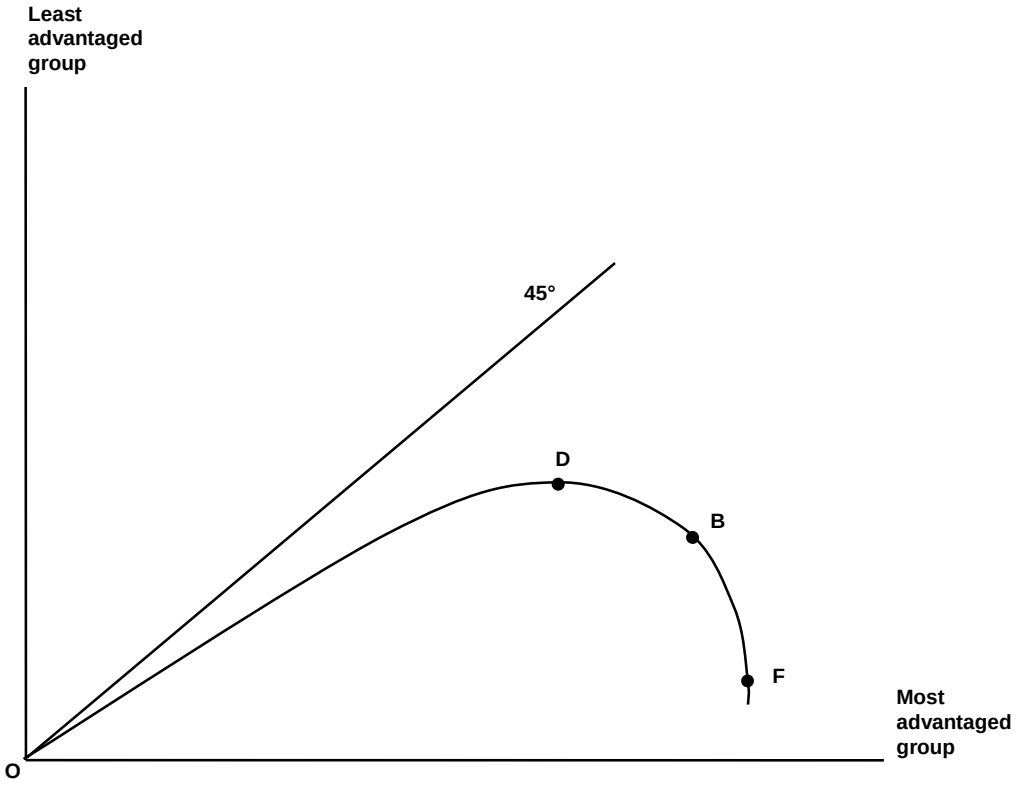

Figure 2: Illustration of the difference principle (based on JaFR: 62, Figure 1)

The x-axis in this diagram measures the amount of primary goods in the hands of the most advantaged, the y-axis the primary goods of the least advantaged; the 45°-line represents equality in primary goods (JaFR: 62). A given curve, such as the one above, exemplifies a particular scheme of cooperation realized in a particular society. The various points on the curve then indicate e.g. the various distributions of wages and salaries possible under this scheme, representing various degrees of equality resp. inequality (JaFR: 63). While perfect equality might *prima facie* seem the most just distribution, Rawls concedes that this would often mean a rather low level of individual wealth and general welfare since under a perfect egalitarian regime, probably less goods and services will be produced than under a regime allowing certain inequalities. By varying the distribution of wages and salaries, more may be produced, because the prospects of a higher income can act as incentives for individuals e.g. to invest more effort in order to belong to the more advantaged. In Rawls' words, "greater returns to the more advantaged serve, among other things, to cover the costs of training and education, to mark positions of responsibility and encourage persons to fill them, and to act as incentives." (JaFR: 63). Thus, by moving from O to D on the curve above, everyone's prospects rise, so that the inequality this necessarily entails is ethically defendable. D is the first (Pareto) efficient point (JaFR: 123), meaning that it is impossible to make one person better off without making another worse off. In this improvement (from O to D), the most advantaged may profit more than the least advantaged, but still both profit, while efficiency rises and equality declines (JaFR: 123). The difference principle now singles out the highest point (D) of the curve, which indicates the maximum prospects of the least advantaged within the

particular scheme (JaFR: 63) – rather than simply requiring absolute equality in primary goods, which will often entail less primary goods for everyone than in a slightly unequal distribution. The segment D-F, where all points on the curve are efficient but the prospects of the most advantaged would be further raised at the expense of the least advantaged, can be called the "conflict segment" (JaFR: 124). It includes the utilitarian Bentham point (B), where the sum of individual utilities is maximized (JaFR: 62). At the feudal point (F), the curve becomes vertical (JaFR: 62) and the prospects of the most advantaged are maximized at starkly disproportionate costs to the least advantaged (JaFR: 124).

Being identifiable only by their index of primary goods (TJ: 281), the least advantaged are not a fixed group characterised by natural or other unalterable features such as race or gender, but are simply those individuals who are worst off under a particular scheme of cooperation (JaFR: 59, footnote 26).[115]

> "The least advantaged are not, if all goes well, the unfortunate and unlucky – objects of our charity and compassion, much less our pity – but those to whom reciprocity is owed as a matter of political justice among those who are free and equal citizens along with everyone else. Although they control fewer resources, they are doing their full share on terms recognized by all as mutually advantageous and consistent with everyone's self-respect." (JaFR: 139)

The difference principle, accordingly, can be conceived not as principle of redistribution in the narrow sense, but as a framework for ethically acceptable economic activity that entails only a certain range of acceptable distributions:

> "There is no prior distribution, no natural baseline or neutral way of arranging the economy, relative to which the difference principle could be seen to make *re*distributive modifications. […] The selected economic ground rules, whatever their content, do not *re*distribute, but rather govern how economic benefits and burdens get distributed in the first place." (Pogge 1994: 212)

Rawls makes it explicit that the difference principle is more demanding than a social minimum, which would cover only the basic needs of the least advantaged (JaFR: 48) – it may, for example, take the form of progressive taxation (cf. JaFR: 51).

3.3.4 Just national institutions

In the last chapters of *A Theory of Justice*, Rawls explicitly comments on how some institutions of the modern state should be devised following his principles of justice. Here, as for the derivation of his general principles above, it is important to know that his inquiry focuses on ideal theory, i.e. on the well-ordered society (JaFR: 13). He concedes that real life might be non-ideal and may require special principles (TJ: 216) and that "[i]n practice we must usually choose between several unjust, or second best, arrangements" (TJ: 247). Some of his plausible conclusions relevant for the central study questions posed above are the following:

a) Property rights: Property rights may be adjusted in order to correct the distribution of wealth and to raise funds necessary for public affairs; a wide dispersal of property is necessary for equal liberties (TJ: 245f). Justice does not necessarily require a right to private property in natural resources or in the means of production (TJ: xvi; JaFR: 114). Both a property-owning democracy as well as a liberal (democratic) socialist regime can satisfy the two principles of justice (TJ: 228; JaFR: 138), in contrast

[115] In *A Theory of Justice* (TJ: 83), Rawls describes the least advantaged as those disadvantaged e.g. in family and class origins, natural endowments or fortune in the course of life - a formulation which in my opinion is less adequate than the one above since it obscures the important difference between natural features and a scheme of social cooperation in determining the position of the individuals.

to laissez-faire capitalism and welfare-state capitalism as two further alternatives (JaFR: 137). The role of the institution of property is to prevent deterioration that occurs if no definite agent is responsible for maintaining an asset (LoP: 8, 39). Further comments by Rawls on property rights will be found in chapter 4.4.2.3.

b) Public goods: As a consequence of the free-rider problem and of market failures that are due to external costs and benefits, the state must arrange for the provision of public goods and enforce their payment (TJ: 236, 240). Transfers and benefits from public goods must enhance the expectations of the least favoured, consistent with the required savings and with the principle of equal liberties (TJ: 267).

c) Intergenerational justice: While the difference principle holds within generations, the principle of just savings holds between them (JaFR: 159). Its primary aim is to establish just basic institutions rather than to increase material wealth, so that saving in the sense of a net increase in capital might not be necessary beyond a certain point (LoP: 107) – real saving is only a transitional duty until its target is reached (LoP: 118). The principle "can be regarded as an understanding between generations to carry their fair share of the burden of realizing and preserving a just society" (TJ: 257); discounting the future on the basis of pure time preference would be a violation of justice (TJ: 253). For arriving at the just savings principle, it can be assumed that the generations represent family lines where ancestors care about their immediate descendants (TJ: 255), or that the generation one belongs to is unknown in the original position, where parties would then want preceding generations to have followed it (JaFR: 160).[116]

3.3.5 Justice among peoples

3.3.5.1 Principles of justice for a society of peoples

While in the *Theory of Justice* Rawls only cursorily comments on the relations between nations (TJ: 7), he elaborates his views in *Political Liberalism* (1993) and especially in *The Law of Peoples* (1999, LoP), where he extends the idea of the social contract and the ensuing conception of justice to a "society of peoples" (LoP: vi, 3, 55). He uses the term *peoples* rather than states or nations, because these entities should be sovereign actors in the society of peoples; there should be no extra interests of states or governments versus their citizens or versus other states (LoP: 23-28).[117] Rawls distinguishes

- liberal peoples with constitutional democracies,
- decent (non-liberal) peoples,
- outlaw states,
- societies burdened by unfavourable conditions, and
- benevolent absolutisms.

Of these, liberal peoples and decent non-liberal peoples (falling short of the liberal ideal in some respects) are the so-called well-ordered peoples. As example of a decent non-liberal people, Rawls discusses a hypothetical hierarchical society which

[116] In the *Restatement*, Rawls obviously adopts a suggestion made by several critics of *A Theory of Justice* (e.g. Birnbacher 1977: 395; Singer 1988: 221) to treat the parties' generation as an arbitrary contingency.

[117] According to a commentary by Beitz, these Rawlsian peoples have elements of statehood, but not all states (neither all societies) count as peoples. It is not important if many or even any actual states fulfil these criteria of a people since the concept is a part of Rawls' ideal theory and not meant as observed reality (Beitz 2000: 679f).

has no aggressive aims, secures human rights, accepts moral obligations for all persons, has a decent consultation hierarchy and whose law is guided by a common good idea of justice, but might allow basic inequalities among its members e.g. on religious or philosophical grounds (LoP: 70f, 74).

In a procedure envisioned as a modified original position at a second level, representatives of the well-ordered peoples make agreements similar to the original position for the domestic case (LoP: 10, 32-34). The well-ordered peoples would among them agree to the same ideal conception of a "law of peoples" (LoP: 4f; 63f), which is to guide them in their conduct among them and towards non-well-ordered peoples (LoP: 89). Rawls does not develop his own principles of justice for this case, nor does he effectively reveal the parties' ways of reasoning, but rather jumps to the conclusion that the parties would choose certain interpretations of the following, commonly accepted and established principles (LoP: 37)[118]:

1. "Peoples are free and independent, and their freedom and independence are to be respected by other peoples.
2. Peoples are to observe treaties and undertakings.
3. Peoples are equal and are parties to the agreements that bind them.
4. Peoples are to observe a duty of non-intervention.
5. Peoples have the right of self-defence but no right to instigate war for reasons other than self-defence.
6. Peoples are to honor human rights.
7. Peoples are to observe certain specified restrictions in the conduct of war.
8. Peoples have a duty to assist other peoples living under unfavorable conditions that prevent their having a just or decent political and social regime."

Rawls grants that this list is incomplete and requires explanation and interpretation, but states his main point as being that "free and independent well-ordered peoples are ready to recognize certain basic principles of political justice as governing their conduct" (LoP: 37). While Rawls does not envision a world-state or a world government (LoP: 36), he assumes that the parties in the international original position will set up common institutions and cooperative organizations for realizing their common aim of a just society of peoples (LoP: 89).

Rawls discusses the necessity for liberal peoples to tolerate decent non-liberal peoples, which he justifies by alluding to mutual respect and peoples' self-determination (LoP: 59-61). In turn, he expects decent non-liberal peoples to accept the liberal principles listed above as reasonable for international relations (LoP: 58). Human rights are to limit a regime's internal autonomy (LoP: 79), as well as the moral pluralism among peoples (LoP: 80). Rawls explicitly adds this constraint on national autonomy and self-determination in favour of globally binding human rights after being criticized for its absence in *Political Liberalism* (1993). He clarifies e.g. that a people may not "protest their condemnation by the world society when their domestic institutions violate human rights, or limit the rights of minorities living among them. A people's right to independence is no shield from that condemnation or even from coercive intervention by other peoples in grave cases" (LoP: 38). In the following, I will discuss in more detail the duty of assistance stated by the eighth principle as the basis for justice among peoples.

[118] Six of these eight principles are already shortly mentioned in *A Theory of Justice* (TJ: 332f) as principles of a law of nations, but are not discussed further. The two principles added in *The Law of Peoples* are the duties to honour human rights and to assist peoples living under unfavourable conditions, which can be considered a more progressive view (Beitz 2000: 672).

3.3.5.2 The duty of assistance

Rawls' toleration of non-liberal societies prompted much criticism, as did his treatment of the so-called burdened societies. He discusses the latter at length in Part III of the *Law of Peoples*, which is concerned with nonideal theory[119] and addresses some suggestions for alternative distributive principles. Burdened societies are conceived as lacking adequate political and cultural traditions, the human capital and know-how, and often the material resources to be well-ordered (LoP: 106). Well-ordered peoples are ascribed a duty of assistance to these burdened societies, but Rawls refuses to place the emphasis of this assistance on economic aid because "a well-ordered society need not be a wealthy society" (LoP: 106), and "merely dispensing funds will not suffice to rectify basic political and social injustices (though money is often essential)" (LoP: 108f). Assistance should instead prioritize on just institutions based on human rights, which will then make sure that basic needs are met (LoP: 109).[120] The aim of assistance in Rawls' concept is to "assist burdened societies to become full members of the Society of [well-ordered] Peoples and to be able to determine the path of their own future for themselves" (LoP: 118). The duty of assistance thus has a target and a cut-off point, after which "further assistance is not required, even though the now well-ordered society may still be relatively poor" (LoP: 111). Rawls thus applies neither his difference principle, nor a similar principle of distributive justice, to the international case: inequalities between peoples in wealth or in natural resources are permissible, and do not need to be balanced by redistribution, as long as they have no unjust effects on the basic structure of the Society of Peoples or on relations among peoples and among their members:

> "The Law of Peoples […] holds that inequalities are not always unjust, and that when they are, it is because of their unjust effects on the basic structure of the Society of Peoples, and on relations among peoples and among their members." (LoP: 113)
>
> "However, because, as I have said, the crucial element in how a country fares is its political culture […] and not the level of its resources, […] the arbitrariness of the distribution of natural resources causes no difficulty." (LoP: 117)

While Rawls is aware that this view (expressed already in *Political Liberalism* 1993) has provoked strong criticism e.g. by Charles Beitz and Thomas Pogge, he defends it and holds that their aims of "liberal or decent institutions, securing human rights, and meeting basic needs" are effectively the same as his, but are covered by his duty of assistance (LoP: 116). He understands that in the real, nonideal and extremely unjust world a global principle of distributive justice is appealing (LoP: 117). However, he holds that if such a principle were applied without target and cut-off point, it would lead to unacceptable results in the hypothetical world arrived at after the duty of as-

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[119] Nonideal theory in this concept suggests policies and courses of action that are permissible and effective under "the highly nonideal conditions of our world with its great injustices and widespread social evils" (LoP: 89), but only after ideal theory has identified the relevant objectives and aims independently of the actual status quo (LoP: 90).

[120] For his insistence on the priority of just institutions over economic aid, Rawls refers to Amartya Sen's work on the causes of famines (LoP: 109): contrary to the doctrine of declining food availability, Sen comes to the conclusion that most famines are triggered by a lack of entitlements of some part of the population (Sen 1981: 154; Sen 1982b: 349). These entitlements are determined by productive resources (land, labour), production possibilities (technology, knowledge), and exchange conditions (prices etc.) (Sen 1999: 162f). Where they are absent, needs are not translated into effective demand and purchasing power on the markets, so that the market mechanism can curb world food production, or even move food away from famine-stricken areas (Sen 1981: 161; Sen 1999: 208). This claim, in my opinion, is supported by the observation that a growing portion of farmland even in developing countries is dedicated to the production of agro-fuels, which allow higher profits than food crops because of the higher purchasing power of consumers in industrial countries.

sistance is fulfilled (LoP: 117): some well-ordered societies, for example, may freely have decided not to industrialize or to retain a rather high population growth; later, they will be less wealthy than others – and rightly so, according to Rawls, who sees no justification for then requiring those wealthier societies to support the former (LoP: 117f). Referring to his communication with Pogge, Rawls adds the following remarks: if Pogge's global egalitarian principle of distributive justice had a target and cut-off point[121], and if this point were similar to the one under Rawls' duty of assistance (e.g. the amount of primary goods needed for a people to stand on its own), then these two presumably contrarian concepts would actually converge (LoP: 119). However, this applies only to concerns of justice among peoples – a so-called cosmopolitan concept of international justice would pose the additional question of global distribution among individuals, demanding further distribution if the worst-off individuals in one society are worse off than the worst-off in another (LoP: 120). While Rawls thus, on the one hand, maintains that there are decisive theoretical differences between e.g. his approach and Pogge's, on the other hand he subscribes to many of his cosmopolitan critics' intentions. He even adjusts his wording to a point where differences are indeed difficult to detect and Rawls' own position seems inconsistent, as in the comment (somewhat surprising for its focus on individuals) that the duty of assistance "seeks to raise the world's poor until they are […] free and equal citizens of [a well-ordered society]" (LoP: 119).

[121] Pogge indeed explicitly incorporates such a target and cut-off point in the elaboration of his own conception of global justice, see ch. 3.5.3.

3.4 Using Rawls' concepts and ethical demands for deriving principles of justice in benefit sharing

After presenting Rawls' approach above, I will here identify which of his concepts and ethical demands I will adopt for the purpose of this thesis, and also discuss where and why I will disagree with his conclusions or do not find them useful for answering the central study questions. In order to keep Rawls' theory and my own comments as clearly apart as possible, I will here only shortly refer to the elements of Rawls' theory explained above, so that the reader may have to check with the previous chapter. Due to the broad and extensive reception of Rawls' work in philosophy and moral theory, only a small selection of secondary literature putting forward important points of criticism can be included here; a more complete or general evaluation of his theory of justice is beyond the scope of this thesis. Some closer attention will be given to Amartya Sen, who has provided valuable comments especially on Rawls' primary goods. As I will illustrate Pogge's own approach in chapter 3.5 below, I will here include only his most direct criticism of Rawls, and only those points I can agree with.[122]

3.4.1 Focus on institutions of the basic structure

Rawls' focus on social institutions of the basic structure corresponds well with my aim of developing rather general principles for a framework of justice in benefit sharing. This framework will primarily address higher-level regulations and policies, rather than commenting on individual benefit sharing agreements or ABS contracts. Therefore, I will adopt Rawls' institutional focus but, since it is implicit in the formulation of the seven study questions, I will not make it an extra principle.

3.4.2 Original position with hypothetical consensus under the veil of ignorance

As stated above, I regard Rawls' contractarian justification as very convincing. It does not rely on metaphysical foundations, and the veil of ignorance as conceived by Rawls permits parties to be aware of the general conditions of human life, but not of their individual natural endowments or place in society, so that they will choose principles of justice from an unprejudiced position. Although Rawls foremost addresses pluralistic Western societies and advocates some clearly liberal principles, I nevertheless regard his way of reasoning in deriving them as acceptable to a broad range of individual and cultural backgrounds, and Rawls' principles themselves are certainly worth defending in the debate with competing philosophies.[123] As a thought experiment, the original position is available at any time to reassess or verify existing or to develop new principles of justice, e.g. for more concrete questions and situations not addressed by Rawls. A veil of ignorance in the context of benefit sharing allows much more objective reasoning than usually observable in the political debate, where the parties' argumentation strongly and somewhat legitimately depends e.g. on whether they are from a provider or user country, or whether they represent indigenous or local communities, administrative or companies' interests. I will therefore adopt Rawls' original position as a way of justification, as well as for answering

[122] Since Rawls has incorporated some of Pogge's points of critique in the *Restatement* (2001) and in *The Law of Peoples* (1999), I will refer especially to Pogge's later publications (after 2001) for remaining criticism.

[123] Considering, for example, women's rights: they might not feature prominently in some widespread world views, but offered a contract approach for deriving moral values, I consider it rather unlikely that negotiating parties would choose a doctrine where they would run a fifty per cent chance of being discriminated against on grounds of such unalterable natural conditions like one's sex.

questions not addressed by Rawls or Pogge, and formulate the following principle of (primarily procedural) justice:

> **The bases of fair and equitable benefit sharing should be designed in such a way that all persons concerned can resp. would agree to them in a hypothetical consensus under a Rawlsian veil of ignorance concerning e.g. their social position, living conditions, natural endowments, and country of birth.**

Pogge's criticism of a purely recipient-oriented institutional perspective on justice

Pogge criticizes Rawls not only with respect to global justice, but, especially in more recent publications, he has renounced Rawls' contractual approach to justice altogether (Pogge 1998; Pogge 2003; Pogge 2008c: 47f). In his view, any theory of justice that follows an institutional perspective (rather than the more traditional moral perspective of actions among persons and groups) will be solely recipient-oriented; moral norms will be chosen solely by their consequences for the quality of life of the members of society (Pogge 2003: 120). In contrast, Pogge points out that we usually attach further importance to the way and mechanisms through which institutions produce this quality of life or relate to shortfalls, e.g. if a certain deficit is officially sanctioned or if it is only an unintended side-effect of otherwise beneficial institutions (Pogge 1998: 163f). While these two possibilities obviously indicate different grades of injustice, they would not be judged differently by parties in the original position. Pogge thinks that parties in Rawls' original position would choose several moral norms that are intuitively unacceptable or absurd:

- They would want to compensate not only social, but also natural physical or mental inequalities within the normal human range (such as ugliness or melancholy) (Pogge 2003: 123).
- They would not choose a principle of equal opportunities if this would lower the (average or minimal) quality of life (Pogge 2003: 126f).
- They would agree to (institutionally) curtail the basic liberties of some, if this reduced the total number of violations of basic liberties (e.g. by becoming a victim of crime) (Pogge 2003: 129f). This might e.g. mean to allow convictions of a certain percentage of innocent persons or to allow excessively severe punishment (such as death penalties for the worst cases of drunk driving), if these measures would successfully deter potential criminals (Pogge 2003: 131-133).

For Pogge, political philosophy is thus faced with the problem to choose between a purely recipient-oriented institutional perspective (leading to the above contra-intuitive demands), a return to the perspective of actions among persons and groups, different perspectives for different fields of application, or a (yet to be developed) institutional perspective that is not purely recipient-oriented (Pogge 2003: 136f).

However, I will not follow Pogge in his rejection of a Rawlsian approach to social justice, since I disagree with his reasoning in this case: Quite conceivably, parties in the original position would consider not only the quality of life they can expect under certain institutions, but also the way and mechanisms through which these institutions will bring about such a quality of life. I am not convinced that the parties would choose those moral norms Pogge finds absurd; they could very well come to the conclusion that a rather high risk of dying in a car accident is a price worth paying for avoiding a (much lower) risk of being sentenced to death for drunk driving. Finally, if some of the norms that the parties would choose seem intuitively absurd after all, these intuitions should possibly not be given such an unquestioned moral priority as Pogge does. Since most of the difficulties he mentions with the institutional perspective further concern especially the area of criminal law, I continue to regard Rawls' institutional perspective and original position as a valid form of justification for moral norms for the limited issue of access and benefit sharing as discussed here – possibly quite in line with Pogge's above suggestion of different perspectives for different fields of application.

Box 5: Pogge's criticism of a purely recipient-oriented institutional perspective on justice

3.4.3 Two principles of justice and their prioritization

Rawls develops his two principles of justice as part of ideal theory and grants that he takes no neutral position to derive them, but that he starts from a liberal democratic regime as worth defending (cf. JaFR: 37). He further addresses these principles only at the domestic level of societies resp. states, not at the international community. Since, however, benefit sharing takes place among and across very different kinds of countries and cultures, the two principles cannot be simply adopted here, but have to be limited to questions of domestic justice in (especially Western) liberal democratic societies. In chapter 3.6, I will adopt principles of global justice which should be given priority over these merely domestic principles. With these qualifications, and although Rawls' vision of a just society is undoubtedly ambitious[124], I find it convincing that parties in the original position would agree on his two principles for the ideal society. Furthermore, his view of the difference principle as not redistributing but setting the ground rules of economic activity is compelling, as is his conception of the least advantaged: in any economic regime, there will be rules and institutions that are generally beneficial, but to some people's disadvantage. Intellectual property rights, for example, may encourage innovations that benefit a majority of people, while a minority e.g. of chronically ill would be better off without such property rights in place. Similarly, minimum wages may secure sufficient income for many job holders, while at the same time driving a smaller number of people out of (legal) work. These individuals, however, are not to be seen as being unfortunate or rightly worse off than those advantaged by the respective economic regime, but, as Rawls formulates, they are "doing their full share on terms recognized by all as mutually advantageous" and are owed reciprocity rather than charity (JaFR: 139). In a hypothetical original position behind the veil of ignorance, it would be rational to choose such rules and institutions of general benefit, even if there is a chance that one would belong to the minority disadvantaged by the respective institution, provided that the disadvantage is not too great and/or it is compensated for in other areas. In the real world, the needs and interests of these disadvantaged minorities (e.g. the chronically ill or the jobless) should then be accepted as at least equally legitimate as those of the advantaged (e.g. the healthy or the job holders) – or even as more legitimate, where they are not already compensated for. Such a view can conceivably be extended to the global level, where economic regimes are put into place that previously existed only at the domestic level, such as intellectual property rights or free trade.

For the question of prioritization, I appreciate Rawls' comments made in the *Restatement* that the first principle may be preceded by the requirement that basic needs be met (JaFR: 44, footnote 7). Only this addition can ensure that all individuals are physically able to exercise their basic rights and liberties (Rawls' first principle), with political participation then probably by itself leading to more equality in opportunities and in the distribution of material means (Rawls' second principle). Rawlsian basic liberties, in my opinion, are also an important basis for economic value creation (see ch. 1.1.2), without which there would be few material means to distribute in the first place.[125] Any potentially resulting efficient-but-unequal distribution should be subject to a regime of political participation (hence the priority of basic liberties) in

[124] Speaking with Rowlands (1997: 241): "Rawls's theory conflicts with what passes for common sense in capitalist societies."

[125] Chinas economic growth during the last decades, for example, started off not by redistribution, but when its inhabitants were allowed more economic liberties, long before its markets were widely opened to international trade and investment. Of course, the lack of political liberties, as well as rising domestic inequalities, still put China far from a Rawlsian just society.

which the poorer majority has the political power to "set the rules" by which the well-off legitimately gain their wealth and drive the economy – an arrangement observable to a certain degree in most democratic regimes, where the fulfilment of basic physical needs is usually guaranteed.[126] Although in this thesis I will primarily address issues of global benefit sharing, for which I will derive principles of global justice from Pogge rather than from Rawls, I will formulate the following principle of domestic justice based on Rawls' two principles (see ch. 3.3.3):

> **After demands of global justice are satisfied and basic human needs are met, the domestic institutions of liberal democratic countries concerned with benefit sharing should ensure that**
> **1. each person has the same indefeasible claim to an adequate scheme of equal basic liberties, compatible with the same scheme of liberties for all, and that**
> **2. social and economic inequalities are, first, attached to offices and positions open to all under conditions of fair equality of opportunity, and, second, are to the greatest benefit of the least-advantaged members of society.**

This principle combines aspects of distributive, commutative, corrective, and procedural justice.

[126] Amartya Sen observes that functioning democracies have proven to be a safeguard against famines because rulers depend on their voters, wealth is distributed more equally, and a free press and opposition serve as early warning systems (Sen 1999: 16, 51f, 180-184). Rawls notes on this subject that "there would be massive starvation in every Western democracy were there no schemes in place to help the unemployed" (LoP: 109).

Empirical validation of Rawls' difference principle

Besides such ethical consideration, the difference principle has also been subject to attempts of empirical validation: Frohlich et al. (1987) designed a series of experimental original positions in which a group of participating students had to agree unanimously on one principle of just income distribution (p. 612). Out of four possibilities, they were found to choose neither the Rawlsian difference principle of maximizing the minimum, nor the utilitarian principle of maximum average (favoured e.g. by Birnbacher 1977: 391, 397), but a compound principle of maximizing the average income with, at the same time, establishing a minimum that is not to be transgressed (p. 617) – a principle Rawls rejected as intuitionistic (p. 610). While empirical results like these might be seen as casting some doubt on the justification of the difference principle, the authors concede that validation is difficult because of the unavoidable dissimilarities between the experimental setting and the hypothetical original position, e.g. concerning the stakes involved or the "thickness" of the veil of ignorance (Frohlich et al. 1987: 624f). Additionally, empirical observations like these restrict Rawlsian justice to the difference principle in material goods, neglecting the lexicographic ordering of Rawls' two principles with its priority for non-material liberties.

Box 6: Empirical validation of Rawls' difference principle

3.4.4 Primary goods as subject of interpersonal comparisons

I will not adopt Rawls' concept of primary goods as the subject of interpersonal comparisons (see ch. 3.3.3) for two reasons: first, their definition remains ambiguous as they seem to encompass liberties which should be equal according to the first principle, and also income and wealth, where inequalities are allowed according to the difference principle. Thus, the notion of primary goods is of little help for defining just distributions already within Rawls' concept. As a second reason, I agree with Amartya Sen's criticism that abstract amounts of certain primary goods, such as income, provide little information as to whether these goods are distributed in a just way: a good's usefulness to an individual often depends on that individual's characteristics and living conditions, so that e.g. income equality does not necessarily guarantee equality in the means of living. Sen positively acknowledges primary goods as a more objective informational base for well-being than utilities (Sen 1982a: 365). However, judging distributions on the basis of primary goods still lacks consideration of people's individual ability to convert them into actual functionings or freedoms: Sen gives the example of a cripple who has adapted to his deprivation versus a "pleasure-wizard" with expensive tastes who is hard to please. Utilitarianism in Sen's opinion would give fewer goods to the cripple than to the pleasure-wizard, because of his generating less utility from them; Rawlsian justice would give both the same primary goods[127]. Both outcomes remain disappointing to Sen since the cripple may need more primary goods to achieve the same level of functioning, e.g. in terms of mobility (Sen 1982a: 357, 365). More generally, the ability to convert primary goods into functionings varies with such contingencies as location, social and political circumstances, traditions, sex, age, genetic endowments, utility functions, and other personal characteristics (Sen 1982a: 365; Sen 1990: 112, 121; Sen 1995: 264); Sen especially mentions the often unfavourable conversion rates (of primary goods into functionings) of women (Sen 1995: 265). As an alternative metric to define just individual shares, Sen proposes his concept of capabilities (see ch. 3.2.2.3).

In the *Restatement*, Rawls replies to this criticism that the ongoing process of pure background procedural justice in his conception would adjust for differences in abilities (p. 171); in his view, the index of primary goods is adjustable considering differences in need (p. 173), so that primary goods in his conception can take into account the difficulties of interpersonal comparisons. With a similar intention, Pogge shows that a resourcist approach to social justice such as a modified Rawlsian one, can, in contrast to Sen's assumption, accommodate the shortcomings identified by Sen in the prevailing theories. A resourcist approach could, for example, focus on comparing people's access to various all-purpose resources (as Rawls does), instead of comparing solely their incomes (Pogge 2002a: 18). Pogge holds that capability theorists have overstated the systematic differences between capability and resourcist approaches in the question of defining just individual shares (Pogge 2002a: 1). Both a capability and a sophisticated resourcist approach are able to take into account the key determinants of quality of life (Pogge 2002a: 18-22); resourcists can even, like capability theorists do, differentiate between needs of males and females or of different age groups (Pogge 2002a: 25f). The key theoretical difference, then, concerns the treatment of natural (as opposed to social) human diversity, which is caused by genetic variation, self-caused factors, and differential luck (Pogge 2002a: 33f). Since

[127] According to the difference principle, inequalities are allowed if the disadvantaged are still better off than under an equal distribution. However, in this example, giving one of the two persons more primary goods than the other would not leave the latter better off than under an equal distribution.

these natural endowments and contingencies are hard to identify and even harder to rate in quality (Pogge 2002a: 52, 59), Pogge refuses to give up the resourcist in favour of a capability metric, which in his opinion cannot produce a criterion of social justice that is superior to resourcist criteria (Pogge 2002a: 1).

Although I largely agree with these objections by Pogge, I regard Sen's introduction of the concept of capabilities as helpful in making explicit issues of differential needs, instead of subsuming them under the rather abstract term of primary goods. Focusing on specific needs and abilities also serves as an important argument against e.g. development aid that is conceived merely as monetary input, against judging the development status of a community or country solely by the monetary income of its members, and against measuring poverty only in monetary terms (see p. 95). I will thus formulate the following principle concerning the metric in which individual shares should be defined, combining aspects of distributive and commutative justice:

> **The individual shares resulting from a just distribution e.g. of benefits should not be defined only in material resources such as income but should take into account differential needs and abilities.**

Since I will focus on institutional rather than on individual benefits sharing, and since I will not comment in detail on how benefits should be distributed among individuals, it will hardly be necessary to consider individual diversity in as much detail as the capability approach would allow.[128]

3.4.5 Property rights as subject to concerns of justice

Although Rawls treats the questions of property rights and of intergenerational savings as demands on domestic institutions, I regard them as convincing also for the international resp. global case. It is very obvious (e.g. in the existing international legislation) that property rights in genetic resources as well as their conservation are already a matter of global importance and interest, with only limited control by national institutions. According to Rawls, property rights may be adjusted to meet overruling concerns of justice (see ch. 3.3.4); he regards them as conditional rather than absolute (see ch. 4.4.2.3). Since private property rights alone are inadequate for the provision of public goods, the state, government or administration must arrange for the provision of public goods and enforce their payment. I will follow this view, which is expressed similarly by Sen (1999: 120, 128, 267), and propose the following principle for (especially distributive) justice in benefit sharing:

> **Property rights and market mechanisms, especially concerning natural resources, may be designed and regulated in such a way as to satisfy concerns of justice, for example in order to provide public goods or to fight and prevent extreme poverty.**

These considerations are easily backed by the thought experiment of a Rawlsian original position, where it would be rational to give higher priority e.g. to food security than to intellectual property in genetic resources: a lack of intellectual property rights in genetic resources might imply less availability of e.g. newly-developed,

[128] The capability approach could, for example, demand that poor pupils living in a colder part of a country receive a higher allowance for school uniforms than their counterparts living in a warmer climate. For my considerations on benefit sharing, in contrast, it will suffice to discuss the provision of basic education as a potential form of benefits, without specifying the exact amount of money that should be spent on school uniforms, school buildings, school meals etc.

patentable drugs, but this might affect only a minority of people compared to those whose food security could be enhanced by easier availability of improved seeds.

3.4.6 Principle of just savings between generations

As Rawls proposes (see ch. 3.3.4), I will conceive the veil of ignorance as extending to the generation the parties belong to, so that one's generation is an unknown contingency in the original position. According to Rawls, parties would in this case agree to a principle of just savings between generations. The problem of intergenerational justice is especially important for the treatment of natural resources: they are resources provided to mankind by the given natural conditions, but their amount and quality depends to a large extent on decisions made by previous generations – with losses especially of genetic resources often being irrevocable. While the issue does not feature prominently in Rawls' theory, it can be assumed that parties in the original position would not know what values they might in reality attach to the natural environment or what resources they would consider necessary for leading the life they envision.[129] They would therefore agree to attempt to save as much natural resources for the next generation as they themselves were handed over from the previous one. Supposedly, this approach would lead to much more restrictive policies of environmental conservation and sustainable resource use than those witnessed at present. I will adopt Rawls' principle of just savings in the following, more concrete form as a principle for distributive justice in benefit sharing:

> **Equally considering present and future generations, benefit sharing should contribute to conserve non-renewable natural resources as far as possible and to allow for future decisions on their use and valuation.**

By focusing on social justice, Rawls does not extend his theory of justice to include non-human beings: "no account is given of right conduct in regard to animals and the rest of nature" (TJ: 448). He presumes that his theory does not imply equal justice for animals, but there may be other requirements, such as duties of compassion arising from animals' capacity for feeling pleasure and pain (TJ: 448). Several authors nevertheless attempt to deduce Rawlsian principles for the treatment of non-human beings by modifying the original position, e.g. by thickening the veil of ignorance to the point where parties are ignorant if they will turn out to be humans or animals (cf. Norton 1989: 152; Rowlands 1997; Rowlands 2002; Thero 1995: 99)[130], or by assuming the parties to additionally consider the interests of non-human beings in the original position (cf. Singer 1988: 223, 227; Thero 1995: 102, 104). Although especially the argument by Rowlands is quite convincing, these approaches will not be considered further since the problems at hand mainly occur among humans[131], and

[129] Other authors suggest to explicitly count environmental resources as social primary goods in Rawls' sense, whose availability partly depends on the socio-economic conditions and which are to be distributed fairly (Singer 1988: 219f) or provided as part of the social minimum (Bell 2004: 301, 304). While in *A Theory of Justice* (TJ: 54, 79) Rawls regards e.g. health as a natural primary good with unavoidable initial inequalities, other authors who follow a Rawlsian line of argument point to the distributional and public aspects of such goods as health care, access to potable water and clean air, which would presumably require their fair distribution (cf. Thero 1995: 95, 106).

[130] According to Rowlands (2002), such a position would obviously require to abandon most human uses of sentient animals, such as raising and killing them for food, animal experimentation, zoos, and hunting.

[131] Of course, the conduct of humans among each other often has direct and indirect consequences for non-human beings, e.g. if a certain property regime incentivises the excessive exploitation of species and ecosystems. However, these consequences will be regarded here only as far as they, in turn, concern or may concern humans.

arguments of social justice in my opinion will suffice to identify the relevant principles of justice in benefit sharing.

3.4.7 Second level original position for justice between peoples

Despite criticism following his *Political Liberalism*, Rawls adheres to his interpretation of international justice, i.e. the second-level original position consisting of the representatives of each people, and the eight principles of justice between peoples. These are conceived as principles of justice between these entities, and in fact are mostly aimed at peoples that are politically independent and economically self-sufficient. While this view might have been eligible several decades ago, it obviously cannot accommodate the current world order: although this is usually less obvious to rich-country citizens than to those of poor countries, "the rules structuring the world economy have a profound impact on the global economic distribution just as the economic order of a national society has a profound impact on its domestic economic distribution." (Pogge 2002b: 49). International relations today are characterised by pervading interdependence between nations, both in the economic and political sphere, as well as by the rise of global actors and institutions other than nation states, such as inter-governmental organisations and treaties, transnational companies, and civil society organisations. Economic and political globalisation prohibits to regard other peoples' fate as merely a domestic matter that should (or need) not be interfered with.[132] Contrary to Rawls' view of independent and self-sufficient peoples, a global basic structure is emerging with certain analogies to the domestic basic structure, which affects the prospects of individuals and peoples; it can favour or disfavour certain peoples and societies and lead to the perpetuation of injustices (Buchanan 2000: 700f, 705, 707).

> "In a situation of sufficiently dense economic cooperation, no single agent can reasonably claim his full marginal product, […] simply because (among other reasons) the value of this product is largely determined by economic factors beyond the agent's control" (Hinsch 2001: 71).
>
> By clinging to self-contained social systems, "we disregard the (negative) externalities a national social contract may impose upon those who are *not* parties to it" (Pogge 1989: 256).

Principles of justice should apply to this basic structure instead of being aimed at the foreign policy of independent peoples. Authors like Thomas Pogge and Charles Beitz therefore suggest that, within a Rawlsian framework, principles for global justice should not be derived from the second-level original position favoured by Rawls. Instead, the global institutional framework should be assessed from a global original position focusing on individuals, with nationality being one contingency among many (Beitz 2005: 17; Pogge 1989: 247). Such an assessment could furthermore follow a kind of global difference principle in giving priority to least advantaged participants (Pogge 1989: 239).

> "Taken seriously, Rawls's conception of justice will make the social position of the globally least advantaged the touchstone for assessing our basic institutions." (Pogge 1989: 242)

While in Rawls' *Law of Peoples*, the political end of society is to become just and stable for the right reasons, in such a cosmopolitan view, the political end is the well-being of individuals (cf. LoP: 119). This view returns to the level of individuals, which Rawls attempted to leave in his *Law of Peoples*. I agree with his cosmopolitan critics, however, that the individual level should not be neglected when discussing global justice, even if the focus is on justice between peoples. Insofar as the cosmo-

[132] Buchanan (2000: 701) quite drastically describes Rawls' Law of Peoples as "a set of rules for a vanished Westphalian world", by which he means "the world as represented in the international legal system that grew out of the Peace of Westphalia in 1648".

politan approach to international justice is implicit in my global institutional approach and in my human-rights based principles of justice derived from Pogge in chapter 3.6, I adopt its main idea without making it an extra principle.

3.4.8 The duty of assistance vs. egalitarian principles of justice

Notwithstanding the above considerations, it is of course still true that nation-states remain important global actors whose conduct and relations merit moral evaluation. However, Rawls' principles of justice between peoples (see ch. 3.3.5.1) are unsatisfactory even if his second-level original position was accepted for deriving international moral norms. I will here concentrate on the duty of assistance as the most contested of the eight and the most relevant for the debate of fair and equitable benefit sharing.[133] For its critique, I will again refer especially to Pogge and in the subsequent chapters follow his argumentation on resulting principles of global justice.

Rawls' principles of international justice largely neglect possible inequalities caused by the global basic structure, where some are inherently favoured and others disfavoured. Since he presupposes that states resp. peoples are independent, self-sufficient, and on equal bargaining terms, no additional principles of international distributive justice are necessary other than the duty to assist peoples living under unfavourable conditions. However, in analogy to the original position and the resulting principles for domestic justice, it seems odd that parties in the second-level original position should neither have an interest in their people's material well-being (Pogge 1994: 208) nor take into account the possibility of real-world international inequalities; rather, they can be assumed to formulate more egalitarian principles than those suggested by Rawls.

> "So long as the delegates to Rawls's second session are merely presumed to know that large international inequalities *may* have a negative impact upon domestic justice of the poorer societies, they have a tie-breaking reason to favor a more egalitarian law of peoples over Rawls's." (Pogge 1994: 214)

Rawls dismisses such egalitarian principles as unfairly burdening societies which have acted responsibly in their economic affairs (cf. Beitz 2000: 691). Among other issues, this standpoint disregards the fact that in burdened societies, the main disadvantages are often borne by innocent victims of the choices of others (Beitz 2000: 692). Furthermore, Rawls' own justification for the domestic difference principle as a framework for ethically acceptable economic activity rather than as a principle of redistribution (see ch. 3.3.3.1) can be applied similarly to the global basic structure: the difference principle is not a principle of *re*distribution, but a principle for the basic rules of allocation – therefore, as Pogge states (1994: 213), egalitarian international institutions are indeed demanding upon favoured societies, but the contrary, prevailing scheme of e.g. unlimited ownership over national resources is at least as demanding upon disfavoured societies.[134] Rawls violates the moral universalism he employs in the domestic case when he, without adequate justification, applies different fundamental principles and therefore double moral standards to national and international institutions (Pogge 2002b: 40; Pogge 2008c: 113). With the same reasons Rawls rejects the difference principle for the international case, he could also reject it

[133] Principles 1, 2, and 3 are widely accepted for the questions considered here. Principles 4, 5, and 7 concerning intervention and war are not relevant for my investigations. The issue of human rights, which peoples are demanded to honor in the sixth principle, will be discussed in the context of Pogge's approach in chapter 3.6.1.

[134] While here it seems that Pogge is arguing in favour of a global egalitarian principle of justice or of a global difference principle, in the following chapter it will become clear that he does not develop or support a complete egalitarian cosmopolitan theory of justice - at least not under present real-world conditions.

for the domestic case (Pogge 2002b: 40-42; Pogge 2008c: 111f). Even if his duty of assistance and a more egalitarian principle of global distributive justice might in fact converge at the empirical level, the duty of assistance would remain to apply only among peoples, not among individuals globally (as Rawls himself remarks).

Rawls is certainly right in pointing out that the problem in bad-off societies is often their political culture and traditions, oppression and corruption, which foster domestic injustice and cannot be alleviated by merely dispensing funds.[135] However, he fails to see or to make explicit that these practices are often encouraged and sustained by the global institutional order (Pogge 2004: 392; see ch. 3.5.2). Similarly, the fact that natural resources are no precondition for welfare (and, indeed, sometimes even an impediment) can be agreed with, but this only reinforces the claim that a society's welfare is not determined solely by internal (natural) conditions, but by the surrounding basic structure and global background institutions. Many of these institutions are the result of international agreements e.g. on world trade. In these negotiations, small and poor societies resp. states are at a great disadvantage vis-à-vis the more affluent ones. Their inferior bargaining position and less know-how tend to leave them with a bad deal, which puts them at a disadvantage again. Rawls' requirement of free, equal, and independent peoples is obviously failing in such a situation, as is his assumption that inequality in wealth among societies usually has no unjust effects on their domestic basic structure.

As fundamental as this criticism of Rawls' duty of assistance may seem: concerning practical issues and the assessment of the current situation in the nonideal world, I assume that Rawls and his main cosmopolitan critics would largely agree on the grossest injustices and on some important remedies and countermeasures that should be taken. Beitz, for example, concedes that Rawls' law of peoples "imposes a significant international distributive requirement in the nonideal world - though it may require less than the most plausible cosmopolitan theory, it almost certainly requires substantially more of the wealthy countries than they do now or are likely to do in the near future" (2000: 694). Similarly, Rawls mentions the possibility that an egalitarian principle of global justice that has a target and a cut-off point could converge with his duty of assistance (see ch. 3.3.5.2). Differences remain of course in the overall focus: Rawls considers issues of global justice only as a supplement to his much more extensive ideal theory, while e.g. Pogge approaches the subject from the very concrete problem of existing severe poverty. Pogge also succeeds in formulating the motivation for reforming the unjust global order in a more stringent form as a duty not to harm vs. Rawls' duty of assistance, which principally has a broader scope but whose justification is less stringent (see ch. 3.6.2). Since Pogge's conclusions on global justice are also much more elaborated and easier applicable, I will prefer them over Rawls' for deriving further principles of fairness and equitability in benefit sharing.

[135] Sen shows, for example, that the gross national product (GNP) is not strictly correlated to people's longevity: there are countries with high economic growth and raised length and quality of life (South Korea, Taiwan), countries with high economic growth but without raised length and quality of life (Brazil), and countries without high economic growth but with raised length and quality of life (pre-reform China, Kerala, Sri Lanka, Costa Rica) (Sen 1999: 45).

3.5 Thomas Pogge: World Poverty and Human Rights

Thomas Winfried Pogge, born 1953, is a native German living and working in the USA. During his academic career, starting with a PhD in Harvard supervised by John Rawls, he has published extensively on Rawls and political philosophy, especially addressing the subject of global justice. After teaching philosophy and political science at various universities in the USA and Australia, in 2008 Pogge became professor of philosophy and international affairs at Yale University. My account and discussion of Pogge's approach is based on the following choice of his numerous publications.

Books:

- *Realizing Rawls* (1989)
- *World Poverty and human rights: Cosmopolitan Responsibilities and Reforms*, 2nd expanded edition (2008)

Journal articles and book sections:

- *An Egalitarian Law of Peoples* (1994)
- *Eine globale Rohstoffdividende* (1995)
- *Gleiche Freiheit für alle?* (1998)
- *Introduction: Global Justice* and *Priorities of Global Justice* in: *Global Justice* (2001)
- *Can the Capability Approach be Justified?* (2002)
- *Globale Verteilungsgerechtigkeit* in: *Weltrepublik: Globalisierung und Demokratie* (2002)
- *Moral Universalism and Global Economic Justice* (2002)
- *Hypothetische Gesellschaftsverträge: Drei Schwierigkeiten* (2003)
- *The First United Nations Millenium Development Goal: a cause for celebration?* (2004)
- *Severe Poverty as a Violation of Negative Duties. Reply to the Critics* (2005)
- *World Poverty and Human Rights* (2005)
- *Interview with Professor Thomas Pogge* (2007)
- *Aligned: Global Justice and Ecology* (2008)
- *Growth and Inequality: Understanding Recent Trends and Political Choices* (2008)
- *The Health Impact Fund. Making New Medicines Accessible For All* (2008, together with Aidan Hollis)

Rawls' theory of justice features prominently in Pogge's work, and part of the debate between these two authors can be followed in their writings. Since Pogge's most important comments aimed directly at Rawls' approach have already been cited above, I will here present Pogge's approach in a self-contained way with only short references to Rawls and to the above chapters where they are informative.

3.5.1 Philosophical roots and intentions of Pogge's approach

Beginning with *Realizing Rawls* (1989), Pogge has attempted a constructive critique of Rawls. Like his mentor, Pogge limits his moral inquiries to the justice of basic social institutions, leaving aside questions of moral principles for individuals. However, Pogge has gradually narrowed his focus of attention from Rawlsian accounts of justice to concrete problems of global justice like world poverty, human rights, intellectual property rights, and resource consumption. Much more than Rawls, he starts his inquiries from actual observations of the existing global order rather than deriving moral principles of ideal theory; he has prominently criticised Rawls for his hesitant and presumably disappointing extension of concepts of justice to the international level. Challenging the rhetoric of progress in global poverty reduction and

economic development, he calls attention to the severe poverty and stark inequalities in living conditions that still exist, despite unprecedented global economic growth and historic progress in the propagation of moral norms. Target audiences of his political appeal are the well-off in affluent countries, who are in the position to initiate the reforms deemed necessary.

> "So long as massive poverty persists, it will have its apologists […]. Dismantling these rationalizations […] may seem like a struggle without end. […] Nonetheless, the struggle is neither pointless nor endless. Its point is to help ordinary citizens in affluent countries decide to end world poverty. And its end will come swiftly once poverty has ended. The clever defenses will then appear as grotesque as the defenses of racism, sexism, slavery, colonialism, and genocide look today; and what now seems like an eccentric and utopian cause will be an exemplar of what justice commands." (Pogge 2008c: 32)

In contrast to his criticism of Rawls' *Law of Peoples* (ch. 3.4.7, 3.4.8), where he seems to suggest a global difference principle, Pogge has in recent years developed and refined his own line of argument and justification, emphasizing negative duties by the better-off vis-à-vis the worse-off and concisely identifying shortcomings of the political and economic global order. His human rights standards of global justice are sufficientarian rather than egalitarian (see ch. 3.2.2.4); they do not demand a homogeneous conception of justice worldwide and mark inequalities as unjust only if they constitute a foreseeable and avoidable violation of human rights. Although his conception of global justice is deliberately construed as a thin one that is acceptable across cultures and, hence, does not amount to a complete or stand-alone theory of justice, it rests on a sound theoretical basis and is being widely acknowledged and discussed within practical philosophy and political science. Interestingly for the subject of benefit sharing, his suggestions for reform include a Global Resources Dividend and a Health Impact Fund (see ch. 3.5.5).

3.5.2 Global poverty as a consequence of the existing global order

As mentioned above, Pogge does not start his reasoning from ideal theory (as Rawls does), but is inspired by the observation of severe poverty, hunger, and premature deaths that continue to affect billions of people worldwide. While the last centuries and decades have brought undeniable improvements in human well-being in terms of income, longevity etc., this trend is less clear if one looks not at national averages and aggregates, but across countries or at individuals at the bottom (Pogge 2005a: 56f). About one third of all human deaths are due to poverty-related causes such as starvation, diarrhoea, and curable infectious diseases (Pogge 2002b: 34). Pogge cites a variety of statistical data indicating severe and growing intra- and international inequalities, such as the following examples:

- The absolute number of people living on less than 2 US Dollars per day has increased by 10% between 1987 and 1998 (Pogge 2002b: 52, footnote 20, citing the World Bank World Development Report 2000/2001; see also p. 95 for criticism of the World Bank's measure of income poverty)
- In OECD countries, consumption expenditure per capita rose by 56% from 1984 to 2004, but only by 10% for the poorest 1% of the world population in the same period (Pogge 2008a: 149f, calculated on the basis of World Bank data).
- The income gap between people in the richest countries and in the poorest has increased from 3:1 in 1820 to 11:1 in 1913, 30:1 in 1960, 60:1 in 1990, and 74:1 in 1997 (Pogge 2002b: 35, citing the UNDP Human Development Report 1999).

- The bottom 40% of the global population account for only 1.6% of consumption expenditure, or 4.7% if adjusted for purchasing power (Pogge 2008b, calculated on the basis of World Bank data for 2004).

Pogge comes to the conclusion that even the recent economic globalization, often praised for its poverty-reducing effects, has disproportionately benefited the rich, with additional income for developing countries often kept by the rulers (Pogge 2008a: 156). Less economic growth more evenly distributed would often be better for the domestic poor, as can exemplarily be seen in China, where growth is accompanied by increasing domestic inequality and where it has also happened at a certain expense of other poor countries (Pogge 2008b). He argues that with rising economic inequalities, interests and possibilities for political influence of the rich and the poor diverge more and more, so that such inequalities tend to remain and to be very hard to reduce in the political process (Pogge 2008b).

For Pogge, the extreme inequalities in living conditions are not only indicating that the current global institutional order is discriminating against those suffering and dying of poverty-related undernourishment or illness, but also, and more importantly, that much of their plight is avoidable under an alternative institutional scheme. Pogge attempts to show that, unlike in previous centuries, severe poverty is now avoidable at relatively low costs to the affluent countries, due to the immense gap in income and wealth (Pogge 2002b: 33f; Pogge 2004: 387f): he calculates that the 2.5 billion people currently living on less than 2 US Dollars per day would additionally need about 300 billion US Dollars annually to reach this benchmark; this is less than 1% of the global social product (Pogge 2008c: 211, estimated on the basis of 2005 World Bank data). The high-income countries, in contrast, receive 79% of the global social product while representing only 15% of the global population (Pogge 2008a: 149, estimated on the basis of 2005 World Bank data).

> "With our average per capita income over 200 times greater than that of the poor at market exchange rates, we could eradicate severe poverty worldwide if we chose to try – in fact, we could have eradicated it decades ago." (Pogge 2008a: 149)

The injustice of the current global order for Pogge thus does not consist in the mere existence of poverty and inequality, but in the fact that they are foreseeable and avoidable (Pogge 2004: 390). Even if the present global order had a poverty-reducing effect over time, which he doubts, this order is still unjust if there are feasible institutional alternatives which would entail less poverty (Pogge 2004: 390f).[136] For Pogge's suggestions for reforming the status quo, see chapter 3.5.5.

Pogge repeatedly challenges what he calls "explanatory nationalism", i.e. the view (held also by Rawls, see ch. 3.3.5.2) that poverty and poor economic performance of many developing countries are primarily caused by their history, culture, or natural environment (Pogge 2002b: 45f). Pogge grants that for explaining the different economic performance among developing countries, national factors of course play a central role (Pogge 2002b: 46; Pogge 2004: 391). However, this does not explain their overall lacking behind in global economic growth since "even if country-specific factors fully explain the observed variations in the economic performance of developing countries, global factors may still play a major role in explaining why

[136] Pogge alludes to the example of a slave-holding society (like the USA previous to the Civil War) which, by raising overall prosperity over time, is also gradually improving the slaves' condition. That this society would still be considered unjust shows that an institutional order should not be judged by comparing it to a presumably worse earlier time, but by comparing it to feasible institutional alternatives (Pogge 2004: 390f).

they did not on the whole do much better or worse than they in fact did" (Pogge 2004: 391). The persisting severe poverty, according to Pogge, is similarly caused by the global institutional scheme - most severe poverty could in fact be avoided by just domestic institutions in poor countries, but most severe poverty could also be avoided by a just global institutional design; these two causal factors are not simply additive but interrelated, and alleviating one may have positive effects on the other (Pogge 2005a: 76f). However, just domestic institutions are very difficult to install in developing countries as long as they are subject to an unjust global order: "Yes, severe poverty is fuelled by local misrule. But such local misrule is fuelled, in turn, by global rules that we [rich countries and citizens] impose and from which we benefit greatly", for example by buying natural resources and selling weapons (Pogge 2005b: 7). Most of the global poor do not "govern themselves poorly", but "are governed poorly" against their will (Pogge 2005b: 7). Pogge's claim that the existing global order not just accidentally brings about severe poverty, but engenders it by way of its institutions, will be further elaborated in chapters 3.5.4 and 3.5.5 below, where responsibilities are addressed and possible reforms outlined.

Pogge assumes that most rich-country citizens quietly consent in this poverty-entailing global order, sharing the intuition that the present global order is basically just, as long as certain procedural rules of fair international conduct are followed and, possibly, a limited duty of assistance is obeyed (Pogge 2002b: 33). Yet, most of these people would presumably reject a similar institutional order with widespread life-threatening poverty as unjust in the domestic case (Pogge 2002b: 33, 43). He thus diagnoses moral double standards for domestic vs. global justice, which, in his opinion, cannot be justified by reference e.g. to cultural diversity, autonomy, or special ties to smaller groups (Pogge 2002b: 43). In the face of severe global poverty, certain substantial principles of justice should instead apply both intra- and internationally. Since these theoretical aspects have already been discussed in chapters 3.4.7 and 3.4.8 above, I will here continue with Pogge's suggestions for such (minimal) universal principles of justice.

Income poverty measured by the World Bank

The World Bank has developed the dominant method for measuring income poverty and issues the main statistics on this subject (Pogge 2004: 381). According to Pogge, they are flawed in several aspects, which can only be shortly mentioned here:

- The poverty line of 1 US Dollar per day, based on the value of 1 Dollar in the USA in 1993 and corrected for purchasing power, is too low; it would not even suffice to pay for food (Pogge 2004: 381).
- Conversion into foreign currencies often overstates the value of poor countries' currencies for fulfilling basic needs: food and basic necessities are relatively more expensive in developing countries than in developed ones, with services the opposite. Thus, the consumption basket of the poor cannot be calculated proportionately to an international one containing e.g. services, as is being done by the World Bank (Pogge 2004: 382f).
- The World Bank's poverty estimates are internally unreliable, because different base years are used for currency conversion, yielding very different poverty rates for a given country and year (Pogge 2004: 384).

  "[The] World Bank has practiced a poverty measurement methodology so severely lacking in internal robustness and reliability that we still have no clear idea about the level, geographical distribution, and trend of severe poverty worldwide." (Pogge/Berges 2007: 5f)

A more reliable method, which is not yet available, should compare much narrower consumption baskets, and should define poverty as not having enough income to buy certain basic necessities (Pogge 2004: 385). Pogge further suggests poverty measurement to be performed by a non-governmental agency, "rather than by the World Bank whose policies are judged by the trend figures it itself produces" (Pogge/Berges 2007: 6). A more detailed critique of the prevailing measurements of poverty is available in various publications by Pogge and Sanjay Reddy, accessible at *http://www.socialanalysis.org* (last accessed 16.01.2009).

Box 7: Income poverty measured by the World Bank

3.5.3 Human rights standards of social justice

Moving on from the diagnosis of severe injustice and criticism of its apologists, in recent publications Pogge has fleshed out a proposal for his own substantive criterion of justice. He suggests to formulate an internationally acceptable core criterion of basic justice neither in terms of merely procedural justice, nor in terms of utilities, Rawlsian primary goods, or Sen's capabilities, but formulated in the language of human rights (Pogge 2005a: 56, 60; Pogge 2008c: 43f). In order to avoid unnecessary paternalism, to respect cultural autonomy, and to be widely acceptable, Pogge invokes only a minimal or threshold standard of global justice (Pogge 2008c: 42, 56).[137] It is based on the value of human life and on the material and immaterial means usually needed, according to a broad consensus, to lead a minimally worthwhile life – while being substantial enough to support criticism of the status quo (Pogge 2008c: 54, 56). Pogge grants that social justice may, and in his opinion does, require more than this minimum, but leaves it to domestic societies to raise their own standards of justice above this threshold (Pogge 2008c: 43). Such a minimal criterion of basic justice should, to certain quantitative, qualitative, and probabilistic limits, ensure reasonably secure access to a minimally adequate share of the following (Pogge 2008c: 44, 54f)[138]:

- liberty of conscience, including access to media and freedom of association
- political participation, including freedom of speech and of assembly
- physical integrity
- subsistence supplies (food, clothing, shelter, basic health care)
- freedom of movement
- basic education
- economic participation

In line with his institutional conception of social justice, Pogge understands human rights as claims primarily on coercive social institutions, who are to effectively provide secure access to certain goods to those persons whose conduct they regulate (Pogge 2008c: 50f): "Human rights are primarily supposed to govern how all of us together ought to design the basic rules of our common life" (Pogge 2008c: 53). In Pogge's view, it is not necessary to fix human rights as legal rights, as sometimes claimed by critics of "Western" human rights concepts imposed upon other cultures (Pogge 2008c: 52). Instead, if countries or cultures succeed in securing human rights by other means than by formulating them as legal rights, e.g. because they are implicit in equivalent strong traditions or customary law, this is sufficient. As a further characteristic of Pogge's concept, human rights demands can be addressed at individuals only if and insofar as they are responsible for designing and upholding the relevant institutions. A specific human right to X does not, in Pogge's account, mean that everyone else has to do whatever possible to ensure a person gets X (Pogge 2005a: 67), but citizens do have the duty to ensure that any coercive social order they impose upon each other secures, insofar as reasonably possible, that each one has secure access to the necessities identified as objects of human rights (Pogge 2008c: 73; for questions of responsibilities see also the following chapter).[139] The present

[137] Pogge supposes that his minimal standard of justice is acceptable to all broadly consequentialist approaches, but not necessarily to libertarian ones (Pogge 2005a: 76) – these are specifically addressed by the reasoning in chapter 3.5.4.3.

[138] These components are intended as a suggestion, not as a definite list (Pogge 2008c: 75).

[139] This institutional understanding of human rights demands according to Pogge is also able to narrow the perceived gap between civil and political human rights on the one hand, and social, economic, and cultural human rights on the other (Pogge 2008c: 75f).

global order is thus unjust "if and insofar as it foreseeably perpetuates large-scale human rights deficits that would be reasonably avoidable through feasible institutional modifications", without adding other harms of comparable magnitude, e.g. concerning certain cultures or the natural environment (Pogge 2005b: 5).

These considerations can be summarized in the following argument:

> **The existing global order is partly responsible for avoidable severe global poverty.**
> **Avoidable severe global poverty is an injustice according to human rights standards of justice.**
> **Therefore, the existing global order is partly responsible for a violation of human rights standards of justice.**

3.5.4 World poverty as violation of negative duties

In line with his focus on concrete and practical issues, and in contrast to most political philosophers concerned with social justice, Pogge does not settle for this diagnosis of injustices in the present global order. Rather, he devotes detailed lines of argument (emerging already in *Realizing Rawls* 1989) to identifying the actors responsible for upholding the unjust institutions, being also the ones able to reform them. For his reasoning, Pogge invokes the philosophical distinction of negative vs. positive duties (cf. Pogge/Berges 2007: 3): if a person actively does something that causes harm to another person, he/she is violating a negative duty, e.g. not to harm. In contrast, if he/she fails to prevent something bad from happening, he/she is violating a positive duty, e.g. to help. Other things, such as the stakes involved, being equal, negative duties, which are narrower in scope, are often more easily acceptable and seen as more stringent than positive duties, for example by libertarians who tend to deny positive duties, such as a requirement on institutions to actively protect the vulnerable (Pogge 2005a: 61, 75; Pogge/Berges 2007: 2). Of course, negative duties might generate concrete positive obligations: the negative duty not to break a contract e.g. generates certain positive obligations for the contracting parties (Pogge 2005a: 68f). Such positive obligations, in contrast to positive duties, are well accepted even by libertarians (Pogge 2005a: 69). Similarly, the negative duties formulated by Pogge imply not only the demand to (passively) abandon a certain harming behaviour, but may demand concrete actions in order to alleviate or compensate the harm that is currently being done e.g. to the global poor.[140]

For his criticism of the global status quo, Pogge leaves aside potential positive moral duties towards the disadvantaged, although he personally believes them to exist, and to demand more than the minimum he suggests (Pogge 2005a: 75; Pogge/Berges 2007: 4).[141] Instead, he relies solely on demanding that those advantaged by the existing order fulfil their negative duties, and does so mainly for pragmatic reasons in

[140] Pogge exemplifies his concept of negative vs. positive duties by referring to the calls for help after the hurricane Katrina hit New Orleans in 2005 (Pogge/Berges 2007: 4): instead of simply appealing to other citizens to help (i.e. to a positive duty), Pogge would rather have invoked a negative duty and formulated the appeal as follows: "Dear fellow citizens, due to a grotesquely unjust allocation of infrastructure spending by the federal and state governments, […] we have been exposed to a substantial risk of devastating flood. This flood has now come to pass, and the damage it does is your responsibility. You must now do what you can to minimize the harm you will have caused."

[141] Likewise, he focuses on those impoverished by unjust global institutions, and does not consider those badly off e.g. due to accidents or natural contingencies. While the latter ought to be helped as well, the obligations to those actively impoverished are of greater weight (Pogge/Berges 2007: 2). Similarly, there would be no negative duties (though, possibly, positive ones) towards the worse-off in the absence of a shared institutional order, e.g. between Earth and Venus (Pogge 2005a: 60).

order to be more convincing to rich-country citizens and to libertarian sympathizers (Pogge 2005a: 61; Pogge/Berges 2007: 4). With diverse audiences in mind, Pogge refers to three distinct lines of argument in claiming the existence of such negative duties towards the global poor:

1) effects of shared social institutions,
2) the uncompensated exclusion from the use of natural resources, and
3) effects of a common and violent history.

The three lines of reasoning appeal to different, mutually inconsistent moral conceptions, but all intend to convince the world's affluent (countries and citizens) that they are currently, in violation of their negative duties of justice, harming the global poor (Pogge 2005a: 74; Pogge 2005b: 4). In the following, they will be explained in more detail. All three further suggest that it is at least difficult, if not impossible, for poor countries to overcome domestic poverty by merely following certain adequate policies, without reforms in the existing global order. Pogge's suggestions for such reforms are presented in chapter 3.5.5.

3.5.4.1 Effects of shared social institutions

Pogge devotes most of his attention to the first of these lines of argument, i.e. the effects of shared social institutions, which is addressed at adherents of consequentialist and contractualist conceptions of justice. Some of the illustrations and examples here could be similarly brought forward in support of the two following lines of argument, but I will follow Pogge in presenting them primarily as features of the global institutional order. They illustrate that these shared institutions are not natural or inescapable, but are man-made and dominated by rich-country governments and citizens (e.g. via the WTO), while discriminating against their poor counterparts. Features of the global institutional order criticized by Pogge include the following:

- A largely unilateral opening of domestic markets for imports has been forced upon developing countries, while developed country markets remain protected by quotas, tariffs, anti-dumping duties etc., and producers continue to receive subsidies and export credits (Pogge 2004: 389; Pogge 2005b: 6).
- Bribery of officials in developing countries by foreign companies has long been tacitly accepted (Pogge 2002b: 55f, endnote 48).
- Developing countries are urged, especially via TRIPS, to introduce and enforce extensive intellectual property rights, which are designed and used mainly by developed country stakeholders (Pogge 2004: 389; Pogge 2005b: 6).
- There are no global minimum wages, global constraints on working hours or on working conditions (Pogge 2004: 391f).
- Increasing international interdependence exacerbates the vulnerability of weaker national economies to exogenous impacts through decisions and policies in the USA and the EU in which the poorer societies have no stakes, for example concerning financial markets (Pogge 2002b: 49).
- Less obvious, but equally affecting the global poor, are the international resource, borrowing, treaty, and arms privileges customarily extended to the effective rulers of any country. The resource privilege, for example, entitles even illegitimate, oppressive governments to sell away their countries' natural resources on the international market without adequately benefiting the domestic population. Revenues are often not used for poverty reduction, but for buying the means for strengthening the rulers' power and for oppressing domestic opposition.[142] The borrowing privilege can additionally burden new

[142] For Pogge, the example of Nigeria is quite instructive in this respect (Pogge 2002b: 47): oil exports are an important source of national income and could be used to fight poverty. Yet, Nigeria has long

> democratic governments with debts incurred by such oppressive former rulers. These common privileges not only stabilize unlawful governments, but also provide incentives for coup attempts and civil wars, especially in resource-rich countries with high potential profits for *de facto* rulers. (Pogge 2002b: 46-48; Pogge 2005b: 7; Pogge 2008c: 235)

The negative effects of these global institutions on the position of the global poor are not difficult to foresee:

> "The worse-off are not merely poor and often starving, but are *being* impoverished and starved under our shared institutional arrangements, which inescapably shape their lives" (Pogge 2008c: 207).

Of course, countries are not necessarily forced to participate in all these global institutions, but once a government has decided to join e.g. the WTO, the country's poor population has little choice, although it is often the one negatively affected e.g. by the asymmetrical terms of trade (Pogge 2004: 392).

> "Within national societies, one-person-one-vote democracy may mitigate the tendency for large inequalities to expand more and more. But there are no democratic practices the global poor might use to affect the economic rules beyond their own society. Even 85% of humankind, united, could not amend the WTO system." (Pogge 2004: 390)

Existing international inequalities further tend to be preserved and aggravated by the fact that poor countries often have little bargaining power and can afford little expertise, thus ending up with unfavourable results e.g. in negotiations about terms of trade (Pogge 2002b: 49; Pogge 2004: 389). Pogge considers such a "slanting of the playing field" as illegitimate: governments may give a certain priority to their own country and its citizens, but only as long as a fair, level playing field exists. Permissible national partiality ends where governments attempt to tailor international rules in their favour, if such behaviour would not be acceptable for the citizens whom they represent (Pogge 2008c: 129, 132). Since the rules of global institutions are largely controlled by the developed countries due to their superior economic, technological, and military strength, they and their citizens share responsibility for these foreseeable effects (Pogge 2004: 390; Pogge 2008c: 205f).

> "This does not mean that we should hold ourselves responsible for the remoter effects of our economic decisions. These effects reverberate around the world and interact with the effects of countless other such decisions and thus cannot be traced, let alone predicted. Nor need we draw the dubious and utopian conclusion that global interdependence must be undone by isolating states or groups of states from one another. But we must be concerned with how the rules structuring international interactions foreseeably affect the incidence of extreme poverty." (Pogge 2008c: 205f; emphasis added)

Consequently, Pogge holds affluent individuals responsible for human rights violations not in any situation where someone can help a badly off person, but only if and insofar as they cooperate in imposing an institutional order that is foreseeably unjust, whose human rights deficits are reasonably avoidable, and to which an alternative, more just design is available (Pogge 2005a: 60). After thus having shown that the rich countries and their citizens are largely responsible for the global institutional

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been ruled by military strongmen who took power by force and used oil revenues to stay in power. Even the civilian Obasanjo, who had raised expectations for reform, obviously was not able to effectively fight corruption (according to Pogge): he had to keep the military officers content, who otherwise would have been strongly tempted to overthrow his government. In Pogge's opinion, corruption in this case is not just a local phenomenon or explicable by tribal culture, but is sustained by the international resource privilege. A similar negative correlation between a country's resource sectors and their rates of economic growth, known as the *Dutch Disease*, can be observed in other resource-rich but poverty-stricken countries.

order, and that this order is discriminating against resp. harming the global poor, Pogge concludes that upholding this order constitutes a violation of the negative duties of the former.

> "By imposing this grievously unjust global order upon the rest of the world, the affluent countries, in collaboration with the so-called elites of the developing countries, are harming the global poor – to put it mildly." (Pogge 2004: 390)

3.5.4.2 Uncompensated exclusion from the use of natural resources

Pogge formulates this reason with a view to counter arguments by adherents of Lockean appropriation schemes.[143] He claims that the poor are largely, and without compensation, excluded from the benefits of a single, common base of natural resources, while the rich consume disproportionately (Pogge 2008c: 208). *Prima facie*, and in accordance with a Lockean concept of appropriation, a just distribution of the resources provided by nature would allocate a proportional share to each person. Deviations from this distribution pattern or changes in the rules of appropriation have to be to everyone's advantage, e.g. by introducing possibilities for value creation. Now, Pogge argues that the global poor, who are only barely physically surviving, obviously do not command (either directly or indirectly via wages) even a proportionate share of the global natural resources, which would be the minimum required by justice (Pogge 2008c: 208f). Since they are not better off under the prevailing appropriation scheme of natural resources than they would be under a strictly proportional distribution, they presumably would not rationally have consented to it (Pogge 2008c: 144), rendering such a scheme unjustifiable within a Lockean concept of property rights.

> "The global poor get to share the burdens resulting from the degradation of our natural environment while having to watch helplessly as the affluent distribute the planet's abundant natural wealth amongst themselves." (Pogge 2008c: 209)

While Pogge grants that the rich consumers do pay world-market prices for the resources they use, these prices in his view are too low and, additionally, often exclusively accrue to the rulers of resource-rich countries, without benefiting the domestic poor (Pogge 2008c: 6f, 208; see also comments on the resource privilege above). For Pogge, "the question remains: what entitles a global elite to use up the world's natural resources on mutually agreeable terms while leaving the global poor empty-handed?" (Pogge 2008c: 208).

3.5.4.3 Effects of a common and violent history

The last of Pogge's arguments to prove that the world's affluent are harming the global poor is addressed at adherents of historical entitlement conceptions of justice, for example libertarians.[144] These often argue that there are historic reasons for the present inequalities, for which those living today cannot be made morally responsible; therefore, they should not be obliged to compensate for these past injustices (Pogge 2005a: 56). Pogge strongly disagrees with this assumption and points out that people's unequal social starting positions today are the result of a common historical process pervaded by injustices such as colonialism and slavery (Pogge 2008c: 209). Of course, the privileged of today are not morally responsible for the past injustices, but then neither is it justifiable that they still profit from the inequalities generated by these injustices, mostly during the colonial era and the resulting unequal start into the post-colonial era (Pogge 2004: 389).[145] Rather, the past injustices are one more rea-

[143] John Locke's conception of property rights will be explained further in chapter 4.4.2.1.
[144] See also ch. 4.4.2.2 for an account of libertarian conceptions of property rights.
[145] In 1960, for example, the inequality in per-capita income between Europe and Africa was 30:1 and has since increased to about 40:1 (Pogge 2004: 389).

son to compensate the descendants of previous victims by at least allowing them roughly equal social starting positions.

> "[N]o historical entitlement conception could credibly support the view that our common history was sufficient benign to justify today's huge inequality in starting places." (Pogge 2005b: 2).

By way of conclusion, Pogge's line of argument in this chapter can be summarized as follows:

> **The negative duty not to harm others if avoidable is widely acknowledged.**
> **The existing global order is partly responsible for a violation of human rights standards of justice, especially in harming the global poor (see above).**
> **Rich countries and their citizens are upholding the existing global order.**
> **Therefore, rich countries and their citizens are partly responsible for a violation of human rights standards of justice, especially in harming the global poor, and are thereby violating the widely acknowledged negative duty not to harm others if avoidable.**

Or, in Pogge's own words:

> "I hold that we have a negative duty not to harm others by cooperating, without compensating protection and reform efforts, in imposing on them an institutional order that foreseeably gives rise to avoidable human rights deficits." (Pogge 2005a: 68)

The compensating protection and reform efforts he mentions are the subject of the following chapter.

3.5.5 Reforming the existing global order

In his suggestions for reform, as already in his diagnosis of global injustice, Pogge focuses on the global institutional order (Pogge 2005b: 5f). Much more than from individual aid efforts and increased monetary donations, the global poor would benefit from structural reforms that "would lift from them the burdens that we currently impose on them for our benefit" (Pogge/Berges 2007: 1). Reforms could consist in amending existing unjust institutions, e.g. by reducing market protectionism in developed countries and constraining the resource and borrowing privileges, or in new instruments such as the Global Resources Dividend (see p. 104) or the Health Impact Fund[146] suggested by Pogge. Such reforms would reduce severe poverty by rendering more just both the global order and many domestic policies (Pogge 2005a: 77f), and are thus justified even if they slow aggregate economic growth (Pogge 2008b) or raise the prices of natural resources (Pogge 2002b: 48). A more just global order, which slows aggregate growth but benefits the poor, may also be desirable for ecological reasons: the environmental damage per unit of income can be expected to decrease, and population growth will be retarded (Pogge 2008a: 147f). Poverty, diseases, and environmental degradation are often of a common origin and aggravate another (Pogge 2008a: 147). However, Pogge is aware that a reduction in resource use must take place independently of the reduction of world poverty, and that development paths should be adjusted towards this aim (pers. comm. 11.02.2009).

[146] Pogge proposes the introduction of a publicly funded *Health Impact Fund* (HIF) alongside the existing patent system for pharmaceuticals (Hollis/Pogge 2008; Pogge 2008c: 222-261). It would reward pharmaceutical companies in proportion to the impact a drug or a treatment has on the global disease burden, thereby incentivizing research into those diseases most widespread globally, instead of those most profitable. The HIF will be discussed in more detail in Box 10 (p. 158).

Due to the great global inequalities in income and wealth, the funds needed for the eradication of severe poverty are not immense and amount to about 1% of the global social product (see ch. 3.5.2). This amount would partly have to consist in additional development aid, strictly channelled to meeting basic needs, and partly in foregone gains for the rich countries under the present institutional order (Pogge/Berges 2007: 6).

> "They, the global poor, have a much stronger moral claim to that 1 percent of the global product they need to meet their basic needs than we affluent have to take 81 rather than 80 percent for ourselves." (Pogge 2005b: 3)

Since, however, reforms of the global order rarely come about by merely academic discourse or by governments suddenly changing their minds, Pogge addresses individual citizens, especially of the developed world, as his most important audience. Being partly responsible for imposing the unjust global order, they are also the ones able to compensate its victims and to bring about the necessary reforms. Pogge conceives their positive obligations, which arise from the negative duty not to harm, as twofold:

1) Compensate the victims of the current global order and try not to actively profit from it, for example in the form of low prices (Pogge 2005a: 72).[147] Compensation can e.g. take the form of donations to poverty relief organisations, while buying fair trade products may reduce one's profiting from unjust prices (Pogge 2005a: 72). The minimal human rights standard of social justice that Pogge suggests is fulfilled when everyone has compensated the poor for the harm he/she is responsible for (Pogge 2005a: 60f). Although he is aware that such an individual share of responsibility for imposing the global order can hardly be quantified, this constraint clarifies that Pogge's standard of social justice does not entail an open-ended duty to help (as is dismissed by Rawls, see ch. 3.3.5.2), but a much narrower duty limited in range, subject matter, and demandingness (Pogge 2005a: 61).
2) Work towards feasible institutional reforms. Even a rather small group of dedicated individuals, by lobbying and exerting political pressure on rich-country governments, might be strong enough to raise awareness and trigger a rethinking of the status quo (Pogge 2005a: 81). While Pogge grants that international institutions and policies are often not transparent and not easy to influence even by rich-country citizens, for him this is no excuse for not trying to be informed and exert influence since it is the elite of both rich and poor countries who ultimately designs the global order and profits from it (Pogge 2005a: 78-80).

Pogge addresses the national level only exemplarily, as in the case of the international resource and borrowing privileges: in order to reduce their effects as incentives for undemocratic takeovers, he suggests that democratic governments of developing countries introduce constitutional amendments that explicitly deny these privileges to potential future undemocratic governments (Pogge 2008c: 159-173). Though such a measure might not be very effective if taken by a single country alone, it would raise awareness of these problems, especially in the affluent countries.

> "The now prevalent attitude of condescending pity for peoples somehow unable to get their act together, allowing themselves to be ruled by autocrats who ruin their economies, may give way to a realization of how the rich democracies have a causal and moral responsibility for the great difficulty of establishing

[147] "Like the slave owners of 1845, the world's affluent today are actively taking advantage of the global institutional order all the time. […] Most anything we buy is cheaper than it would be if severe poverty were avoided" (Pogge 2005a: 72).

> and maintaining stable democratic regimes in the poorer countries." (Pogge 2008c: 171)

Concerning concrete economic policies developing countries should follow in order to reduce severe domestic poverty, Pogge remains largely silent, pointing out that recommendations by economists are as diverse as opening markets (as in China), government investment in basic services (as in Kerala, India), or industrial protectionism (as in South Korea) (Pogge 2002b: 49; Pogge 2005b: 5).

However, the fact that there are realistic suggestions for reform and compensation efforts like the ones outlined by Pogge supports his claim that an alternative global institutional order is feasible under which some of the current human rights deficits are reasonably avoidable. For Pogge, institutional reforms for eradicating severe poverty are not only a demand of justice, but also in the self-interest of developed countries:

> "In this way and only in this way can we refute the conviction, understandably widespread in the poor countries, that we will not give a damn about their misery until they have the economic and military power to do us serious harm." (Pogge 2008c: 220)

The Global Resources Dividend

One of Pogge's concrete suggestions for institutional reforms concerns the use of natural resources. As explicated above in his second reasoning for world poverty as a violation of negative duties (ch. 3.5.4), he holds that justice requires that the global poor command at least a proportional share of the common base of natural resources. As a means to put this conception into practice and, at the same time, to raise part of the funds needed to reduce severe poverty, Pogge suggests a global fee for the exploitation of natural resources, termed *Global Resources Dividend* (GRD), which is to be employed for the relief of global severe poverty (e.g. Pogge 1995; Pogge 2008c: 202-221). Contrary to current international law, the GRD would put a certain constraint on national property rights in natural resources by requiring sharing their benefits with the global poor.

> "This proposal [of the GRD] envisions that states and their governments shall not have full libertarian property rights with respect to the natural resources in their territory, but can be required to share a small part of the value of any resources they decide to use or sell. This payment they must make is called a dividend because it is based on the idea that the global poor own an inalienable stake in all limited natural resources." (Pogge 2008c: 202)

National sovereignty over resources would be confined e.g. to decisions about whether and how to use the resources; if and when they are used, some of their economic value has to be shared (Pogge 2008c: 203). The GRD would fall "on goods and services roughly in proportion to their resource content: in proportion to how much value each takes from our planet" (Pogge 1994: 200). It would be owed by the countries extracting the resource, and most of the cost could be passed on to the end users via higher world market prices (Pogge 2008c: 211). Funds could be disbursed to the global poor pursuant to clear rules with transparent administration backed by sanctions, either via governments or, where those are clearly corrupt or unwilling, via non-governmental poverty-relief agencies (Pogge 1994: 202; Pogge 2008c: 212). In order to be easily applicable and widely acceptable, the GRD could be based on resources that are easy to monitor and whose discouragement has positive ecological effects; its impact on the price of basic consumer goods should be small (Pogge 2008c: 212). Pogge exemplifies the practicability of the GRD with a surcharge on mineral oil: about 3 US Dollars per barrel would suffice to raise 30% of the approximately 300 billion US Dollars needed annually for eradicating severe poverty (see above); this would raise the price of petroleum products by only about 7 US Cents per gallon (Pogge 2008c: 211).

> "It is thus clearly possible – without major changes to our global economic order – to eradicate world hunger within a few years by raising a sufficient revenue stream from a limited number of resources and pollutants." (Pogge 2008c: 211f)

Box 8: The Global Resources Dividend

3.6 Using Pogge's concepts and ethical demands for deriving principles of justice in benefit sharing

In analogy to chapter 3.4 above, I will here identify which of Pogge's concepts and ethical demands I will adopt for the purpose of answering the study questions. As indicated above, I will subscribe to Pogge's conclusions more unconditionally than to Rawls', so that this evaluative chapter will be shorter than the above one on Rawls. As mentioned above, the institutional approach followed by Pogge and Rawls is implicit in the formulation of the study questions and will not be made an extra principle.

3.6.1 Minimal human rights standards of justice

In contrast to Rawls, Pogge does not develop any principles for domestic justice within independent countries or societies, but aims at certain substantial and consensual standards of justice that apply both intra- and internationally. It seems adequate to formulate them in the language of human rights, based on universal human needs to lead a worthwhile life, and to formulate them as rather weak, minimal standards that are reasonably attainable. If Pogge's empirical data is correct, benefit sharing could have a significant effect on e.g. poverty reduction in raising part of the roughly 1% of the global social product needed. As Pogge points out, this amount would only partly have to be additional monetary funds, and would hardly threaten the affluents' overall standard of living. I would like to add to this an important observation that Pogge seems to neglect: even though the funds necessary for eradicating poverty may somewhat reduce the global social product in the short term, they can be expected to pay off in the medium and long term, because they would enable the poor to contribute to global value creation, instead of just managing to survive on a day-to-day basis.[148] A global poverty eradication scheme as envisaged by Pogge can thus be conceived as not so much a redistribution of existing wealth, but rather as a more equal distribution of opportunities to create value and raise living standards (cf. Rawls' second principle of justice). Therefore, I adopt Pogge's suggestion for a sufficientarian criterion of global basic justice, which ensures that everyone has reasonably secure access to a minimally adequate share of personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation.[149] Implicit in this criterion is a priority on poverty eradication, as prominently demanded by Pogge. With regard to benefit sharing, my principle will be as follows:

> **At the global level, benefit sharing should give priority to meeting basic human needs (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation), rather than e.g. to attaining equality or maximizing average supplies of certain goods.**

[148] The success of the *Grameen Bank*, holder of the 2006 Nobel Peace Prize, has shown that it is possible to significantly reduce poverty simply by providing micro-credits to the poor, especially women, as a catalyst in socio-economic development; its loan recovery rate is 98% (see *http://www.grameen-info.org/index.php?option=com_content&task=view&id=26&Itemid=0*, last accessed 06.11.2009).

[149] Pogge's enumeration of human basic needs bears certain similarities to Rawls' primary goods (basic rights and liberties, freedom of movement and of occupation, powers and prerogatives of offices and positions, income and wealth, social bases of self-respect) and Sen's functionings (being adequately nourished, being free from avoidable disease, longevity, literacy, being able to take part in the life of the community, having self-respect, being able to choose).

Addressing aspects of distributive, commutative, and corrective justice, this principle can be considered as logically preceding the one derived from Rawls' two principles of justice for the domestic case (ch. 3.4.3), and it can be easily combined with the principle demanding to take into account differential needs and abilities (ch. 3.4.4).

3.6.2 Responsibility of the affluent

For questions of benefit sharing, Pogge's detailed account of negative duties of the affluent towards the global poor is very enlightening. I agree with him that the argument for these negative duties is more stringent than Rawls' argument for the duty of assistance and, hence, may be better able to convince the affluent as well as libertarian sympathizers. Of course, as Pogge adds, there may be positive duties towards the disadvantaged that exceed the negative ones. Furthermore, it could be argued that some of his demands could also be formulated as positive duties since they require rather active measures (such as the introduction of a Global Resources Dividend). However, I will follow Pogge in focusing on the negative duties generated by the shared social institutions, the exclusion from the use of natural resources, and the common and violent history.

The global circulation and use of many genetic resources, as well as the globalisation of certain property rights in them, exemplify the shared global institutions that for Pogge are the main justification for such negative duties – he explicitly mentions intellectual property rights and TRIPS (see ch. 2.3.2). While he develops this concept in opposition to the view that the affluent countries and citizens are not, in a strict sense, morally obliged to help the global poor, these negative duties can also be employed in justifying why e.g. affluent users of genetic resources (or consumers of products based on them) should share certain benefits with the providers of these resources, or e.g. with provider countries in general (see ch. 4.6.3). I will therefore adopt the following principle of commutative and corrective justice:

> **Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' negative duties towards those foreseeably and avoidably disadvantaged by the shared institutional order.**

With this principle, my conception of justice in benefit sharing definitely leaves Rawlsian ground. The fundamental difference between Rawls' and Pogge's approaches to global justice could be described exactly as the question of responsibilities, i.e. whether burdened societies are merely lacking adequate traditions, know-how, and material resources to be well-ordered (Rawls 1999a: 106), or if they are also actively burdened by others, as Pogge states. Although both approaches may converge at the level of concrete measures for poverty-relief, and although a positive duty of assistance can, in principle, have a broader scope than a negative duty not to harm, I regard the justification for the latter as more stringent (see ch. 3.4.8).

The question which of Pogge's three justifications for seeing world poverty as a violation of negative duties is the most plausible is less relevant for the issues considered here since all three approaches could agree on similar reforms towards justice. For the subject of this thesis, the uncompensated exclusion from natural resources is of special interest, and in my opinion is necessarily linked to the shared international institutions such as the international resource privilege.

3.6.3 Inalienable stakes of the poor in limited natural resources

In line with Pogge's reasoning concerning the poor's uncompensated exclusion from the use of natural resources, and as formulated in his suggestion for a Global Resources Dividend, the global poor can be conceived as owning an inalienable stake in all limited natural resources. This view, which focuses on the distribution within one generation, corresponds well with Rawls' principle of just savings between generations, from which I have already derived the principle that benefit sharing should contribute to the conservation of natural resources (ch. 3.4.6). It is also well in line with Rawls' concept of conditional property rights and their being open to regulation to satisfy concerns of justice. I will add the following principle as one of distributive and commutative justice, adapting Pogge's wording to the subject of genetic resources:

> **Insofar as genetic resources are provided to mankind by nature, all persons should be regarded as holding a proportionate share in them, for which they have to be adequately compensated if excluded.**

The Global Resources Dividend is a very interesting instrument for putting these ideas into practice, also with regard to genetic resources: it acknowledges a partial national sovereignty over resources, but does not confer full property rights to those currently in the position to use and deplete resources or to appropriate them in the form of intellectual property rights. Certain inalienable stakes by the poor or by future generations are acknowledged not only in theory, but materialise and contribute to a just distribution, without necessitating complicated mechanisms for determining initial property rights. Anticipating the critique that such a scheme as the GRD might slow aggregate economic growth, Pogge rightly points out that this can be justified if it entails significant improvements for the poor. I am more sceptical, however, about his claim that the resulting rise in the poor's resource consumption will not have negative ecological effects (see ch. 3.5.5). However, this concern applies especially to the consumption of non-renewable resources and is less relevant for the use of genetic resources.[150]

3.6.4 Justice in national and international policy-making

The previous principles derived from Pogge's approach have primarily considered effects of institutions on poor and affluent individuals. Here, I will derive two last principles of both procedural and corrective justice from Pogge's comments on the role of governments and countries as actors within the global institutional order. Implicit in Pogge's criticism of illegitimate governments and of the international resource and borrowing privileges is the demand that governments respect and act according to their population's needs and interests. Although Pogge does not comment explicitly on groups or communities within countries, such as indigenous and local communities playing an important role in benefit sharing, I assume that he would agree that such groups should enjoy a certain self-determination vis-à-vis the national government and should be able to represent their interests in national and global policy-making. This demand can be backed by Pogge's human rights standards of social justice, which include liberty of conscience, freedom of association and speech, and political participation (see ch. 3.5.3). I will capture this issue in the following principle:

[150] Especially in agriculture, genetic resources are endangered more by non-use than by using them in a sustainable way (see ch. 4.2.1).

Affected communities and individuals should be able to participate in policy-making concerning the use of and benefit sharing for genetic resources.

Pogge further criticizes a "slanting of the playing field" at the level of international negotiations and agreements where developed countries often take advantage of their superior bargaining power and expertise. The developing countries end up with less favourable results, such as asymmetrical terms of trade. As will be seen in chapter 4.8.7.3, negotiations on access and benefit sharing are often of a similar pattern and lead to similarly unfair results. I will therefore formulate my last principle as follows:

International negotiations about the use of and benefit sharing for genetic resources should consider and compensate differential bargaining power, especially the disadvantages of developing countries.

3.7 Results: principles of justice in benefit sharing

In this chapter, ten principles of justice in benefit sharing have been derived, which will provide guidance for answering the study questions in the following chapters. For this purpose, they are here rearranged and numbered for easier reference, with emphasis added on the central issue of each:

1) The bases of fair and equitable benefit sharing should be designed in such a way that all persons concerned can resp. would agree to them in a **hypothetical consensus** under a Rawlsian veil of ignorance concerning e.g. their social position, living conditions, natural endowments, and country of birth. (Rawls)

2) Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Pogge)

3) At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Pogge)

4) The individual shares resulting from a just distribution e.g. of benefits should not be defined only in material resources such as income but should take into account **differential needs and abilities**. (Pogge, Sen)

5) After demands of global justice are satisfied and basic human needs are met, the **domestic** institutions of **liberal democratic countries** concerned with benefit sharing should ensure that
    1. each person has the same indefeasible claim to an adequate scheme of equal basic liberties, compatible with the same scheme of liberties for all, and that
    2. social and economic inequalities are, first, attached to offices and positions open to all under conditions of fair equality of opportunity, and, second, are to the greatest benefit of the least-advantaged members of society. (Rawls)

6) **Property rights** and market mechanisms, especially concerning natural resources, may be designed and regulated in such a way as to satisfy concerns of justice, for example in order to provide public goods or to fight and prevent extreme poverty. (Rawls)

7) Insofar as genetic resources are provided to mankind by nature, all persons should be regarded as holding a **proportionate share** in them, for which they have to be adequately compensated if excluded. (Pogge)

8) Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Rawls)

9) Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Pogge)

10) International negotiations about the use of and benefit sharing for genetic resources should consider and compensate **differential bargaining power**, especially the disadvantages of developing countries. (Pogge)

In the ensuing discussion, I will often refer to them in abbreviated form by the numbers indicated here. I further would like to point out that my ordering of the principles does not infer any ranking in priority or importance; it is merely one possible way of ordering them from the more general to the more specific ones. As mentioned before, they combine aspects of distributive, commutative, corrective, and procedural justice. The ten principles presuppose the recognition of basic human rights; principle 3 is not meant to justify them, but only applies human rights standards to questions of benefit sharing.

These principles are not intended as comprehensive summaries of the authors' approaches, but were selected according to their relevance for the problems at hand. I will refer to some of them more often than to others, but all of them will play their role in justifying criteria for justice in benefit sharing. Notwithstanding the undeniable theoretical differences between Rawls' and Pogge's conceptions, I expect the above principles, for the limited purpose of this thesis, to be applicable without serious contradictions or inconsistencies. Considering the current global situation and the spirit of both Rawls' and Pogge's writings, there can be little doubt that both would largely agree to consider widespread poverty, dictatorial political regimes, exploitive economic relations, environmental degradation, and similar wrongs as instances of injustice and would agree on many of the concrete demands I will formulate below. Similarly, Sen states that "[the] greatest relevance of ideas of justice lies in the identification of *patent injustice*, […] rather than in the derivation of some extant formula for how the world should be precisely run" (Sen 1999: 287). On this basis, the following chapter will be dedicated to the development of concrete ethical criteria for a more fair and equitable benefit sharing than is happening at present.

4 Developing concrete criteria for fair and equitable benefit sharing for crop genetic resources

4.1 Approach and objective

Representing the core of my thesis, this chapter attempts to apply the principles of justice elaborated in the previous chapter to the concrete problems of sharing the benefits from the use of crop genetic resources and associated knowledge in a fair and equitable way. Access and benefit sharing are as yet discussed mostly at the political rather than the scientific level. Therefore, apart from peer-reviewed scientific literature, important sources of information are international legal documents, reports for international organisations like the United Nations or the World Bank, and various publications by non-governmental organisations, pressure groups, and individual stakeholders. This currently available literature is often of a political and partly tendentious nature. Although many of my criteria developed here will correspond with demands found in these contexts, my aim is to base such claims on adequate principles of justice derived in the previous chapter.

From the discussion of Rawls' and Pogge's concepts of justice, some general conclusions for the regulation of agriculture policy and crop breeding seem obvious: the institutional framework should prioritise

- compensating those who are disadvantaged by the existing institutional order (cf. principle 2),
- meeting basic human needs (cf. principle 3),
- compensating those who are excluded from a proportionate share in genetic resources (cf. principle 7),
- conserving natural resources (cf. principle 8), and
- participation on equal terms of affected individuals, communities, and countries (cf. principles 9 and 10).

A more detailed discussion of how the ten principles can be applied to the specific issues of benefit sharing will follow. Other objectives often put forward in the ABS debate, such as economic prosperity, efficiency, or free trade, may be means to achieve these priority issues or arise as by-products, but should not be regarded as sole targets from an ethical point of view.

In the following chapters 4.2 to 4.8, I will elaborate some concrete answers to the central study questions that have been posed in chapter 1.2.2, which are recapitulated in the chapter headings below. I will apply similar steps in the course of answering each question: as a first step at the beginning of each chapter, I will identify those principles of justice out of the ten derived from Rawls and Pogge (see p. 109) that are relevant for the respective question. I will then attempt to develop answers that are consistent with these more general principles and that cover the main issues and points of contention arising in the political debate on access and benefit sharing. These answers will be formulated as criteria[151] of justice and will be summarized at the end of each chapter. In most cases, I will discuss in detail only those demands I regard as convincing and justifiable, and will largely leave aside further claims voiced in the public debate that cannot be sufficiently justified. Since the issues become more specific in the progression from question 1 to 7, the discussion of the first ones will refer closely to the ten principles of justice, while the answers to the later

[151] Although these criteria will mostly take the form of demands, I prefer the term "criteria" in order to clearly identify them and set them apart from other demands mentioned in the text.

questions will more and more be based on the results of the previous ones. As already stated above, I will not take the *status quo* or the existing legislation as a given framework for the development of ethical criteria, but attempt to answer the key questions from an unprejudiced standpoint based on ethical considerations. However, the objective of my thesis of course implies that I adopt at least the third objective of the CBD[152], i.e. fair and equitable benefit sharing, as a legitimate demand in investigating how such benefit sharing could be realized.

In developing the ethical criteria by answering the central study questions, it will not be possible to derive each claim directly from the theoretical foundations in chapter 3, but the criteria for fair and equitable benefit sharing which I will develop will be consistent with the ten principles extracted from Rawls' and Pogge's approaches. I will refer to these principles as closely as possible in order to show that ethical justifications are indeed applicable to questions of access and benefit sharing and that they can advance the debate, liberating it from revolving around entrenched positions simply repeated in discussions and negotiations (cf. ch. 1.2.3). In some cases, it will be necessary to extend my discussion to related topics and background information e.g. on intellectual property rights, existing ABS legislation, and traditional knowledge. Although this results in varying length and complexity of the following chapters, it implies no evidence of differential importance. Similar to the method of deriving the ten principles of justice in chapter 3, I will in the course of each chapter here deduce my own, concrete criteria for justice in benefit sharing with regard to the respective study question, which is posed in the heading of each chapter. The answers and demands which I will formulate are singled out from a pool of demands and arguments often voiced in the political discussion on access and benefit sharing; they are the ones I regard as most convincing and justifiable on the basis of principles of justice. The resulting criteria are not intended as a mere summary of the respective chapter, but will reformulate the ethical considerations by focusing exclusively on the concrete demands for fair and equitable benefit sharing that can be derived. While some of them are rather uncontroversial, others may seem quite radical and are in obvious opposition to existing legislation. The criteria will be compiled at the end of each chapter (4.2 to 4.8), and in the concluding synopsis in chapter 4.9, I will attempt to consolidate them into a coherent conception of fair and equitable benefit sharing.

[152] CBD Article 1: "The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources […]."

4.2 What are the long-term aims of access and benefit sharing regulation?

Different stakeholders follow different motivations in the debates on access and benefit sharing. While some only aim at preventing misappropriation (according to their respective definitions), others see benefit sharing, for example, as a means to address international inequality between (developing) provider and (developed) user countries (see ch. 1.1.2). Depending on these motivations, lines of argumentation and aims e.g. in the negotiations for the International Regime on ABS differ: while the former may concentrate on demanding stronger or better defined property rights for genetic resources and associated knowledge, the latter may focus on maximising monetary transfers from user to provider countries. In addition, the debate on benefit sharing often focuses very much on either national legislation or on single acts of transfer (of money, technology etc.) within individual ABS contracts. This remains unsatisfactory from an ethical viewpoint, where the question of adequate benefit sharing should be treated not only as one of justice in bilateral exchanges, but should incorporate aspects of distributive, commutative, corrective, and procedural justice (see ch. 3.2.1). A narrow perspective of bilateral exchanges of benefits would not only neglect important principles of justice such as those put forward by Rawls and Pogge, but would also contradict the spirit of the CBD, which regards the three objectives of conservation, sustainable use, and benefit sharing as strongly interrelated. Approaching the subject from Rawls' and Pogge's theories of justice, I will therefore start with investigating the general aims and purposes of ABS regulation and benefit sharing, which should be considered if aspects of justice are taken seriously in the development of a global ABS framework for crop genetic resources. These aims and purposes could then be addressed e.g. in model ABS contracts or in global minimum standards for benefit sharing as suggested in chapter 4.8.2. While this approach is in contrast to a large part of currently available literature on the subject, I regard it as indispensable for justifying the more concrete demands that will follow.

Out of the ten principles of justice derived from Rawls and Pogge (p. 109), the following ones apply specifically to the long-term aims of access and benefit sharing regulation and will be referred to in this chapter:

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- Insofar as genetic resources are provided to mankind by nature, all persons should be regarded as holding a **proportionate share** in them, for which they have to be adequately compensated if excluded. (Principle 7)

- Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Principle 8)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

In the following, I will attempt to apply these principles of justice to the first study question, resulting in the answers and demands represented by the headings of the three sub-chapters, with their order being one of practicality, not of priority. A similar procedure will be followed in answering the remaining six study questions in chapters 4.3 to 4.8.

4.2.1 Conservation of diversified genetic resources for food security

The conservation of a broad variety of crop genetic resources should be an overarching aim of access and benefit sharing regulation. This is not only a matter of intergenerational justice as formulated in principle 8, in the sense that the present generation should not consume more non-renewable resources than any other generation had or will have at its disposal. Since crop genetic resources are in principle renewable, it is not great quantities of genetic resources that must be passed on to future generations. Rather, it is crop diversity, together with the associated knowledge concerning management and use, which is crucial for present and future food security.

On the one hand, world agriculture depends on crop diversity to provide enough and healthy food and feed and to avoid catastrophic calamities by plant diseases and pests.

> "Crops often do better outside their centres of origin, where they may be free from their natural pathogens and parasites. But where those or similar diseases and pests strike, it is essential to be able to go back to the centres of origin in order to find resistance to them." (Moore/Tymowski 2005: 79)

This happened e.g. in the case of the Irish potato famine in the 1830s, caused by *Phytophtora* downy mildew, for which resistance traits had to be sought in the centre of origin of potatoes in South America (Moore/Tymowski 2005: 79). Though not all examples are that spectacular, countries remain dependent on each other for the exchange of crop genetic resources (Dutfield 2004: 11; Moore/Halewood 2006: 1; Seiler 2003: 1).

On the other hand, especially small farmers often operate under unfavourable environmental conditions and have few means at their disposal to alleviate or control them e.g. by fertilizers, irrigation, physical or chemical plant protection. The resulting uncertainties and heterogeneities in site conditions make it necessary to sow or plant an internally diverse selection of genotypes, in order to ensure at least some success in the face of unpredictable rainy seasons, pest infections etc. For similar reasons, plant breeders depend on broad gene pools to further improve crops and adopt them to new conditions, such as changes in agro-ecological conditions due to global warming, new pests, weeds, and plant diseases (e.g. Frei/Becker 2004: 1592). Changing food and feed habits and requirements are another reason for the constant need for innovation in crop breeding and management. Diversity within species, as well as a certain diversity of crop species for food and feed purposes, is thus a well-acknowledged necessity.

Food security undoubtedly constitutes an important basic human need as addressed in principle 3; it is therefore a matter of justice to demand that access and benefit sharing regulation should provide future generations with crop genetic resources at least as diverse as at present. This is expressed in the following criterion of justice:

Access and benefit sharing regulation should aim at conserving as much inter- and intraspecific crop diversity as possible, respecting probable needs and priorities of future generations.

Unfortunately, if certain trends continue without significant conservation efforts, many species and varieties will be extinct within only one generation - a notion usually more prominently associated with flagship animal species of nature conservation like great apes or whales, but no less imminent for crop species and, especially, varieties.[153] Although the need for conservation is generally acknowledged, crop diversity has been declining during the last decades, one reason being the so-called Green Revolution, which produced a rather small number of high-yielding varieties of staple crops; further reasons are e.g. the industrialisation of agriculture, the continuing monopolisation of the seed markets, and falling world market prices. In contrast to wild plants, crops with a history of human cultivation often cannot exist without human management since important natural traits for survival in the wild, such as the shattering of seed heads or seed dormancy, have been eliminated in the breeding process (Moore/Tymowski 2005: 2).

Since future developments are impossible to foresee exactly, it is equally impossible to determine the optimal amount of crop biodiversity to be conserved. A precautionary approach would aim to conserve as much as possible, both *ex situ* (outside natural habitats) and *in situ* (in natural habitats). While conservation *ex situ* is less expensive and easier manageable than *in situ*, *ex situ* conservation alone is no sustainable solution for conservation problems especially of crop genetic resources: many species cannot be conserved *ex situ* due to their biological characteristics, for example because they are propagated vegetatively or their seeds do not survive deep-freezing. Even of those which are suitable for *ex situ* conservation (especially cereals), samples may e.g. suffer during storage or may become useless if associated information is lost. Within their original surroundings, in contrast, crops continue to adapt to changing biotic and abiotic environmental conditions, they are developed further by breeding and spontaneous selection, and associated knowledge is more likely to be preserved. Such *in situ* conservation can consist of continued diversified farming or cultivation specifically for conservation purposes and can be complemented with local seed banks and seed exchange networks – practices that are endangered by current trends of standardisation and industrialization of agriculture. Furthermore, *in situ* conservation of whole habitats is the only way to preserve resources that are hitherto unknown or not common for food or feed use: considering not only the actual but also the potential (future) value, all plant, many microbial and even animal genomes might be regarded as crop genetic resources since they can theoretically be introduced into existing crops e.g. by genetic engineering. *Ex situ* collections are thus not sufficient for conserving genetic resources, although they can complement *in situ* conservation and management and can act as "insurance" against unintended loss e.g. in case of natural or man-made disasters.[154] As a result of these more practical considerations, I will add the following criterion of justice:

[153] The current global situation of the conservation and utilization of crop genetic resources is documented extensively in the *Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture*, which will be published by the FAO in October 2009 (see *http://www.fao.org/agriculture/crops/core-themes/theme/seeds-pgr/sow/en/#cr*, last accessed 23.07.2009). A similar FAO report on the world's animal genetic resources for food and agriculture is available at *ftp://ftp.fao.org/docrep/fao/010/a1250e/a1250e.pdf* (last accessed 23.03.2009).

[154] In February 2008, the *Svalbard Global Seed Vault* was opened as a safety net for gene banks around the world, in order to protect their accessions against catastrophic or incremental losses. Located in the permafrost of Spitsbergen, Norway, it offers to store in a remote and secure location du-

Conservation should adequately combine *ex situ* techniques (especially as a safety net) and *in situ* methods (especially for new resources and associated knowledge).

Many authors agree that if it was possible to overcome valuation problems, even strict economic reason would require stricter biodiversity protection than currently enforced (Grafton et al. 2004: 401; Lerch 1999: 183; Zeeb 1996: 3). However, a complete market solution is not possible for most practical purposes, as will be discussed in detail in chapter 4.3.1, so that other forms of remuneration for resource conservation must be found (see ch. 4.3.4). Fortunately, the costs of conservation will usually not be as high as in Leningrad during the German siege 1941-1944: scientists of the Vavilov Institute saved and even propagated seeds and plants at costs of their lives, and several of them even starved to death next to the collections of crop seeds (Fowler/Mooney 1990: 220-222).

4.2.2 International justice and poverty alleviation

As mentioned above (ch. 3.2.1), benefit sharing should not be conceived merely as payment for access to genetic resources in the context of private, bilateral contracts. Rather, it is quite evident already from the CBD text that benefit sharing was intended to address and mitigate structural injustices between the resource-providing South resp. developing countries on the one hand, and the resource-using North resp. industrial countries on the other hand: the developing countries as main providers of currently utilized crop genetic resources have already borne most of the costs of conservation and providing access, so that benefit sharing is envisaged by the CBD as a form of compensation.[155] The CBD repeatedly alludes to this aim of a more comprehensive equity between nations, e.g. as preferential terms for developing countries in technology transfer (Art. 16) and in research participation (Art. 19); the financial mechanism installed in Articles 19 and 20 is to provide funding especially to developing countries (see ch. 2.2). Sharing should thus be required not only for those benefits arising from newly accessed genetic resources and the respective ABS contracts, but, more generally, should include those benefits arising from the use of genetic resources that have been accessed or appropriated in the past.

> "ABS was not created with the objective of establishing a well-functioning international market for the negotiation and sale of resources based on commercial contracts. If that had been the negotiators' intention, it would have been created under the global trade regime, perhaps as part of the WTO family of instruments and processes. […] Rather, the goal of ABS is the creation of a system by which countries which have conserved and provided access to their genetic resources and the ecosystems that foster them can receive a share in the value that is derived from those resources, and a lingering incentive for continuing to conserve their resources and use them sustainably. By utilizing a com-

plicates of existing seed samples, e.g. from the *ex situ* collections of the CGIAR and other national or regional gene banks. The depositor remains the owner of the sample and is the only one entitled to access them; storage is provided free of costs. As of October 2008, more than 320,000 seed samples were stored in the Seed Vault, which is funded by the Norwegian government and the Global Crop Diversity Trust. This information is taken from the *Frequently Asked Questions* available at *http://www.croptrust.org/documents/web/Svalbard%20and%20Trust%20QandA_Oct08.pdf*; for more information see also the website of the Seed Vault at *http://www.croptrust.org/main/arctic.php?itemid=211* and its Seed Portal at *http://www.nordgen.org/sgsv* (all last accessed 18.02.2009).

[155] Tvedt/Young (2007: 19f) point out that developing countries have not only conserved genetic resources and provided access to them, but are further disadvantaged by higher costs for social and economic development, because they cannot rely as heavily on the exploitation of their (and others') natural resources as the developed countries have done.

> mercial tool (contracts between source countries and users) the [CBD] Parties sought to make this sharing direct." (Tvedt/Young 2007: 83)

The view of benefit sharing as balancing a structural and historical injustice between countries is obviously consistent and compatible with Pogge's account of the existing global order, where the poor (countries and individuals) are disadvantaged by the historical process resp. today's institutional order. Principle 2 therefore describes benefit sharing as fulfilment of the affluents' negative duties towards those foreseeably and avoidably disadvantaged by the shared institutional order. Together with principle 3, which demands priority for basic human needs, and principle 7, which demands compensation for those excluded from a proportionate share of genetic resources, this suggests defining international justice and poverty alleviation as a further overarching aim of ABS regulation, yielding my next criterion of justice:

> **Access and benefit sharing regulation should advance international justice and alleviate severe global poverty.**

Though poverty alleviation is not an explicit goal of the CBD, it is mentioned in Article 20.4 and is one objective of the Bonn Guidelines (Art. 11k). Several authors are optimistic that, given the political will, ABS policies can contribute to domestic poverty alleviation as well as to global justice (Henne et al. 2003; Jonge/Korthals 2006: 146, 154). As Pogge explains in his criticism of "explanatory nationalism" (ch. 3.5.2), alleviating severe global poverty cannot be refused by the claim that it is caused primarily by domestic parameters such as inefficient resource management or bad governance, which the better-off have no reason to feel responsible for. While such factors no doubt play a certain role, they should not serve as an excuse for avoidable injustices in the present global institutional order, as Pogge convincingly demonstrates. A legitimate standpoint on this matter must instead demand to reform the global order so that benefits reach the global poor, independent of by whom they are governed or which burdens they inherited by culture or descent.

4.2.3 Encourage desirable innovations

The sustainable use of crop genetic resources is not only one of the three CBD objectives, but also the soundest way of conserving them *in situ* since they are not so much endangered by over-use as by non-use. Putting them to the best use implies continuous research and innovation, which are necessary due to varying biotic and abiotic agro-ecological conditions as well as changing food and feed requirements (see ch. 4.2.1). New uses of crop genetic resources will primarily concern food and feed production, but are also imaginable in the areas of agro-fuels[156], biosynthesis of organic compounds, bioremediation etc. Of course, innovation often needs significant investment before any profit is made; the following table exemplifies duration and costs of typical R&D programmes in different commercial sectors:

Sector	**Years to develop product**	**Costs in million US Dollars**
Pharmaceutical	10 – 15+	231 – 500
Conventional agricultural seed[157]	8 – 12	1 – 2.5
Botanical medicine	< 2 – 5	0.15 – 7
Transgene	4+	35 – 75

[156] I will not comment here on the potentially problematic role of growing agro-fuels in competition with food production (see also footnote 120).

[157] For more details on the process of the development of new crop varieties, see Kate/Laird (1999: 127, Box 5.1).

Ornamental horticulture	1 – 20+	0.05 – 5
Biological agent for crop protection	2 – 5	1 – 5
Chemical pesticide	8 – 14	40 – 100
Cosmetics and personal care	< 2 – 5	0.15 – 7

Table 4: Duration and costs of typical R&D programmes in different sectors (based on Kate/Laird 1999: 9, Table 1.3)

In comparison to other sectors using genetic resources, breeding conventional seeds is obviously time-consuming (e.g. due to reproduction intervals and field trials), but not as expensive as the development of e.g. pharmaceuticals, chemical pesticides, or transgenic seeds. Accordingly, it could be argued that innovative crop varieties do not necessitate as extensive possibilities for recuperation of investment in the form of intellectual property rights as e.g. pharmaceuticals. However, commercial R&D will always be directed at those innovations that promise profits, which are not necessarily those ethically desirable or most urgently needed. Although the principles of justice derived from Rawls and Pogge do not directly address innovation and research, it can be assumed that it is in their spirit to demand that innovations on the basis of crop genetic resources are encouraged with the aim to meet basic human needs (cf. principle 3). Desirable innovations in this sense may be crops or techniques that directly secure and enhance the availability of enough and adequate food, or ones that provide e.g. small farmers with products that can be exchanged for basic commodities on the markets.[158] I will therefore formulate the following criterion of justice:

> **Access and benefit sharing regulation should encourage innovations based on crop genetic resources with the aim to meet basic human needs, especially enhancing the availability of enough and adequate food and of other basic commodities.**

Principle 9 provides further guidance in demanding that communities and individuals who are affected participate in policy-making concerning the use of genetic resources, which conceivably includes their use in research and development. In the following, I will shortly discuss how this demand is addressed by the main actors of crop research and development: farmers, public research institutions (mostly non-commercial research), and private enterprises (mostly commercial research).

In many parts of the world, farmers' informal seed systems (including selection, multiplication, distribution) successfully operate alongside formal seed systems (including specialised breeders, seed producers, certification, sales agents), and they still provide most crop seed in developing countries (The World Bank 2006: 12). This practice not only makes farmers independent of commercial seed providers, but also enables them to play an important role in maintaining and selecting traditional varieties (Kate/Laird 1999: 126). By on-farm selection, crops can be adapted specifically

[158] At his point, I would like to respond to the frequently voiced question why small-scale and subsistence agriculture should be encouraged and assisted at all since large-scale mechanized agriculture is much more profitable and would allow developing countries to produce the same amount of agricultural products by a smaller percentage of the total population. Apart from the basic problem that such restructuring disrupts cultures and traditions and that many of the ex-farmers may simply end up in slums around the bigger cities, a resource-based argumentation suggests itself: small-scale and subsistence farming may be unprofitable if measured in monetary terms and with fossil fuels, chemical fertilizers, and pesticides available at relatively low prices – however, if the "currency" was total energy (input vs. output), and environmental costs and benefits such as water and nutrient balances, accumulation of chemicals, soil erosion, and emissions were fully taken into account, the perceived advance in efficiency of large-scale mechanized agriculture would shrink significantly and may even cease to exist.

to local conditions and needs; informal seed exchange networks between farmers secure availability and diversity.

> "Farmers' seed systems can be very effective in providing seed of adapted varieties at the right time and at low cost, […] they make a valuable contribution to agro-biodiversity." (The World Bank 2006: 13)

The proportion of seeds that is farm-saved rather than bought from commercial vendors is difficult to estimate; globally, Kate/Laird (1999: 126) conclude it to be 20%, with 80% for developing countries, while GRAIN (2005c: 2) estimates a proportion of 70% for developing countries. Dependent on crop and country, even developed country farmers save significant amounts of seeds (Kate/Laird 1999: 126); a survey by the International Seed Federation (Buanec 2005) found that that an average of 67.5% of cereal seeds in 14 industrial countries was farm-saved. Extrapolating from these numbers that the seed industry loses almost seven billion US Dollars per year due to farm-saved seeds in the 14 surveyed countries alone, the author calls for stricter enforcement of breeders' intellectual property rights (see also ch. 4.4.5.5).

Of course, seed saving is often primarily a means to reduce costs, and innovations that are in the interest of small farmers and poor population groups could sometimes be addressed with equal or even better results by specialised research institutions rather than by the farmers themselves. Crop breeding and other agricultural research especially in developing countries has until recently been financed mainly by the public sector such as the CGIAR Centres, with resulting products being freely available: "seed production and distribution have been seen as vehicles for technology transfer rather than as commercial operations" (The World Bank 2006: 12). However, commercial research and trade in seeds is gaining importance, often implying the introduction and strengthening of intellectual property rights that enable innovators to recuperate their R&D investment through the exclusive commercial exploitation of the resulting product (see ch. 4.4.5.1).[159] The downside of multinational companies dominating the breeding and seed sector in combination with intellectual property rights could be a concentration on profitable products, a small range of varieties and crops, legal and biological[160] impediments for farmers to save and exchange seeds. Commercial research might thus even present an obstacle to desirable innovations based on genetic resources, or the innovations may be available, but not affordable for small farmers and poor stakeholders. The needs of small and subsistence farmers, the food security of poor population groups, as well as the improvement of crops adapted to adverse environmental conditions or grown only regionally ("orphan crops") will often not be addressed by commercial research, because little profits can be expected. Considering aspects of justice, I therefore suggest that these needs should be addressed either by explicit incentives for private enterprises, or by a public research and breeding sector. Such an appreciation of public funding runs counter to the current mainstream efforts of privatisation, but it allows democratic control of research aims involving genetic resources (cf. Anwander et al. 2002: 87; Brand 2007: 21f, 27; El-Tayeb 2005: 274). Arguing along similar lines, Jonge/Korthals (2006) demand to replace the present "downstream focused" benefit sharing at the end of successful research and development by "upstream focused" benefit sharing, i.e. shared decision-making concerning research priorities and the

[159] According to the non-government organisation ETC Group, the global top ten seed corporations in 2006 accounted for 57% of the commercial seed market worldwide (estimated at 22.8 billion US Dollars), with a growing trend, and the leading company Monsanto alone accounting for 20% (ETC Group 2007).

[160] Examples of such biological "protection" mechanisms are hybrids, which according to Kate/Laird (1999: 126) already account for 40 % of the global commercial seed market, and, more recently, genetic use restriction technologies (GURTs). They are discussed in chapter 4.4.5.4.

use of resources. For Pogge's suggestion of a publicly financed *Health Impact Fund* as an incentive for corporate pharmaceutical innovations addressing the most urgent human diseases, see p. 158.

Viewed from the perspective of justice, public regulation and funding of innovation can adequately prioritize basic human needs (principle 3) and the conservation of natural resources for future generations (principle 8), can involve affected communities and individuals (principle 9), and the funding sources can be designed so as to acknowledge the affluents' negative duties towards the disadvantaged (principle 2). This view is expressed in the following criterion of justice:

> **Public regulation and funding of innovation should be possible, e.g. by a combination of corporate commercial research, public non-commercial research, and farm-based innovations.**

4.2.4 Results: Criteria of justice for long-term aims of access and benefit sharing regulation

The five criteria developed above as answers to the first study question are compiled here and numbered for easier reference. I will proceed in an analogous way in the following chapters, with a synopsis of all criteria in chapter 4.9.

Conservation:

1.1 Access and benefit sharing regulation should aim at conserving as much inter- and intraspecific crop diversity as possible, respecting probable needs and priorities of future generations.

1.2 Conservation should adequately combine *ex situ* techniques (especially as a safety net) and *in situ* methods (especially for new resources and associated knowledge).

International justice and poverty alleviation:

1.3 Access and benefit sharing regulation should advance international justice and alleviate severe global poverty.

Innovations:

1.4 Access and benefit sharing regulation should encourage innovations based on crop genetic resources with the aim to meet basic human needs, especially enhancing the availability of enough and adequate food and of other basic commodities.

1.5 Public regulation and funding of innovation should be possible, e.g. by a combination of corporate commercial research, public non-commercial research, and farm-based innovations.

*4.3 **Which** medium- and short-term purposes **should benefit sharing serve, e.g. in order to reach the above aims?***

The above chapter identified resource conservation, international justice, poverty alleviation, and encouragement of desirable innovations as long-term aims of access and benefit sharing regulation. While conceivably most authors would agree with these aims, possible ways to achieve them are in dispute, as will become even clearer in the following chapters. Here, I will first discuss some propositions for purposes of benefit sharing to be achieved in a shorter term, contributing to the more general long-term aims. Most of them address the providers of genetic resources and would benefit especially the disadvantaged. Again, it will be demonstrated that these purposes are more adequately addressed by considering various aspects of distributive, commutative, corrective, and procedural justice, rather than considering only direct exchanges between individual providers and users. Out of the ten principles of justice (p. 109), the ones I found to be relevant to the question discussed here are:

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- **Property rights** and market mechanisms, especially concerning natural resources, may be designed and regulated in such a way as to satisfy concerns of justice, for example in order to provide public goods or to fight and prevent extreme poverty. (Principle 6)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

Applying these principles to the second study question, and having in mind the long-term aims identified above, the following answers and resulting criteria of justice seem justifiable.

4.3.1 Adequate monetary valuation of genetic resources?

The lack of adequate monetary valuation of genetic resources is often claimed to be responsible for their under-provision, mismanagement, and for unfair bargains in ABS contracts. It is usually argued that part of the costs and/or benefits associated with these resources are not internalised so that market prices do not reflect their total value and ABS contracts do not capture all benefits. If it is assumed that such internalisation of costs and benefits is feasible, adequate valuation of genetic resources might *prima facie* seem a promising terrain for achieving more international justice since they occur in greatest diversity in developing countries, and industrial countries depend as much on them as on mineral or energy resources. Some authors conclude that if only the developing countries succeeded in adequately exploiting and marketing their genetic resources, the resulting monetary benefits could to a certain extent balance global injustices and, for example, finance resource conservation.

While not discussing these claims in all details, I will illustrate the main problems which result in a general difficulty to base just benefit sharing on the monetary valuation of genetic resources.

The first problem is empirical and arises in attempts to estimate the actual markets for genetic resources. The most comprehensive study available on the commercial market for products derived from genetic resources was published by Kate/Laird in 1999, based on a literature survey and about 300 interviews with users of genetic resources. The authors estimate the following annual commercial markets:

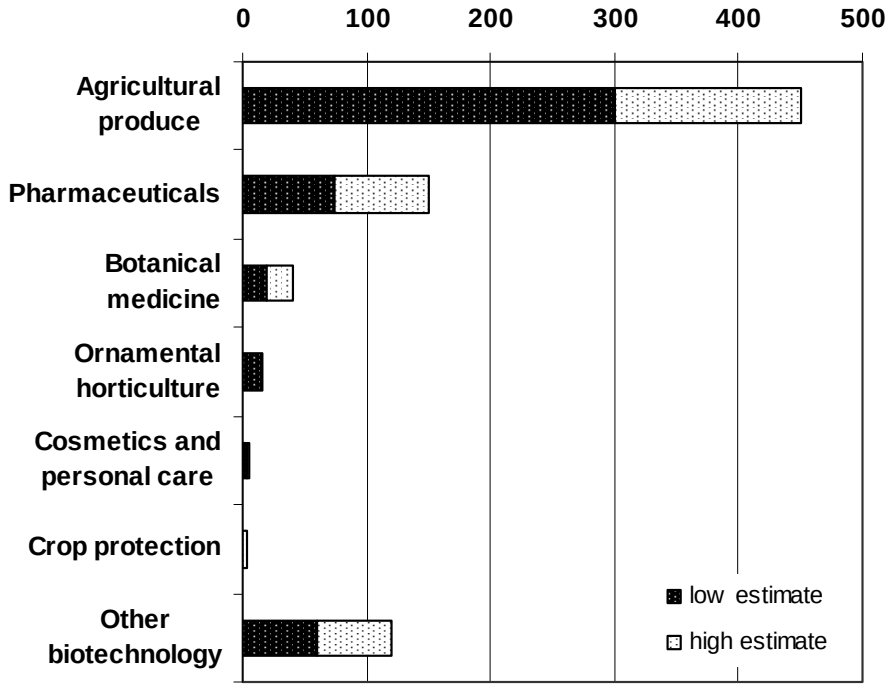

Figure 3: Estimated annual commercial markets for products derived from genetic resources (in billion US Dollars); own illustration based on Kate/Laird (1999: 2, Table 1.1). Botanical medicine here means production directly from raw plant material such as ginseng, green tea, gingko, aloe, camomile, ginger (Kate/Laird 1999: 81, Box 4.1); high estimate includes minerals and vitamins. Other biotechnology includes products for environmental protection, energy generation, chemical industry, diagnostics etc.

These estimates are probably too low, especially for agricultural produce, since they cover neither subsistence-level use nor the use in local markets, which usually are not captured in national or industry statistics (Kate/Laird 1999: 1). The estimate for agricultural produce (300 to 450 billion US Dollars) further shows that the value of crop genetic resources is underestimated if it is determined by the commercial sales of agricultural seeds alone (according to Kate/Laird, 30 billion US Dollars): the final value of produce reaching the consumer is far greater than the value of the seeds and much higher than e.g. the commercial value of pharmaceuticals derived from genetic resources. Estimates for markets in certain individual resources are available mainly for pharmaceuticals: some plant-based "blockbuster drugs" like the chemotherapy drug vincristin (developed from the Madagascar rosy periwinkle *Catharanthus roseus*) command prices of more than 10 million US Dollars per kg pure substance (Kate/Laird 1999: 2). Other examples are cited e.g. by Kate/Laird (2004: 134), Reid et al. (1993a: 15-18), and Schuler (2004: 160). The contributions of single genetic resources used in agriculture are much more difficult to determine: crop varieties and breeding lines are by necessity being crossed, and certain genes or traits are transferred from one to another, while pharmaceuticals are usually based on only one or a

very small number of genetic resources. Additionally, product markets in pharmaceuticals are much more regulated and easier to monitor than those in the agricultural sector. It is to be assumed, however, that there are individual crop genetic resources (e.g. certain breeding lines, traditional varieties or even single resistance genes) that have contributed greatly to crop breeding and to the market value of resulting products (see footnote 163 and ch. 1.1.4.6).

Despite these impressive commercial markets, however, such values of the sales of final products offer little indication of the bioprospectors' willingness to pay for access to a specific original resource (Kate/Laird 1999: 1, 143), which would be central to the individual ABS contract. Reasons for the difficulty in quantifying the value of "raw" resources (in contrast to the value of final products) and the often low willingness to pay are partly fundamental, partly contingent and include

- further potential providers of the same resource or other resources possessing the same trait,
- potential technical substitutability of the resource (Henne 1998: 80),
- uncertain expenditures on associated R&D to develop the final product (see Table 4),
- varying marginal use for market participants (Lerch 1999: 175),
- awareness or unawareness of conservation costs (Henne 1998: 80), and
- other political and legal conditions (Henne 1998: 80).

The value of genetic resources in ABS negotiations, expressed here as the user's marginal willingness to pay, can thus be expected to be often considerably lower than the "real" market value or the value for the providers. It is therefore possible that monetary benefits arising from unregulated bilateral ABS contracts will not provide significant funding for aims of resource conservation and poverty alleviation at the global level (see ch. 4.3.4).

The imbalance of the users' willingness to pay and the actual value of a genetic resource is further aggravated by the fact that the above considerations have addressed only direct use values. The total economic value, in contrast, includes further values which can hardly be estimated, much less captured in ABS contracts (cf. Byström et al. 1999: 16). Numerous conceptions of classifying them exist[161]; I will here prefer the one by Grimble/Laidlaw (2002: 8):

Use values			**Non-use values**	
Consumptive direct use values	Non-consumptive direct use values	Indirect use values	Option values	Existence values
Goods for home consumption, manufacture or trade	Non-tradable or subtractive goods, incl. aesthetic values	Ecological functions for maintaining sustainability and productivity	Possible future use or serendipity	Satisfaction from knowledge of existence

Table 5: Classification of the total economic value; based on Grimble/Laidlaw (2002: 8)

Although this classification addresses biological as well as genetic resources, for the line of argument followed here, it is a useful differentiation. An additional "intrinsic value" of biodiversity is often postulated in environmental ethics and also mentioned

[161] Virchow (1999; cited in Alker/Heidhues 2002: 17) suggests: total economic value = direct use values + non-direct use values; Randall/Stoll (1983; cited in Lerch 1999: 177) suggest: total economic value = use value + non use value).

in the CBD Preamble, but its implications for practical questions are far from clear. Such a value that is independent of human appreciation does, of course, play a significant role in many indigenous and local cultures. Where this is the case, justice obviously demands to take into account such worldviews in ABS negotiations (cf. principle 9), as will be discussed in chapters 4.8.6 and 4.8.7.

To each of these use and non-use values, corresponding beneficiaries can be conceived at the local and global level, as well as in the present and in the future (Henne et al. 2003: 6), many of whom can hardly be taken into account in ABS contracts. Many of the direct use values are known only to a limited number of people or communities (Henne 1998: 75); to the others, they represent merely option values. It is almost only the consumptive direct use values that are accessible for monetary valuation; other values mostly remain external, hence the characterisation as external benefits resp. costs. They are mostly provided in the form of public goods, with all the pitfalls described in chapter 4.4.4.

It is thus insufficient to base benefit sharing only on the monetary valuation manifested in ABS contracts since in this case the providers run the risk of losing resources of more total value to them than the user is willing to compensate them for. Additionally, external costs and benefits, e.g. concerning ecological functions (indirect use values) or future uses (option values), often accrue in other parts of the world or in the future and thus cannot be internalised or captured in bilateral contracts. Monetary amounts determined or negotiated as benefits in exchange for access to genetic resources cannot be justified by mere reference to their market or commercial value. These consideration are well in accordance with the principles that market mechanisms may be designed and regulated in such a way as to satisfy concerns of justice (principle 6) and that benefit sharing should be regarded as fulfilment of the affluents' negative duties (principle 2), rather than as merely a negotiable payment for newly accessed resources. I will sum up these objections to the market-based valuation of genetic resources in the following criterion of justice:

> **Amounts of benefits to be shared should not primarily be determined in bilateral ABS negotiations and contracts since these are unable to capture all components of the total economic value of crop genetic resources.**

Suggestions to alleviate these valuation problems, for biological or genetic resources in general and for ABS negotiations in particular, range from more sophisticated market solutions internalizing external values, to the acknowledgment that such market-based valuation is principally impossible (Lerch 1999: 183; McAfee 1999: 528; Peria 2005: 175). As an alternative, it has been suggested to leave the valuation to the providers instead of to the users (Young 2004: 289), e.g. in the form of cartels of provider countries fixing royalty rates in ABS negotiations (Vogel 1999: 530; Vogel 2007). Such an approach, however, would run counter to other aims of benefit sharing identified here like the encouragement of desirable innovations (ch. 4.2.3) and is thus not very convincing. From the above discussion, and because costs for negotiation and enforcement would probably be forbiddingly high, complete market solutions seem illusionary, so that the desirable effects that some proponents expect from monetary valuation should be attempted by other means. While I cannot provide a concrete solution for the general valuation problems here, I regard it as important to keep in mind these uncertainties and contingencies for the further discussion of fair and equitable benefit sharing. In chapter 4.4.3, I will demand to constrain the prop-

erty rights transferred in ABS contracts so as not to unduly limit the use values remaining with the providers and potential future users.

4.3.2 Conservation of associated traditional knowledge

In order to conserve crop diversity and to facilitate innovations based on genetic resources (as demanded in chapters 4.2.1 and 4.2.3), it is indispensable to conserve the associated knowledge about the characteristics, habitats, management, and uses of a specific crop.[162] Especially in the case of resources which are not commercially marketed, such as landraces and farmers' varieties, the associated knowledge often exists as informal, common, and traditional knowledge of the indigenous and local communities currently managing the resources. Due to its special characteristics such as oral transmission, practical nature, secrecy, and local reference (see ch. 1.4.8), this traditional knowledge is susceptible to loss if the communities holding it (have to) move, change their way of living, or lose their natural base of existence (Heineke 2003; Kuppe 2002: 117ff). Posey/Plenderleith (2004: 154) rightly underline that the knowledge of indigenous communities should not be protected simply for nostalgic reasons or to compensate for past injustices, but may "hold the key for understanding the rational use and management of these living natural areas, and probably others". Benefit sharing can contribute to this conservation e.g. by remunerating providers (see ch. 4.3.4) or by funding targeted conservation efforts. I will therefore formulate a criterion of justice complementary to that concerning the conservation of genetic resources:

> **Benefit sharing should facilitate the conservation of traditional knowledge associated with crop genetic resources.**

In addition to such a protection against loss, and in accordance with a right to self-determination of affected communities and individuals (cf. principle 9), traditional knowledge should also be protected against misappropriation. Important and somewhat controversial tools that aim to serve both purposes (protection against loss and against misappropriation) are public and non-public registers and databases, where traditional knowledge can be documented together with claims to owner- or creatorship (see ch. 4.4.5.7).

4.3.3 Incentives for providers to grant access

In chapter 4.2.3, I have illustrated the importance of encouraging innovations based on genetic resources, especially such innovations that will enhance the availability of enough and adequate food and of other basic commodities. Empirical studies confirm that genetic resources and associated knowledge continue to provide important leads in the discovery and development of a wide variety of products (Alker/Heidhues 2002: 17; Holm-Müller et al. 2005: 55; Kate/Laird 2004: 134, 143). Opinions diverge, however, on whether such innovations will employ "fresh" genetic resources that are not yet investigated or are only found *in situ*. Overall demand for genetic resources in commercial use may

increase because of…	**decline because of…**
new tools to explore and use them (Alker/Heidhues 2002: 17; Kate/Laird 1999: 317; Kate/Laird 2004: 134,	alternative methods of discovery and development (Alker/Heidhues 2002: 17; International Chamber of Commerce 2004: 4;

[162] In chapters 1.1.4.4 and 1.1.4.5, the significance of traditional knowledge for the commercial exploitation of cupuaçu and brazzein has been illustrated.

143).	Kate/Laird 1999: 316).
increased consumer demand for natural products (Kate/Laird 1999: 317).	increased use of literature and existing *ex situ* collections instead of bioprospecting (Kate/Laird 1999: 317f; Moore/Halewood 2006: 2).

In the case of crop genetic resources, expectations are similar to other sectors: plant breeders will continue to use primarily improved material (such as commercial varieties) and well-known genetic material from *ex situ* sources, existing in their own or other companies' collections, gene banks, research institutions, and botanical gardens (Alker/Heidhues 2002: 17; International Chamber of Commerce 2004: 4; Kate/Laird 1999: 135). The demand for "exotic" or "primitive" genetic resources, especially landraces and wild relatives *in situ*, is generally low and may

grow because…	**decrease because…**
albeit small, their contributions can be very important, e.g. by introducing a resistance or tolerance gene.[163]	the material often is already in domestic national collections, so breeders do not have to contact providers abroad.
they are necessary to further broaden the genetic base.	the demand for material from abroad is focused on countries with similar agro-ecological conditions.
they may facilitate moving from chemical pesticides to more biological approaches.	access to genetic resources abroad is becoming more difficult because of restrictive policies.
modern methods facilitate their exploration and use.	they need a lot of input for further breeding and to eliminate undesirable traits.

(based on Kate/Laird 1999: 138-142, especially Box 5.8)

Evaluating these contradictory arguments, Kate/Laird (1999: 142) come to the unsurprising conclusion that the overall demand for access to genetic resources (both traditional and improved) in agriculture and plant breeding is expected to grow or remain at the present level. Unfortunately, it depends on the validation of these empirical uncertainties how much benefits can be expected to result from future ABS contracts; this will also be discussed in chapter 4.3.4.

[163] For some recent uses of "primitive" material in successful breeding programmes, see Kate/Laird (1999: 140, Box 5.7).

Demand for genetic resources in other sectors of biotechnology

For pharmaceuticals, the demand for and use of natural products and associated knowledge seems to be cyclical (Kate/Laird 1999: 76; Ribeiro 2005: 59). Despite a currently low level of drug-discovery programmes by major pharmaceutical companies, natural products and derived or related structures are expected to continue to play an important role (Kate/Laird 1999: 76; Newman/Cragg 2007: 467), translating into a steady demand for fresh, possibly mainly *ex situ*, genetic resources. In an analysis of the sources of new chemical entities and new drugs from 1981 to 2006, Newman/Cragg (2007: 467; cf. Figure 1, p. 472) found that natural products or structures derived from them remain important in pharmaceutical R&D – in spite of a currently low level of bioprospecting programmes and the emergence of high-throughput-screening of products of combinatorial chemistry. The best selling drug (over 11 billion US Dollars in 2004) was atorvastin, which is employed in cases of elevated cholesterol levels and is derived directly from a natural product (p. 467). The authors advocate expanding the exploration of natural active agents especially in marine and microbial environments (p. 475f). Kate/Laird (1999: 34) found 42% of the sales of the 25 top selling drugs worldwide to be either biologicals, natural products, or entities derived from natural products. The diverse and rapidly growing botanical medicine industry is another important user of genetic resources and associated knowledge (Kate/Laird 1999: 78). Botanical medicine (produced directly from raw plant material such as ginseng, green tea, gingko, aloe, camomile, ginger) may be considered an intermediary between agricultural and pharmaceutical use of genetic resources, illustrating the difficulties of delimiting such uses. However, since companies in this field are often not so much interested in discovering new products but in marketing those that are known and well-established (Kate/Laird 1999: 115), demand for fresh resources may be low. In crop protection and other biotechnology sectors, demand for genetic resources is expected to grow especially for micro-organisms (Kate/Laird 1999: 226, 260).

Box 9: Demand for genetic resources in other sectors of biotechnology

Even though not all research and development that is or will be carried out on the basis of genetic resources might be ethically desirable, there are undoubtedly many desirable innovations for which genetic resources will be needed. Any innovators who are not already holders of adequate resources will have to be able to access them e.g. via bioprospecting. In the past, this has often happened without explicit permission, and in connection with the recently available strong protection of resulting products by intellectual property rights, this has resulted in claims of "biopiracy" by the original resource holders: broad intellectual property rights by users on material not significantly differing from the original resource mean that the resource providers cannot continue to freely use their resource, or at least cannot commercialise it. Even strict conditions put down in national access legislation or in bilateral ABS contracts at present are no guarantee that providers can safeguard their interests since these are difficult to enforce abroad (see ch. 4.8.1). The fear of misappropriation therefore has already prompted many provider countries and communities to erect legal barriers and severely restrict access to their genetic resources. Brazil, for example, requires anthropological profiling to identify entitled custodians of traditional knowledge prior to the grant of PIC (Kamau et al. 2008: 6) – a task exceedingly complicated e.g. in the case of widely disseminated traditional knowledge. In the view of Byström et al. (1999: 53), "access regulation is the tool offered by the CBD to countries providing genetic resources for self-defence against IPR claims" and enables them to set conditions for the use of their biodiversity. This effect is not restricted to commercial research: public research is increasingly being privatised, and the remaining public institutions often strive for protection of their own material and research results by intellectual property rights. Thus, the exchange between research institutions, gene banks, botanical gardens etc. as well as access to them for non-commercial purposes is facing equivalent difficulties as commercial research. Until fears of misappropriation are counteracted, provider countries, communities, and institutions will be inclined towards restrictive access as the only way to defend their autonomous resource use and self-determination. Of course, this might imply that less potential benefits from their genetic resources will be realized, but with very little substantial benefit sharing taking place so far, they assume to have nothing to lose by denying access (Frein/Meyer 2005: 130). Considering aspects of justice (especially principles 3, 6, 9), such a defence of vital means to subsistence and of traditional, often collective, ownership structures must be regarded as legitimate: free access, in combination with easily gained intellectual property rights for users that restrict others' rights to use the protected resource, can entail significant negative effects in the socio-economic sphere.

Either as a result of this restriction on access, or of certain other trends referred to in the tables above, corporate demand for *in situ* genetic resources and associated knowledge is observed to be diminishing, and companies seem to focus even more than hitherto on existing commercial or public *ex situ* collections and knowledge already publicized. Thus, the current practice of access regulation runs the danger of impeding access to fresh genetic resources and to deter potential users from research. Since this is hardly in the common interest, new ways of protecting the providers' rights and freedoms have to be considered in order to (re-)facilitate access. Of course, it is in accordance with principles of justice if providers deny access as a matter of principle, e.g. for resources and knowledge of high cultural or spiritual value to them. However, in cases where their main concern is the socio-economic harms of misappropriation, providers might be more inclined to grant access if these reservations can be eased by adequate measures and instruments. I will thus formulate the following criterion of justice:

Benefit sharing should offer incentives for providers of genetic resources and associated knowledge to grant access, e.g. by better protecting their customary rights and freedoms concerning resource use.

Suggestions for appropriate measures and instruments, which will be discussed in more detail elsewhere, include adequate forms of intellectual property rights (ch. 4.4.5), user country legislation (ch. 4.8.1), and global minimum standards for benefit sharing (ch. 4.8.2). The ITPGR (ch. 2.4.2) is the most prominent example of an instrument designed for this purpose of re-facilitating access by defining a binding framework of benefit sharing. As an interim solution for resources not covered by the ITPGR, Frein/Meyer (2005: 151) recommend providers "insist that, in order for them to sign any ABS agreement, the provisions of that agreement must specifically exclude any patents on the knowledge and resources under negotiation". This suggestion can be supported on ethical grounds, but may deter potential users and impede desirable innovations. At the very least, therefore, the continued customary use of genetic resources, such as seed saving and informal seed exchange, should be guaranteed as an important contribution to meeting basic human needs (principle 3) and conserving genetic resources *in situ* (principle 8). It is well possible, as GRAIN (2005b: 11) states, that these contributions to people's livelihoods and environmental health[164] will remain the greatest benefits for resource holders and can hardly be compensated by potential profits from commercialisation and privatisation or by benefits arising out of ABS contracts.

> "For countless communities of farmers, forest keepers, fisherfolk, hunters and others, the crucial benefit-sharing issue is not whether they can control access. What really matters in terms of benefits is their own autonomy to continue using, managing, sharing and developing biodiversity" (GRAIN 2005b: 11).

4.3.4 Remuneration for providers' efforts and associated knowledge

The central and most obvious purpose of benefit sharing in the present discussion is to channel an adequate amount of benefits to those providing resp. having provided genetic resources and associated knowledge. Depending on one's viewpoint, these benefits can be considered e.g. as (fixed) payment solely for granting access to an individual resource, as (proportionate) sharing in the profits of resulting products, and/or as compensation for past conservation efforts that have often entailed considerable direct or indirect costs (see ch. 1.1.2). Accordingly, aspects of commutative justice are, again, intertwined with aspects of distributive and, possibly, corrective justice (see ch. 3.2.1). In line with the long-term aims of benefit sharing identified in chapter 4.2, I will conceive benefit sharing with providers as

- compensation for their conserving resources and associated knowledge,
- contribution to international justice and poverty alleviation, and
- incentive to grant access.

While the questions of who exactly should receive benefits and what they should consist of will be discussed in chapters 4.6 and 4.7 respectively, I will here focus on the overall amount of benefits to be expected.

[164] These values are well captured by the various components of the total economic value as explained in Table 5 (p. 123), e.g. the indirect use value of ecological functions.

At present, the opportunity costs[165] for *in situ* conservation and diversified small-scale agriculture are mainly borne by the local handlers of genetic resources. These are often small farmers and marginalized population groups in developing countries, who provide large external benefits through their small-scale and low-input agriculture (cf. Subramanian 2002: 384f). If these farmers, communities, and countries are to be encouraged to continue with this practice of providing public goods at individual costs, additional benefits will be necessary to outweigh short-term individual gains that would accrue from changing to more productive varieties or from giving up farming altogether (cf. Alker/Heidhues 2002: 16; Henne et al. 2003: 5). If no efforts are made to convey to them more benefits, ongoing attempts to raise agricultural productivity will lead to further homogenisation of crops and cropping systems (contrary to principle 8). In the long run, this may reduce dietary diversity and quality[166] and endanger the food security and basic means of subsistence of poor farmers and communities (contrary to principle 3). Benefit sharing is often thought to be a solution to these (valuation) problems and hoped to provide significant additional income e.g. for farmers and indigenous and local communities, as well as for developing countries in general. Some authors explicitly see the developing countries' biodiversity as „green gold" or the equivalent of Middle East oil to be mined (e.g. Sharma 2005: 10, 12). Insofar as the providers' additional income would fulfil the aims in the previous chapter, it is of course welcome from an ethical point of view. However, given the present framework of ABS contracts, this presupposes a steady or increasing demand of fresh genetic resources and adequate payment negotiated bilaterally between user and provider. In chapter 4.3.1, I have demonstrated that both desiderata are not necessarily fulfilled: demand for genetic resources for which benefit sharing regulations would apply, as well as users' willingness to pay, are uncertain and will often be low. Providers are at a structural disadvantage due to their often inferior bargaining position vis-à-vis commercial users and to the unenforceability of contractual ABS provisions abroad (see ch. 4.8.1). Therefore, it has to be regarded as unlikely that bioprospecting and ABS contracts within the current legislative framework will yield large sums of additional income for providers – especially for *in situ* providers such as farmers, indigenous and local communities (Bowen 2005; Carrizosa 2004a: 296, 300; Dross/Wolff 2005: 9, 58; Kate/Laird 2004: 147; Seiler/Dutfield 2001: 109, 111; Zeeb 1996: 71). Some authors even hold that providers might end up poorer after a period of bioprospecting and market saturation, when they will find themselves without access to their former resources and without equivalent compensation (McAfee 1999: 528; Shiva 2005: 34).

Without attempting to answer this empirical question, it is quite obvious that the great benefits that undoubtedly arise from the use of crop genetic resources cannot be captured adequately in monetary terms or market solutions such as bilateral ABS contracts, and resource providers will very likely not be adequately remunerated if they remain dependent on this kind of benefit sharing. In order to significantly serve the envisaged long-term aims (ch. 4.2), benefit sharing must thus be discussed within a broader framework extending beyond the benefits that are usually negotiated in

[165] These are the foregone financial gains compared to alternative uses to which the habitats could be put. While *in situ* conservation of crop genetic resources recently has been practiced mostly in developing countries, industrialised countries have followed the (individually and in the short term) economically more efficient course of splitting the available land into areas of intensive monocultures and areas of (nature) conservation (Kuppe 2002: 116).

[166] To give one example out of many available, Frei/Becker (2004: 1608) found some traditional rice landraces in the Philippines to contain significantly higher levels of protein, lipids, and micronutrients than modern high-yielding varieties.

bilateral ABS contracts. This is not only a matter of practicality, but also a means of regarding benefit sharing as the fulfilment of the affluents' negative duties towards the disadvantaged (principle 2).

> "For practical and equitable reasons, ABS must be seen not only as a commitment to create ABS, but also as an obligation to make it profitable for developing countries. Hence, if the experiential data on ABS to date indicates that it has not been financially beneficial to developing countries, the Contracting Parties have an obligation to make it beneficial, rather than to drop it as an unpromising concept." (Tvedt/Young 2007: 94)

My next criterion of justice hence says:

> **Providers and conservers of crop genetic resources and associated knowledge should be compensated not only via benefits agreed in bilateral ABS contracts, but also e.g. via public funding and support.**

In order to be distributed in a just way, these additional funds should prioritise the provider's basic needs (principle 3) and should be distributed more broadly than only among the clearly identifiable providers of an individual resource. In chapter 4.6, I will argue for extending benefit sharing to all providers and custodians of agro-biodiversity, avoiding some of the market inadequacies already discussed. Chapter 4.7 will comment on potential elements of benefit sharing, including the balance of monetary and non-monetary measures enhancing providers' capacities for domestic innovations and marketing. Notwithstanding such additional funds for providers, benefit sharing from crop genetic resources should not be regarded as the only or sufficient source of funding for conservation, poverty alleviation[167], and the promotion of desirable innovation. Rather, these aims will continue to challenge the global economic order (as illustrated drastically by Thomas Pogge) and are only achievable by combined efforts in various political and economic areas. In the following chapters (4.4 to 4.8), I will discuss the most important conditions that must be fulfilled in order for benefit sharing to serve the aims and purposes identified in this and the previous chapter.

4.3.5 Results: Criteria of justice for medium- and short-term purposes of benefit sharing

Summarizing, the following conclusions can be drawn for justice in the purposes of benefit sharing.

Valuation of genetic resources:

2.1 Amounts of benefits to be shared should not primarily be determined in bilateral ABS negotiations and contracts since these are unable to capture all components of the total economic value of crop genetic resources.

Conservation of associated traditional knowledge:

2.2 Benefit sharing should facilitate the conservation of traditional knowledge associated with crop genetic resources.

Incentives to grant access:

2.3 Benefit sharing should offer incentives for providers of genetic resources and associated knowledge to grant access, e.g. by better protecting their customary rights and freedoms concerning resource use.

[167] According to Pogge's estimates, 300 billion US Dollars would be necessary annually only to eradicate the most severe poverty (see ch. 3.5.2).

Remuneration for providers:

2.4 Providers and conservers of crop genetic resources and associated knowledge should be compensated not only via benefits agreed in bilateral ABS contracts, but also e.g. via public funding and support.

4.4 How should legitimate property rights in genetic resources and associated knowledge be construed?

4.4.1 Approach and objectives

Property rights in genetic resources are arguably the most contested issue in the context of access and benefit sharing: according to some, they are making "biopiracy" attractive and profitable, while for others, they are quite to the contrary an important tool to fight misappropriation and to adequately value genetic resources. According to the CBD Preamble, states have sovereign rights over their biological resources, but are also responsible for their conservation – which is at the same time a common concern of humankind.[168] The ABS provisions of the CBD obviously imply that it is possible to identify providers of genetic resources and associated knowledge who are able and entitled to grant access. However, the CBD does not interfere with national legislation on property rights, so that fundamental, ethically relevant questions like the following remain unanswered:

- Can and should genetic resources be construed as private property at all?
- Do similar property rights apply to natural and to cultivated genetic resources?
- How can their ability to reproduce without human assistance be accounted for?
- Who is the owner of a crop genetic resource if the individual contributions to its cultivation are not identifiable?
- How can the associated knowledge be taken into account, which is not part of the genetic information but is crucial for a plant to serve as a resource?

Some possible answers to these questions will be discussed here on the basis of the ten principles of justice and the aims and purposes of benefit sharing identified above. While a comprehensive account and evaluation of the legal and economic debates concerning property in genetic resources is beyond the scope of this thesis, I will refer to the most important aspects and arguments, focusing on those relating to justice and benefit sharing.

The term *property* is used with different and diffuse meanings. At one end of a continuum, it may signify nothing more than the physical possession of something (whether legitimate or not), while at the other end, it may be understood as ownership rights, i.e. as a normative term concerning a person's rights to a thing. For the purposes here, I will follow the latter variant in discussing property rights that are normatively or legally acknowledged. Such property rights can include any rights of disposal that are formally or habitually acknowledged. The objects of property rights can be tangible or intangible (i.e. intellectual); owners can be persons, groups or institutions. Property rights may consist in a rather comprehensive bundle of rights, e.g. to exclusively exploit, transfer and destroy a resource, but they are also conceivable as being restricted to certain uses and subject to further conditions. In the following, I will first give an account of various concepts of property and their foundations in theories of political philosophy and ethics (ch. 4.4.2). Coming to the result that property rights may legitimately be regarded as conditional rather than absolute rights, I then deduce some constraints on them on the basis of Rawls' and Pogge's concepts of justice. In this context, I will state that property rights in genetic re-

[168] "The Contracting Parties, […]Affirming that the conservation of biological diversity is a common concern of humankind, Reaffirming that States have sovereign rights over their own biological resources, Reaffirming also that States are responsible for conserving their biological diversity and for using their biological resources in a sustainable manner, […]"

sources may exclude the rights to destroy them and to exclude others from their use (ch. 4.4.3), and that common property or open access regimes can be viable alternatives to private property regimes (ch. 4.4.4). After discussing these differentiations, I will focus on intellectual property in genetic resources and associated knowledge as the central issue in the debate on property in genetic resources (ch. 4.4.5). After commenting on patents as the most contested variant, I will evaluate various other conventional and alternative instruments of protecting intellectual property. Differentiating the subject matter of protection (e.g. unaltered genetic material vs. improved varieties), I will identify which protection instruments are justifiable for which kind of genetic resources resp. associated knowledge. I would like to mention already at this point that I do not aim at a general critique of the patent system, nor do I claim that fair and equitable benefit sharing can or should be achieved by the correct regime of property rights alone. They can be one instrument contributing to a fairer and more equitable benefit sharing, e.g. by preventing illegitimate patents and by providing legally acknowledged forms of property for traditional genetic resources and traditional knowledge, but it would be unrealistic to expect that they can solve all problems of justice concerning the use of genetic resources.

4.4.2 Concepts of property rights in political philosophy and ethics

The definition and justification of property rights have always been a central subject in political philosophy and ethics. After introducing the property concept of John Locke as fundamental for the modern understanding of property rights, I will shortly illustrate how private property rights are conceived in some currently prevalent ethical approaches.[169] The first one, libertarianism, states an absolute right to private property, while for the remaining ones, private property rights are subject to certain constraints. Neither the theoretical foundation of property rights in these theories nor their further differentiation is possible here; rather, the aim is to illustrate how the justification of private property hinges on an account of justice, and how different accounts of justice can yield diverging conceptions of property rights. Although current legislation or alternative suggestions for property rights mostly do not adhere strictly to one of these theories, many arguments put forward in the debate can be attributed to one of these conflicting basic positions. For the remaining discussion of property rights, I will then adhere to a concept of conditional property rights consistent with the principles of justice deduced from Rawls and Pogge, as well as with the aims and purposes of benefit sharing identified in chapters 4.2 and 4.3.

4.4.2.1 The locus classicus *in the work of John Locke*

Up to the 17th century, private property had been regarded as merely a contingent result of social convention: it broke up the original community of goods, and at the same time imposed certain moral duties on the wealthy since they assumed a greater part of the total amount of goods that was taken to be finite (Brocker 1992: 26-28, 287f).[170] This view became subject to criticism and revision in the 17th century, when John Locke (1632-1704) formulated a new justification, which is explicated in the second of his *Two Treatises of Government* (1690)[171]: private property does not arise

[169] The ethical approaches themselves have been shortly characterised in chapter 3.2.2. Here, I will refer more specifically to their conception of property rights. Apart from these four, property theories have been elaborated e.g. by Kant and Hegel, which are not considered here.

[170] This view lives on in contemporary concepts e.g. of a "universal destination of goods" formulated in Catholic social teaching, which attempts to balance private property and the common good (cf. Warner 2001: 303f). "There is a social claim upon private property – private property must serve the common good, the well being of all." (Warner 2001: 312f).

[171] I refer here to *The Second Treatise of Government* edited by Thomas Peardon, based on the 1764 edition which included corrections and changes made by Locke after the original publication in 1690.

through social convention, but as a natural right (i.e. a right pertaining to every human being and preceding any government) from each individual's property in his/her own person. From this concept of self-ownership, Locke deduced both a defensive right resp. right to personal liberty, and a right to property in external goods (Herrmann 2007: 15): in a pre-institutional state of nature, individuals have equal moral claims on natural resources (Pogge 2008c: 143). These un-owned natural resources were originally given by God to all men in common, but when someone actively appropriates them and mixes his labour with them, the product becomes his legitimate property.

> "He that is nourished by the acorns he picked up under an oak, or the apples he gathered from the trees in the wood, has certainly appropriated them to himself. Nobody can deny but the nourishment is his. I ask, then, When did they begin to be his? When he digested or when he ate or when he boiled or when he brought them home? Or when he picked them up? And it is plain, if the first gathering made them not his, nothing else could. That labour put a distinction between them and common. That added something to them more than Nature, the common mother of all, had done, and so they became his private right." (Locke/Peardon 1952: 18, § 27)

Locke thus justifies the appropriation of natural resources as belonging to the natural rights of every human. Such statements in the 17th century implied distinct criticism of aristocratic and feudal societies, where property rights were based on custom and inherited privileges rather than on one's own achievements. Just distributions in Locke's concept are not defined by a certain distribution pattern of (limited) goods, but solely by fair rules of appropriation (Brocker 1992: 288). Appropriation by these rules may legitimately lead to unequal distributions if they come about through varying personal abilities and efforts (Brocker 1992: 286; Herrmann 2007: 22). Greater property for Locke does not entail greater duties; quite to the contrary, the pursuit of wealth is morally desirable, and poverty mostly self-inflicted (Brocker 1992: 288f).

The two most prominent objections to Locke's approach are, on the one hand, the question why not only the added value resulting from human labour on natural goods, but the whole product should become one's property, and on the other hand the fact that natural resources are often not as unlimited as the concept of appropriation by labour presupposes (Herrmann 2007: 21f). Even in the 17th century, land, water, or wild fruits that Locke mentions as examples would often not have sufficed for everyone interested in appropriating them. For such cases of scarcity, Locke introduces the constraint (termed Locke's proviso) that nothing must spoil and that a person's appropriation must leave enough and as good for others.

> "It will, perhaps, be objected to this, that if gathering the acorns or other fruits of the earth, etc., makes a right to them, then any one may engross as much as he will. To which I answer, Not so. […]As much as anyone can make use of to any advantage of life before it spoils, so much he may by his labor fix a property in; whatever is beyond this is more than his share and belongs to others." (Locke/Peardon 1952: 19; § 30)

This condition can be lifted with universal consent, if it is to the advantage of everyone. The invention of money, according to Locke, is an example of such a desirable suspension of the proviso, making everyone better off than would be possible in a state of nature with strictly proportional shares (Pogge 2008c: 208).

While Locke's account of the origin of property through natural rights, self-ownership, and invested labour has influenced all subsequent conceptions of property

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My account of Locke's writings is further based on Brocker (1992), Herrmann (2007), Pogge (2008c), and Uzgalis (2007).

rights (Brocker 1992: 311ff), it is today being referred to especially by libertarians. For intellectual property rights in genetic resources and associated knowledge, for example, it is often argued that they arise as natural rights by the efforts invested in research and development. However, this claim can be questioned already within the Lockean concept since these property rights often restrict others' freedoms to use their physical property as they please, and diminish the potential intellectual property in genetic resources available to others – hence not leaving enough and as good for others (cf. Hollis/Pogge 2008: 63-66). In these respects, intellectual property rights in genetic resources differ significantly from Locke's examples of (tangible property in) bulk natural resources. His concept of property rights is thus not easily applicable to the problems of benefit sharing and will here mainly serve as background information for the criticism of libertarian property rights below.

4.4.2.2 Property rights in libertarianism, utilitarianism, and egalitarianism

Libertarian theories of property rights are usually based on the Lockean concept of natural rights and self-ownership; they reject any interference with private property or forced redistribution by the state. The most influential contemporary work is Robert Nozick's *Anarchy, State and Utopia* (1974, especially pp. 150-182). In his entitlement theory, a person is entitled to a holding if the property was justly acquired originally, or gained by a just transfer from another person properly entitled (Nozick 1974: 151). After the exact requirements for just acquisitions and transfers have been spelled out by convention, a distribution is just if property is distributed solely according to these principles. Nozick accepts only historical principles for entitlements to property; he decidedly rejects those principles of distributive justice he calls end-state principles, meaning such principles that define just distributions by regarding only their result (e.g. utility, equality) independent of the history how it came about. He roughly follows Locke's definition of justice in acquisition, although he criticises the labour-mixing criterion as incoherent (p. 175). With reference to Kant, Nozick compares taxation to forced labour (pp. 168-170), which would violate the second form of Kant's categorical imperative, i.e. not to use a person solely as a means (pp. 30-33). He provides the following weak interpretation of Locke's proviso: a person rightfully acquires an un-owned object by improving it (resp. working on it) only if nobody else's situation is worsened by this acquisition in such a way that he/she is not free any more to use the object or an equivalent one (p. 176). An example of such an illegitimate acquisition is the appropriation of the only water hole in a desert; in such cases, property rights may legitimately be limited or overridden. However, the new owner in this case is still justified if he compensates the persons concerned (p. 178) or if his new property is self-developed and would not exist without him (pp. 181f). As an example for the latter case, Nozick explicitly refers to patents.[172]

Nozick's entitlement theory has found many critics, which in my opinion rightfully question his acceptance of various existing injustices in a libertarian property rights regime: they point out that people's advantages in acquisitions and property are often contingent e.g. on family background and thus unjust from the start, and that the institution of private (especially intellectual) property rights itself can imply continuous interference with certain freedoms of others (e.g. Hollis/Pogge 2008: 63-66). It is not clear how Nozick justifies the absolute priority of liberty, instead of balancing freedom against end-state principles like equality or social welfare. Libertarian prop-

[172] Quite to the contrary, it seems to me that Nozick's restrictions on appropriation may well apply to genetic resources, especially to patents on unaltered genetic material, which indeed restrict others' use of existing material resources (see ch. 4.4.5.1).

erty rights in genetic resources are, to a certain extent, implicitly presupposed by purely bilateral ABS contracts, but I will argue below that they would neglect e.g. the character of genetic resources as intergenerational property, as well as basic demands of justice such as poverty alleviation.

Property rights and distribution patterns within a utilitarian theory, in contrast, are justified on purely teleological grounds, i.e. by considering their consequences in terms of greatest (aggregate or average) utility. Utilitarian arguments often arise in practical debates on property rights in natural resources, e.g. in the following way: society is said to benefit from private property rights because goods are employed more efficiently and sustainably than under a different rights regime, leading to greater common or total welfare. Following this justification, critics argue, pure utility may also require significant redistributions from the rich to the poor, whose marginal utilities for a given resource will be higher. This might be instrumental for achieving greater material equality, but with the drawback that property rights would remain rather weak or altogether loose their quality as rights (Goodin 1994: 444), thereby neglecting personal liberties and possibly involving continuous interference with individual property relations. From a Rawlsian standpoint and in accordance with the ten principles of justice extracted in chapter 3, strict utilitarianism can be said e.g. to fail to attach adequate weight to the importance of basic personal liberties, such as the interests of minorities with regard to their resources (cf. principle 5), and would therefore probably not be agreed to in a hypothetical consensus (cf. principle 1). An important favourable characteristic of the utilitarian approach, however, is that consequences in the future weigh the same as in the present (Birnbacher 2002: 96, 105), which would e.g. entail rather strict duties for the conservation of natural resources, as demanded also by Rawls in his principle of just savings (cf. principle 8).

Egalitarianism would demand redistributions of property until equality (of a certain indicator) is reached. In a radical egalitarian view, similarly to strict utilitarianism, private property rights would lose the character of basic rights. They would instead be subject to redistribution or might even be rejected altogether with regard to certain resources (as in Marxism). As explained above for utilitarian property rights, such neglect of basic liberties in favour of strict equality (beyond the fulfilment of basic human needs, see principle 3) is difficult to justify within the framework of justice employed here.

A contractarian approach to property rights would have to determine what affected persons would rationally agree to. This may or may not be similar to the schemes suggested by competing theories (above all, egalitarian theories), but with a difference in legitimation. In the following, I will adopt a contractarian approach to property rights in accordance with the principles of justice identified in chapter 3.

4.4.2.3 Conditional property rights in accordance with Rawls and Pogge

From the above comparison of the concept of property rights in various ethical theories, it is evident that such rights can be justified on very different and even antagonistic grounds. While all of them acknowledge that people's rivalry for limited goods necessitates property rights as a reciprocal limitation of individual freedoms, there is a plurality of viable views. For the discussion below, it is important to note that of these theories, only libertarianism states an absolute right to private property while for the remaining, private property rights are subject to certain concerns of justice. Such concerns of justice, which make property rights conditional rather than abso-

lute, are here adopted from the theories of Rawls and Pogge and expressed in the following principles (see ch. 3.7, p. 109):

- The bases of fair and equitable benefit sharing should be designed in such a way that all persons concerned can resp. would agree to them in a **hypothetical consensus** under a Rawlsian veil of ignorance concerning e.g. their social position, living conditions, natural endowments, and country of birth. (Principle 1)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- **Property rights** and market mechanisms, especially concerning natural resources, may be designed and regulated in such a way as to satisfy concerns of justice, for example in order to provide public goods or to fight and prevent extreme poverty. (Principle 6)

- Insofar as genetic resources are provided to mankind by nature, all persons should be regarded as holding a **proportionate share** in them, for which they have to be adequately compensated if excluded. (Principle 7)

- Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Principle 8)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

- International negotiations about the use of and benefit sharing for genetic resources should consider and compensate **differential bargaining power**, especially the disadvantages of developing countries. (Principle 10)

Rawls goes as far as saying that his theory does not presuppose a right to private property in the means of production and is compatible with a property-owning democracy, as well as with a liberal (democratic) socialist regime where society is the owner of the means of production (Rawls 1999b; Rawls 2001: 138). Quite consequentially, Rawls rejects capitalism, even in the form of a welfare state, as violating his principles of justice because of the concentration of economic and political control (Rawls 2001: 137f). He argues that a capitalist welfare state indeed, as libertarians criticize, redistributes income at the end of each period, and runs the risk of the least advantaged developing into a discouraged and depressed underclass dependent on welfare and feeling cut off from public political culture (Rawls 2001: 139f). The property-owning democracy as his preferred economic arrangement instead ensures the widespread ownership of productive assets and human capital at the beginning of each period and regards the least advantaged as free and equal persons to whom reciprocity is owed by justice (Rawls 2001: 139).

While Pogge hardly comments on property rights in general, it can safely be assumed that he would agree with Rawls on their conditionality and would regard them as part of the global institutional order that should be reformed in order to reduce severe poverty. He explicitly addresses intellectual property rights, which in his opinion should be treated instrumentally and may be outweighed and curtailed by the right to life of the poor (Hollis/Pogge 2008: 66; Pogge 2008c: 227)[173]. Pogge's insistence on the priority of basic human needs (principle 3), as well as on his assumption of an *a priori* equal distribution of natural resources (principle 7) in my opinion can be convincingly justified by the thought experiment of a hypothetical consensus under a Rawlsian veil of ignorance (principle 1): the number of people negatively affected by food insecurity due to their lack of entitlements to basic resources is in all probability much higher than the number of people substantially benefiting from e.g. patents in genetic resources.

The approaches of both authors thus allow the public regulation of property rights in the pursuit of aims like social justice. Contrary to some prevailing, rather libertarian, arguments, I will therefore presuppose that, by regulating the use and transfer even of privately owned genetic resources, biodiversity legislation does not interfere unduly with property rights but rather exercises the state's task to place justice and the common good above individual short-term interests.[174] These considerations yield a first criterion of justice for property rights in genetic resources and associated knowledge, which is quite similar to principle 6:

> **Property rights in genetic resources and associated knowledge should be conceived as conditional rather than absolute and should be responsive to demands of justice.**

Once such a constraint on ethical grounds is accepted, assignments of property rights can be chosen that are pragmatic as well as conscious of distributional effects. Crucial components to be considered are e.g. the scope of the respective property right and different kinds of owners; these possibilities will be developed further in the following chapters 4.4.3 and 4.4.4. In chapter 4.4.5, I will conclude by applying these observations to intellectual property in different kinds of genetic resources and associated knowledge.

4.4.3 Defining the scope of property rights

Property rights are often understood as the rights of exclusive disposal over a good, without further differentiation according to the goods or owners concerned. However, it is unhelpful to discuss property in genetic resources in this way as an all-or-nothing concept, where conflicting positions can hardly be reconciled. Many disagreements in the field of property rights result from the fact that different authors have in mind different sets of rights supposed to constitute a property right. For clarification, I will here shortly refer to the property rights theory of economics[175], which understands property rights as any rights of disposal, together forming a bundle of rights. This bundle can include any one, several, or all of the following:

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[173] For Pogge's criticism of intellectual property rights, see Hollis/Pogge (2008) and Pogge (2008c: 222-251). For his quite elaborated suggestion of an alternative to patents in the pharmaceutical sector, see p. 158.

[174] Such a legitimate regulation of privately owned genetic resources are e.g. restrictions for the trade in specimen of endangered species and in derived products such as ivory or tiger bones.

[175] In the 1960s, this new economic discipline started to explicitly study the emergence, specification, and efficiency of ownership rights within neoclassical economics, instead of just taking them as given constraints (Lerch 1996: 10, 63f).

a) the right to destroy,
b) the right to access, use, and exploit,
c) the right to benefit from returns,
d) the right to exclude others,
e) the right to immunity from expropriation, and
f) the right to exchange and transfer.

Further central assumptions of the theory are:

- Demsetz-Wagner-Principle: new property systems emerge when a property yields higher benefits than before, or if its transaction costs, i.e. the costs to negotiate and enforce a property right, drop (Grafton et al. 2004: 41; Lerch 1996: 64, 66). According to Lerch (1996: 68f), this procedure may be equivalent to the transition from the Lockean state of nature, where everyone appropriates necessary goods from an un-owned stock, to a state of competition for scarce resources.
- Coase-Theorem: inefficient market results caused by externalities can be corrected by negotiations and free trade among affected parties, provided that transaction costs are sufficiently low, there are no negotiation costs and no strategic behaviour (Grafton et al. 2004: 43f; Lerch 1996: 67).

Following these assumptions, defining property rights is claimed to be a way of avoiding external effects associated e.g. with non-rival or non-exclusive goods. Critics, however, point out that the ideal Coasian conditions are never fulfilled, transaction costs are too high, and, hence, market failures remain (Grafton et al. 2004: 41f ; Lerch 1996: 116, 122, 127f). See also chapter 4.3.1 for the problem of adequate valuation of genetic resources, where these non-ideal restrictions play an important role. Nevertheless, Coase-negotiations remain popular among proponents of market solutions to environmental problems.[176] I will refer to the problems of externalities and open access resources in more detail in chapter 4.4.4, and will here discuss some possibilities of constraining property in genetic resources on the basis of the above-mentioned bundle of possible "sub-rights".

In different cultures, from different standpoints and for different kinds of resources, a property right may take very different forms. Different concepts may persist within one legal system, and each of the single rights can be justified and negotiated independently (Brocker 1992: 398f). Accordingly, the transfer of ownership does not necessarily imply the transfer of all of the above rights (Byström et al. 1999: 30). Such differentiation is crucial e.g. for the recognition and design of property rights regimes other than private property, and it may provide the opportunity to adequately focus debates. With regard to patents, for example, there is a controversy if they can be considered "real" property or not – with the differentiation provided here, it would be rather uncontroversial to agree that they are a form of intellectual property that includes primarily the right to exclusive benefits from returns, the right to exclude others from the commercial use of the invention for a limited period of time, as well as the right to transfer these rights.

Concerning private property of irreplaceable natural resources like biodiversity, many authors acknowledge restrictions especially for the right to destroy one's property (Goodin 1994; Lerch 1996: 30, 149, 193; Sagoff 1994: 458f). Although, at first sight, comprehensive property rights at least in individual animals or plants seem well established, they are quite commonly restricted to certain components: laws

[176] One example are CO_2 emission trading schemes, where emission rights are traded on a market basis with the aim to cap total emissions while achieving the most efficient resource use.

forbid cruelty towards animals, impose land use restrictions, and regulate trade in specimen of endangered species[177]. In the light of Rawls' and Pogge's theories of justice, it is legitimate and even desirable to design property rights in genetic resources in such a way as to include e.g. the rights to use and to benefit, but not the rights to destroy and to exclude others – the latter would probably violate intergenerational justice by not conserving potentially valuable resources (principle 8) and would possibly deprive others of basic means of existence (contrary to principle 3). Furthermore, crop genetic resources are usually not the result of a single individual accomplishment or invention, but are developed from previously existing resources and are able of further reproduction and evolution without continuing human input. Individual exclusive ownership is hardly justifiable in these cases, especially if it takes the form of broad product patents covering already existing material (see ch. 4.4.5.1). I will therefore formulate the following criterion of justice for scopes of property rights:

> **Property rights in genetic resources may exclude the right to destroy them and the right to exclude others from their use.**

Such restrictions of property rights in genetic resources are not a new idea; they are embodied e.g. in the farmers' privilege (no authorisation is required for saving seeds and re-sowing them), in the breeders' exemption (no authorisation is required for the use in further breeding), and in the possibility of compulsory licensing often provided by patent laws. The restrictions concerning the right to exclude others could remain valid when genetic resources are exchanged or transferred, so that their continuing use, especially the customary use of providers and previous holders of the genetic resource, is facilitated resp. guaranteed. These provisions contribute to food security (principle 3) and facilitate R&D based on genetic resources by offering incentives for providers to grant access (see ch. 4.3.3).

Where such restrictions are not in place, and exclusive property rights can be transferred quite easily (as often envisaged for ABS contracts), various problems and injustices can arise. For example, there may be various communities customarily using a resource, of which only one is participating in ABS negotiations and in resulting benefit sharing, but all of them are hence forbidden to use the resource in certain ways (e.g. to commercialise them). Another possible scenario is that poor communities may be coerced into selling their resources for less than their real value (cf. Vira 1999: 519), giving up substantial benefits for smaller short-term gains. Without paternalistic inference, it can be justified to adjust property rights e.g. concerning continued customary use, so that local and indigenous communities do not run the risk of selling off their basic resources on discriminatory conditions due to their inferior bargaining position (contrary to principle 10).

4.4.4 Distinguishing open access, common and private property

Property regimes are not only able to differentiate in terms of the scope of property rights conferred (as explained above), but different property rights can further apply to different kinds of property. While the important distinction between tangible and intangible resp. intellectual property will be discussed in chapter 4.4.5, I will here first illustrate the main differentiation concerning the proprietors. As an alternative to private property, there have always been resources used in common by a smaller or larger group of people. I will refer to such ownership relations as *common property*

[177] One example is the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES).

in the case of a defined user group with defined usage rights, and as *open access* if no explicit property rights are installed or enforced.[178] Resources can further be categorized as rival vs. non-rival, and additionally as exclusive vs. non-exclusive, with (non-)rivalry being merely a physical attribute, and (non-)exclusiveness being additionally determined by social or political choice (Byström et al. 1999: 31). For reasons of clarity, I will avoid referring to the terms *public goods* and *private goods*, which are sometimes used as parallel terms to open access and private property. Furthermore, the popular notion of biological or genetic resources as *common heritage of (hu)mankind* will not be explicitly discussed here since its exact content (e.g. in comparison to open access) and legal significance remain vague (see footnote 34).

In principle, biological and genetic resources at all levels (including objects of intellectual property rights) are conceivable as private or common property or as open access resources. In fact, these property regimes often intermingle and coexist even for specific resources and are one reason for the tough debates on misappropriation. Even more prominently than for crops, the status of natural resources between open access, common and private property is being discussed in connection with problems of the conservation of wildlife biodiversity: problems of over-exploitation, free-riding, and market failure arise most easily if natural resources are non-exclusive but rival in use, as e.g. in freely accessible fishing or hunting grounds. This is obviously the case if property rights are not specified (open access resources), but similar problems can arise in regimes of common property. In an influential article in *Science* (1968), Garrett Hardin introduced the term *tragedy of the commons* for the expected overexploitation of a resource in common property.[179] Although Hardin's account, which is mainly concerned with human overpopulation, has been widely and legitimately criticised, it is still often alluded to in demands for privatisation and commercialisation of natural resources (Goldman 1998: 88f, 111). On closer analysis, however, commonly used resources often are <u>not</u> overexploited as long as the group of owners successfully specifies and enforces rights to access and use.[180] Lerch (1996: 83f) interprets these rules as assigning private property rights <u>within</u> a common property, which means that private and common property differ only gradually in the exclusivity and scope of rights, and in reality mostly occur in combination. The problems of over-exploitation perceived by Hardin and others therefore are more characteristic of open access resources, where property rights are inadequately defined or not enforceable due to high transaction costs – Lerch (1996: 78) thus prefers to talk of a *tragedy of open access*. While the "tragedy" of resource depletion due to deficient property rights is mainly discussed for bulk uses of biological and abiotic natural resources, crop genetic resources in the form of genes or varieties can similarly be endangered – albeit not so much by over-exploitation but by non-use (cf. Shiva 2005: 27): where property rights are missing, responsibilities and incentives for conserva-

[178] My classification follows Lerch (1996). Other authors coin every property that is not privately owned as belonging to "the commons", which neglects the helpful distinction between common property and open access.

[179] The *tragedy of the commons* as conceived by Hardin is a kind of prisoner's dilemma, in which individually rational strategies lead to unsatisfying overall results (Lerch 1996: 71; similarly Grafton et al. 2004: 405f). The problem was already pointed out by Aristotle and Thomas Aquinas (Lerch 1996: 70), and in England, demands for a solution in the form of enclosures of the commons, i.e. the privatisation of collectively used pastures, date back to the 14th century (Goldman 1998: 92).

[180] This observation is discussed e.g. by Lerch (1996: 81f). Grafton et al. (2004: 423) mention the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) and the *Montreal Protocol on Substances That Deplete the Ozone Layer* as successful examples of globally regulating the exploitation even of open access resources because of their focus on specific measures, limited costs, and well-defined benefits.

tion, documentation, and innovation are difficult to define; whoever invests time and effort in the provision of such open access genetic resources can hardly count on remuneration.

The introduction of intellectual property rights is one attempt to solve this *tragedy of open access* for genetic resources by turning them into excludable goods covered by private property rights (Byström et al. 1999: 32f; Wilson 2007: 274f). Van den Belt (2003: 229, 240; similar: Brand/Görg 2003: 26f) compares the privatisation of genetic resources by patenting to the privatisation of other commonly owned resources in history by his notion of *enclosure of the genetic commons*. Since intellectual property rights in genetic resources are discussed extensively in chapter 4.4.5, it suffices here to note that privatisation of genetic resources, e.g. in the form of intellectual property rights, will often be no ethically acceptable solution to problems generated by open access or common property regimes. Rather, certain regimes of well-defined common (material as well as intellectual) property may better suit the purposes of efficient allocation, internalising external costs, and encouraging innovation and conservation (see ch. 4.2, principle 8; see also Lerch 1996: 124, 126, 148), which are usually cited in favour of privatisation. Common property regimes with restricted scope of individual rights to access and use further correspond to many traditional ways of managing genetic resources, so that an additional effect of acknowledging institutionalized common property regimes would be to strengthen indigenous and local participation and self-determination (cf. principle 9; see also Goldman 1998). Furthermore, effective common property regimes and intact commonly owned genetic resources especially benefit the poor, i.e. those with few privately owned resources, and provide basic means of subsistence (principle 3). Defining property rights at the local level might also be conducive to conservation aims: local users have an economic interest in sustainable and efficient management, if they are the ones directly receiving potential benefits (Lerch 1996: 144f, 150-152; similar: Grafton et al. 2004: 58). Of course, such locally installed common property rights need complementary measures to ensure conservation because there remain external benefits of conservation not immediately accessible to the local conservers (see ch. 4.3.4).

Notwithstanding this positive recognition of common property regimes, it is neither feasible nor desirable to frame all genetic resources as private or common property of the current owners – not only because of the high transaction costs and widespread cultural unacceptability, but also because this approach would e.g. tend to exclude people from their proportional share in genetic resources (contrary to principle 7) and would disregard the demands of future generations, which can be seen as co-owners of an intergenerational common property (principle 8; see also Lerch 1996: 131). In these cases, the best solution may be to define an open access regime where the conservation, documentation, and further development of resources is regulated and funded by public institutions, as envisaged in the ITPGR (see ch. 2.4.2). One remaining problem in such open access regimes, however, will be how to identify the illegitimate private appropriation of these openly accessible genetic resources, and to enforce benefit sharing where desirable (Frein/Meyer 2005: 136; Mgbeoji 2006: 97). A solution could be to impose clear restrictions on privatisation, such as restricting the scope of resulting property rights as suggested above, and to install multilateral benefit sharing schemes e.g. via trust funds (see ch. 4.8.3).

I will summarize these considerations in a criterion of justice for adequately distinguishing between various kinds of property:

Property regimes for genetic resources and associated knowledge may be designed as publicly regulated open access resource, well-defined common property, or restricted private property.

Before continuing on the basis of these conclusions, the following diagram (Figure 4) shall illustrate the distinctions and interrelations of concepts within the field of property rights so far identified:

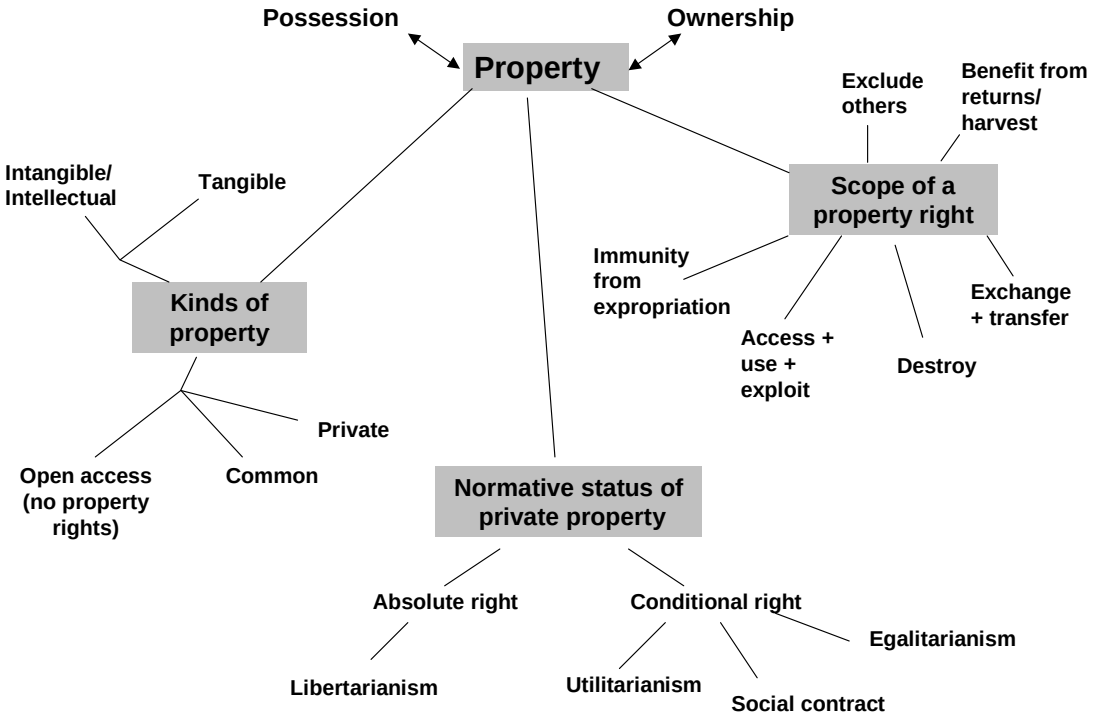

Figure 4: Differentiation of property rights (own draft)

Against this background, I will in the following focus on intellectual property rights in crop genetic resources and associated knowledge.

4.4.5 Tailoring intellectual property rights for crop genetic resources and associated knowledge

A central difficulty in the debate on property rights in genetic resources is that the objects often consist of both material and immaterial components (see ch. 1.4.2). Therefore, the conventional distinction between tangible and intangible/intellectual property is difficult to uphold, and different ownership and usage rights are conceivable for the concrete objects vs. the contained information. While individual organisms and biological resources are mostly conceived as tangible property, genetic resources are more and more being construed as intellectual property. Leaving aside the ethically less contentious issue of tangible property rights, I will in the following focus on intellectual property rights (IPRs) in genetic resources, which are currently the central and most controversial issue of the "biopiracy" debate.

According to the World Intellectual Property Organization (WIPO)[181], intellectual property rights are assigned to "creations of the mind" and fall into the categories of

- industrial property: inventions (patents), trademarks, industrial designs, geographic indications of source, and
- copyright: literature and artistic works.

[181] I am referring to the website *http://www.wipo.int/about-ip/en* (last accessed 10.08.2009).

IPRs are a kind of "artificial" property right in the sense that they are typically granted by society in order to balance the interests of an applying inventor or artist against the common interest in innovation. Crop genetic resources in the past have mostly been subject to a form of IPRs designed specifically for plant varieties, i.e. plant variety protection (PVP, also coined plant breeders' rights, PBR); they have been explained in detail in chapter 2.3.4.[182] Rather recently, patents on genetic resources (plant, animal, microbial) have been introduced as an additional form of legal protection. They can cover not only varieties, but also e.g. genes, traits, breeding methods, or plant and animal products.

From an extremely critical standpoint, it is sometimes argued against all forms of IPRs in genetic resources because they are e.g. the common heritage of humankind, and nobody is entitled to exclusive rights over them. However, this approach has similar disadvantages as those cited above for open access regimes, e.g. of not being able to identify misappropriation and of discouraging conservation and innovation, therefore impeding important aims of fair and equitable benefit sharing (see ch. 4.2). In this thesis, therefore, IPRs and other forms of property rights in genetic resources are regarded as instrumental and conditional (see above), but not *per se* as wrongful. In the following, I will attempt to develop criteria that should be fulfilled in order for IPRs to be adequately conducive to justice in benefit sharing. While I cannot give a full account of the legal and economic repercussions of IPRs in genetic resources, I will present the main lines of argument and some important ethical conclusions. Since most debates on IPRs in genetic resources focus on patents, these will necessarily play a prominent role in my discussion (ch. 4.4.5.1, 4.4.5.2), but I will also consider further instruments for protecting intellectual property that may be more appropriate for crop genetic resources and associated knowledge (ch. 4.4.5.4). In their evaluation, I will go as far as stating that patents principally are too comprehensive property rights for any biological material (ch. 4.4.5.1); they should be restricted to technical procedures and processes or should be replaced by more adequate instruments that at least provide for the farmers' privilege and the breeders' exemption (ch. 4.4.5.5). Another important demand will be to differentiate between the main kinds of genetic resources as well as associated knowledge; for each of them, a different set of IPRs may be adequate (ch. 4.4.5.7).

4.4.5.1 Evaluating the rationale for patents

For evaluating patents on genetic resources, it is necessary to briefly consider the reasoning underlying the patent system in general. This reasoning is broadly applicable also to other forms of strong IPRs that will be discussed below, with patents merely being the most prominent and most contested variant. Patents are an exclusive right granted to an inventor, who may exclude anyone else from commercially exploiting the invention for a limited period, usually 20 years. In order to be patentable, inventions must fulfil the three conditions of industrial applicability / utility, novelty, and inventive step / non-obviousness (see below). In return for the patent, the inventor has to adequately disclose the invention to the public. The need for patents is usually justified by the fact that markets fail in the efficient provision of socially desirable innovations: information and knowledge are costly to produce, but once a new piece of them exists, it is non-rival and, in the absence of legal protection, non-excludable. Activities that generate such information and knowledge can be

[182] Interestingly, there are no corresponding IPRs to protect animal genetic resources in agriculture, such as breeds and races. The subject of animal genetic resources in agriculture has until recently found much less attention than plant or microbial genetic resources – possibly exactly because there have been less efforts, possibilities, and incentives for IPRs on such resources.

regarded as investments analogous to other capital investments made e.g. by private corporations, and the absence of IPRs can mean that these investments do not promise adequate returns (Belleflamme 2006: 270). In other words, markets alone provide too few incentives for "producing" desirable innovation, potentially resulting in its under-provision. In order to change this unfavourable situation, public intervention is necessary. While this diagnosis remains largely undisputed, there is less consent as to the kind of intervention recommended. The two main alternatives are to either install a system of legally acknowledged IPRs which render the innovation excludable, or to publicly finance or subsidize R&D activities.[183] In the former case, a further problem arises: socially desirable innovations, such as pharmaceuticals, may be under-utilized if the owners' exclusive property leads to high monopoly prices.

In the Western developed world, the trend over the last decades has been to reduce public spending on R&D activities (e.g. by privatising academic research in universities; cf. Overvalle 2006: 233) and at the same time to strengthen and broaden IPR regimes (Belleflamme 2006: 276). The number of patent applications has risen exponentially, and patents have increasingly been used as quantitative indicators measuring a company's R&D output (i.e. innovation), or as trading devices between companies e.g. in cross-licensing agreements (Belleflamme 2006: 276, 279). The patentable subject matter has been expanded from pure inventions into the realm of discoveries, especially concerning product patents (in contrast to process patents); additionally, patent offices increasingly accept rather broad patent claims beyond the initial innovation itself.[184] This has induced a certain contest among researchers to apportion as large a part as possible of the remaining "free" knowledge to oneself, although, possibly, all innovators would be better off with fewer resp. narrower patents granted overall. Concerning genetic resources, a trend can be observed to claim patents not only on genetically modified organisms, but also on conventional seeds, conventional breeding methods, and resulting products (Then/Tippe 2009: 14-16). Not only do such patent claims include essentially biological processes which can be interpreted as being explicitly excluded from patentability[185], but they also often lack inventiveness in being based on well-known technologies such as marker assisted selection[186]. According to a compilation by Christoph Then[187], strategies for achiev-

[183] For Pogge's suggestion of a further alternative, see p. 158.

[184] In a *reductio ad absurdum*, Radder (2004: 286) shows that it is theoretically possible under current product patent systems to patent the product of a novel nuclear fusion bomb (i.e. nuclear fusion heat) - resulting in a patent on the heat of the sun. El-Tayeb (2005: 261f) devises a similar example: "For discovering the double helix nature of the DNA molecule, Watson and Crick, with the help of experienced patent lawyers and a venture capitalist, would have won the grand prize: a patent on exploiting the structure of DNA and possibly on all genetic materials."

[185] Article 4 of the EU *Directive 98/44 on the legal protection of biotechnological inventions* reads: "1. The following shall not be patentable: (a) plant and animal varieties; (b) essentially biological processes for the production of plants or animals. 2. Inventions which concern plants or animals shall be patentable if the technical feasibility of the invention is not confined to a particular plant or animal variety. 3. Paragraph 1(b) shall be without prejudice to the patentability of inventions which concern a microbiological or other technical process or a product obtained by means of such a process." The "broccoli case" mentioned in the text is intended to clarify exactly what is to be regarded as an "essentially biological process" in plant and animal production.

[186] In marker assisted selection, breeders screen the genome of interesting plants or animals in search of so-called molecular markers, i.e. identifiable DNA sequences that are found at specific locations within the genome and are known to be statistically associated with certain traits of interest (e.g. yield or pest resistance). The breeder is able to select at a very early stage for traits associated with these molecular markers, without having to know the location or DNA sequence of the genes responsible for the trait, and without having to wait for its phenotypic expression. (Ruane/Sonnino 2007: 6f)

[187] The compilation is available at *http://www.no-patents-on-seeds.org/index.php?option=com_ content&task=view&id=39&Itemid=42* (last accessed 27.05.2009); similar in Then/Tippe (2009).

ing otherwise unpatentable products are e.g. the description of specific plant ingredients and claiming all genetic resources with these characteristics, the use of elaborated breeding techniques and claiming all resulting genetic resources, and the transfer of foreign genes into existing varieties and claiming all plants and seeds with the inserted genes.

Multinational corporations seem to try to claim significant parts of the genome of important crops, whole groups of varieties, as well as the whole chain of production from breeding to using the product as food, feed, or agro-fuel – and numerous such overly broad patents have indeed been granted. Various cases of claimed and granted patents of these kinds are documented by Then and Tippe in their publications of 2008 and 2009; for example, a broccoli patent (EP 1069819 B1)[188] granted in 2002 but currently (May 2009) pending before the Enlarged Board of Appeal of the European Patent Office claims the following:

> "2. A method for the production of Brassica oleracea with elevated levels of […] which comprises: (a) crossing wild Brassica oleracea species with broccoli breeding lines; (b) selecting hybrids with elevated levels of 4- methylsulfinylbutyl glucosinolates, or 3-methylsulfinylpropyl glucosinolates, or both; (c) backcrossing to broccoli breeding lines; and (d) selecting plants with elevated levels of 4- methylsulfinylbutyl glucosinolates, or 3-methylsulfinylpropyl glucosinolates, or both. […]
> 9. An edible Brassica plant produced according to the method of any one of claims 1 to 6.
> 10. An edible portion of a broccoli plant produced according to the method of any one of claims 1 to 6.
> 11. Seed of a broccoli plant produced according to the method of any one of claims 1 to 6."

Further examples from the area of crop genetic resources and involving biopiracy claims have been presented in chapter 1.1.4.

Sceptics of this escalating patentability suspect that it has resulted in a market failure antipodal to the one arising in the absence of any IPRs; they frame it as a global prisoner's dilemma (Belleflamme 2006: 280) or as a so-called *tragedy of the anticommons*. The latter notion was coined by Heller/Eisenberg (1998) in response to Hardin's *tragedy of the commons* (see ch. 4.4.4):

> "Although the metaphor ["tragedy of the commons"] highlights the cost of overuse when governments allow too many people to use a scarce resource, it overlooks the possibility of underuse when governments give too many people rights to exclude others. Privatization can solve one tragedy but cause another" (Heller/Eisenberg 1998: 698).

Belleflamme (2006: 281, 283) comes to the conclusion that there is currently hardly any empirical evidence that the stronger IPRs introduced since the 1980s are succeeding in spurring innovation. Quite to the contrary, the accumulation of patents in a certain area of research ("patent thickets") as well as in a single product ("patent stacking"), observable in certain research disciplines such as biotechnology, seem to stifle further innovation. An instructive example of accumulated IPRs posing a problem to research is the genetically modified "golden rice" enriched with beta-carotene: its breeders Ingo Potrykus and Peter Beyer had to negotiate 70 existing intellectual and technical property rights from 32 rights holders before being able to make the

[188] Information on the broccoli case was taken from the website of the initiative No Patents on Seeds at *http://www.no-patents-on-seeds.org/index.php?option=com_content&task=view&id=20&Itemid=20&lang=en*, where links to the patent, the opposition and decision documents are provided (last accessed 29.07.2009).

rice available for the intended humanitarian use – a problem they overcame by entering into a partnership with Syngenta (then Zeneca), which thereby gained the rights for commercial use (i.e. use by farmers gaining more than 10,000 US Dollars income from "golden rice") (Potrykus 2001: 1158f). While Potrykus points out the possibilities of genetically modified organisms (GMOs) to solve humanitarian problems, he also acknowledges that "the interest of the agbiotech companies to use "golden rice" for better acceptance of the GMO technology" helped to solve the IPR problems (Potrykus 2001: 1159) – differently stated: had the public opinion been less critical of genetically modified organisms, the "golden rice" developed by Potrykus and Beyer would have been subject to extensive, previously existing IPR claims, even for purely humanitarian purposes.

A further prominent criticism of the current patent system is that examiners of patent applications fail to identify prior art, which would destroy the applicant's claim of novelty and thus invalidate the patent. Such insufficient examination may be due to organisational difficulties, as well as to the widespread reliance on post-award litigation. Patents illegitimately granted on such false claims are sometimes termed "bad" patents, in contrast to "good" patents which are not challengeable within the respective patent law (Federle 2005: 26f). "Bad" patents are often central to accusations of misappropriation, and in some prominent cases, such patents have successfully been challenged and subsequently revoked, albeit at high costs and only after they have been allowed to stand for quite a number of years (see ch. 1.1.4.1, 1.1.4.2). From an ethical point of view, however, this is a dissatisfying situation, and the procedures of patent (and other IPR) application and examination should be designed with a view to reduce such instances to a minimum. While it is probably difficult even for diligent patent examiners to screen globally for the existence of prior art, some procedural improvements should be possible: traditional genetic resources and traditional knowledge can be documented in databases that are accessible to patent offices (see ch. 4.4.5.7), and patent challenges can be facilitated.[189] In my further evaluation of IPRs in this chapter, I will not investigate the cases of "bad" patents in detail, but only relate to the problem of prior art where applicable.

Many authors further share the conviction that patents on genetic resources disregard their intrinsic value (e.g. Then 2003: 62; Nilles 2003: 224), but such an intrinsic value will not be postulated here (see ch. 4.3.1) and is not necessary for reaching the conclusions presented. A similar critique of the present globalisation of patents and other strong IPRs concerns the conceptualization of knowledge and science inherent in these concepts: they impose "Western" property concepts and values prevailing in industrial countries (Correa 2003: 215; Dutfield 2004: 59; Mgbeoji 2006: 17; Tsioumanis et al. 2003: 614) and favour those actors already familiar with them, such as corporations located in Western countries. Patents and similar IPRs are designed for a special type of knowledge and are difficult to apply e.g. to traditional genetic resources or traditional knowledge (see ch. 4.4.5.7), which in developing countries play a much more important role than in industrial countries. In the opinion of Mgbeoji (2006: ix), non-Western forms of knowledge are thereby systematically marginalized and devalued, as are contributions by farmers.

[189] In the USA, for example, each party in a patent law suit has to pay its own litigation costs independent of the outcome (Holger Furtmayr, pers. comm. 12.02.2009). With the average costs for a patent infringement suit estimated at 1.5 million US Dollars (Correa 2008: 23, footnote 72), this obviously discourages poor stakeholders from fighting patents, even if they are quite sure to be successful.

Most critics of the patent system do not aim at abolishing it altogether, but rather suggest to (re-)introduce clearer restrictions e.g. on the patentable subject matter or on the scope of claims allowed within a patent application.[190] On the basis of my previous considerations on justice, patents can be accepted as an instrument to encourage innovations and to provide for the disclosure of related knowledge, as long as they do not unduly interfere with other demands of justice and do not themselves constitute access restrictions impeding desirable research and development (see ch. 4.4.5.3). Hence, patents on the biological material itself, as well as broad patents covering whole production chains, all seeds possessing certain traits (e.g. oil quality or protein content), or considerable parts of a crop genome, which are applied for by multinational corporations dominating both the agricultural and food/feed market, are an unjust appropriation and monopolisation of genetic resources provided by nature (contrary to principle 7) and are endangering food security especially of the poor (contrary to principle 3). It therefore seems necessary to confine patents to genuine inventions, and I will formulate the following criterion of justice for patents:

> **Patents should be restricted to clearly attributable, novel inventive achievements such as technical procedures and processes and should not extend to previously existing knowledge or the biological material itself; prior art searches should be extended accordingly.**

This implies that patents may be granted e.g. for the special technique of genetically manipulating a plant, but not on the resulting plant or cell itself. If someone else succeeds in producing the same plant by another technique, this would then not infringe the first patent. Of course, this criterion does not consider whether such a patent would constitute a danger to *ordre public* or morality (see ch. 2.3.2; e.g. a procedure for cloning humans); this should be decided independently.

Before continuing in chapter 4.4.5.3 with the discussion of arguments in favour of and against patents and similar IPRs specifically for genetic resources, I will in the following shortly illustrate the factual status quo of patents on biological entities.

4.4.5.2 Status quo *of biopatenting legislation*

While patents can be traced back to their probable origin in Venice already in 1474 (Hermann 2003: 19; Mgbeoji 2006: 16), patents on living organisms are a relatively new concept. After the US *Plant Patent Act* of 1930 allowed patents on asexually propagated plants (see p. 43), it took until the 1980s to extend patents to other living organisms: probably the first modern patent on a complete living organism, a genetically modified bacterium consuming oil slicks, was granted 1981 in the USA. It had been filed by Ananda Chakrabarty already in 1972, but the final decision by the Supreme Court (Diamond vs. Chakrabarty) took until 1980 (cf. Lerch 1996: 100). The first US utility patent for a crop (a maize plant abnormally rich in an amino acid) was granted in 1985 (Dhar 2002: 12). In 1988, the US Patent and Trademark Office granted a patent for the first living animal, the transgenic "onco-mouse" (Dutfield 2004: 22). Today, bio-patents exist for genes, varieties, traits, breeding methods, plant and animal products, but remain controversial and restricted to a few (especially developed) countries. They usually grant stronger and more extensive property

[190] It is, for example, conceivable that a duty to acknowledge foreign prior art might be included in TRIPS as a specification of the requirement that inventions must be novel (Art. 27.1). A more realistic improvement would be to harmonize the definition of prior art in patent laws in order to avoid "bad" patents, e.g. by broadening the current US definition (cf. Lu 2007: II.C.2).

rights than the plant variety protection regimes following UPOV-Conventions (see ch. 2.3.4).

Although national legislation is evolving fast and is not a focus of this thesis, I will here indicate some trends evident in literature. Radder (2004: 277) points out the slight differences between the current US and European patentability criteria as the most influential ones worldwide:

US Patent Act[191]	**European Patent Convention**[192]
Utility	Industrial applicability
Novelty	Novelty
Non-Obviousness	Inventive step

Table 6: US and European patentability criteria

In its *Directive 98/44 on the legal protection of biotechnological inventions*[193], the EU further specifies the requirements for bio-patenting: Article 6 on *ordre public* and morality considers as unpatentable especially processes for cloning human beings, processes for modifying the human germ line, uses of human embryos for industrial or commercial purposes, and processes for modifying the genetic identity of animals that cause unnecessary suffering. Since these exceptions refer only to human dignity and animal suffering, the article can be interpreted as not applying to patents in agro-biotechnology (Baumgartner 2006: 525f).

Most authors agree that, in general, bio-patents are granted more liberally in the USA than in the EU. Reasons are, for example, the less strict conditions for accordance with *ordre public* and morality, and for novelty (see e.g. Federle 2005: 60-62). The US novelty requirements are often criticised for systematically devaluing public use and knowledge held abroad: Section 102 of the US *Patent Act* does not recognize them as prior art, but requires written publication or knowledge resp. use within the USA (Dutfield 2004: 50; Federle 2005: 48; Mgbeoji 2006: 148). Both the EU and the USA grant not only process patents, but also product patents on biological material (such as genes) if e.g. this material has been isolated from its natural surrounding by a technical procedure:

> "Biological material which is isolated from its natural environment or produced by means of a technical process may be the subject of an invention even if it previously occurred in nature." (EU Directive on the legal protection of bio-technological inventions, Art. 3.2; similarly: German patent law, paragraph 1.2)
>
> "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." (US Patent Act, paragraph 101; emphasis added)

In US patent law, the patent is then valid for any, even hence unknown, process that produces this biological material and any commercial use of it – albeit not for the material in its natural surrounding (Hermann 2003: 28; Radder 2004: 276-281; Then 2003: 60). In the EU, the scope of product patents is said to be narrower (Federle 2005: 36), but comments in literature are inconclusive. For disclosure of biotechnological inventions, it usually suffices under both patent laws to deposit the patented

[191] The Patent Act is available at *http://www.uspto.gov/web/offices/pac/mpep/consolidated_laws.pdf* (last accessed 10.08.2009).
[192] The Patent Convention is available at *http://www.epo.org/patents/law/legal-texts/html/epc/1973/e/ma1.html* (last accessed 10.08.2009).
[193] The directive is available at *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:213:0013:0021:EN:PDF* (last accessed 16.02.2009).

organism or an appropriate sample since a complete description for reproducibility is not feasible (Federle 2005: 37, 52).

Like other natural resources, crop genetic resources are distributed unequally around the globe. Most *in situ* biodiversity today is found in developing countries of the South, which is not surprising considering the large-scale industrialised agriculture in developed countries that favours homogenous varieties suitable for mechanized farming. In contrast, by far the most patents on genetic resources and their commercial utilization are held by industrial country actors (Mgbeoji 2006: 35; Nilles 2003: 217).[194] The World Bank estimates that developing countries annually pay more than nine billion US Dollars in license fees to industrial countries (Kaiser 2006: 1175). This imbalance may partly be due to the fact that patent protection is less common in developing countries, but it also exemplifies the advance in knowledge and technology of developed countries (Lerch 1996: 52f) and explains the divergent interests in international negotiations e.g. concerning a revision of TRIPS (see ch. 2.3.2).

After TRIPS entered into force, most developing countries started to introduce TRIPS-complying IPR regimes. While patentability criteria in national laws differ e.g. with regard to plants and animals (in accordance with TRIPS Art. 27.3 b), the further regulation of patent exploitation and use is considered outside the scope of the patent system and has to be addressed in other parts of national legislation (cf. TRIPS Art. 27.2[195]). According to the World Bank (2006: 25), various developing countries have made use of the possibility to exclude plant varieties from patentability as allowed in TRIPS Article 27.3, provided a *sui generis* system for plant variety protection is in place. However, such plant variety protection regimes are often not yet installed (Seiler 2000: 16; The World Bank 2006: 2, 15), and those that do exist are not necessarily compatible with UPOV and often restricted to certain (commercially valuable) crops and new varieties (The World Bank 2006: 15, 17f). For an overview of IP legislation currently in place worldwide, see e.g. the databases by the WIPO[196] or by the non-governmental organisation GRAIN[197].

4.4.5.3 Main arguments pro and contra strong intellectual property rights for genetic resources

Strong IPRs for crop genetic resources such as patents not only accidentally, but intentionally, exclude others from access to and use of resources that are central to meeting basic human needs. Since this is contrary to important demands of justice (principle 3 and ch. 4.2), their legitimacy cannot be taken for granted, but has to submit to ethical scrutiny (as do all property rights, see principle 6 and ch. 4.4.2.3). Possible criteria for judgment are the aims defined in chapter 4.2, i.e. resource conservation, poverty alleviation, international justice, and encouragement of innovations. Not surprisingly, opinions diverge drastically on how these aims, which are accepted by many advocates as well as adversaries of IPRs, can be achieved. Especially companies are prominently pushing for strong IPRs on genetic resources and associated knowledge, while many non-governmental organizations fight them with slogans like “no patents on life”. In order to organise and better understand their pre-

[194] Statistics on patents granted by national or regional patent offices are available at the WIPO website at *http://www.wipo.int/ipstats/en/statistics/patents* (last accessed 10.08.2009).
[195] “Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, […] provided that such exclusion is not made merely because the exploitation is prohibited by their law.”
[196] The database is available at *http://www.wipo.int/clea/en* (last accessed 07.09.2009).
[197] The database is available at *http://www.grain.org/brl* (last accessed 07.09.2009).

vailing lines of argument, the following table summarizes, in a slightly simplified form, the main arguments pro and contra strong IPRs (especially patents) for genetic resources found in literature[198]. Some of them have already been mentioned, others will be discussed below.

[198] Sources are Alker/Heidhues (2002); Brand/Görg (2003); Carrizosa (2004b); GRAIN (2005b); International Union for the Protection of New Varieties of Plants (2005); Kuppe (2002); Lasén Díaz (2005); Lerch (1996); Louwaars (1998); Posey/Dutfield (1996); Posey/Plenderleith (2004); Radder (2004); Sharma (2003); Seiler/Dutfield (2001); Sharma (2004); Seiler (2000); Straus (2005); Then (2003); The World Bank (2006); United Nations Development Programme (UNDP) (2001); Van den Belt (2003); Wilson (2007). I have not related these sources to the individual arguments because of better readability and because the authorship in this case is not relevant: many authors do not argue entirely pro or contra strong IPRs, and if they do, they often cite common counter-arguments.

Pro strong IPRs	**Contra strong IPRs**
1 a) IPRs provide incentives for research and breeding, because innovators are compensated for their expenditures.	1 b) IPRs obstruct research and breeding since innovators and users of genetic resources have to navigate around existing IPRs, which can accumulate in a single plant by propagation and crossing.
2 a) Where IPRs are installed, they are an incentive for foreign breeders to introduce their IPR-protected varieties, which can be a valuable contribution to domestic agriculture.	2 b) IPRs exclude others from the (commercial) use of genetic resources, thereby restrict their freedoms and diminish benefits to society.
3 a) IPRs facilitate transfer of knowledge and technology e.g. by compulsory disclosure in patent applications.	3 b) Due to protection requirements, strong IPRs favour the development of high-input, high-yielding, genetically uniform varieties adapted to industrial rather than small-scale agriculture.
4 a) Rightfully granted IPRs can protect resources against misappropriation.	4 b) IPRs are contrary to many indigenous cultures and traditions and are unable to recognize non-market values and values to future generations.
5 a) By adequately valuing genetic resources and internalizing external benefits, strong IPRs encourage the conservation of genetic resources.	5 b) Due to several reasons (failure to consider intergenerational aspects, high transaction costs, difficulties in identifying the legitimate owners), strong IPRs cannot adequately value genetic resources and may lead to underprovision and loss of genetic diversity.
6 a) IPRs are a source of funding for public research institutions.	6 b) Through seeking IPRs, public breeding may concentrate on commercially interesting crops and commercial farmers, rather than on orphan crops and varieties for subsistence agriculture.
7 a) National laws for strong IPRs result in strategic advantages and trade benefits for developing countries because they satisfy the requirements of industrial countries e.g. in bilateral trade negotiations.	7 b) IPRs reduce the options of developing countries for broader support of domestic development objectives e.g. via compulsory licensing.

Table 7: Arguments pro and contra strong intellectual property rights on genetic resources and associated knowledge

As a preliminary evaluation, I would agree that the first five arguments (1-5) are the most important from an ethical point of view; they are also the most contested, as indicated by their strikingly antagonistic claims. The first argument is the one most often cited by advocates of IPRs in industry and politics, but has also met with fundamental criticism (see ch. 4.4.5.1 and below). While I have already commented on argument 5 in chapter 4.3.1, the following discussion will focus mainly on arguments 1-4. The validity of arguments 6 and 7 depends on a lot of factors apart from IPR regimes, and they are referred to in various contexts in this and other chapters. Many of the disadvantages cited here could e.g. be mitigated by tightening patent requirements (see criterion above), strengthening public research, or by framing IPRs as common property (see ch. 4.4.4).

It is quite obvious that this confrontation of arguments is not very helpful in the ethical debate on legitimate IPRs on genetic resources: each argument *per se* possesses a certain validity, and they can hardly be weighed against each other in a general way. Rather than analysing these arguments in depth at this point, I therefore prefer to differentiate between the various objects of intellectual property relevant in the context of benefit sharing (ch. 4.4.5.6). It is important in this context to note the different meanings of the term "protection" that are employed: protection against misappropriation (by enforcing property rights to a resource), and protection against loss (by purposeful conservation of a resource and documentation of associated knowledge). Advocates of strong IPRs tend to equate these, arguing that establishing IPRs e.g. for indigenous and local communities will act as incentive for the rights holders to conserve the resources they then "officially" possess. For opponents of strong IPRs, the two forms of protection are often mutually exclusive, e.g. when IPRs are granted to individual stakeholders and others are then excluded from the use of the resource in question. Again, this controversy cannot be answered without referring to specific cases, or at least without differentiating between different kinds of resources, as will be done in chapter 4.4.5.6. In addition, a range of stronger and weaker measures beyond patents exist that are suitable for protecting intellectual property, according to purpose, which will be investigated in the following.

4.4.5.4 Conventional and alternative instruments for protecting intellectual property

I will here shortly illustrate the most important and most relevant conventional and alternative instruments for IP protection. The list here is intended primarily as source of information, with their evaluation following in chapter 4.4.5.7. A growing body of literature suggests and evaluates conventional and alternative concepts of IPRs or weaker protection regimes for genetic resources and associated knowledge. These imply options to limit the scope of property rights, as discussed above, and in their weaker forms are hardly any property right at all. For the definition of the conventional instruments of protection, I refer to the WIPO definitions (World Intellectual Property Organization 2005b) unless noted otherwise; these are very similar to those in the TRIPS-Agreement. Alternative instruments are proposed by various authors with possibly divergent views on their exact content; I will exemplarily illustrate some of them. Discussing all general advantages and disadvantages of the possibilities for IP protection would be beyond the scope of this thesis; rather, I will roughly evaluate their usefulness for protecting genetic resources and associated knowledge in chapter 4.4.5.7, after introducing my differentiation of the subject matter of protection. The most prominent possibilities for protecting IP currently discussed are the following:

Conventional instruments for protecting intellectual property

a) Patents

Patents are an exclusive right granted to an inventor, who may exclude anyone else from commercially exploiting the invention (even if made later independently) for a limited period, which is usually 20 years. In order to be patentable, inventions must fulfil the three conditions of industrial applicability / utility, novelty, and inventive step / non-obviousness. National legislation may further exclude certain subject matter from patentability, e.g. plants and animals. In return for the patent, the inventor has to adequately disclose the invention to the public.

b) UPOV-style plant variety protection

Plant variety protection (PVP) laws protect plant varieties that are distinct, uniform, stable, and new; in contrast to patent protection, farmers and breeders enjoy certain privileges and exemptions. For details, see chapter 2.3.4.

c) Trademarks

Trademarks distinguish the goods or services of one corporation from those of another by a specific sign or combination of signs, which are used on goods or in connection with their marketing. Trademarks do not protect genetic resources or knowledge *per se*, but can identify certain products and provide customers with information about their origin (Posey/Dutfield 1996: 90).

d) Trade secrets

Trade secrets are a legal means to protect know-how that is known only to a few people, provided efforts are made to prevent disclosure (Posey/Dutfield 1996: 87). Contrary to patents, trade secrets provide no protection against independent innovations (Belleflamme 2006: 272). Since their requirements are less strict than e.g. for patents, they might be feasible for protecting traditional knowledge that is no novel invention (Posey/Dutfield 1996: 90).

e) Geographical indications

A geographical indication is a legally protected label for goods from a specific geographical origin, where this origin is understood to imply a specific quality or reputation (e.g. champagne, Darjeeling tea, Parma ham). Geographical indications are primarily used as customer information for agricultural products, but are also available for goods manufactured in a certain place or region. A special kind of geographical indication is the more strictly regulated "appellation of origin", for which the specific quality of a product must be exclusively or essentially due to its geographical origin. Geographic indications are in principle suited for marketing genetic resources from a specific region, but are non-exclusive.

f) Certificates, labels

Certificates and labels are used to provide information about a product possibly of interest to customers, such as information about quality, production methods, or trade conditions. Although they convey no intellectual property rights and are non-exclusive, certificates and labels can contribute to successful marketing if customers are aware of them and appreciate the specific qualities they imply. Unlike the protection instruments mentioned above, which are regulated by law, certificates and labels are usually administered and authenticated by independent organizations. (Posey/Dutfield 1996: 91f)

These instruments are not necessarily available in every country and for every product; details depend on the design of national legislation and have to be investigated on a case-by-case basis. Less prominently discussed legislation concerning crop genetic resources are the so-called seed laws, i.e. legal provisions for the commercialisation and marketing of seeds. While their main objective is to ensure good quality of the seeds on the markets, they are claimed to have similar consequences as strong IPRs in favouring high input, high-yielding, genetically uniform varieties and in hindering exchange and marketing of traditional varieties, leading to diversity loss and disempowerment of farmers (GRAIN 2005c).[199]

[199] Seed laws of various countries are compiled by GRAIN at *http://www.grain.org/brl/?typeid=50* (last accessed 07.09.2009).

I will not consider another important branch of intellectual property: copyrights and related rights. Since they protect only the form of expression of an idea as literary, musical and other artistic creation, but not the idea itself (World Intellectual Property Organization 2005a: 7), they are not adequate for protecting either genetic resources or associated knowledge *per se*. Copyrights may, however, be useful for protecting cultural expression and folklore (World Intellectual Property Organization 2005a: 21), which are not investigated here.

Alternative instruments for protecting intellectual property

g) Reformed patents and PVP

Examples for feasible reforms to current patent and PVP laws are the mandatory disclosure of source in IPR applications (see ch. 4.8.5) and the guaranteed farmers' privilege of seed saving and exchange.

h) Collective / community IPRs

Although IPRs in genetic resources and associated knowledge are at present mostly restricted to private property rights, they are in principle also conceivable as property of a community or an otherwise defined group of people; this would necessitate changes to many current IPR laws.

i) Registers for positive protection

Registers can be used to document the legal acknowledgment of a certain property right in a genetic resource or a piece of knowledge. Criteria for protection may be less stringent than for conventional IPRs, and the scope of the property right may be restricted accordingly. Examples are databases of traditional knowledge (see ch. 4.4.5.7) or registers of landraces resp. farmers' varieties, where traditional varieties can be registered and thus protected from subsequent appropriation by others. These registers and databases can be made available to patent offices worldwide for prior art searches, so that patents on existing resources and knowledge can be prevented and do not have to be challenged afterwards. The register administration may act as custodian of the registered resources and knowledge, assist in negotiations for ABS contracts (Subramanian 2002: 387), and may generally represent the contributors' interests. The more importance is attached to guarding the positive property rights and to preventing others from any access, the more confidential the registers have to be designed.

j) Registers for defensive protection

Where it is either not possible or not desired to claim actual property rights to a resource or associated knowledge, registers can also be used for the limited purpose of preventing patents on existing resources and knowledge by proving prior art; this is usually called defensive protection. Since these resources and knowledge will often be already more or less publicly known, it is usually suggested to publicize such registers, e.g. on the Internet, and make them known to patent offices and other IPR application authorities.

Both kinds of registers have the additional intention of protecting genetic resources and associated knowledge from loss, but on the other hand can run the risk of attracting illegitimate users if access to them is too easy (cf. Posey/Dutfield 1996: 81).

k) Framework of related rights

Various authors suggest to regulate IPRs within a broader framework of resource-related legislation, which might state specific rights e.g. for farmers or indigenous

communities. Examples are the legal acknowledgment of farmers' rights, of the rights of indigenous communities to land, resources, and knowledge (see ch. 4.8.7.2), or of traditional resource rights (suggested by Posey)[200]. Such frameworks could take into account concerns not usually addressed by IPR legislation, such as land rights and customary law, which especially in developing countries are often central to conflicts about genetic resources and traditional knowledge.

Apart from these forms of legal protection, protection of genetic resources is possible by biological means such as hybrid breeding[201] or genetic use restriction technology (GURT); the latter is also termed "terminator technology" by its adversaries due to lacking germination capacity of harvested material (International Union for the Protection of New Varieties of Plants 2005: 7; Seiler/Dutfield 2001: 36, 41; The World Bank 2006: 5-10). Methods of biological protection are principally different from legal means of IPR protection and, due to their nature, would be applicable only to one of the four subject matters of protection distinguished below (i.e. improved varieties). They are usually not understood as forms of IPR protection: the reasons put forward by the seed industry for employing them are higher yields due to the heterosis effect for hybrids, and biosafety (avoidance of out-crossing) for GMOs equipped with GURTs. Critics, on the other hand, claim that the real aims are in both cases monopolies running counter to e.g. farmers' rights and, in the case of GURTs, endangering food security if sterility genes spread among crops (Dutfield 2004: 75-79; GRAIN 2007: 3; Parthasarathy 2002: 10). While there are no attempts to legally curtail the well-established hybrid breeding, GURTs are subject to widespread public criticism and moratoriums, and their large-scale commercial introduction is uncertain. In the following, I will limit my evaluation to legal forms of IPR protection.

[200] Traditional resource rights after Posey (Posey/Dutfield 1996: 95f) include different types of individual and collective rights to the knowledge and technology, tangible and intangible assets that indigenous and local communities deem necessary for present and future generations, e.g.

- human rights,
- the right to self-determination, participation and privacy,
- the right to customary law and practice (incl. farming),
- the right to land and environmental integrity,
- the right to intellectual and cultural property and to benefits from the use of traditional knowledge.

[201] Hybrid varieties are produced by first establishing a large number of (forcedly) self-fertilized lines of a normally cross-pollinating crop, e.g. maize. Continuous self-fertilization of these lines over several generations leads to the accumulation of homozygosity (i.e. homogeneity of alleles), and many of these inbred lines have to be abandoned because they accumulate deleterious alleles. Those lines that accumulate favourable alleles, in contrast, are continued, and if two such inbred lines are then crossed, the resulting hybrid combines the favourable alleles of both parents and often produces a yield that is both higher than that of either parent and higher than that of the original, cross-pollinating population. This phenomenon of enhanced hybrid performance is known in plant breeding as *heterosis*, and it diminishes as soon as the hybrid generation is again openly pollinated, i.e. if the material harvested from hybrids is re-sown. This overview is adapted from Hartl (1988: 64f). Outside plant breeding, the term hybrid or hybridisation is used in a wider sense for organisms resulting from the mingling of species or evolutionary lines.

The Health Impact Fund

Thomas Pogge proposes a Health Impact Fund as an interesting alternative to patents for rewarding and incentivizing private pharmaceutical research (Pogge 2008c: 222-251; further elaborated in Hollis/Pogge 2008). While this research is without doubt both necessary and expensive, the conventional protection of resulting products by (product) patents has morally undesirable effects: it incentivizes research into (especially chronic) diseases suffered by the well off who can afford innovative drugs, instead of research into more easily curable infectious diseases concentrated among the (more numerous) poor. Due to their high monopoly prices, drugs and treatments protected by patents are often out of reach for most of the global population, which for Pogge constitutes a human rights violation (see Hollis/Pogge 2008: 57-68). In contrast, the proposed alternative mechanism would reward innovators out of public funds, in relation to how successful the innovation actually is in reducing the global burden of disease (which would have to be assessed independently). Drugs and treatments would be offered near the actual price of production and distribution. Innovators could choose whether to apply for conventional patents or for the alternative mechanism envisaged here, which would complement rather than replace the existing patent system. Since rewards would depend on the actual, observable impact of the innovation, the most profitable innovations would be those that address the most widespread and easily curable diseases, and innovators would try to ensure effective access e.g. via generic drug producers and the public health systems of developing countries.

> "The HIF is not a system which looks to the pharmaceutical companies for philanthropy: instead the idea is to offer them the opportunity for market-based rewards for the contribution their products make to improving global health." (Hollis/Pogge 2008: 5)

Although Pogge's suggestion is not easily applicable to innovations based on crop genetic resources, it indicates that there are feasible alternative mechanisms to reward innovators, while at the same time making their innovations (e.g. a new crop variety) accessible to those who most need them and directing research and development where it has the greatest positive impact. Although the positive impact of a innovation based on genetic resources will be more difficult to determine than that of pharmaceuticals, criteria could be their suitability for small-scale and ecologically sustainable agriculture. As in Pogge's suggestion, the innovator would be interested in making the innovation widely accessible and would be discouraged e.g. to prohibit seed saving. In chapter 4.8.3, I will propose a global fund for benefit sharing, which might be analogous to the proposed health impact fund in some respects. However, since the overall focus of this investigation is to ensure that benefits are shared (in a fair and equitable way), other incentives for innovation are less prominent, and I will not discuss in more detail if an instrument similar to the health impact fund should be introduced for rewarding agricultural research.

Box 10: The Health Impact Fund

4.4.5.5 Farmers' privilege and breeders' exemption

Before further differentiating the subject matter of protection and commenting on legitimate respective forms of IPRs, I will here summarize the justifications for the farmers' privilege and the breeders' exemption as desirable exceptions to (or preconditions for) IPRs in genetic resources. While the farmers' privilege is justified mainly by its contribution to food security, the breeders' exemption facilitates continuing innovation on the basis of existing material. The viability of both lines of reasoning is supported by the fact that both exemptions have been part of the UPOV-Conventions until 1991 (see ch. 2.3.4).

Farmers, especially at the subsistence level, are arguably the most vulnerable group among those affected by restrictions imposed by IPRs in genetic resources. Strong IPRs such as patents on seeds, which up to now exist mainly for genetically modified varieties (see above), forbid farmers to use seeds saved from a previous harvest of the patented crop without licensing by the patent holder. However, many small and subsistence farmers depend on such seed saving, as well as on the customary exchange of seeds on an informal and non-commercial basis. It allows them to conserve varieties that have proven to be useful, to improve their seeds according to individual needs, to be independent of commercial seed vendors, and to form seed exchange networks for concerted conservation and improvement strategies. These effects are desirable from an ethical point of view since they contribute to food security, *in situ* conservation, poverty alleviation, and resource-based innovations (see ch. 4.2).[202] The farmers' privilege provides a substantial benefit in itself and can alleviate certain problems that arise by the privatisation of genetic resources, i.e. by turning them into excludable, limited goods. The positive effects can also be expected to outweigh some potentially disadvantageous ones, e.g. a slowing down of commercial R&D due to restrictions on IPRs that potentially disencourage innovation. That this must not even be the case has been discussed in chapter 4.4.5.1. Furthermore, it is far from clear to which extent commercial R&D addresses the needs of subsistence farmers. Rather, such R&D mostly aims at mechanized, large-scale agriculture, while subsistence farmers tend to rely on traditional varieties or varieties provided by public research (see ch. 4.2.3). On the other hand, large-scale farmers in both industrial and developing countries are unlikely to significantly extend their use of farm-saved seeds, even if the possibility to do this would be legally expanded e.g. by an extended farmers' privilege for patented varieties: mechanised farming of large agricultural areas with the help of fertilizers and pesticides, aiming at marketing the final product, is most profitable with high-input, high-yielding, homogenous varieties – demands which are often fulfilled better by certified, commercial seeds than by a sample of last season's harvest. Seed saving is also not feasible with hybrid varieties: the favourable characteristic of hybrids, i.e. the higher vigour and yield known as heterosis, as well as their phenotypical homogeneity, occur only in the first generation of crosses between parent breeding lines and will largely be lost if harvested material is re-sown (see footnote 201). Subsistence farming and mechanised agriculture are two substantially different ways of land management, whose aims and needs are disparate and, accordingly, require disparate approaches in R&D. Although the farmers' privilege to a certain extent infringes upon the IPR holders' rights, it is defendable on ethical grounds, and I will below demand that all IPRs in genetic resources should allow informal and non-commercial seed saving and exchange.

[202] For an in-depth analysis of the impact of policies on seed systems, especially the differences and potential interactions between the farmers' seed system and the formal seed system, see Louwaars (2007).

The breeders' exemption, consisting in the right to use protected plant material for further breeding without authorisation of the rights owner, is intended as a further counterbalance to IPRs on crop genetic resources. If it was extended to other conventional types of IPRs, especially patents, it could alleviate the problems of patent thickets and patent stacking (see ch. 4.4.5.1), thereby providing breeders with the freedom necessary for continuing innovation. The task of plant breeding by its very nature differs significantly from that of technical innovations: a breeder not only builds on a body of existing knowledge, but has to employ physically existing material already in use in one way or the other. Thus, if all currently existing crop genetic resources were protected by IPRs providing for the breeders' exemption, the breeder would immediately be confronted with the need for licensing agreements as soon as starting work.[203] For these reasons, the UPOV-Conventions hitherto have adhered to the breeders' exemption, although pressure is mounting to introduce more patent-like PVP with tighter limits to the breeders' exemption (see ch. 2.3.4). From an ethical point of view, however, this exemption fulfils a desirable role similar to the farmers' privilege in making breeders (including public breeding programmes) more independent of agricultural corporations, and enabling even small breeders to benefit from the current status of agricultural R&D (see ch. 4.2). Such small breeders are often farmers themselves, and the UPOV Convention deliberately leaves the definition of a breeder rather broad (see ch. 2.3.4). As with a strong farmers' privilege, a breeders' exemption in IPR legislation may be a certain brake on commercial R&D, but here the same deliberations apply as for the former: the most disadvantaged farmers and breeders benefit the least from the current research aimed at mechanized, large-scale agriculture in a few standard crops, while they would have much to gain from freer research according to their needs and by less quasi-monopolies of agrochemical corporations. Weaker IPRs can also be expected to ease the widespread reluctance of providers and providing countries to grant access. As argued in chapter 4.3.3, ensuring the providers' customary rights and freedoms concerning resource use may offer incentives to allow access as the precondition for desirable innovations based on genetic resources. Introducing a breeders' exemption into all IPR legislation could also reduce the attractiveness of breeding genetically modified crops, which in many countries at present offer stronger IPRs (in the form of patents) than conventional breeds (in the form of UPOV-PVP). Combining both demands discussed here, an important criterion for IPRs in genetic resources is the following:

> **All intellectual property rights in crop genetic resources should provide for the farmers' privilege (i.e. informal and non-commercial seed saving and exchange), and for the breeders' exemption (i.e. the right to use protected plant material for further breeding without authorisation of the rights owner).**

The concept of farmers' rights, which is often discussed in the context of ABS and has been explained in chapter 2.4.2.1, goes further than the farmers' privilege in including such issues as participation, benefit sharing, and protection of traditional knowledge. Since these aspects are discussed in various other parts of this thesis and the content of further criteria of justice in benefit sharing, I will not comment on them here, though they are important and desirable supplements of the farmers' privilege with regard to justice. The farmers' privilege and breeders' exemption with

[203] The possibility of compulsory licensing is, of course, provided for by most patent legislation; however, it is usually not applicable to the normal breeding situation, but reserved for cases of emergency or of refusal by the patent holder to commercialise a desirable product at all.

regard to IPRs in genetic resources should be separated from the question of who has to share benefits for which uses; this will be discussed in chapter 4.5.

4.4.5.6 Differentiating the subject matter of protection

Not only the forms of IPRs, also the subject matter of protection needs to be differentiated – a fact often overlooked by advocates as well as opponents of IPRs in the field of crop genetic resources. I regard it as necessary to distinguish at least four main categories:

a) unaltered genetic material, e.g. genes or traits,
b) improved varieties[204] and breeding lines including those generated by genetic engineering; grown mainly for marketing and income generation,
c) traditional genetic resources, e.g. landraces, traditional cultivars, farmers' varieties; grown mainly for subsistence and local markets, and
d) traditional knowledge (as defined in chapter 1.4.8).

I will not distinguish whether or not a resource is genetically modified. Although their ethical evaluation is central to a whole branch of literature, I hold it to be less essential for judging the fairness and equitability of benefit sharing arrangements: once the above differentiation is applied, criteria of justice in benefit sharing can be developed independent of the breeding method. The crucial question here is not how a gene or a trait has been introduced into a plant, but where it originated and what property rights might be attached to it. Of course, a growing proportion of genetically modified crops will probably exacerbate many of the problems discussed in this thesis, especially by allowing stronger IPR protection by legal and biological means, accelerating agricultural mechanization and the loss of species and varieties in agroecosystems, and facilitating the monopolisation of seed markets. On the other hand, these processes are not unique to genetically modified crops, but concern other improved varieties as well.

For each of these four categories of subject matter to be protected by IPRs, a different matrix of scope and kinds of property rights (as discussed in chapters 4.4.3 and 4.4.4) is theoretically possible and might be desired for different reasons and with different justifications. This variety is reflected by the various conventional and alternative instruments for IP protection listed above, which obviously imply such differentiations. The terminology suggests that to three of these four categories (a, c, d) the criterion of novelty in a strict sense does not apply, which is usually required especially for patents. However, a lot of argumentative and material effort by industry as well as, partly, politics has been and is being directed at the justification of strong IPRs (and of existing IPRs rather than new *sui generis* systems) for all four of these. Other authors suggest that especially developing countries exclude patents on plants and plant varieties and instead install *sui generis* systems closer to their interests and those of their local farmers and seed producers (e.g. Alker/Heidhues 2002: 11; The World Bank 2006; Wissen 2003: 139). Several authors opt for varying levels of protection for different crops, e.g. export crops vs. subsistence food crops (Louwaars 1998), for exemptions for resource poor farmers (Alker/Heidhues 2002: 16), or for differentiation between domestic and foreign varieties or inventions (Seiler/Dutfield 2001: 47). According to Seiler/Dutfield (2001: 47), this is possible in a TRIPS-conform *sui generis* system, which would have to differ from both UPOV-

[204] Without implying that traditional varieties are not improved, I will use the term "improved varieties" for commercially grown varieties that are the result of "modern", targeted breeding and are usually merchandised under a recognisable name – the type of variety eligible for protection by UPOV.

style PVP and patents. Differentiated solutions such as these suggestions in my opinion are very helpful and probably necessary for national implementation of IPRs for genetic resources, and an international IPR regime (especially TRIPS) should provide enough flexibility for such national specifications (see ch. 4.8.7.1). The following criterion expresses the need to differentiate the subject matter of intellectual property protection and will serve as a basis for the next chapter:

> **Among the subject matter of intellectual property protection, at least the four categories of unaltered genetic material, improved varieties and breeding lines, traditional genetic resources, and traditional knowledge should be distinguished.**

In the following, I will outline some possibilities for the ethically legitimate use of conventional and alternative instruments in this context, either domestically or in an international framework for IPRs in genetic resources and associated knowledge.

4.4.5.7 Matching intellectual property protection instruments to the subject matter of protection

After distinguishing the four most important kinds of subject matter potentially to be covered by IPRs, I will here tentatively assign the IP protection instruments identified above to each of these categories. Since there is a sizable and growing body of literature dedicated to this subject[205], I cannot discuss all variants in detail. I will focus my evaluation on principles and criteria of justice, taking into account some aspects of practicality. The results are subsumed in Table 8.

a) Unaltered genetic material

Many authors reject patents on unaltered genetic material since it can only be discovered, not invented. Others (e.g. the US patent office, see ch. 4.4.5.2) regard the isolation of a gene in connection with the identification of a useful property as sufficient for protection by a product patent. In the early years of genetic research, the technique of gene sequencing was indeed so demanding that isolation and identification involved significant inventive tasks and may have merited a substantial reward. However, due to advances in gene sequencing[206] and in the light of the extensive claims especially of product patents (see ch. 4.4.5.1), patents on unaltered genetic material can today be considered unjustified rewards for a relatively small inventive step and may significantly impede further research and development. This is especially the case if these patents extend to all unknown future uses of the genetic material and to all new processes yielding the same product, because such patents would cover further inventions not really attributable to the patentee (Radder 2004: 285, 289; see criterion above). Mgbeoji (2006: 144) points out that product patents are not granted for isolated mineral or metallic substances, demonstrating the bias of the patent system towards chemical and pharmaceutical products. But just like mineral substances, genetic resources are no pure objects of human invention; they are provided by nature, and all persons should be regarded as holding a proportionate share in them (principle 7). Justifiable possibilities for protecting the discoverer's (not in-

[205] Examples are Alker/Heidhues (2002); Carrizosa (2004b); DeGeer (2003); Dross/Wolff (2005); Heineke (2003); Henne (1998); Henne et al. (2003); Kate/Laird (2004); Louwaars (1998); Posey/Dutfield (1996); Ruiz (2004); Schuler (2004); Schüklenk/Kleinsmidt (2006); Seiler (1998); Seiler/Dutfield (2001); Sharma (2004); Shiva (2005); Subramanian (2002); The World Bank (2006).

[206] According to Service (2006: 1544), for example, the cost of DNA sequencing has fallen 1,000-fold from 1990 to 2005, and researchers are aiming at sequencing whole genomes for as little as 1,000 US Dollars.

ventor's) rights in unaltered genetic material therefore seem to be limited to trade secrets and defensive protection by public registers. Such registers, if they are available to patent offices, might also help them to identify patent applications that wrongfully claim to have invented e.g. an already existing trait ("bad" patents, see ch. 4.4.5.1). The following criterion expresses these objections to IPRs on unaltered genetic material:

> **Unaltered genetic material should only be eligible for weak protection e.g. in the form of trade secrets or defensive protection registers.**

This criterion would, for example, exclude the patent claims on the protein brazzein and the DNA sequence capable of expressing it, which have been mentioned in chapter 1.1.4.5.

b) Improved varieties and breeding lines

While crop varieties in the past usually have been protected by specialised PVP instruments, patents are becoming more common for genetically modified lines and varieties, and recently also for conventionally bred products (see ch. 4.4.5.1, 4.4.5.2). Considering the criterion formulated in chapter 4.4.5.1, this practice should be revised: every variety or breeding line is a direct descendant of previously existing resources and mostly consists of this existing material. Patents on breeding lines or varieties (let alone on all plants possessing a certain trait or on all products further down the production chain) do not separate this physical material from the novel inventive achievement and restrict others' freedoms to use existing resources; often, the inventive step is rather small[207]. The examples of patents on the Enola bean, high-oil maize, and Hawaiian taro in chapter 1.1.4 illustrate these problems. Since patents do not allow for the breeders' exemption, patent thickets and patent stacking (see ch. 4.4.5.1) are foreseeable results when protected varieties are crossed and used for further breeding; artificial scarcity is created and parallel innovations are hindered (cf. Pogge 2008c: 228f). Similarly, the absence of a farmers' privilege for patented varieties is unsatisfactory. From the point of view of justice, the only justification for patents for improved varieties and breeding lines would consist in them being the only possibility to encourage desirable innovations (ch. 4.2.3).[208] Looking at the above-mentioned trend of patents granted or applied for, however, these innovations primarily concern high-input, high-yielding, genetically uniform varieties adapted to industrial rather than small-scale agriculture. They are much more profit-

[207] Mgbeoji (2006: 138f) gives the example of patents granted for a variety solely on the grounds of an alteration in flower colour. In his opinion, traditional farmers and breeders have over the centuries achieved far more genetic improvements than the seed industry. In the words of El-Tayeb (2005: 256): "No one has yet been able to "invent" a useful biological entity from scratch and no serious scientist has yet proposed this as feasible in the foreseeable future." This remains true even after the J. Craig Venter Institute has created the first entirely synthetic living organism, the bacterium *Mycoplasma laboratorium*: it contains a minimum set of 381 genes found to be essential for an existing bacterium, which were synthesized and inserted into a bacterial cell which previously had its DNA removed. The patent application is available via the patent database of the United States Patent and Trademark Office (search for the application serial number 20070122826) at *http://patft.uspto.gov/netahtml/PTO/search-bool.html* (last accessed 07.09.2009). Although synthesizing a complete and new genome without doubt involves inventive achievements at the level of methods and technologies, the transformed bacterium has merely had its DNA exchanged; the remaining cell, without which the novel DNA would be nothing than an inactive organic molecule, was not synthesized.

[208] In chapter 4.2.3, it has been noted that R&D is usually less expensive in breeding than for pharmaceuticals or chemical pesticides, so that innovative crop varieties will often not necessitate as extensive possibilities for recuperation of investment in the form of intellectual property rights as e.g. pharmaceuticals.

able for private industry than innovations e.g. in crops or varieties suitable for subsistence agriculture, which would be the ones ethically most desirable (see principle 3 and ch. 4.2.3). As Frein/Meyer (2005: 152) state: "the patent system is in itself inherently anti-poor and anti-development", thereby contradicting major criteria of justice in benefit sharing. For these reasons, patents can be considered too comprehensive a protection not only for unaltered genetic material, but also for improved varieties and breeding lines – and therefore, for genetic resources in general.

Fortunately, incentives for innovation based on crop genetic resources do not have to be dispensed with: the remaining conventional IPRs, especially plant variety protection according to the UPOV-Convention 1978 (UPOV 1991 being too close to patent protection), offer sufficient incentives and rewards for innovation. UPOV-protected varieties must not be produced, multiplied, or marketed without the breeder's consent, with the important (and desirable) exceptions of research and non-commercial purposes and the breeding of further new varieties (breeders' exemption). Any such plant variety protection should further guarantee the farmers' privilege as important contribution to food security (principle 3). In addition to this conventional instrument, community IPRs as well as positive protection by registers could account for unconventional ownership relations and weaker protectability criteria. Reformed patents which provide for the farmers' privilege and the breeders' exemption may also be acceptable if they cover only novel inventive achievements – in this case, they would be quite close to UPOV 1978. Defensive protection is only necessary where other possibilities fail. My criterion for IPRs for improved varieties therefore is the following:

> **Improved varieties and breeding lines may be protected by plant variety protection according to UPOV 1978, or by weaker instruments.**

c) Traditional genetic resources

Landraces, farmers' varieties, and other traditional genetic resources do mostly not meet the stringent criteria of strong conventional IPRs regarding novelty (patents) resp. distinctness, homogeneity, and stability (UPOV-style PVP). Although it is sometimes suggested to adapt the protection criteria respectively (i.e. extend the scope of protectable innovations and skills) and thus enable farmers and communities to apply for rights in what is perceived to be their legitimate property, such a solution entails serious problems: most importantly, it is often close to impossible to identify the rightful (individual or collective) owner since the resources are being and have been widely used and grown. Probably due to legal unclarities and conflicting international obligations, very few *sui generis* IPR systems for traditional genetic resources and traditional knowledge have so far been implemented in national legislation (Dross/Wolff 2005: 78; Ruiz 2004b). Moreover, the main argument in favour of strong IPRs, i.e. being an incentive for innovation, is less convincing for the case of traditional genetic resources or traditional knowledge since they often exist already, and their production does not have to be pushed (Lu 2007: II B.1.a). From an ethical point of view, exclusive property rights in such resources may restrict others' customary and commercial use of them, may hinder further innovation, and may engender commercialisation and privatisation of a good crucial to food security and rural subsistence (contrary to principle 3 and various criteria formulated above).[209] In the words of Frein/Meyer (2005: 152):

[209] In a comparative study on patents on Neem, turmeric, ayahuasca, basmati rice, and Enola beans, Schuler (2004: 161, 176f) found that, while patents on existing resources usually cannot prevent people in the provider countries from the continued use of their resources and traditional knowledge or

> "If the intention of governmental negotiators is to create an ABS system that can strengthen the weak, protect their rights, and gain fair prices for their resources, the negotiators must limit the influence of the patent system in the field of traditional knowledge and genetic resources."

On the other hand, these genetic resources are very valuable to small farmers and rural populations as well as an important reservoir of genetic diversity, so they definitely merit protection against loss or misappropriation (principles 3, 7, 8). This is the objective of various forms of registers suggested in literature (e.g. Drahos 2002; Ruiz 2004b; Subramanian 2002): while registers for defensive protection merely prove prior art and are rather uncomplicated to install, registers for positive protection also establish a (restricted) form of property or usage rights and could make the resources available for ABS negotiations. Publicly accessible registers would also facilitate patent application monitoring e.g. by civil society organisations. The scope of protectable resources under these alternative IP instruments could be defined more freely than for conventional IPRs, including e.g. non-homogenous but identifiable landraces. Such instruments of negative and positive protection could be decisive for indigenous and local communities' chances for a larger-scale trade in products based on genetic resources, for providing possibilities for poverty alleviation, rural development, and participation in policy-making concerning genetic resources (principles 3, 9). However, applicants for positive protection would have to somehow verify their ownership, which means that resources could not yet be too widespread or widely used. Any form of register further has to balance confidentiality against documentation efforts in order to prevent the registered resources from unintentionally entering the public domain or attracting unauthorized use.

Where exact property relations cannot be identified or are not desired, trademarks, geographical indications, and other certifications may be useful for marketing traditional genetic resources.[210] In addition, a (possibly international) framework of related rights or a genuine *sui generis* property concept designed specifically for traditional genetic resources and associated knowledge seems recommendable. This framework could equip indigenous and local communities with better enforceable rights to their resources and knowledge on the basis of cultural self-determination, and could apply where intellectual property protection instruments fail, e.g. when resources and associated knowledge are widely dispersed (Posey/Dutfield 1996: 92). I will not formulate a criterion of justice at this point, but subsume the demands both for traditional genetic resources and associated traditional knowledge in one criterion below.

d) Traditional knowledge

The situation for protecting traditional knowledge is largely similar to that of traditional genetic resources, and many of the above arguments apply accordingly. Of course, legislators may choose to introduce different protection measures for resources and for knowledge since e.g. trademarks and geographical indications do not protect knowledge as such. Overall, traditional knowledge will hardly be eligible for

even from commercialising a product themselves (cf. Federle 2005: 64), they do at least present an important competition in case of commercialisation (loss of export markets, see ch. 1.1.4.1), and possibly raise resource prices.

[210] An instructive example of ongoing efforts to legally protect a traditional crop genetic resource is the denomination "Basmati" (Dutfield 2004: 108).

conventional IP instruments (with the possible exception of trade secrets[211], certificates, and labels) due to its diffuse nature and hard-to-establish origin and ownership. Out of the alternative IP instruments mentioned above, primarily the various types of registers for positive or defensive protection seem feasible and appropriate. Considerations of secrecy vs. publication are even more important than in the case of tangible resources: traditional knowledge as an immaterial good is easily placed in the public domain e.g. by scientific publications, enabling others to freely access it and rendering it unavailable for future ABS negotiations.[212] Where such publishing by outsiders happens without consent of the original knowledge holders (provided they are identifiable), it can rightfully be declared a misappropriation (Byström et al. 1999: 48), which may be compensated to a certain extent by integrating the original knowledge holders in multilateral benefit sharing schemes (see ch. 4.8.3). In a similar approach, Dutfield (2004: 117) identifies a so-called liability regime as a further possibility especially for traditional knowledge in wide circulation: it would not define property rights nor allow refusing access, but would require *ex post* compensation for the use of traditional knowledge. Mgbeoji (2006: 175) suggests an international bureau investigating the novelty of inventions.

Despite their disadvantages such as increasing the risk of attracting illegitimate users, a more widespread implementation of such registers can in many cases be a reasonable measure. Registers can greatly facilitate prior-art searches by IPR application authorities and can provide evidence for challenging wrongfully granted IPRs. In case of the US Patent Act, which only accepts written documentation of public use and knowledge held abroad as prior art (see ch. 4.4.5.2), registers could provide the crucial proof in written form that so far has often not been available. Of course, in order to serve this purpose, appropriate databases must not only be available to IPR application authorities, but these authorities must actually consult them, and their findings must be relevant to the applicable IPR legislation. Furthermore, it must be taken into consideration that traditional genetic resources and traditional knowledge are often documented in a form and language very different from that in the IPR application: the register might for example describe the medicinal properties of a whole plant instead of the pharmaceutically active chemical (cf. Dutfield 2004: 114). These unconventional forms of documentation, as well as the unconventional property rights possibly related to them in their country/ies of source or origin, should not be discriminated against.

An interesting example of a register for defensive protection of traditional knowledge is the Indian *Traditional Knowledge Digital Library* (TKDL)[213]: starting in 1999, Indian government organisations have collected information and texts on various traditional Indian medical systems (e.g. Ayurveda, Yoga), translated them into five major modern languages (English, French, German, Japanese, Spanish), and made them available in a database whose main aim is to prevent unjustified patenting. Al-

[211] According to Lu (2007: V.D), trade secrets are no suitable means to protect traditional knowledge since usually not enough effort is made to maintain secrecy, or the knowledge already is in the public domain.

[212] Mgbeoji (2006: 91-93) and Posey (2004: 130) point out the political implications of scientific research in this respect: incorrect descriptions of crop genetic resources as "wild" or "natural" or such labels as "ethnobotany" or "folklore" for traditional knowledge might make it difficult for indigenous and local communities to claim property rights and resulting rights to benefit sharing.

[213] The Digital Library is available at *http://www.tkdl.res.in* (last accessed 23.03.2009). Information on the TKDL is taken from this website and from a press release of the European Patent Office in February 2009, available at *http://www.epo.org/topics/news/2009/20090211.html* (last accessed 23.03.2009).

though the included knowledge so far is taken from books and is thus supposedly already part of the public domain, access to the complete database is restricted to patent offices under a specific access agreement. Prior art searches are facilitated by a compatible classification developed specifically for this purpose, and by the fact that the database transliterates e.g. the traditional names for plants, diseases etc. into their modern or scientific counterparts. Since February 2009, the European Patent Office can access the database, which meanwhile contains more than 200,000 entries, for conducting prior art searches. A further example of defensive protection of traditional knowledge is the *Traditional Ecological Knowledge Prior Art Database* (TEK*PAD)[214]. Under the roof of the international non-profit *American Association for the Advancement of Science*, this database is a freely accessible Internet-based index and search engine of existing documentation concerning indigenous knowledge and plant species uses. An exemplary register for positive protection is the Peruvian *Regime of protection of the collective knowledge of indigenous peoples*, which is discussed by Dutfield (2004: 118-120).

In addition to these kinds of registers as rather weak protection instruments, rights and access to traditional knowledge certainly need to be embedded into related but broader concerns for local and indigenous communities, based on the principles of poverty alleviation and political participation (principles 3, 9). Aspects to be considered are e.g. the right to self-determination, land and human rights, community-controlled research, and measures to advance conservation and use of traditional knowledge (cf. Dutfield 2004: 109, 124; Posey/Dutfield 1996: 41; Schüklenk/Kleinsmidt 2006). Concepts incorporating some of these are e.g. farmers' rights or traditional resource rights (see ch. 4.4.5.4). Furthermore, national IP measures alone will be only of limited success: since they are unable to effectively prevent misappropriation by foreigners, an international framework for traditional knowledge protection is necessary – at the same time, this system must be flexible and able to cater to national characteristics and cultures (Dutfield 2004: 123f).

As a common demand of justice for both traditional genetic resources and associated knowledge, I will formulate the following criterion:

> **Traditional genetic resources and associated traditional knowledge are not eligible for patents or plant variety protection according to UPOV; weaker and unconventional instruments (such as trademarks, geographical indications, certificates, registers for positive and defensive protection) should be available for their protection against loss and misappropriation.**

The following table is my attempt to summarize the above considerations and suggestions for adequate protection instruments for the various categories of subject matter. Some measures are either-or possibilities, others are complementary. A positive evaluation, however, does not imply an unconditional recommendation; measures should be chosen according to concrete needs and demands and may vary according to crop and to administrative level (e.g. domestic vs. international).

[214] The database is available at *http://ip.aaas.org/tekindex.nsf* (last accessed 23.03.2009).

	Unaltered genetic material	**Improved varieties**	**Traditional genetic resources**	**Traditional knowledge**
Conventional IP instruments				
Patents	-	-	-	-
UPOV 1978 - style PVP	-	+	-	-
Trademarks	-	+	+	-
Trade secrets	+	+	-	-
Geographical indications	0	+	+	-
Certificates, labels	0	+	+	+
Alternative IP instruments				
Reformed patents / reformed PVP	-	0	-	-
Collective / community IPRs	-	+	-	-
Registers for positive protection	-	+	+	+
Registers for defensive protection	+	+	+	+
Framework of related rights	-	0	+	+

Table 8: Matching IP instruments to the subject matter of protection (+: permissible; 0: permissible with restrictions; -: undesirable)

Notwithstanding these suggestions for restrictions in property rights and for alternative property regimes, the aims and purposes of benefit sharing identified in chapters 4.2 and 4.3 in my opinion cannot be achieved by property rights alone. Especially resource conservation and poverty alleviation necessitate a broader approach in order to ensure that property rights are not only acknowledged, but also give rise to benefit sharing obligations. Schüklenk/Kleinsmidt (2006: 129) point out that benefits for local and indigenous communities should not have to depend on IPR regimes that may otherwise be responsible for their marginalization and inability to afford e.g. adequate health care, as in the notorious case of patented HIV drugs. Furthermore, weak IPRs or lacking commercial markets might make R&D or the disclosure of results unattractive to private corporations, and may even discourage the development of some high-end agricultural or medicinal products.[215] Hence, there will probably always be R&D objectives of common interest that have to be additionally addressed by public funding (see ch. 4.2.3).

4.4.6 Results: Criteria of justice for property rights in genetic resources and associated knowledge

The following criteria of justice for property rights have been developed in this chapter.

Concepts of property rights:

3.1 Property rights in genetic resources and associated knowledge should be conceived as conditional rather than absolute and should be responsive to demands of justice.

[215] Wilson (2007: 264) points to the case of patents on surgical treatments: they are excluded from patentability in most countries due to their medical importance, even with the downside of potentially less innovation in this area. In the opinion of Wilson, patents on pharmaceuticals or on genetically modified crops can be principally rejected for the same reason.

Scope of property rights:

3.2 Property rights in genetic resources may exclude the right to destroy them and the right to exclude others from their use.

Open access, common and private property:

3.3 Property regimes for genetic resources and associated knowledge may be designed as publicly regulated open access resource, well-defined common property, or restricted private property.

Patents:

3.4 Patents should be restricted to clearly attributable, novel inventive achievements such as technical procedures and processes and should not extend to previously existing knowledge or the biological material itself; prior art searches should be extended accordingly.

Farmers' privilege and breeders' exemption:

3.5 All intellectual property rights in crop genetic resources should provide for the farmers' privilege (i.e. informal and non-commercial seed saving and exchange), and for the breeders' exemption (i.e. the right to use protected plant material for further breeding without authorisation of the rights owner).

Differentiating the subject matter of protection:

3.6 Among the subject matter of intellectual property protection, at least the four categories of unaltered genetic material, improved varieties and breeding lines, traditional genetic resources, and traditional knowledge should be distinguished.

Matching instruments to the subject matter of protection:

3.7 Unaltered genetic material should only be eligible for weak protection e.g. in the form of trade secrets or defensive protection registers.

3.8 Improved varieties and breeding lines may be protected by plant variety protection according to UPOV 1978, or by weaker instruments.

3.9 Traditional genetic resources and associated traditional knowledge are not eligible for patents or plant variety protection according to UPOV; weaker and unconventional instruments (such as trademarks, geographical indications, certificates, registers for positive and defensive protection) should be available for their protection against loss and misappropriation.

*4.5 Who **should be required to** share **benefits?***

After criteria for property rights have been developed above as an important background, this and the following chapters will more directly address questions of benefit sharing, starting here with the problem which users of genetic resources should be required to share benefits. Proponents of bilateral ABS contracts as only or main source of benefit sharing assume that benefit sharing obligations are adequately defined by such contracts between a user and a provider. The approach here, however, attempts a broader perspective, and it has already been shown that bilateral ABS contracts alone are no satisfactory answer if the aim is indeed fair and equitable benefit sharing according to the principles of justice deduced in chapter 3 (see p. 109). Since these principles mainly address the receivers of benefits, only three are directly applicable to the question investigated here:

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

While these principles alone, of course, can give no satisfying answer as to who exactly should be required to share benefits, they provide guidelines in judging the existing suggestions. From the viewpoint of justice, I regard it as necessary to demand benefit sharing for the following uses and user groups of crop genetic resources.

4.5.1 Triggers of benefit sharing obligations

Especially principle 2, as well as the criteria formulated in the above chapters, suggest to regard benefit sharing regulation as part of a globally shared institutional order, rather than as a matter between an individual user, an individual provider, and concerning an individual resource. On this basis, benefit sharing has to be more encompassing and should explicitly be designed as a tool of redistribution from the affluent to the disadvantaged (individuals, countries etc.). Such a more comprehensive view was possibly also held by those who formulated the central benefit sharing article in the CBD:

> "Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, […] with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms." (CBD Art. 15.7)

While the detailed interpretation of this article is still unresolved in the legal and political discussion (see the negotiations in the ABS Working Group), it is quite obvious that it is not restricted to bilateral private contracts as sources of benefit sharing but asks for internationally coordinated political regulation of the use of genetic re-

sources.[216] The CBD further does not specify whether benefit sharing obligations concern only newly accessed or newly provided genetic resources (for which ABS contracts are principally feasible), or extend to the utilization of resources that are used at present, but have been accessed in the past (in which case no ABS contracts have been concluded). From the spirit of the Convention, I tend to assume the latter, which would imply more far-reaching obligations than are envisaged e.g. by the International Regime on Access and Benefit Sharing (see ch. 2.4.3), and which would be more in line with the principles and criteria of justice developed here. Especially for crop genetic resources, this approach seems much more adequate since such resources usually are not newly found by e.g. bioprospecting in the tropical rainforest, but have been in use and subject to continuous human input and to crossing with other resources, often for centuries.

For the implementation into national and international ABS legislation, Tvedt/Young (2007, especially pp. 62-70) propose an interesting solution concerning when and for what activities benefit sharing should be necessary. Starting from the observation that suggestions for ABS regulation hitherto mostly require first to define "genetic resources" and then to monitor the flow of the relevant biological material, specimen, and, possibly, of derived products across national boundaries, they argue that such an approach is too complicated and unworkable.

> "After years of thought, the authors have concluded that one cannot directly regulate all "genetic resources" *per se*, no matter how they are defined, unless we are willing to impose some level of control on all movement of any biological material. These facts strongly suggest that an ABS system cannot be based on a species-by-species or specimen-by-specimen oversight."
> (Tvedt/Young 2007: 65)

Instead, the authors suggest employing two triggers for benefit sharing that are easier to define and to monitor: in their proposal, any utilization of genetic resources would trigger a general relevance for benefit sharing; any benefits arising from this utilization would trigger a benefit sharing obligation. The utilization of genetic resources in this approach could be defined quite clearly e.g. as a list of activities, or as more general criteria for activities to be considered such utilization (p. 66); the ITPGR can be regarded as an attempt to regulate one such category of use (p. 67f). The trigger "utilization" could also be employed to identify utilization by third parties to which genetic resources have been transferred, or who are using e.g. information obtained from the resources, without ever having touched the original material (p. 74). Even the fruitless discussion on derivatives can be simplified in this concept: if, contrary to the suggestion by Tvedt and Young, a static definition of genetic resources were employed, it would be necessary to determine to which derivatives of such resources

[216] As mentioned in chapter 2.1, the CBD by its very nature can only oblige contracting parties (i.e. states) to benefit sharing. However, if the CBD in Article 15 intended to primarily establish a system of private bilateral ABS contracts, formulations to this effect could have been used, as has happened in other articles, such as (emphasis added): "Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for […]" (Art. 11); "Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, with the aim that the private sector facilitates […]" (Art. 16.4); "Each Contracting Party shall, directly or by requiring any natural or legal person under its jurisdiction […]" (Art. 19.4). In chapter 4.2.2, I have cited a similar comment by Tvedt and Young that the CBD Parties envisaged ABS contracts between provider countries and users merely as a tool to globally share benefits with the countries that have conserved and provided access to their genetic resources. Independent of these terminological difficulties, however, and as stated in chapter 2.1, I will not take the *status quo* as a given framework for the development of ethical criteria (with the exception of the CBD benefit sharing objective), but will seek to answer the central study questions on the basis of a more comprehensive conception of justice.

benefit sharing should extend – a controversial matter e.g. in negotiations for the International Regime on ABS. Such derivatives may include

- material generated through breeding or multiplication at a later stage in the user country,
- meta-extracts or essences from a sample,
- products or commodities created by use of the genetic resource (p. 74).

In the trigger approach by Tvedt and Young, an exact delineation of derivatives is not be necessary since each direct or indirect use is evaluated separately on the basis of a list of activities resp. of criteria defining the utilization of genetic resources (pp. 63, 74). Applying such an approach e.g. to the example of the Brazilian peanut mentioned in chapter 1.1.4.6, benefit sharing obligations could be defined even though access has been in the past.

The trigger approach would thus first require defining a list of activities constituting a utilization of genetic resources. After a case of "utilization of genetic resources" has been observed, the next question would then be if and when benefits arise – when this is the case, the user would be obliged to share them. Concerning the timing of the user obligation Tvedt and Young, for practical reasons, suggest focusing on when the utilization results in capture of the "actual or potential value" referred to in the Article 2 of the CBD (p. 70). In commercial development, this could be when a commercially valuable commodity (product, IPR etc.) is created; in non-commercial research, this could be the point of publication of the research results (p. 70). At these points, it will be possible to rationally determine the amount of benefits arising and the amount to be shared (p. 70). Ideally, the latter follows from the ABS contract, but user country legislation must provide means for enforcing these contracts and for imposing responsibilities on users who have not obtained a contract, or not disclosed the source of genetic resources (p. 71; see ch. 4.8.1). With this approach, tracking each and every biological sample or specimen (often via various intermediaries) becomes obsolete, provided that effective and enforceable user country legislation is in place that defines the two triggers "utilization" and "arising benefits" (pp. 52, 60). The implementation of the trigger approach at the national and the international level will be discussed in more detail in chapters 4.8.1 and 4.8.2, respectively.

The proposal by Tvedt and Young complements quite well the definition of genetic resources adapted from a report of a CBD expert meeting[217] that I have put forward in chapter 1.4.2: this report distinguishes genetic from biological resources on the basis of their use, with e.g. the use

a) for propagation and cultivation,
b) for breeding and genetic modification,
c) for taxonomic research and *ex situ* conservation, and
d) for identifying and extracting certain compounds from biological material

constituting a genetic resource whose specific utility is based on its heritable characteristics. The last of these four uses is sometimes not considered a use of genetic resources (with benefit sharing obligations) since it is not directly the genes or genetic material that is used but biochemical extracts or compounds (i.e. derivatives). However, these biochemical properties are the result of specific genetic endowments of a species or variety, and most of the prominently discussed cases of ABS (especially

[217] I refer to the *Report of the Meeting of the Group of Legal and Technical Experts on Concepts, Terms, Working Definitions and Sectoral Approaches* of December 2008, available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-02-en.pdf* (last accessed 16.06.2009). The report itself provides a more detailed list of activities (pp. 7f); it remains to be seen if and in how far this idea will be implemented into legislation.

for medical and cosmetic uses, but also the case of brazzein illustrated in chapter 1.1.4.5) concern compounds and extracts, rather than genetic material in a narrow sense, which is used primarily in breeding. Limiting benefit sharing obligations to the direct utilization of genetic material would therefore unduly restrict the scope of ABS regulation and would exclude many cases where benefit sharing is commonly regarded as justified. On the other hand, the use for propagation and cultivation in my opinion should not necessarily require benefit sharing, as will be explained in chapter 4.5.2 below. From the list above, thus, b), c), and d) should be considered as a utilization of genetic resources. If worked out in more detail e.g. by the International Regime or by national legislation, this would provide a list of activities triggering a relevance for benefit sharing, as suggested by Tvedt and Young. I will at this point not discuss such details, but adopt their central idea in a first criterion of justice concerning the uses for which benefits should be shared:

> **Certain kinds of uses of organisms or of biological material constitute a utilization as genetic resource; among them are at least the uses for breeding, genetic modification, taxonomic research, *ex situ* conservation, and for the identification and extraction of biochemical compounds. Benefits that arise from such a utilization should be shared.**

This criterion, however, is not sufficient for defining benefit sharing obligations and needs to be supplemented. Above, I have explained why not only uses of newly accessed or newly provided genetic resources, but also uses of resources accessed in the past may legitimately trigger benefit sharing obligations – especially for crop genetic resources. In chapter 4.5.4, I will explain why benefit sharing obligations should also extend to the use by end-consumers, and in chapter 4.7 benefit sharing at the moment of access will be considered. A drawback of this trigger approach to benefit sharing is that providers receive benefits only if and when the resources they have provided prove (commercially or scientifically) valuable. While this is conceivably in line with Article 15.7 of the CBD, it would be unfair to conclude that providers do not merit certain benefits, rewards, or payments for granting access to their resources in the first place, e.g. as compensation for their conservation efforts, and because they may transfer certain exclusive exploitation rights to the user. In chapter 4.6.1, I will therefore argue that all providers should receive benefits, which should partly be independent of the commercial success of resulting products. In any case, the crucial precondition for the triggers of benefit sharing obligations to be enforceable is effective user country legislation that ensures the identification of instances of utilization (see ch. 4.8.1).

4.5.2 Commercial users

The short list of uses mentioned above suggests benefit sharing obligations e.g. for

a) farmers (propagation and cultivation),
b) breeders (breeding and genetic modification),
c) biological basic research (taxonomic research and conservation), and
d) pharmaceutical and (agro-)chemical research and development (identifying and extracting certain compounds),

in so far as they make use of certain heritable characteristics of specific organisms or biological material. This list is not meant to be exhaustive, but contains the major obvious categories of users of genetic resources and associated knowledge. Of these, I would exempt farmers from benefit sharing obligations on ethical grounds: they are usually the most disadvantaged group in the chain of agricultural production (see principle 2 and ch. 4.2.2) and are not only users, but at the same time important pro-

viders of crop genetic resources. Furthermore, as soon as farmers buy seeds or other input that was developed on the basis of genetic resources (e.g. pesticides), the vendor will pass on to them the additional costs arising from his/her own benefit sharing obligations (see below). This has the ethically desirable effect that large-scale farmers, who obtain much of their farming input via commercial markets, participate in benefit sharing via higher purchase prices, while subsistence farmers, who can afford less external purchases, will also contribute less to benefit sharing. In chapter 4.6.3, I will further discuss why small and subsistence farmers generally should receive benefits from others' utilization of crop genetic resources, rather than being obliged to share the little benefits they gain from cultivation.[218]

As for the remaining categories of users listed above (b-d), I will not investigate the different branches separately, but rather distinguish between commercial and non-commercial users as the ethically most relevant differentiation. Prominent examples of commercial users of genetic resources are corporations of the pharmaceutical, cosmetics and (agro-)chemical sectors, as well as commercial breeders (cf. Kate/Laird 1999). Non-commercial users are e.g. national and international research institutions such as the CGIAR Centres, publicly financed breeding programmes, and universities. Of course, certain institutions may employ a combination of public and private funding; in these cases, the different projects should be treated separately, if possible.

Generally, all commercial users of genetic resources should be required to share benefits that arise from their utilization of such resources. Details may be regulated by national legislation and ABS contracts, but since crop genetic resources are often not newly accessed (see above) and ABS contracts cannot capture the total value of resources (ch. 4.3.1), ways should be found of defining benefit sharing obligations also for uses of genetic resources not covered by ABS contracts (e.g. multilateral benefit sharing, see ch. 4.8.3). While the total amounts to be shared do not have to be huge, it is important that criteria of justice are followed e.g. concerning the recipients of benefits (ch. 4.6), the elements of benefits (ch. 4.7), and the mechanisms of implementation and enforcement (ch. 4.8). The benefit sharing obligations of commercial users might lead to higher prices for consumers of resulting products, especially if benefit sharing is designed mainly as financial compensation of providers. However, this redistribution is principally justifiable on ethical grounds, as has been illustrated in the previous chapters and is demanded by principle 2. In addition, I will discuss non-monetary benefit sharing as a desirable and, possibly, more cost-efficient complement to monetary benefit sharing in chapter 4.7.2.

4.5.3 Non-commercial users

Exemptions from benefit sharing obligations are often demanded for non-commercial research on the grounds that such obligations may unduly impede non-commercial research and development (e.g. Carrizosa 2004a: 300; Seiler/Dutfield 2001: 17f), where no additional resources are available to spend on benefit sharing. Publicly financed research is often subject to rather tight limits in time and funding, and bureaucratic national ABS regulation in provider countries is sometimes perceived as yet another restriction on the freedom of scientists in their pursuit of knowledge sup-

[218] Due to my focus on crop genetic resources, I refer only to farmers here; similar considerations should apply to e.g. indigenous communities using traditional medicine among themselves or for subsistence purposes: they should not be required to share benefits, but should instead be generally eligible for receiving benefits from others' utilization of similar kinds of genetic resources.

posedly in the common interest.[219] From an ethical viewpoint, impediments to non-commercial and publicly funded research by overly strict ABS regimes can indeed be expected to be detrimental especially to basic research, as well as to research aimed at those who depend most on it, i.e. small farmers and poor rural populations (contrary to principle 2 and criteria in chapter 4.2). Furthermore, non-commercial research can in itself be regarded as a form of multilateral benefit sharing since its results are usually freely available and rather easily accessible. On the other hand, it may be expected that at least the organisational handicaps for non-commercial research will be reduced once effective user country legislation is in place, assuring provider countries that utilization of the genetic resources accessed on their territory will give rise to benefit sharing obligations even abroad (see ch. 4.8.1).

However, too generous a treatment of non-commercial research runs the risk of unduly curtailing the rights of the providers in pursuit of the freedom of the users. A general and advance exemption for all non-commercial users would e.g. be contrary to principle 9, which demands that affected communities and individuals (here, the providers) participate in policy-making on benefit-sharing. Providers who realize that they can receive more benefits from commercial users may also be reluctant to grant access to non-commercial users, from whom less or no benefits can be expected. This would probably have undesirable effects since non-commercial users, especially non-commercial research, are often better able to address the aims mentioned in chapter 4.2, such as resource conservation and innovations dedicated to meeting basic human needs. Furthermore, even if the user institution itself is non-commercial, it may develop some commercially interesting products (e.g. varieties), which are a source of significant future benefits e.g. in breeding – in such cases, it would be unfair to share no benefits at all with the providers, only because these benefits originate from a product which was developed in a publicly financed institution. This line of argument plays an important role in the conflicts around the CGIAR's *ex situ* collections, whose specimen were often collected without immediate commercial interest but were then made available (mostly for free) to both commercial and non-commercial users (see p. 53). Similar concerns as for genetic resources are voiced for traditional knowledge: once accessed and transferred into the public domain e.g. by scientific publication, the providers often lose their claims to intellectual protection, and no contractual benefit sharing is likely to take place for further uses of this knowledge, be they commercial or not. These worries can be addressed to a certain extent by the solution envisaged above, where benefit sharing obligations are triggered by specific categories of utilization, and not by the use of a certain resource sample which would have to be tracked from provider to user. Nevertheless, this does not invalidate the above arguments against a general and advance exemption for all non-commercial users. My next criterion of justice therefore demands that benefit sharing obligations principally apply to both commercial and non-commercial users:

> **Commercial as well as non-commercial users of crop genetic resources and associated knowledge should be required to share benefits, with the exception of farmers.**

[219] A drastic, though non-agricultural, example is the primatologist Marc van Roosmalen, who in June 2007 was sentenced to 15 years and 9 months in a Brazilian prison for alleged biopiracy (Check/Hayden 2007; Rohter 2007). He was convicted of keeping monkeys without permits, auctioning names of new primate species, and selling material without proper authorisation. While van Roosmalen has for some time had trouble with the Brazilian authorities, which might have prompted their drastic reaction (cf. Röckenhaus/Roosmalen 2007), many scientists have come to his help and have asserted that Brazil is not the only country where biological research is facing increasing difficulties and suspicions.

On the other hand, a differentiation between commercial and non-commercial users concerning amounts and kinds of benefits to be shared is legitimate. The amounts to be shared may be lower than for commercial research, and, more importantly, non-commercial users often will be able to offer non-monetary forms of benefit sharing that might involve no great extra costs, such as capacity building, participatory research, or joint publications (see ch. 4.7.2). Many non-commercial users may already have in place such practices and procedures, so that they could be regarded as already fulfilling their benefit sharing obligations. The amounts of benefits to be shared could further be designed to vary with the kind of intellectual property protection that a user envisages for a product: benefit sharing obligations for breeders who have their products covered by UPOV plant variety protection, for example, should be less than for breeders who gain patents for similar products since the weaker protection instrument of the former *per se* implies significant benefits for society as compared to the patent. In the absence of globally uniform IPR legislation concerning plant varieties, such differentiations could also alleviate certain structural injustices arising from the heterogeneity of national legislation (e.g. concerning patentability, see ch. 4.4.5.2). These possibilities for differentiation are expressed in the following criterion of justice:

> **For non-commercial users and users aiming at weaker intellectual property rights, obligations should be lower and/or should focus on non-monetary benefits.**

If the trigger approach discussed above is applied (i.e. benefit sharing obligations are triggered by certain activities; no complete monitoring of the flows of biological material is necessary), there will often be no direct providers, and, therefore, benefit receivers, identifiable - especially for resources that are used at present, but have been accessed in the past. In chapter 4.9.2, I will therefore suggest a regime where users share benefits with the actual providers of the resource if they are identifiable, but in any case (also) with further stakeholders generally eligible for benefit sharing (multilateral benefit sharing).

4.5.4 Food and feed industry and end-consumers

In addition to the above-mentioned groups of users of genetic resources and associated knowledge, and contrary to most suggestions in literature, I would like to extend some benefit sharing obligations to the food processing industry and to the final consumers of products based on crop genetic resources. Of course, corporations of the food processing industry may be subsumed under the category of commercial users of genetic resources discussed above. However, I will treat them separately here in order to draw attention to this central use of crop genetic resources, which is often not discussed explicitly.

While direct human and animal consumption of biological resources is usually not considered a utilization of genetic resources (see ch. 4.5.1, 1.4.2), this is only true if such food and fodder is consumed mainly for the uptake of energy and unspecific nutritional components such as carbohydrates, fats, and proteins (staple foods, cooking oil etc.). In contrast, there are many cases in which a specific food or fodder is chosen for consumption because of its specific heritable characteristics. Some examples of such specific qualities of crop species or varieties are

a) specific contents of vitamins or minerals (fruits, vegetables etc.),

b) specific tastes or looks (spices, favourite varieties of fruits, regional vegetable varieties etc.),
c) specific storage or processing qualities (fruits ripening after harvest, seedless varieties, waxy vs. floury potato varieties etc.).

Such a use of certain organisms or biological material, whose specific utility is based on specific heritable characteristics, has above been defined as constituting a genetic resource. It thus seems legitimate and even advisable to include such specific uses in human and animal consumption into an encompassing benefit sharing scheme as envisaged here. There seems to be no obvious reasons why, for example, benefit sharing should be necessary for the extraction of a pharmaceutically interesting compound from a plant species traditionally used by local communities, as well as for the transfer of drought-resistance genes from a landrace into improved breeding material, but not for marketing or processing a variety of apple or potato that is preferred by end-consumers because of its taste, look, or quality for cooking. In all cases, the resource and knowledge in question may have been in the public domain for some time, and commercial resp. corporate actors are marketing products that could not have been produced without a specific genetic resource possessing a specific heritable characteristic. If benefits should be shared at all for the present utilization of genetic resources which have been accessed in the past, as has been claimed above, it seems consistent to extend benefit sharing obligations to at least that segment of food processing and marketing which makes use of specific heritable characteristics of organisms or biological material.[220] The ITPGR mentions the possibility of voluntary contributions by food processing industries in Article 13.6 (see ch. 2.4.2.1).

Whether to address the food industry or, more directly, the end-consumers of the respective products is more a matter of practicality than of systematic reasoning – the food industry would obviously pass on the additional costs to the consumers. A feasible way of collecting benefits in this extensive and complex sector, where actual providers and intermediaries are often not identifiable, may be a tax on certain products, possibly as part of existing value added taxes. Unlike the commercial and non-commercial users addressed above, and to simplify matters, the food industry or end-consumers could contribute to benefit sharing exclusively in such monetary form. Although such a mechanism, especially one requiring additional taxes, might be difficult to negotiate, install, and enforce, it merits consideration. While the amounts transferred would not have to be great in terms of percentages of the total value of consumed products, they may contribute significantly to the global stream of benefit sharing in absolute terms.[221] In chapter 4.8.3, I will suggest a global trust fund as a multilateral form of benefit sharing, of which such taxes could be one important source.

The downside of this scheme of additional benefit sharing by end-consumers is that prices for important basic means of subsistence may rise, and food security for poor consumers may be endangered (contrary to principle 3). If this effect is not prevented

[220] Given my focus on crop genetic resources, I do not consider other industries or end-consumers here. However, it is obvious that, for similar reasons, benefit sharing could be extended e.g. to industry and consumers in the sector of personal care and cosmetics based on natural compounds: these products often utilize genetic resources with specific qualities which are well-known and have little demand for newly accessed resources, but consume significant amounts of bulk material. Some companies in this sector have voluntarily established practices of fair trade and organic production, which are well accepted and appreciated by (industrial country) consumers despite higher costs.

[221] In Box 8 (p. 104), Pogge shows a similar effect for his suggestion of a Global Resources Dividend, raised e.g. from a rather small proportional contribution from sales of crude oil. The "benefit sharing tax" suggested here could be regarded as a special kind of GRD on genetic resources.

or outweighed by opposite effects from other measures suggested in this thesis, or is not desired as a matter of principle, the scheme could be adjusted so that e.g. only rich consumers or consumers in rich countries pay such additional charges – this would be quite in line with principle 2 regarding benefit sharing as a negative duty by the affluent. I will thus formulate the following criterion of justice for benefit sharing obligations by an important user group:

> **Benefit sharing obligations should extend to the food and feed industry or end-consumers as far as they utilize crop genetic resources; benefits should preferably be monetary, such as a tax on certain products.**

Such a contribution of end-consumers to a global scheme of benefit sharing could be conceived as a form of public funding outside ABS contracts, which in chapter 4.3.4 has been shown to be necessary e.g. for resource conservation and public research.

4.5.5 Results: Criteria of justice for benefit sharing obligations by users

The following answers have emerged to the question of who should be required to share benefits and for which uses.

Triggers of benefit sharing obligations:

4.1 Certain kinds of uses of organisms or of biological material constitute a utilization as genetic resource; among them are at least the uses for breeding, genetic modification, taxonomic research, *ex situ* conservation, and for the identification and extraction of biochemical compounds. Benefits that arise from such a utilization should be shared.

Commercial and non-commercial users:

4.2 Commercial as well as non-commercial users of crop genetic resources and associated knowledge should be required to share benefits, with the exception of farmers.

4.3 For non-commercial users and users aiming at weaker intellectual property rights, obligations should be lower and/or should focus on non-monetary benefits.

Food / feed industry and end-consumers:

4.4 Benefit sharing obligations should extend to the food and feed industry or end-consumers as far as they utilize crop genetic resources; benefits should preferably be monetary, such as a tax on certain products.

*4.6 Who **should** receive **benefits?***

After the previous chapter has roughly identified by whom and for which uses benefits should be shared, this chapter will be dedicated to the receivers of such benefits. While of course every person worldwide is constantly benefiting from biodiversity and genetic resources in some way or the other (see ch. 4.3.1), I will here regard only those beneficiaries that should be addressed by ABS regulation and legislation. In many of the prominently discussed cases of misappropriation, providers are local farmers, indigenous or local communities in developing countries, but traditional genetic resources and associated knowledge are, of course, also held by farmers and communities in developed countries (see ch. 1.1.4.3). Where this is the case, they should be considered in questions of access and benefit sharing, i.e. they should be eligible for benefit sharing according to the criteria formulated here.[222] As in the previous chapter, I will employ a broad perspective of distributive, commutative, corrective, and prodecural justice, rather than assuming that the legitimate receivers of benefits are adequately and sufficiently defined by bilateral ABS contracts alone. This approach allows to treat separately two questions often regarded as inseparable in concepts based on bilateral ABS contracts, where the users of a resource are quasi automatically those to share benefits, while the contractual providers are the ones to receive them. I will point out in the course of this chapter why the purely bilateral approach to benefit sharing engenders considerable injustices on the part of the receivers and should be replaced by multilateral forms of benefit sharing. The majority of the ten principles of justice (see p. 109) are relevant for these considerations on the just distribution of benefits:

- The bases of fair and equitable benefit sharing should be designed in such a way that all persons concerned can resp. would agree to them in a **hypothetical consensus** under a Rawlsian veil of ignorance concerning e.g. their social position, living conditions, natural endowments, and country of birth. (Principle 1)

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- The individual shares resulting from a just distribution e.g. of benefits should not be defined only in material resources such as income but should take into account **differential needs and abilities**. (Principle 4)

[222] Taking into account the long-term aims of benefit sharing, especially global justice and poverty alleviation (ch. 4.2.2), justice in benefit sharing would of course require a certain priority for poor farmers and communities in developing countries. However, even in developed countries, farmers are often found among the poorer parts of society, so that sharing benefits with them will often not be against the more general aims identified above.

- After demands of global justice are satisfied and basic human needs are met, the **domestic** institutions of **liberal democratic countries** concerned with benefit sharing should ensure that
    1. each person has the same indefeasible claim to an adequate scheme of equal basic liberties, compatible with the same scheme of liberties for all, and that
    2. social and economic inequalities are, first, attached to offices and positions open to all under conditions of fair equality of opportunity, and, second, are to the greatest benefit of the least-advantaged members of society. (Principle 5)

- Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Principle 8)

On the background of these principles, I regard the following stakeholders as essential receivers of benefits.

4.6.1 Actual providers of crop genetic resources and associated knowledge

In the simplistic view that benefit sharing obligations arise only out of bilateral ABS contracts, the receivers of such benefits can only be those mentioned in the contract, which will usually be the providers of the respective, newly accessed resource(s). As demonstrated in chapter 4.5 for the users, this view is already questionable with regard to Article 15.7 of the CBD, which demands to share benefits "with the Contracting Party providing such resources", i.e. with the provider country. Furthermore, I have shown in chapter 4.5 that not only uses of newly accessed or newly provided genetic resources, but also uses of resources accessed in the past may trigger benefit sharing obligations. Additionally, it can be argued that the actual providers are often not the original resource holders, e.g. in the case of *ex situ* collections. These objections will be addressed in the following chapters 4.6.2 to 4.6.4. On the other hand, the actual providers of genetic resources and associated knowledge are of course entitled to certain remuneration, e.g. in exchange for their conservation efforts and as an incentive to grant access, as has been discussed in chapter 4.3.4.

A major injustice of many existing ABS contracts is the fact that the amount of benefits often depends on the commercial success of the resulting product. As illustrated in chapter 4.3.1, the commercial success of products based on genetic resources usually takes many years to materialize and is difficult to predict for the individual resource. Basing benefit sharing only on commercial success would thus amount to a game of pure chance; providers would often have to wait for years until uncertain benefits in unknown quantities materialize. Since many or most of the genetic resources accessed originally will prove not useful to the user, their providers would only receive marginal benefits often disproportionate to the exclusive access rights they may have granted to this user. In addition, practical problems can arise in retrospectively determining the exact contribution of each resource to the final product; this is especially complicated for new crop varieties and similar products of agricultural R&D (cf. The World Bank 2006: 76). As one possible alternative, it may be a fairer approach for a user to share benefits from commercialisation with all providers he/she has worked with, i.e. all his/her ABS partners (cf. Seiler/Dutfield 2001: 13f). Such a model has been practiced by the Californian company Shaman Pharmaceuti-

cals, which attempted drug prospecting with fair benefit sharing in the 1990s.[223] A further problem is that such benefit sharing arising from commercial success might leave providers to non-commercial users unrewarded, although they similarly contribute to the conservation and development of new crops (cf. Kate/Laird 1999: 155). This applies especially to public *ex situ* collections and research institutions, which play an important role in R&D for such crop genetic resources that are not profitable for commercial enterprises. In chapter 4.5, I have argued at length that both commercial and non-commercial users should be required to share benefits. For the sake of justice, as well as to avoid under-provision of genetic resources to such institutions, providers should similarly receive adequate benefits independent of later commercialisation.

Another source of injustice is the fact that *ex situ* collections and databases at the same time are important providers of genetic resources and associated knowledge themselves. Many *ex situ* collections for crop genetic resources, especially the CGIAR Centres, have until recently given away samples for free – a service in the interest of easy access to and exchange of resources for crop breeding, and one reason why these accessions are often the first choice of commercial users. While this practice remains desirable where genetic resources are requested by farmers (see ch. 4.5.2), it is questionable whether other users should also benefit from these publicly financed services, or if they can be committed to a certain compensation for the considerable conservation efforts and costs which made such an easy provision of samples possible. In chapter 4.5, I have attempted to justify a general duty to share benefits for both commercial and non-commercial users, and this duty should also apply if the provider is a publicly financed research or conservation institution. My first criterion of justice for the receivers of benefits thus is the following:

> **All actual (individual and institutional) providers of a given crop genetic resource and associated knowledge should receive benefits; these should at least partly be independent of the commercial success of resulting products.**

Whether this demand is enforced by national or international legislation, or remains to be respected by the individual user and provider, is a subordinate question; what is essential is that adequate benefit sharing indeed takes place. In the standard case of access to genetic resources, a provider will enter into an ABS contract with the prospective user, with the contract containing the user's benefit sharing obligations. These obligations, as well as the remaining provisions of the ABS contract, should be in accordance with the principles and criteria of justice derived here. Feasible measures to encourage and monitor such compliance are discussed in chapter 4.8. Only if neither the provider country nor the provider his/herself requires benefit sharing (or an ABS contract) should the actual provider in mutual agreement be excludable from benefit sharing. The user in this case may, however, have benefit sharing obligations towards further stakeholders, e.g. to the groups identified in the following, whose legitimate claims to benefit sharing the actual providers should not be able to invalidate unilaterally.

4.6.2 Potential providers of crop genetic resources and associated knowledge

A further important source of arbitrariness in benefit sharing is the fact that many crop genetic resources and the associated knowledge have a large geographic range

[223] Shaman Pharmaceuticals went bankrupt in 1999, but this was due to difficulties concerning the drug approval process, not to the company's benefit sharing scheme (Abate 1999).

and are not attributable to a single, well-defined community or even country. In the language of the CBD, these resources often have more than one country of origin, i.e. they occur *in situ* in more than one country (see ch. 1.4.3). One prominent example is the Neem tree (*Azadirachta indica)*, which is grown and used all over India and elsewhere for varying (non-food) purposes, and is the source of many patents and claims of misappropriation. Of the examples mentioned in chapter 1.1.4, the problem of numerous potential providers of the utilized genetic resources could be expected to occur with all of them (if retrospective benefit sharing were now intended). Large geographical ranges of genetic resources can either be natural, or may have arisen from past flows of genetic resources, as is typical of crop genetic resources. Tracking these flows of resources and specimen and identifying their provenance can be very difficult or even impossible, especially when *ex situ* collections are involved (Dutfield 2004: 11; Young 2004: 278). Thus, the current *in situ* distribution of a genetic resource often does not indicate its original provenance, so that no original provider country can be identified as the legitimate "owner" of the resource. Accordingly, even users willing to fulfil all benefit sharing obligations will often meet with great difficulties in identifying legitimate negotiation partners and rightful recipients of benefits. Apart from prompting local conflict, especially if the shared benefits are private and exclusive rather than public (Henne et al. 2003: 9), such difficulties may raise transaction costs to forbidding heights, making ABS contracts unattractive and forfeiting chances for desirable innovation and poverty alleviation (see ch. 4.2). The situation is often even more complicated for knowledge associated with genetic resources: it is immaterial, often widely dispersed, disseminated or completely diffused, and different knowledge may be associated with a certain resource in different surroundings (cf. Dross/Wolff 2005: 78, 80f). This makes it exceedingly complicated to identify knowledge holders eligible for ABS negotiations and resulting benefit sharing.[224]

In cases like these, there are many holders or potential providers of a given resource or associated knowledge, most of whom will often be equally eligible for entering into ABS negotiations with prospective users. ABS contracts concluded with only one of these potential providers tend to be unfair if benefits are restricted to the one group or person chosen as contract partner, if the remaining potential providers are barred from the possibility of entering into future ABS negotiations themselves, or if they have their customary rights and freedoms concerning resource use limited by the contract provisions (contrary to the criterion in ch. 4.3.3). This occurs especially if the ABS contract includes a transfer of property rights; Young (2004: 282f) refers to this as localization of payment but globalization of patent protection. In order to avoid such injustices and to raise legitimacy and equitability, a certain proportion of benefits (in addition to those received by the actual providers) should be shared among all potential providers of a resource and associated knowledge, i.e. at least among all countries of origin. This demand is formulated in the following criterion of justice:

> **Benefit sharing should extend to all potential providers of a given crop genetic resource and associated knowledge, i.e. at least to all countries currently possessing the resource *in situ*.**

[224] In this context, I want to point out that distinguishing between legitimate, original, or indigenous "owners" of traditional knowledge as entitled to benefit sharing, vs. intermediary, non-indigenous "users" of such knowledge (e.g. vendors of herbs in urban street markets) as not entitled to benefit sharing, is problematic: it assumes a sharp distinction between traditional and other (e.g. Western) knowledge, which often does not exist (see ch. 1.4.8).

Again, the amount of benefits could vary with the kind of user and of IPRs aimed at (see ch. 4.5.3). The problem of identifying all relevant stakeholders for the negotiation of ABS contracts is further discussed in chapter 4.8.6.

4.6.3 Regions of high agro-biodiversity

The above suggestion to participate all potential providers of a given genetic resource already reaches beyond what is commonly proposed and debated e.g. in the negotiations for the International Regime on ABS. However, I would favour to extend this concept even further: especially for the case of crop genetic resources, benefits should, at least in part, be distributed more broadly to regions or countries of high *in situ* agro-biodiversity, independent of whether a given resource has been obtained there or currently exists there. While this suggestion at first sight might seem far-fetched, I regard it as defendable: crop genetic resources have always been widely exchanged and crossed with domestic material; a specific resource might have been developed from origins in a region where similar varieties cannot be found any more. Most varieties and genotypes incorporate crop genetic resources from various origins, and the value of the contribution of each ancestor resource often is impossible to determine (Moore/Halewood 2006: 1f).[225] As a realisation of commutative justice, benefit sharing with regions of high agro-biodiversity could thus be a way of sharing benefits with past generations of farmers and breeders, who have provided the present stock of genetic resources as well as the associated knowledge (cf. Young 2004: 289). In chapter 4.5.1, I have argued similarly that not only uses of newly accessed or newly provided genetic resources, but also uses of resources accessed in the past, may trigger benefit sharing obligations.

It could be objected that such an extension towards past generations could collide with demands of justice within the present generation, where e.g. priority should be given to meeting basic human needs of today's poor (principle 3). However, a scheme of compensation for countries or regions in acknowledgment of their historical contributions to conservation and breeding can be expected to mostly coincide with demands of justice among those living at present: since many genetic resources currently used in agriculture are based on genetic material originally from developing countries, such a scheme will often address regions with marginalised and poor rural populations, where the descendants of previous resource providers often continue to bear the costs in form of marginalised and underprivileged lifestyles. In chapter 4.6.5, I will further suggest that the distribution of benefits among the receivers follows demands of justice e.g. in prioritising basic human needs. Thus, a further important justification for benefit sharing with regions of high agro-biodiversity arises from more general considerations of justice; channelling benefits to such locations would very likely contribute to international justice and poverty alleviation (cf. Henne et al. 2003: 47). This has been identified as one long-term aim of ABS regulation (ch. 4.2.2) and is quite in line with a central principle of justice: in a globally shared institutional order where agricultural goods, though essential for human existence, are often traded at extremely low prices, these regions are foreseeably and avoidably disadvantaged. Following Pogge, principle 2 in this case considers the

[225] Moore/Tymowski (2005: 24) mention the following instructive examples: "The VEERY spring bread wheat variety […], which was the leading cultivar among varieties during the 1980s, was the product of 3170 different crosses involving some 51 parent varieties from at least 26 countries. […] The rice variety IR36 […] has 15 landraces and one wild species in its heritage and was the result of some 20 years of breeding work." Similar considerations could probably be made for the examples of the Enola bean, the taro varieties, and the Brazilian peanut mentioned in chapter 1.1.4.

affluent, i.e. those advantaged by this order, as having a negative duty of compensation e.g. in the form of benefit sharing.[226] In chapter 4.2.2, it has been explained that the CBD expresses a similar view: today's developing countries as main providers of currently utilized crop genetic resources have already borne most of the costs of conservation and providing access, and can therefore legitimately demand a more comprehensive equity between nations. While this point of view is rarely stated explicitly in current international negotiations, it can still be assumed to form part of the motivational background, as demonstrated e.g. by the following quote from the conclusions of a workshop on access and benefit sharing at Bremen University (Germany):

> "The workshop participants took the view that benefit sharing is about justice and recognition of contributions to and promotion of conservation of biological diversity and not just carving up a monetary pie. The link between benefit sharing and the conservation objective of the CBD, it was felt, has been marginalised in the overall ABS debate." (Kamau et al. 2008: 8).

Complementing these lines of justification, additional funding for regions of high agro-biodiversity could be an important aid and incentive for the continuing *in situ* conservation of such diversity, which is another long-term aim of ABS regulation (see ch. 4.2.1; cf. principle 8) and cannot be expected to be financed out of benefits from ABS contracts alone (see ch. 4.3.4). Similar considerations have led to the current design of the benefit sharing fund of the ITPGR's multilateral system, which distributes funds to farmers in developing countries who conserve and sustainably use crop genetic resources irrespective of whether these individual farmers have contributed genetic material to the Treaty's multilateral system.

Possibly, the regions of high agro-biodiversity do not have to be large to be eligible for funding: even communities or farmers' organisations in developed countries could e.g. receive financial support for the conservation of traditional varieties and landraces – without such public contributions to their desirable provision of the common good agro-biodiversity, these developed country farmers have to cover the higher costs of diverse crops and (usually) lower yields by higher product prices, which is only feasible with expert marketing strategies and interested consumers.[227] The following criterion of justice leaves these details to e.g. national specification, but demands that certain benefits are indeed shared with these kinds of regions:

> **Benefits should also be shared with regions or countries currently possessing high *in situ* agro-biodiversity.**

As mentioned above, the amounts and forms of benefits received by these various groups of stakeholders may vary and can be adjusted in legislation or on a case-by-case basis. The multilateral benefit sharing which I will propose in chapter 4.8.3 facilitates such broad distribution of benefits beyond the individual contract partners.

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[226] Such an extension of benefit sharing towards the disadvantaged is also backed by Rawls' account of the disadvantaged not as unfortunate or rightly worse off, but as free and equal persons who are "doing their full share on terms recognized by all as mutually advantageous" and are owed reciprocity rather than charity (Rawls 2001: 139; see ch. 3.3.3.1).

[227] One example for the successful marketing of traditional varieties, albeit for animal rather than plant resources, is the "Bäuerliche Erzeugergemeinschaft Schwäbisch Hall", a farmers' community in Southwest Germany producing and marketing traditional races of pigs, cattle, and geese raised in a sustainable farming environment (see *http://www.besh.de*; last accessed 01.04.2009).

4.6.4 Original providers of crop genetic resources and associated knowledge to public *ex situ* collections and databases

In the above chapter 4.6.3, I have demanded to share benefits with regions of high agro-biodiversity. One justification for this claim has been that these regions have often provided genetic resources in the past and should be remunerated to a certain extent retrospectively. The same reasoning would demand to share benefits with the original providers of crop genetic resources and associated knowledge to public *ex situ* collections and databases, as far as they are not already considered in existing benefit sharing schemes. This is often the case for providers whose contributions took place before the CBD entered into force: having entered the public domain in times when benefit sharing was not yet required, the genetic resources are now subject to the sovereignty of the country where the collection is located (CBD Preamble), and are often freely available without access restrictions or benefit sharing obligations. This historic injustice is sharply criticized e.g. by Sharma (2004: 2-4), whose pessimistic diagnosis cannot easily be contradicted: in the past, developing countries were led to believe that germplasm would be lost if not collected and conserved in large, central *ex situ* facilities. Following this advice, they gave away their genetic resources to the CGIAR Centres as well as Fort Knox and Fort Collins (both USA), without anticipating the ensuing CBD process that explicitly framed genetic resources as subject to national sovereignty without control by the countries of origin. Among the examples mentioned in chapter 1.1.4, this problem clearly applies to the Brazilian peanut. Sharma sees the same process of misappropriation and loss of control happening now to traditional knowledge, e.g. by way of corresponding registers and databases (see ch. 4.4.5.7).

This *status quo* of pre-CBD accessions is obviously unsatisfactory, especially since they constitute the largest part of many *ex situ* collections. It also contravenes the criterion formulated in chapter 4.6.1 that all providers of genetic resources and associated knowledge should receive benefits, independent of commercial success and of the kind of user. A solution should be found to retrospectively include original providers to *ex situ* collections in benefit sharing schemes. Especially for old accessions and immaterial knowledge, however, establishing the original specimen provenance will often be difficult. As a compromise, benefits shared with *ex situ* collections could be designed to address both the immediate needs of the institution and the needs of those who provided the majority of accessions, and/or they could be shared at least with the countries or regions that provided the specimen, or where it originated (i.e. the specimen provenance). These would probably be roughly the regions of high agro-biodiversity mentioned above, and considerations of justice are applicable accordingly: benefits for such original providers to *ex situ* collections would contribute to international justice and poverty alleviation (see ch. 4.2.2), and would fulfil the affluents' negative duties towards the disadvantaged (principle 2). I will therefore formulate the following, further criterion of justice for receivers of benefits:

> **As far as identifiable, the original providers of crop genetic resources and associated knowledge to public *ex situ* collections and databases should be included in benefit sharing schemes.**

4.6.5 Just distribution of benefits among receivers

The distribution of benefits within the receiving communities is rarely taken into focus when discussing benefit sharing for genetic resources. However, once benefits indeed start to flow, this is an important question, where central principles of justice

can be brought to bear. Out of the ten principles of justice employed here, especially principles 3 and 4 apply, i.e. benefits should be used primarily to meet basic human needs, and a just distribution should take into account differential needs and abilities of the recipients. In a similar vein, principle 5 demands (for the domestic institutions of liberal democratic countries) that economic inequalities are to the greatest benefit of the least-advantaged members of society. For the distribution of benefits within receiving communities (providers, potential providers, previous providers, or communities in regions of high diversity), this implies that benefits should not necessarily be distributed equally among individuals, and should not be measured only in monetary terms. Rather, they should especially reach the poorest or most disadvantaged members, and those who are least able to meet their basic needs themselves, and they should have a positive impact on individuals' abilities. Benefits should therefore not be shared merely with the governments or governmental institutions of providing countries (as formulated in CBD Article 15.7), without guarantees that these channel them into poverty alleviation, rural development etc.[228] Otherwise, benefit sharing from genetic resources might become yet another kind of governmental privilege, in addition to e.g. the borrowing, treaty, and arms privileges mentioned by Pogge (ch. 3.5.4.1).

Although the exact distribution of benefits among the receiving individuals has to be determined case by case, some rough guidelines presumably are identifiable: several authors point specifically to the disadvantaged situation of women in many countries and communities. They tend to be overrepresented among the poor (Pogge 2008b: 8), often lack property rights and other basic freedoms, and are underrepresented e.g. in political participation and capacity building programmes (Alvarez-Castillo/Feinholz 2006: 116, 118f). This bias is not only unjust towards the women, but further affects those whose care is mainly in the hands of women, especially children (Pogge 2008b: 8). Furthermore, women are often the ones responsible for subsistence crop cultivation, seed saving, and imparting associated knowledge, so they have a key role in preserving genetic resources and providing adequate diets for the whole family. If women are adequately supported and helped in these tasks, their abilities are strengthened and can be expected to translate into comprehensive social benefits for all, especially regarding food security; some negative effects of poverty may be alleviated, and benefits will be passed on to the next generation (Sen 1999: 189, 191f, 201). Benefits from the use of crop genetic resources thus could e.g. be designed as measures specifically addressing the needs of women, or could be channelled into gender-specific projects (cf. Alvarez-Castillo/Feinholz 2006: 119-121). These measures do not necessarily have to relate directly to genetic resources; it may be more adequate e.g. to finance women's education or economic independence[229].

Further kinds of discrimination that are potentially reinforced or aggravated by benefits distributed unequally within communities may concern class, ethnicity, race, or age (Alvarez-Castillo/Feinholz 2006: 119). They can be counteracted by similar, reversely discriminating benefit sharing measures as the ones described above for women. Of course, such concern for domestic discrimination can interfere with national and communal self-determination, in which cases compromises should be found. On the other hand, I have argued in footnote 123 that such discrimination presumably violates the first principle of justice derived from Rawls, i.e. that all persons concerned by a social institution (e.g. a discrimination regime) should be able to

[228] Pogge formulates similar demands in his suggestion for a Global Resources Dividend; see p. 104.
[229] The *Grameen Bank* is an interesting example of micro-credits given primarily to women and having a major positive impact on poverty alleviation (see footnote 148).

agree to it in a hypothetical consensus under a veil of ignorance: it is rather unlikely that, under these conditions, people would choose a doctrine where they would run a high chance of being discriminated against. Therefore, I regard it as *prima facie* legitimate to utilize the instrument of benefit sharing for countering such discriminatory regimes. Although it is obvious that not all shortcomings in justice within the receiving communities can be alleviated or even addressed by benefit sharing, the latter should at least not reinforce them, as expressed in the following criterion of justice for the internal distribution of benefits:

> **The distribution of benefits among receivers should follow principles of justice, e.g. in addressing basic needs and the disadvantaged, considering differential abilities, and not discriminating unfairly.**

The various monetary and non-monetary elements that such benefit sharing with different stakeholders can consist in will be discussed in the following chapter 4.7.

4.6.6 Results: Criteria of justice for recipients of benefits

The question of who is to participate in benefit sharing is central to justice in the use of genetic resources. Its discussion has yielded the following criteria.

Actual providers:

5.1 All actual (individual and institutional) providers of a given crop genetic resource and associated knowledge should receive benefits; these should at least partly be independent of the commercial success of resulting products.

Potential providers:

5.2 Benefit sharing should extend to all potential providers of a given crop genetic resource and associated knowledge, i.e. at least to all countries currently possessing the resource *in situ*.

Regions of high agro-biodiversity:

5.3 Benefits should also be shared with regions or countries currently possessing high *in situ* agro-biodiversity.

Original providers to collections and databases:

5.4 As far as identifiable, the original providers of crop genetic resources and associated knowledge to public *ex situ* collections and databases should be included in benefit sharing schemes.

Just distribution among receivers:

5.5 The distribution of benefits among receivers should follow principles of justice, e.g. in addressing basic needs, considering differential abilities, and not discriminating unfairly.

4.7 What elements should benefit sharing include?

This chapter will finally approach the subject that is often the only one discussed in the context of benefit sharing for genetic resources and associated knowledge, i.e. which kinds of goods should be transferred. From an ethical standpoint, criteria of fairness and equitability concern a much broader scope of matters. These need to be (and have above been) discussed prior to the actual monetary and non-monetary elements of benefit sharing, and they might have a much more significant impact on the aims and purposes stated in chapters 4.2 and 4.3. Accordingly, I will here investigate which elements and kinds of benefits are the most adequate in the light of principles and criteria of justice, rather than conceiving them merely as a payment for access to genetic resources. Relevant results from chapters 4.2 to 4.6 will be incorporated into the following considerations, together with the appropriate principles from ethical theory (see p. 109):

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- The individual shares resulting from a just distribution e.g. of benefits should not be defined only in material resources such as income but should take into account **differential needs and abilities**. (Principle 4)

- Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Principle 8)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

- International negotiations about the use of and benefit sharing for genetic resources should consider and compensate **differential bargaining power**, especially the disadvantages of developing countries. (Principle 10)

The most common classification of benefit sharing elements is to distinguish between monetary and non-monetary elements, which I will adopt for reasons of practicality and have already briefly mentioned in chapter 4.5. I will refer more than previously to the Bonn Guidelines (see ch. 2.4.1) since they offer a rather comprehensive list of possible types of benefits. As will become clear in the following discussion, both monetary and non-monetary elements are important components of a benefit sharing scheme, and it will often depend on the kind of user and recipient which respective proportions are feasible or desirable.

4.7.1 Monetary benefit sharing

For many aims and purposes of benefit sharing, monetary benefit sharing seems an obvious choice: such funds can be used to alleviate poverty (ch. 4.2.2), to finance ongoing conservation and R&D in fields not interesting to private companies (ch. 4.2.3), as well as to remunerate providers and conservers of genetic resources and associated knowledge (ch. 4.3.4). In comparison to non-monetary elements, they can more easily be collected from different users and distributed to different stakeholders, as demanded in chapters 4.5 and 4.6. The main forms of monetary benefits that are suggested e.g. in Appendix II of the Bonn Guidelines are the following:

a) up-front payments,
b) sample fees, collecting fees,
c) research funding,
d) milestone payments,
e) royalties, profit shares, and license fees.

The Bonn Guidelines further mention trust funds, joint ventures, and joint IPRs as monetary benefits, which I will discuss in chapters 4.7.2 and 4.8.3. Though the Guidelines also subsume collectors' salaries under monetary benefits, I agree with Ribeiro (2005: 71) that those salaries are actually a payment for labour commissioned by the user, and not benefits to be shared on grounds of anyone's use of the resources collected. The order chosen here to enumerate the monetary benefits roughly corresponds to a potential chronological order during the bioprospecting process, but many existing ABS contracts do not provide for all of these, and not all of them might be necessary for a fair and equitable arrangement. The first three types of payments (a, b, c) are due as soon as a resource is accessed, independent of its future commercial use, while the latter two (d, e) materialize only during or after processing and commercialisation, with their final amount depending on the success of these activities. For benefit sharing to be fair and equitable, both types are desirable: up-front payments, sample fees, and research funding secure benefits to all actual providers independent of commercialisation, as has been demanded in chapter 4.6.1, while milestone payments and royalties, in case of commercial success, are able to provide additional funding e.g. for the conservation of resources and for public research. Of course, this applies only to cases where providers can and have been identified; for all other cases of benefit sharing obligations (see ch. 4.5), only the second type of monetary benefits is feasible and might partly be channelled into trust funds benefiting the various groups of stakeholders identified in chapter 4.6. The first criterion of justice for elements of benefit sharing therefore is the following:

> **Within monetary benefits, the following components should be distinguished:**
> - **components due as soon as a genetic resource is accessed (up-front payments, sample fees etc.); relevant mainly for actual providers,**
> - **components due at a later time, e.g. proportional to commercial success (milestone payments, royalties, license fees etc.); can also be employed if provider is unknown or undisclosed, and for multilateral benefit sharing with further recipients.**

At first sight, up-front payments, sample fees etc. may seem to contradict the trigger approach favoured in chapter 4.5.1, according to which benefits arising from a utilization of genetic resources (typically occurring later than the access activity) should be shared. However, this trigger approach only defines a minimum of benefit sharing requirements that can and should be enforced e.g. by user country legislation. Ac-

cess-triggered monetary benefits such as up-front payments, sample fees etc., in contrast, will typically be mutually agreed on in an ABS contract between provider and user in addition to (future) utilization-triggered benefits.[230] They provide an incentive to grant access (see ch. 4.3.3) and are one important possibility to ensure that all actual providers receive benefits, independent of the commercial success of resulting products, as demanded in chapter 4.6.1 (see also Convention on Biological Diversity 1996: 5; Kate/Laird 1999: 330; Peria 2005: 182).

As for the appropriate, fair and equitable amount of monetary benefits, it would probably be inadequate to define it globally e.g. as a fixed sample fee or royalty. Some examples for royalties in national ABS laws are given by Carrizosa et al. (2004), who come to the conclusion that royalty rates in ABS contracts are usually below 5% of product sales (Carrizosa 2004a: 296).[231] In addition to these royalties, most national laws provide for access-triggered benefits like sample fees. While it is of course legitimate for national or international legislation to specify a certain range or minimum amount of monetary benefits (see ch. 4.8.2), from the point of view of global justice, it is much more important to effectively establish an international framework fulfilling the remaining demands of justice, e.g. concerning who is to share benefits and who is to receive them (see ch. 4.5, 4.6). Fair and equitable benefit sharing as envisaged here will in all probability require further, non-commercial components, which will be discussed in the following chapter. In certain cases, however, a restriction to monetary benefits may be sensible – especially for more indirect benefit sharing as e.g. by the food and feed industry or end-consumers in the form of taxes, as I have suggested in chapter 4.5.4.

Those monetary benefits that are transferred can of course be used for financing various kinds of ethically desirable measures and facilities that meet basic human needs (principle 3), enhance abilities (principle 4), contribute to resource conservation (principle 8), facilitate participation in policy-making (principle 9), and compensate for certain structural disadvantages of developing countries (principle 10). On the one hand, an explicit commitment to spend benefits only on certain aims and purposes can be conceived as inappropriate paternalism towards receiving countries and communities. On the other hand, this can be justified at least for multilateral benefit sharing with others than the actual providers, if such a global benefit sharing scheme explicitly aims e.g. at resource conservation, international justice, and poverty alleviation (ch. 4.2). The negotiators of bilateral ABS contracts may, of course, agree on certain additional or alternative benefits for the actual providers; this has to be left to the discretion of the contract parties.

> "The Convention recognizes each country's sovereign discretion regarding how it will use and distribute benefits, but many experts suggest that the link between ABS and conservation means the user country has an interest in how benefits are distributed." (Tvedt/Young 2007: 22).

[230] In a personal communication (18.04.2009), Tvedt confirmed that the sampling of species indeed could trigger some up-front payments, but that access is not necessarily a good checkpoint for legally enforcing benefit sharing obligations.

[231] Decision 391 of the Andean Community prescribes minimum royalties of 5% of the gross sale of products (Carrizosa 2004b: 26); Peru's Law No. 2781 raises this to 10% (p. 26f). In the Philippines, royalties are supposed to be at least 2% of the gross sales of products, while in Samoan law, the amount is also 2%, but it is unclear if this applies to net or gross sales (p. 28). The Law of Biodiversity of Costa Rica seems the most demanding in requiring royalties of up to 50% (Cabrera Medaglia 2004b: 105). In relation to these national laws, the 1.1% established by the multilateral system of the ITPGR seem rather low.

In order to promote the use of monetary benefits for such ethically desirable purposes, it will often be advantageous not to distribute monetary benefits among the providers in cash, but to spend them e.g. on local public services in education and health care (cf. principle 3), or on local research and breeding programs, funds for local resource conservation (cf. principle 8) etc.[232] In other cases, the channelling of benefits into a micro-credit programme may be an interesting and worthwhile alternative since micro-credits enable beneficiaries to contribute to value creation and make them more independent of further external aid (see footnote 148). In accordance with principle 9, local participation should be ensured for the determination of priorities and implementation of these projects. In short, the nature, use, and distribution of monetary benefits should follow the principles and criteria of justice identified in this thesis. The following criterion states this more concretely:

> **Monetary benefits should be earmarked for ethically desirable purposes (e.g. local public services, local conservation measures, R&D serving the common interest, micro-credits).**

Such forms of monetary benefit sharing via financing local institutions and services are of course close to non-monetary benefit sharing, so that some of the considerations below (ch. 4.7.2), e.g. on capacity building, would apply here similarly. Further practical problems may arise if the providers of resources and associated knowledge, resp. the communities and individuals eligible for receiving benefits, hold the view that monetary benefit sharing does not conform to their norms and values as a matter of principle (Byström et al. 1999: 50f). As in the vaguely analogous case of intellectual property rights for traditional genetic resources and traditional knowledge (see ch. 4.4.5.7), these value systems of beneficiaries should be respected, and more adequate (e.g. non-monetary) forms of benefit sharing devised. On the other hand, where indigenous or local communities do have agreed to monetary compensation, it should be acknowledged that this is often a rational choice in their marginalized position and within the present ABS framework.[233]

4.7.2 Non-monetary benefit sharing

The importance of non-monetary benefits in addition to or instead of monetary ones is already implicit in many considerations in the previous chapters concerning e.g. the principles of justice and the aims and purposes of fair and equitable benefit sharing. Some concrete reasons for supplementing monetary benefits by non-monetary ones are the following:

- The amount of monetary benefits often will not mirror the total value of the genetic resource (ch. 4.3.1).
- Monetary benefits would in most cases not be a significant source of income for providing and conserving communities and countries (ch. 4.3.4). This is especially true for crop genetic resources, where “blockbuster” products are even rarer than in the pharmaceutical sector.
- Non-commercial users often can pay little monetary benefits, but can offer valuable non-monetary ones (ch. 4.5.3).

[232] Detailed suggestions of measures to be adopted by states to support conservation and sustainable use are given by Moore/Tymowski (2005: 41-60).

[233] Concerning the case of the Hoodia plant in South Africa, where the San people as original holders of the resource and associated knowledge were offered an ABS contract only after access had taken place, Frein/Meyer (2005: 146) cite the lawyer Roger Chennells: “To criticize the San for signing the agreement is like criticizing a drowning person for accepting the saving hand.”

- Primary aims of benefit sharing as a contribution to justice are not merely an increase in income, but an increase e.g. in the satisfaction of basic human needs (principle 3) and in individual abilities (principle 4); these are not necessarily achieved by short-term monetary inflow.
- More abstract principles of justice, such as the participation of affected communities and individuals in policy-making (principle 9), or a more equal standing of developing vs. developed countries (principle 10), cannot be secured by only monetary compensation. Instead, they necessitate structural efforts to "level the playing field", as Pogge demands (ch. 3.5.4.1).

On the basis of these considerations, I will formulate the next criterion of justice:

> **As far as possible, non-monetary benefits aimed at ethically desirable purposes should supplement monetary ones.**

The most commonly discussed non-monetary elements of benefit sharing can be classified as follows:

a) concrete assistance in relevant public services, infrastructure, access to scientific databases etc.,
b) transfer of technology, equipment, and know-how related to the use and conservation of genetic resources,
c) medium and long term, local and regional capacity building for individuals and institutions, e.g. in conservation, biotechnology, resource management, information management, legal and administrative issues,
d) joint and participatory research and development (including the sharing of user's research results), e.g. in taxonomy, plant breeding and food security,
e) joint publications and intellectual property rights.

In addition to the Bonn Guidelines, sources of these suggestions are Brush/Carrizosa (2004: 74), Convention on Biological Diversity (1996: 4), Dross/Wolff (2005: 58), and Seiler/Dutfield (2001: 40, 100, 111, 113). Many other authors agree with these suggestions in principle, but with less systematic enumerations of desirable benefits.[234] I have ordered these elements from rather straightforward, material benefits to more sophisticated, demanding, and long-term oriented ones; in the following, they will be further discussed and evaluated.

Ad a): These benefits can be conceived as quasi monetary benefits earmarked for specific purposes; they are feasible for all groups of benefit recipients. While in the area of pharmaceutical genetic resources, current examples of such benefit sharing approaches are the financing of public hospitals or schools, in the agricultural context such public services might consist in funds for agro-ecological conservation projects, sustainable irrigation management, local seed banks, or academic exchange. As mentioned above for monetary benefits, such investments can be effective in meeting basic human needs (principle 3), enhancing abilities of the poor (principle 4), contributing to resource conservation (principle 8), and compensating for some structural disadvantages of developing countries (principle 10). Though it might be argued that schools or hospitals are inappropriate benefits since they lack a direct relation to crop genetic resources, in my opinion they can be legitimate and desirable where they are the easiest way of achieving these and similar aims of justice. In all cases, the ad-

[234] Henne et al. (2003: 47), for example, recommend income opportunities for locals, markets for products, empowerment of locals, strengthening of autonomy, cultural identity and self-confidence. For an exemplary, fictitious benefit sharing profile of pharmaceutical R&D that incorporates diverse monetary and non-monetary benefits, see Convention on Biological Diversity (1996: 6).

dressees of benefit sharing should participate in decision-making and implementation.

Ad b): Transferring adequate technology and equipment into developing countries and regions that often lack the basic infrastructure can be more useful than mere money for purposes like inventorying regional biodiversity or promoting the domestic use of genetic resources. It can include e.g. aerial survey equipment, software, equipment for collecting and preserving specimens, biotechnology know-how, and low-input agricultural technologies (Convention on Biological Diversity 1996: 4). One possible approach to transferring technology and know-how especially to actual and potential providers of a genetic resource is to grant them facilitated access to products derived from their resources and/or the right to manufacture them themselves (Laird 1993: 116). Of course, such transfer is also a feasible element of benefit sharing with other groups eligible for receiving benefits (see ch. 4.6). However, technology transfer alone will not necessarily result in technology mastery (Peria 2005: 178), which is why a lot of attention needs to be given to capacity building.

Ad c): Capacity building together with technology transfer is often recommended as a focus of benefit sharing since it empowers providers (and other recipients of benefits) e.g. to make better use of their genetic resources: improving their own research and development capacities enables them to commercialise high-value products, rather than just exporting raw material in the form of biological samples and extracts, thereby reaping a greater proportion of the potential benefits in the value creation chain themselves (cf. Seiler/Dutfield 2001: 110). If capacity building and similar non-monetary benefit sharing elements are absent or fail, developing countries remain dependent on the export of primary products and run the risk that "their environments merely (and only for a limited period) represent an extension of the international production lines of the industrialized countries" (Seiler/Dutfield 2001: 16; similar: Juma 1993: 199; Kate/Laird 1999: 115f). Strengthened capacities are conducive to most of the aims of justice and benefit sharing mentioned in this thesis, and they improve the providers' autonomy and negotiating position for future ABS negotiations. From a development perspective, these effects are, in all likelihood, more valuable than financial benefits (Tvedt/Young 2007: 72). Of course, the aims of capacity building projects may be scrutinized on ethical grounds: in areas like biodiversity conservation, sustainable resource use, and rural development, capacity building is definitely desirable, while capacities in biotechnology, IPR protection, and marketing may raise the suspicion that they will contribute to further commodification and monopolization of genetic resources (Ribeiro 2005: 71f). However, I would not necessarily entertain this suspicion since comprehensive biotechnological and legal capacities are just as necessary to effectively represent one's interests in these developments and to participate in policy-making, as demanded by principle 9. Unfortunately, current capacity building projects often focus merely on conveying knowledge about the ABS process, the respective negotiations and legal requirements.[235] In contrast, I would suggest to explicitly include capacity building, together with technology transfer, in such areas as biotechnology, agro-ecology, land management, resource conservation, and intellectual property rights. This not only seems to com-

[235] One prominent example is the *ABS Capacity Development Initiative for Africa*, whose aims are to increase awareness, to foster participation, to improve regional cooperation, and to support the development of partnerships with the private sector (see *http://www.abs-africa.info*, last accessed 22.04.2009). Of course, this focus on basic information and networking may make sense at present, but should later be supplemented by capacity building in such substantial areas as mentioned in this text.

ply with the spirit of the CBD (e.g. Art. 16), but is also crucial if the resource providing countries are really meant to close the development gap to industrial countries as a contribution to international justice (see ch. 4.2.2) and to the fulfilment of the affluents' negative duties towards those disadvantaged by the shared global order (principle 2).

The importance of the latter two kinds of non-monetary benefits is acknowledged in the following criterion of justice:

> **Non-monetary benefits should include technology transfer and capacity building e.g. in the areas of resource conservation and use, basic and applied research, and rural development.**

The need to transfer technology and to build capacity should not, however, imply the assumption that developing countries and small-scale farmers must merely be assisted to gain access to the "blessings" of modern agriculture such as improved seeds, fertilizers, and pesticides in order to escape their deficient production systems. Quite to the contrary, it is widely acknowledged among relief agencies that local agricultural production often does not benefit from this kind of input, which enables agro-chemical corporations to gain new markets and thus can open the door to a dependency on foreign input and to the erosion of local diversity.

> "And so the seeds and the seed aid programmes emerging from today's food crisis are situated at the heart of a fundamental struggle between competing models of food production: a corporate-controlled and globalised industrial food system versus a diversity of efforts to maintain, develop and expand food sovereignty. Looking at the available evidence, especially at the national level, it seems that most of the seed aid is landing on the agribusiness side of the fence." (GRAIN 2008: 8f)

Rather than from such agro-industrial input, farmers will often benefit more from better adapted technology transfer and capacity building measures that strengthen local seed and food production systems, secure fair prices and marketing possibilities for their products, and enable them to participate in the value-adding process after harvesting. For these purposes, the most adequate transfer and exchange of technology and capacities may be between communities, countries and regions of the South (possibly supported financially by the North), rather than North-South transfer. If local farmers, communities, and organisations thus should not only be passive recipients of benefits in the form of technology or even capacities, the following elements of non-monetary benefit sharing are additionally important.

Ad d): Joint and participatory R&D of resource providers and users is even more demanding and costly than capacity building, but can be an effective means to enhance the providers' capacities and to direct research at ethically desirable innovations (see ch. 4.2.3). In the area of crop genetic resources, the primary example for such joint R&D, which is already being carried out e.g. by the CGIAR Centres, is participatory plant breeding: farmers are routinely involved in breeding and decision making concerning

- the definition of breeding goals and priorities,
- the selection of source germplasm,
- *in situ* cultivar development,
- varietal evaluation, and
- multiplication and commercialisation of selected lines (Halewood et al. 2007: 1).

Such a close participation not only enables farmers to influence crop R&D, but can also serve as a form of technology transfer and capacity building (Halewood et al. 2007: 2f). Another interesting example for benefits foremost to local people are the community-controlled conservation centres for *in situ* conservation of genetic resources and associated knowledge that are suggested by Posey/Dutfield (1996: 32). Although CBD Articles 15.6 and 15.7 explicitly demand participatory research and sharing of research results, ABS contracts in the past have often neglected this element of benefit sharing. In addition to the costs and long-term commitments this would necessarily involve, it is conceivable that users have little interest in fully sharing research results with providers since this could imply forfeiting the users' future IPRs and risking competition in commercially exploiting the research results.[236] On the other hand, this kind of benefit sharing might be especially attractive to non-commercial and scientific users, who might be not so much interested in commercialising research results and may not be able to offer sizable monetary benefits (Convention on Biological Diversity 1996: 5; see ch. 4.5.3). Non-commercial users could grant the providers pre-publication access to research results, thereby enabling them to protect the commercial potential of their genetic resources (Consortium for the Barcode of Life 2008: 11).

Ad e): For joint publications and intellectual property rights, similar considerations apply as for joint and participatory R&D above: they are demanding but effective tools to benefit providers in the long term and to place them on a more equal footing with users in ABS negotiations. A potential drawback is that joint IPRs may be difficult to implement within the present IPR system (see ch. 4.4.5.4). On the other hand, these benefit sharing elements may, again, be attractive especially for non-commercial users. Furthermore, a provider's co-authorship or co-ownership will often translate into material benefits only in connection with adequate capacity building enabling the provider to utilize the research results.

> "Developing provider countries have less ability to capitalize on published results than industrialized countries due to their lower technological capacity. The opportunity to share in the economic benefits stemming from the utilization of a genetic resource may be lost by the provider country, even though it was not gained by the non-commercial researcher." (Consortium for the Barcode of Life 2008: 11)

The latter two groups of benefits will often be feasible only for the actual providers, while only indirectly benefiting other stakeholder groups. However, in a medium-term perspective they could prove quite valuable also from the point of view of global justice, and could even break up the clear distinction between users (sharing benefits) and providers (receiving benefits). By leaving a significant proportion of control and rights with the providers (see ch. 4.3.3), participatory R&D, joint publications, and joint IPRs would represent an important step towards participation and self-determined development. The next criterion of justice therefore promotes their application:

> **Providers and users should aim at participatory R&D as well as at joint publications and joint IPRs, especially where users are non-commercial.**

[236] Tvedt/Young (2007: 72) explicate that research results are most valuable as long as they remain exclusive; publication may seriously diminish the value of a resource for future utilization. Benefit sharing in this case must strike a balance between interests of the provider (keeping information between provider and user) and the user (not sharing the complete results with the provider).

In general, non-monetary benefits of the kinds mentioned here are thus promising instruments in the pursuit of many of the principles and criteria of justice identified in this thesis. In selecting and designing them, the overall aim should be that they truly follow these principles and criteria. As Peria (2005: 179) states:

> "[T]here can be no guarantee that benefit-sharing alone will enable a developing country to develop its technological capacity, especially if the country's own research infrastructure is not fully developed and its capacity to absorb and commercialize technology on its own is in question."

Some non-monetary benefits, such as joint publications and IPRs, will by their nature be largely restricted to the actual providers, while others are well suited also for benefit sharing with the remaining stakeholder groups mentioned in chapter 4.6. Multilateral benefit sharing probably is more difficult to organise for non-monetary than for monetary benefits, for which a global fund will be suggested in chapter 4.8.3. Accordingly, non-monetary benefit sharing with other than the actual providers (negotiated in ABS contracts) may necessitate a more active role of governments and international organisations. If they set up a framework of projects e.g. for technology transfer and capacity building, users of genetic resources could be integrated or contribute to them in some form or the other. Compared to monetary benefits, non-monetary ones may lead to less local conflicts due to their more explicit catering to the common interest and to the provision of open access goods. Indirectly, non-monetary benefits can be expected to translate into monetary benefits possibly larger than would have been negotiable in ABS contracts.

Benefit sharing in human genetic research

The design of benefit sharing schemes is also a prominent issue of debate in human genetic research. Important analogies to crop genetic research are the facts that the contribution of an individual sample to later research results is difficult to identify, and that there are often more potential providers than will actually contribute to the research project (see ch. 4.6.2). A further similarity is the prevalent orientation especially of commercial research towards the needs and interests of developed countries, although the majority of samples resp. resources might originate from developing countries (see e.g. Hammond/Mayet 2009). The Ethics Committee of the Human Genome Organisation has issued an exemplary statement on benefit sharing (HUGO Ethics Committee 2000) that considers these matters and includes several recommendations similar to those given in this and the previous chapters:

- Benefits should not be limited to those individuals who participated in the research project.
- There should be no direct monetary payment of individuals, but benefits could consist of local infrastructure and public health care.
- Participants should be involved in benefit sharing negotiations and should receive information about general research outcomes.
- Commercial users should donate a percentage, e.g. 1-3%, of their net profits to healthcare infrastructure or to related humanitarian efforts. The Committee, however, does not specify if the 1-3% relate to the total profits of a company, or only to those profits generated by the access to certain samples or research results. This obviously could make a huge difference in quantity, and only the former suggestion would be independent of commercialisation, as I have demanded above for agricultural R&D.

Box 11: Benefit sharing in human genetic research

4.7.3 Results: Criteria of justice for elements of benefit sharing

Summarizing the above considerations, the following criteria for fair and equitable forms of benefit sharing can be deduced.

Monetary elements:

6.1 Within monetary benefits, the following components should be distinguished:
- components due as soon as a genetic resource is accessed (up-front payments, sample fees etc.); relevant mainly for actual providers,
- components due at a later time, e.g. proportional to commercial success (milestone payments, royalties, license fees etc.); can also be employed if provider is unknown or undisclosed, and for multilateral benefit sharing with further recipients.

6.2 Monetary benefits should be earmarked for ethically desirable purposes (e.g. local public services, local conservation measures, R&D serving the common interest, micro-credits).

Non-monetary elements:

6.3 As far as possible, non-monetary benefits aimed at ethically desirable purposes should supplement monetary ones.

6.4 Non-monetary benefits should include technology transfer and capacity building e.g. in the areas of resource conservation and use, basic and applied research, and rural development.

6.5 Providers and users should aim at participatory R&D as well as at joint publications and joint IPRs, especially where users are non-commercial.

4.8 How can the demands of justice that have been identified above be implemented into national and international policy?

After illustrating various clusters of problems and elaborating demands of justice for benefit sharing in the previous chapters, I will here propose some measures that could facilitate their fulfilment. They are mostly not new to the debate on ABS, but represent my selection according to their justification by virtue of the criteria of justice developed in the previous chapters. Of course, users and providers of genetic resources and associated knowledge could simply be encouraged to follow, in their design of ABS contracts, as far as possible the guidelines of the criteria developed in the previous chapters. Unfortunately, however, mere appeals are likely to encourage "cheating" by putting users willing to fulfil their benefit sharing duties at a significant disadvantage in relation to those who are unwilling.

> "Presently, the legal, practical and financial situation of users who are unaware of or intentionally violate ABS administrative and other requirements can be significantly better than those who comply. […] In essence, the costs and time spent in compliance with bureaucratic [ABS] requirements constitute a competitive disadvantage for the compliant user, as compared with the non-compliant user." (Tvedt/Young 2007: 102f)

In order to avoid these perverse incentives, to provide for cases where there is no ABS contract, and to facilitate multilateral benefit sharing, some regulation at the national as well as at the international level is necessary.

While two of the measures suggested below (user country legislation, stakeholder participation) are mostly a matter of national policy, the remaining ones have to be addressed at the international level. They are conceivable as elements of the International Regime on ABS that is being negotiated at present, but they can also be regarded as measures to be realized independently in order to come closer to the aim of fair and equitable benefit sharing. I will here not take a definite position in the fierce debate whether they should be negotiated and implemented within the WTO (e.g. a revision of TRIPS), the WIPO, the ITPGR, or under the institutional roof of a new regime pertaining to the CBD[237]. What is important is that they (or similar measures) indeed encourage, monitor, and enforce compliance with principles and criteria of justice, and do so more adequately than bilateral ABS contracts alone. Obviously, however, these measures alone are not sufficient to achieve e.g. the general aims identified in chapter 4.2, i.e. the conservation of genetic resources and associated knowledge, international justice, poverty alleviation, or the encouragement of desirable innovation. These aims have to be pursued additionally in various areas of national and international policy, and I can here only discuss those measures pertaining to ABS regulation. Furthermore, several of the demands of justice identified previously can also be implemented within existing legislation and regulation, so that a discussion is not necessary here. This concerns, for example, the design of property rights in genetic resources and associated knowledge: criteria for the property rights themselves have been developed in chapter 4.4[238], while complementary measures

[237] Henne et al. (2003: 34-36) discuss COP decisions, CBD Amendments, Protocols and Annexes, favouring an ABS protocol because this would be strong enough, albeit rather inflexible and difficult to negotiate. Protocols are separate legal instruments (e.g. the Cartagena Protocol on Biosafety); parties to the CBD are not obliged to become parties to them (Henne et al. 2003: 35). In the ABS Working Group, many developing countries have taken to referring to the "future ABS protocol", although the nature of the Regime is all but clear.

[238] Important demands of chapter 4.4.5, such as refusing patents on unaltered resources, replacing plant variety patents by PVP, and securing the farmers' privilege, can be implemented, for example, in

suggested here are e.g. disclosure requirements (ch. 4.8.5) and fairness in international relations (ch. 4.8.7).

Since the measures proposed here represent a rather concrete level of implementation, most of them cannot immediately be derived from the ethical framework by Rawls and Pogge, so that I will refer primarily to the criteria elaborated in the above chapters. Those principles of justice that are applicable to the more procedural question discussed here are the following (see p. 109):

- Benefit sharing should be designed and regarded as part of the fulfilment of the affluents' **negative duties** towards those foreseeably and avoidably disadvantaged by the shared institutional order. (Principle 2)

- At the global level, benefit sharing should give priority to meeting **basic human needs** (personal and political liberties, physical integrity, subsistence supplies, freedom of movement, basic education, and economic participation) rather than e.g. to attaining equality or maximizing average supplies of certain goods. (Principle 3)

- Equally considering present and future generations, benefit sharing should contribute to **conserve non-renewable natural resources** as far as possible and to allow for future decisions on their use and valuation. (Principle 8)

- Affected communities and individuals should be able to **participate in policy-making** concerning the use of and benefit sharing for genetic resources. (Principle 9)

- International negotiations about the use of and benefit sharing for genetic resources should consider and compensate **differential bargaining power**, especially the disadvantages of developing countries. (Principle 10)

Considering these principles as well as the existing institutional framework, the following measures seem adequate answers to the conclusions drawn in the previous chapters.

4.8.1 User country legislation for compliance with provider country ABS requirements

This chapter is based to a large extent on Tvedt/Young (2007), who present a convincing and coherent concept of effectively beginning to implement the benefit sharing objective of the CBD.

Although, in principle, each country both provides and uses genetic resources and associated knowledge, most countries see themselves mainly as provider country (esp. developing countries) or user country (esp. developed countries). In international negotiations, each of these two groups tends to declare the other group responsible for introducing national legislation in order to implement operative ABS measures.[239] So far, it is mainly the (developing) provider countries that have issued na-

national legislation, in the course of a TRIPS revision, or under the roof of the WIPO, where intellectual property rights for traditional knowledge are a hotly debated topic (see ch. 2.3.3.1).

[239] To give one example: in a collation of operative text submitted by Parties for negotiations of the International Regime, the African group formulates quite clearly (p. 14): "Contracting Parties shall […] take measures to ensure the fair and equitable sharing of benefits arising from the commercial

tional ABS legislation since they stand to lose most from an unregulated access to genetic resources and associated knowledge: in the absence of international regulation or appropriate national legislation in user countries, the use of genetic resources cannot effectively be regulated once the resources have left the country.

> "Expecting the source country to develop measures that improve the situation for the user is essentially asking the seller to give up many negotiating points before he knows who the buyer is, which property is to be sold, what kind of sale it is, the terms of payment, etc." (Tvedt/Young 2007: xvi)

Provider countries often lack technical, legal, and financial resources to monitor and enforce their national laws abroad, or even to track the flow of genetic resources. In order to protect their interests, therefore, they often opt for rather strong access restrictions. Such a strategy may reduce instances of illegitimate appropriation, but does not encourage desirable innovations; neither does it provide incentives to grant access (contrary to the criterion formulated in ch. 4.3.3). It is not very conducive to a functioning international benefit sharing scheme and does not solve the problem of enforcing ABS requirements abroad.

> "One conceptual problem with the ABS framework as it currently is discussed, is that it will require source countries and providers to undertake the lion's share of ABS enforcement. This burden may eliminate most possibility of enforcement." (Tvedt/Young 2007: 122)

Such an unfair distribution of burdens connected to ABS enforcement is also clearly in violation of principles of justice, especially principle 2, which demands to design benefit sharing as fulfilling the affluents' negative duties towards the disadvantaged, rather than simply passing on the responsibilities of enforcement towards those countries most dependent on it. Similarly, principle 10 requires compensating the countries' differential bargaining power, rather than taking advantage of it. It is therefore essential for fair and equitable benefit sharing to function that user countries develop ABS legislation which requires and incentivises users to comply with provider country ABS requirements; this is independent of and additional resp. complementary to an envisaged International Regime on ABS.

In the simplest form, the user country ABS legislation would have to define its scope and coverage, e.g. in the form of the two triggers discussed in chapter 4.5.1 (Tvedt/Young 2007: 112), and impose a direct benefit sharing obligation, e.g. a statement that users of foreign genetic resources and associated knowledge must comply with all relevant laws of the provider country, including benefit sharing requirements (Tvedt/Young 2007: 114; similar: Correa 2008). Adequate oversight measures must then be established in user countries to observe and determine when

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and other utilization of [genetic resources], their derivatives and products […]." In contrast, the EU submission (p. 17) reads: "Parties requiring prior informed consent for access to their genetic resources (should) take measures to encourage providers and users to provide […] for the fair and equitable sharing of benefits arising from the utilisation of genetic resources […]." The collation of text is available at *http://www.cbd.int/doc/meetings/abs/abswg-07/official/abswg-07-04-en.pdf* (last accessed 11. 05.2009).

While in ABS negotiations the EU thus favours rather weak compliance and enforcement measures in user countries, it proposes much stronger language where the across-border enforcement of intellectual property rights is concerned. This asymmetry is exemplified in a proposal by several NGOs for ensuring the enforcement of provider rights in a Regime on ABS (available at *http://www.evb.ch/cm_data/ABSWG-7-NGO-Enforcement.pdf*, last accessed 27.04.2009). This proposal quotes some passages from the draft text of the *EU-India Free Trade Agreement*, while substituting references e.g. to "intellectual property rights" and "TRIPS" for references to "providers' rights" and "CBD", respectively. The resulting text for the enforcement of ABS seems quite harsh and unrealistic in the context of ABS, while for intellectual property rights, where national interests are contrary, this is the language put forward in negotiations. For an evaluation of the draft free trade agreement, see also Correa (2009).

genetic resources are utilized and when benefits arise; users must have the possibility to prove compliance with provider country ABS law, especially their ABS contract (Tvedt/Young 2007: 114f).

> "When a user has met both triggers – utilizing genetic resources and receiving one or more benefits arising from that utilization – then the user country will be able and obligated to determine if that user has complied with ABS. Prior to triggering both, a user's obligation is still inchoate – that is, there is still no non-contract basis for claiming that he has violated his ABS responsibilities." (Tvedt/Young 2007: 116)

Since a mere requirement to comply with provider country law, however, is almost unenforceable due to practical reasons, it should be complemented by positive incentives that are able to effectively motivate users to comply. Tvedt/Young (2007: 104f), for example, suggest financial benefits, organisational help, and legal certainty regarding the user's right to use the genetic resource and knowledge in question.[240] Since the legal details are beyond the scope of my investigations, I will state the criterion on this issue in rather general terms:

> **User countries should adopt legislation that requires and incentivises users to comply with provider country ABS legislation.**

If user countries went ahead with legislation of the kind envisaged here, provider countries could be expected to be much more willing to facilitate access e.g. via harmonisation and standardisation, so that the use of genetic resources and associated knowledge would indeed be encouraged and enhanced, certain benefits would arise from this use and could be shared – a precondition for criteria of fairness and equitability in benefit sharing to be applicable, at least as far as newly accessed genetic resources and associated knowledge are concerned. For a full functionality of global benefit sharing, it may further be necessary to agree internationally on common definitions and triggers, as well as on minimum benefit sharing standards and default benefit sharing mechanisms where no ABS contract exists (see ch. 4.8.2, 4.8.4).

4.8.2 International agreement on common definitions, triggers, and minimum standards of benefit sharing

It has been mentioned at various occasions above that fair and equitable benefit sharing at the global level probably necessitates a global regulatory framework. Whether under an explicit International Regime on ABS or on a different basis, this framework ideally should include agreements in two areas: it should define the conditions that give rise to benefit sharing obligations, and it should introduce certain minimum standards of benefit sharing. As a demand of procedural justice, the negotiation of this framework should be fair in considering and compensating the differential bargaining power of countries (principle 10), rather than being another instrument of safeguarding the interests of the affluent and powerful (see also ch. 4.8.7.3).

The conditions that give rise to benefit sharing obligations may e.g. be formulated in terms of a common definition of genetic resources, of activities falling under benefit sharing requirements, and/or of certain user groups. One possible scenario for this definition is the trigger approach suggested in chapter 4.5.1: any utilization of ge-

[240] See Tvedt/Young (2007: 108-120) for a more detailed discussion of the legally and institutionally challenging user country measures. Drawing on experience with the implementation of the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), they regard the confirmation of data provided by the user as another major challenge for user country legislation (p. 120). The effectiveness of positive incentives for corporations to adhere to ethically desirable regulation is similarly stressed and counted on in Pogge's suggestion for a Health Impact Fund (see p. 158).

netic resources triggers relevance for benefit sharing; any benefits arising from this utilization trigger a benefit sharing obligation. The utilization of genetic resources could be defined e.g. as a list of activities, or as more general criteria for activities to be considered such utilization. I will not discuss further details here; the crucial point is that countries should achieve an agreement on such triggers or similar clear rules so that all stakeholders share an understanding of when benefit sharing is required. Ideally, all countries should design their national ABS legislation in accordance with these agreed definitions and triggers; such harmonisation would greatly reduce transaction costs, efforts, and legal uncertainty for providers as well as for users (see ch. 4.8.1).

In addition to such formal definitions, countries should agree on certain minimum standards of benefit sharing, which have to be observed both by national ABS legislation and by bilateral ABS contracts (cf. e.g. Byström et al. 1999: 6). These would not only guarantee certain benefits at least for actual providers and thus prevent a "race to the bottom" among potential providers resp. provider countries[241], but could also promote benefit sharing with other groups identified as legitimate recipients of benefits (ch. 4.6). More generally, agreed minimum standards could establish benefit sharing procedures in accordance with the criteria of justice identified in the previous chapters, as well as with demands discussed in the following, such as participation and documentation mechanisms. Within this framework of minimum standards, individual countries could implement stricter benefit sharing requirements for resources and/or users under their jurisdiction, or specify requirements according to national needs and priorities.

The following criterion of justice sums up the demand for agreement on these issues:

> **A global regulatory framework should define conditions that give rise to benefit sharing obligations as well as certain minimum standards of benefit sharing.**

For practical reasons and in order to streamline procedures, the common definitions, triggers, and minimum standards could be integrated into model contracts, model clauses, codes of conduct, or standard material transfer agreements. An example for the latter is the Standard Material Transfer Agreement of the multilateral system in the ITPGR, which replaces lengthy bilateral negotiations for each access activity (ch. 2.4.2.2). Especially in the seed sector, such a "decoupling of access and benefit-sharing" in combination with a multilateral mechanism of benefit sharing appears to be reasonable (cf. Kate/Laird 1999: 155), for example because of the widespread difficulties in determining the origin and legitimate "owner" of genetic resources. In a detailed discussion paper, Oldham (2009) suggests to apply experiences from commons/open source licensing models in the fields of software and creative works to genetic resources, introducing non-exclusive ABS commons licenses as part of the International Regime.

[241] Several authors advise provider countries to increase their influence and prevent being played off against each other by collaborating and developing regional ABS policies or even provider "cartels" (Carrizosa 2004a: 298; Seiler/Dutfield 2001: 63; Young 2004: 288).

Prior informed consent (PIC) and mutually agreed terms (MAT)
In addition to the triggers for benefit sharing, international agreement should probably be reached on certain formal requirements for ABS contracts. Since my focus here is on benefit sharing, I will only mention them briefly and not capture them in an explicit criterion. The need for fair contract provisions and fair negotiation procedures between provider (resp. provider country) and user is usually discussed under the headings of "prior informed consent" (PIC) and "mutually agreed terms" (MAT). Article 15.4 of the CBD demands: "Access, where granted, shall be on mutually agreed terms", with Article 15.5 adding: "Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party." Both terms also feature prominently in the negotiating text for the International Regime on ABS, as can be seen in the annexes to the final reports of the meetings of the Working Group (see footnote 81). Their basic intention is to ensure that genetic resources and associated knowledge are not accessed without consent of the respective holders, who should be informed adequately about e.g. the access activity and intended uses of the resources and knowledge. Both parties, the user and the provider, should then agree on the terms and conditions of access and benefit sharing, usually laid down in the ABS contract.

The requirement of PIC and MAT in general is a demand of procedural justice supposedly to be followed by any contract. It does not *per se* imply substantial ethical demands such as those discussed here, e.g. for participation. From an ethical viewpoint, therefore, an international agreement would be desirable that requires e.g. prior informed consent from the provider country's government authorities and from local (possibly indigenous) providers, considering the latter's rights to genetic resources and knowledge; the PIC procedure could be designed to include full disclosure of aims and purposes of the access activity, participation of all stakeholders, and the presentation in understandable form and local language (see ch. 4.8.6, 4.8.7.2). Since these issues are discussed elsewhere, I will not go into further details here. Some authors (e.g. Lu 2007: V.1) further suggest to make PIC a new patentability requirement in TRIPS, but this would in my opinion only be a second step after implementing e.g. the mandatory disclosure requirements discussed below. PIC for each invention derived from the one gained by the initial access activity, as suggested by some, is probably unfeasible, and for crop genetic resources in breeding it is even undesirable, since it would significantly obstruct innovation and breeding. Of course, this limitation in PIC requirements for derived uses does not necessarily imply an equivalent limitation in the requirement to share benefits: even breeders employing only derived inventions or derived genetic resources can and should share benefits, e.g. via the global trust fund proposed below.

Box 12: Prior informed consent (PIC) and mutually agreed terms (MAT)

4.8.3 Global mechanisms for multilateral monetary and non-monetary benefit sharing

The discussion of criteria for fair and equitable benefit sharing in the previous chapters has repeatedly revealed that multilateral mechanisms for benefit sharing, i.e. mechanisms extending beyond individual ABS contracts, are desirable. Without multilateral benefit sharing, it would be difficult e.g. to extend benefit sharing to potential providers, to regions of high agro-biodiversity, and to original providers to collections and databases (ch. 4.6), or to include the food industry and end-consumers into benefit sharing schemes (ch. 4.5.4). Furthermore, public funding and support for providers, as suggested in chapter 4.3.4, are easier to channel into such multilateral mechanisms than into purely private benefit sharing agreements in the form of ABS contracts. The most obvious and most prominently discussed instrument for multilateral benefit sharing in monetary form are trust funds. Various types of them are suggested by different authors[242]; some already exist at the national or regional level (Kamau et al. 2008: 7, 9f), and the multilateral system of the ITPGR can be regarded as the first one functioning at the global level. I will illustrate one suggestion for establishing a global trust fund for benefit sharing according to the criteria of justice developed here, before then commenting on the possibility of designing a similar mechanism for multilateral non-monetary benefit sharing.

As a multilateral mechanism for collecting and distributing monetary benefits, a trust fund is a means to avoid or alleviate several of the shortcomings of solely bilateral benefit sharing between the actual provider and the immediate user. It could facilitate a broad distribution of benefits according to the criteria of justice defined in chapter 4.6 and ensure their spending for desirable aims and purposes as identified in chapters 4.2 and 4.3. In order to achieve these purposes, the trust fund could e.g.

- support organizations and local projects that apply for funding[243],
- provide continuous funding for public agricultural research and conservation institutions (such as the CGIAR Centres) and for capacity building measures,
- issue calls for specific R&D or conservation projects in the common interest resp. in the interest of those stakeholders eligible to receive benefits,

or combine these approaches. Funding could be allocated more efficiently than by bilateral schemes to those projects, institutions, and countries most suitable, e.g. those with the lowest conservation costs (cf. Zeeb 1996: 71) or with the largest impact on poverty alleviation. Depending on its volume and success in establishment, the global trust fund could primarily concentrate on directly resource-related projects, or could extend its focus towards more abstract but associated aims like poverty alleviation and rural development. Possible sources of funds for this global instrument, which should be agreed upon internationally, are e.g.

- a proportion of the monetary benefits negotiated in ABS contracts,
- "default" benefit sharing for utilization of genetic resources in the absence of an ABS contract (ch. 4.8.4),
- benefit sharing contributions by the food and feed industry resp. by end-consumers e.g. in the form of a tax (ch. 4.5.4), and

[242] Examples are Dross/Wolff (2005: 58); El Tayeb (2005: 277); Kate/Laird (1999: 131); Posey/Dutfield (1996: 41, 133); Seiler (1998); Vogel (1999: 530). Of these, the mandatory "international biodiversity trust" suggested by El Tayeb is the one closest to the recommendations made here. Pogge envisages a similar instrument for distributing funds from his Global Resources Dividend (see p. 104).

[243] This instrument of benefit distribution is used by the benefit fund of the ITPGR, where organizations and projects can apply for grants of up to 50,000 US Dollars in various areas of ITPGR priorities (see ch. 2.4.2.2).

- international public funding (ch. 4.3.4)[244].

Especially if it focused on standard contributions from the food and feed industry or end-consumers, such a mechanism could be a form of compensation for using natural (in this case genetic) resources similar to the Global Resources Dividend suggested by Pogge (see p. 104). Independent of its exact design, such a global trust fund would be an important instrument in global benefit sharing, so that the next criterion of justice is as follows:

> **A global trust fund for multilateral monetary benefit sharing should be established.**

According to Tvedt/Young (2007: 124), an international fund in combination with standard payments collected from users without reference to specific genetic resources was initially suggested in CBD negotiations, but was not implemented.

> "The "fund" option, although generally preferred by the legal experts and those charged with implementing ABS, did not find general favor in the negotiations. It was eventually dropped, in preference for the model in which each country separately controls all genetic resources found within its jurisdictional boundaries through a combination of national legislation and private contracts. In the ensuing 15 years, however, the failure of ABS to develop into a thriving market tool paying benefits to individual countries has been recognized as a system-design problem." Tvedt/Young (2007: 124)

A global benefit sharing fund continues to be sidelined in the current negotiations on an International Regime on ABS – arguably, this is forfeiting an important chance for achieving a more fair and equitable global benefit sharing. By varying the sources of funds and their amounts, the global benefit sharing fund could be flexible enough to respond to changing needs and conditions; if, for example, the public contributions were greatly increased and the direct contributions by users were lowered accordingly, this fund could be designed analogous to the Health Impact Fund suggested by Pogge (see p. 158) as an instrument for rewarding ethically desirable agricultural research and innovations, representing an alternative to patents and other intellectual property rights.

While trust funds are a feasible instrument of multilateral monetary benefit sharing, in chapter 4.7.2 I have discussed the need for non-monetary benefit sharing to supplement monetary instruments. Of course, a global trust fund could already to a certain extent ensure that monetary contributions are converted into desirable non-monetary benefits, and the design and implementation of multilateral non-monetary benefit sharing is more difficult than that of a trust fund. However, a non-monetary mechanism would be a desirable addition to global benefit sharing regulation since it would facilitate e.g. technology transfer to and capacity building of others than the actual providers; non-commercial users in particular might favour non-monetary over monetary benefit sharing also in the multilateral case (see ch. 4.5.3). Free humanitarian licenses for products protected by intellectual property rights may be another feasible example of multilateral non-monetary benefit sharing. Similar to the trust fund, its non-monetary counterpart could further include contributions from users of genetic resources without an ABS contract, as well as public contributions. The latter might be especially relevant for the benefit sharing obligations formulated more indirectly in the CBD, such as source country participation in R&D, the transfer of tech-

[244] Public contributions are currently also an important source of funding for the benefit fund of the ITPGR (see ch. 2.4.2.2), to which Norway, for example, contributes 0.1% of national seed sales annually (Bhatti 2009: 9).

nology, and the exchange of information; these may not be easily transferred to private users, so that in this case, governments of user countries might be required to provide more direct action and involvement to meet their CBD commitments (Tvedt/Young 2007: 133).

Considering these arguments, efforts should be made to add to the global trust fund a mechanism for multilateral non-monetary benefit sharing. I will formulate this demand as a further criterion of justice similar to the previous one:

> **A global mechanism for multilateral non-monetary benefit sharing should be established.**

4.8.4 Default mechanisms for benefit sharing in the absence of an ABS contract

In chapter 4.8.1 above, I have argued for adequate user country legislation that ensures compliance with provider country ABS requirements. To avoid loopholes in this ABS framework, it is additionally necessary to provide for cases where there is no ABS contract or obvious ABS requirement by the provider; examples are cases

- where the provider or source of a genetic resource is unknown or undisclosed,
- where the provider country has no ABS legislation in place or does not require ABS contracts, or
- where genetic resources or the associated knowledge have been in the public domain for some time (see ch. 4.5.1).

Such "default" mechanisms may be introduced within user country legislations, but for reasons of legal clarity and transparency, it seems reasonable to agree internationally on a common framework, or even on one global mechanism. Its substantial benefit sharing provisions should, as far as possible, be in accordance with the criteria of justice developed in the above chapters; it may be similar or closely connected to the minimum standards of benefit sharing suggested in chapter 4.8.2. If it included benefit sharing for genetic resources and associated knowledge in the public domain (as suggested here), these default mechanisms would be a sizable contribution to global benefit sharing, and being independent of ABS contracts, their disbursements could easily consider those stakeholders often neglected in ABS contracts, especially potential providers, regions of high agro-biodiversity, and original providers to collections and databases (see ch. 4.6).

The default mechanisms could include a certain differentiation according to the different reasons for the absence of an ABS contract: where the provider is unknown or undisclosed, benefits can be shared via the multilateral mechanisms which have been discussed in chapter 4.8.3; possibly, they could be channelled specifically to the countries of origin of the species or variety in question. Where the provider of a resource is known, but does not require benefit sharing or an ABS contract, demands could be less in quantitative terms, but should not be zero: even if a provider or provider country grants free access to genetic resources, this decision does not necessarily consider the interests of previous providers (e.g. if the provider is an *ex situ* collection) or of other potential providers of the same resource, who may thereby be deprived of chances for entering into ABS negotiations or economic exploitation themselves (see ch. 4.6.2). For fairness in this respect, it may be necessary that some benefit sharing takes place even in these cases; as a minimum, it could consist of adequate documentation and some multilateral benefit sharing via the multilateral mechanisms proposed above. Benefit sharing for genetic resources and associated

knowledge already in the public domain could focus on contributions by the food and feed industry resp. the end-consumers (see ch. 4.5.4), again ideally into the global trust fund in order to be able to reach as many legitimate recipients of benefits as possible.

In analogy to the agreement on common definitions, triggers, and minimum standards (ch. 4.8.2), I will not discuss further details here since the most important point is that default mechanisms are internationally agreed on at all. The respective criterion of justice is the following:

> **Default mechanisms for benefit sharing in the absence of an ABS contract should be agreed on internationally; they should focus on multilateral benefit sharing.**

4.8.5 Documentation and communication mechanisms between user and provider countries

As explained in chapter 4.8.1 above, it is difficult, if not impossible, for provider countries to enforce their ABS legislation across borders, i.e. in user countries. While the most important measure to facilitate compliance with such provider country legislation is adequate user country legislation, there are additional measures and instruments to support enforcement of the former: one important need of provider countries is access to information concerning the utilization of genetic resources abroad. Only on the basis of such information can individual providers and provider countries track the flow of the genetic resources they have provided or passed on, and can discover and prove instances of misappropriation, misuse, or a breach of ABS contract provisions. Unfortunately, users of genetic resources are currently not required to identify and document where and under what circumstances they acquired them. This lack of appropriate international information and documentation tools is regarded by many authors as a major obstacle to the functionality of the current ABS framework based on private bilateral ABS contracts (e.g. Tvedt/Young 2007: 122).

For these reasons, one of the most prominent issues in international negotiations concerning ABS are mandatory certificates and disclosure requirements. The various proposals distinguish

- certificates issued in the provider country and validating the source, origin, or provenance of a genetic resource, and
- disclosure of the source, origin, or provenance of a genetic resource required by certain user activities in user countries.

Both kinds of documents would contain similar information, with the former addressed at user country authorities, while the latter would communicate user-side information back to the source country. Main substantial differences between the various suggestions concern the exact information included, the activities and authorities requiring disclosure, and the sanctions in case of non-compliance.

4.8.5.1 Certificates validating source, origin, or provenance

The three prevailing suggestions[245] for international certificates as discussed, for example, by Dross/Wolff (2005: 71-76), are the following:

[245] A fourth possibility was suggested by the *Group of technical experts on an internationally recognized certificate of origin/source/legal provenance* convened by the CBD in 2007. They proposed a certificate of compliance, which, in essence, would be very similar to the certificate of legal prove-

a) Certificate of source

A certificate of source as the simplest variant would indicate in which country (or smaller entity) a user obtained the genetic resource, i.e. the certificate would identify the actual provider or provider country. The main drawback is that this might not be the country where the resource originated, e.g. if the source is an *ex situ* collection with the specimen originally collected abroad.

b) Certificate of origin

Certificates of origin would provide information about the actual *in situ* origin (country or smaller entity) of the genetic resource. Obviously, they are more informative than mere certificates of source, but there are cases where this origin may be difficult to determine, e.g. if the user obtains the resource from an *ex situ* collection, if the resource has been transferred repeatedly already, or if it contains lineages from diverse geographical origins.

c) Certificate of legal provenance

Since information on the physical source or origin of a genetic resource alone does not verify that it has been obtained in accordance with ABS provisions and other appropriate regulations, a third variant has been suggested in the form of certificates of legal provenance[246]. Such a certificate would confirm that national ABS laws, where existing and applicable, have been obeyed in the obtainment of the resource. Certificates of legal provenance could also cover *ex situ* collections, declaring that the material was acquired legally or acquired before the CBD entered into force (cf. the SMTA of the CGIAR Centres). Tvedt/Young (2007: 121f), however, argue that certificates of legal provenance can only be created after the context and purpose of the certificate is clear and national ABS legislation is in place, and even then, problems will arise concerning who is able and authorized to validate and certify the legal provenance, e.g. if a sample or specimen has passed through several hands or if the user's compliance can only be validated after benefits have arisen.

4.8.5.2 Disclosure of source, origin, or provenance

A mandatory disclosure of the source, origin, or legal provenance of genetic resources is discussed e.g. as an additional requirement in

- applications for intellectual property rights,
- applications with food and drug authorities,
- applications for import or export permits,
- applications for research funding, and
- scientific publications (see e.g. the final report of the seventh meeting of the ABS Working Group, pp. 49, 51).

While there is currently no agreement if such disclosure requirements are desirable and whether they should be developed within the WTO/TRIPS, the WIPO, or the International Regime on ABS[247], it seems that they can principally be made compatible with existing international legislation (e.g. Cabrera Medaglia 2009: 19).

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nance. The full report is available at *http://www.cbd.int/doc/meetings/abs/abswg-05/official/abswg-05-02-en.doc* (last accessed 07.09.2009).

[246] It is important to note that the term *legal provenance* here does not refer to the "real" specimen provenance as defined in chapter 1.4.3; I have adopted it from the literature mentioned in the text and will not use the term further.

[247] The shifting of the subject between the various international fora is a problem in itself; some countries seem to employ this as a strategy to inhibit substantial progress on the matter (see ch. 2.3.3.2).

Depending on the details of design and implementation, these requirements could obviously entail considerable costs and efforts for applicants as well as for the authorities involved. Not surprisingly, mandatory disclosure is opposed by many users and user countries (cf. Dross/Wolff 2005: 86; Federle 2005: 162; Holm-Müller et al. 2005: 68; International Chamber of Commerce 2004 and 2005; Oxley 2006; Ruiz 2004a: 4). Fortunately, however, the framework of implementation measures proposed above would already address many of the purposes of detailed certification and disclosure requirements: appropriate user country legislation (ch. 4.8.1) in combination with the suggested trigger approach to benefit sharing (ch. 4.5.1) can greatly facilitate the documentation of all uses of genetic resources and associated knowledge that are relevant for benefit sharing, as well as the enforcement of ABS contracts. The trigger approach would require defining when benefits arise. Tvedt/Young (2007: 70) suggest this to be e.g. when a commercially valuable commodity is created, or when research results are published. These instances are quite similar to those listed above[248], so that the requirements by the trigger approach could be combined rather easily with a disclosure requirement: the same actions that have been commonly defined as triggering a benefit sharing obligation (e.g. creation of a commercial product, IPR application, publication of results etc.) could trigger a requirement to disclose the source, origin, or legal provenance of the genetic resources employed. At this moment in time, users would be required to present an ABS contract covering the respective resource and use; the ABS contract could either function as a certificate itself or could be accompanied by one. Where users employ genetic resources or associated knowledge from the public domain, they should provide adequate documentation to substantiate this claim. This would enable original providers and traditional users to raise objections in case of misappropriation; in the case of widely distributed resources and knowledge, certain compensation would be possible via multilateral benefit sharing mechanisms as described above.

[248] The main difference between the two lists concerns import and export permits. Within the framework envisaged here (especially adequate user country legislation), import and export of genetic resources do not necessarily have to trigger disclosure requirements since the subsequent utilization of the resources would be identified, documented, and relevant ABS contracts could be enforced even across borders. It has already been explained in chapter 4.5.1 that a comprehensive tracking and tracing of all flows of resources is not necessary in the context of such a trigger approach to benefit sharing. Applications with food and drug authorities, in contrast, can easily be defined as instances of a realization of the resources' value which require benefit sharing.

Disclosure in patent applications

Disclosure requirements are discussed most concretely for intellectual property rights applications, especially patents. Inventors who have utilized genetic resources or associated knowledge for their innovation would be required to disclose the source, origin, and/or legal provenance in the patent application (Tvedt/Young 2007: 123). A mandatory disclosure in TRIPS has already been proposed in various forms by various actors; developing countries, for example, have proposed to introduce a new Article 29*bis* (conditions on patent applicants), rather than amending the otherwise contested Article 27 (patentable subject matter). For the current status of the debate on disclosure in TRIPS, see the official website at *http://www.wto.org/english/tratop_e/TRIPS_e/art27_3b_ background_e.htm* (last accessed 12.02.2009).

The *European Directive 98/44/EC on the legal protection of biotechnological inventions* mentions the geographical origin of biological material, but its Recital 27 only states: "Whereas if an invention is based on biological material of plant or animal origin or if it uses such material, the patent application should, where appropriate, include information on the geographical origin of such material, if known; whereas this is without prejudice to the processing of patent applications or the validity of rights arising from granted patents" (available at *http://eur-lex.europa.eu/LexUriServ/site/en/oj/1998/l_213/l_21319980730en00130021.pdf*, last accessed 23.6.2009; p. 3). The Recital does not create a legally enforceable obligation, and by 2006, only five EU countries had adopted legislation on this issue (Hoare/Tarasofsky 2006: 4).

A major point of dissent in the debate is whether failure to disclose the required information should lead to sanctions within or outside the relevant IPR system. If, in the former case, IPRs can be refused or revoked on grounds of missing or false disclosure, this would amount to an additional substantive protectability criterion - in the case of patents, a fourth patentability criterion. The more common suggestion is to restrict sanctions to monetary penalties and similar civil sanctions outside the IPR system (Tvedt/Young 2007: 123). Since few patent applications including disclosure have been made and there is no notification system, the effectiveness and feasibility of national disclosure requirements cannot be determined yet (Hoare/Tarasofsky 2006: 19f).

> "Moreover, unless these disclosures are verified in some way, they would seem unlikely to provide any value not already provided by national ABS legislation in source countries. Those who feel that they need not comply with source-country ABS – because, for example, they assume that resources are not subject to ABS requirements – will probably also feel that they are not required to comply with the patent disclosure requirement either." (Tvedt/Young 2007: 123)

Box 13: Disclosure in patent applications

4.8.5.3 Argument for a certificate of source

Concerning the nature of the certificate required, a certificate of source would probably suffice to ensure the necessary documentation and communication, provided that the remaining framework as suggested here is in place: together with the ABS contract, it would trace the genetic resource back to the provider (or a chain of providers resp. intermediaries), who would be able to identify cases of misappropriation, misuse, and non-compliance with ABS contract provisions. The provider country could check if relevant ABS legislation has been obeyed (i.e. the aim of certificates of legal provenance); the interests of countries of origin (i.e. the aim of certificates of origin) would be addressed by multilateral benefit sharing mechanisms. In this way, there is hardly any additional effort or expense necessary by either the provider or the user: certificates of source could be an integral part of ABS contracts, and at the point in time that triggers benefit sharing obligations, the ABS contract submitted by the user would automatically include a certificate of source, which would thereby be disclosed.

In order to serve their purpose of enhancing transparency and information flow among countries, and to facilitate the enforcement of ABS legislation, at least those parts of ABS contracts identifying the genetic resources employed (i.e. the certificate of source) should be forwarded to the respective providers and provider countries. If additional control by the general public or by other potential providers is deemed desirable, the disclosures of source could even be made publicly available. Users who cannot present an ABS contract would be obliged to adhere to the default benefit sharing mechanism described above; the source or origin of the resources they employed could be traced as far as possible, and the information could be published. These mechanisms would make it more difficult for users to cheat e.g. by naming as source the wrong provider or the public domain. With regard to the principles of justice, adequate documentation and communication mechanisms are instruments to facilitate political participation of affected communities and individuals (principle 9) as well as compensate to a certain extent the structural disadvantages of developing countries in negotiating and enforcing ABS legislation (principle 10). The following criterion of justice summarizes the above considerations:

> **Users should be required to obtain a certificate of source from the actual provider or provider country of genetic resources and associated knowledge, and to disclose this source when benefits from utilization arise; the information should be forwarded at least to the respective providers and provider countries.**

The following figure illustrates this proposed procedure:

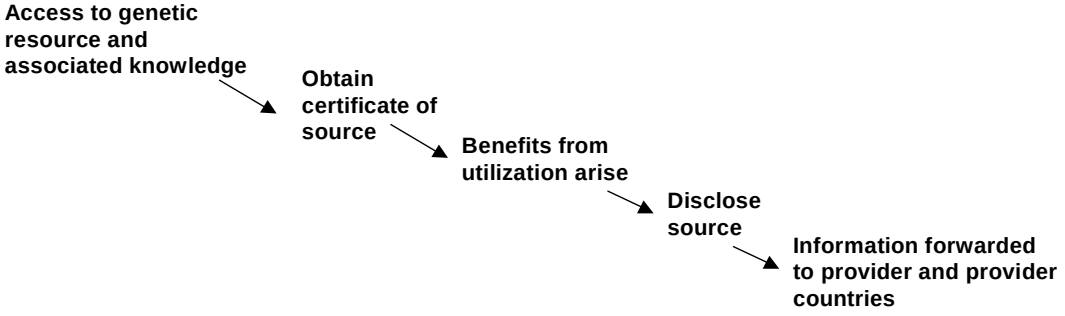

Figure 5: Certificates of source as documentation and communication mechanism between user and provider countries

If conceived in this or a similar way, certification and disclosure mechanisms can be a useful addition to a framework of global and national benefit sharing regulation. If, in contrast, they were introduced as stand-alone measures without the adequate framework especially of user country legislation, they would run the risk of being ineffective since their contents would be hard to verify, cheating difficult to detect, and sanctions uncertain (cf. Tvedt/Young 2007: 122f).

4.8.6 Participation of all legitimate stakeholders in ABS policy-making

After the above desiderata for implementation (ch. 4.8.1 to 4.8.5) have been dedicated to concrete mechanisms and instruments which would contribute to fair and equitable benefit sharing, some comments will be added here concerning procedural justice in the development of ABS regulation and policies. Although located at the end of the discussion of criteria of justice, they are of no less importance. Quite to the contrary, the demands discussed here can be conceived as precondition for the above ones since their aim is to secure more justice in negotiations, which presumably will lead to fairer outcomes.

In several previous chapters (e.g. ch. 4.3.1, 4.6), various reasons have been given why it would be wrong to base benefit sharing solely on bilateral ABS contracts freely negotiated between the respective provider and user of a genetic resource and associated knowledge. It has been concluded that a regulatory framework is necessary for substantial benefit sharing to take place, and that there are stakeholders other than the immediate contract partners who may be affected by an access activity or by the terms of ABS contracts, or should be included in benefit sharing schemes according to criteria of justice. Such important groups of further stakeholders are, for example, potential providers, people and communities in regions of high agro-biodiversity, original providers to *ex situ* collections, and end-consumers (ch. 4.6.2, 4.6.3, 4.6.4, and 4.5.4, respectively). Ideally, these additional stakeholders should participate in the negotiation of the individual ABS contract. In practice, however, this will often not be feasible, e.g. because they will be difficult to determine, and many national access procedures are quite complicated already (see ch. 2.5). As a minimum, therefore, their effective participation in the national and international policy-making process should be ensured, in addition to their participation in the design and implementation of local benefit sharing projects (see ch. 4.7.1).[249] The political participation of all stakeholders is not only instrumentally important, e.g. in putting forward demands for minimum benefit sharing standards and multilateral benefit sharing (see ch. 4.8.2, 4.8.3), but is also inherently valuable and desirable: political participation of affected communities and individuals concerning the use of and benefit sharing for genetic resources has been identified as a basic principle of justice (principle 9). Furthermore, their participation might lead to a stronger consideration of future generations e.g. in the form of enhanced resource conservation (principle 8).

[249] Comprehensive participation especially of indigenous and local communities has emerged as one of the greatest challenges in the drafting of ABS contracts and ABS legislation. An instructive example is the German-Ecuadorian research project *ProBenefit*, which from 2003 to 2008 attempted to develop procedures for a fair and transparent agreement on ABS in the Amazon lowlands of Ecuador (cf. Ploetz 2005; Ploetz et al. 2008). Despite the project's explicit commitment to extensive participation and capacity building, procedural difficulties between the researchers and the cooperating indigenous organizations, as well as among the indigenous representatives themselves, were so time-consuming that the project never reached the anticipated second phase of actual botanical and pharmaceutical investigations.

I have included end-consumers in the above enumeration on the presumption that they will be included in a form of multilateral benefit sharing, as suggested in chapter 4.5.4. Although it might be argued that these consumers will not be in favour of benefit sharing at all, for reasons of fairness they should have a say in relevant negotiations – after all, it is well possible that they do see the necessity of a certain global sharing of benefits, at least as a condition for further access to fresh genetic resources and as an incentive for provider countries to conserve resources and associated knowledge. If, for example, consumer organisations would be known to agree to certain benefit sharing standards, it might also be easier to oblige corporate and institutional users to comply with these standards as part of their social responsibility. Given the political realities, however, most consumers especially of the developed countries are already able to participate in policy-making so that the focus of further efforts should be on the participation of usually disadvantaged groups of stakeholders especially in developing countries. Depending on the national and local situation, these may be farmers, local impoverished communities, or indigenous peoples. Similar to the situation mentioned above for the just distribution of benefits (ch. 4.6.5), the participation of women merits special attention. The special and prominent case of indigenous peoples is further discussed in chapter 4.8.7.2. The political participation of these and similar groups is a means to counterbalance their otherwise often disadvantageous position (cf. e.g. Brouns 2004: 43) and to hinder national governments with their national sovereignty over genetic resources to take arbitrary decisions against the interests of those directly affected (see ch. 3.6.4).

GRAIN (2008: 11) mentions the example of the debate around disclosure requirements for patents on genetic resources: many governments at the WTO might agree on adding such a requirement in TRIPS, but this misses the point that many holders of traditional genetic resources and traditional knowledge do not claim property rights in them, even if these might make the original holders eligible for benefit sharing:

> "Many people interpret indigenous calls for participation as meaning they want a hand in the commercialisation of genes extracted from their native lands, but this is missing the point. What they want is the right not to own these things." (Le'a Malia Kanehe of the Indigenous Peoples Council on Biocolonialism, cited in GRAIN 2008: 11)

Following Pogge in conceiving such stakeholders as often foreseeably and avoidably disadvantaged by a shared institutional order, their participation is a stringent negative duty to be followed by the affluent and advantaged (principle 2).

> "The best that an international regime for benefit-sharing can hope to achieve is the elaboration of rules and obligations that give the most power possible to the powerless." (Frein/Meyer 2005: 148)

In the opinion of Brand (2007: 15, 29), the democratization of biodiversity policy is the only way to reform economic and political priorities with the aim of effectively implementing those CBD objectives not built on commodification and privatisation of genetic resources.

The demand for participation is captured in the following criterion of justice:

> **All legitimate stakeholders who will be affected should participate in national and international policy-making on access and benefit sharing.**

Participation in policy-making requires significant expertise, which means that the above-mentioned stakeholders, as a demand of procedural justice, need access to relevant information, to the institutions and international fora involved, as well as to

technical and legal capacity building and assistance (e.g. DeGeer 2003: 207). Another important point to consider are language barriers, which may make it impossible for certain (e.g. indigenous) stakeholders to participate in policy-making and even in negotiations for ABS contracts. The CBD, for example, attempts to facilitate participation by funding travelling expenses for indigenous representatives to attend meetings of the Working Groups on ABS and Article 8j, and by providing interpretation into the six official UN languages, where possible.

4.8.7 Self-determination of nations and peoples

After the participation of communities and individuals has been addressed in the above chapter, I will here focus on the global level, with nations and peoples as the main actors and stakeholders. I refer to peoples in addition to nations in order to explicitly include communities that regard themselves as distinct from other population groups or sectors of society e.g. on cultural or ethnic grounds, such as indigenous peoples as prominent holders of genetic resources and associated knowledge. Analogous to the participation requirements discussed above for the national level, self-determination of nations and peoples is not only instrumentally important to achieve the demands identified in the previous chapters, but is itself an important demand of justice as defined by the participation of affected communities and individuals in policy-making (principle 9), and by the compensation of differential bargaining power in international negotiations (principle 10).

For reasons of clarity, I will in the following distinguish aspects of self-determination with regard to national legislation, to indigenous peoples' rights, and to relations between countries, although, in practice, these may often overlap. I will draw arguments especially from the areas of intellectual property rights and global trade since they have been regulated at the global level (WTO, TRIPS etc.) long enough to allow conclusions about fair and unfair practices. The issue of ABS, in contrast, is quite new to the global arena, so that, on the one hand, few experiences can be referred to at present, but, on the other hand, national governments still enjoy certain freedoms in designing and negotiating ABS legislation and regulation. Thus, they may be able to avoid some of the negative experiences made in the context of global trade and IPR regulation that are mentioned below.

4.8.7.1 Adequate scope for implementing national legislation

While I have in the above chapters argued for certain global minimum standards and global benefit sharing mechanisms, I would here like to stress the need to reserve, at the same time, adequate legislative and regulatory scope for the domestic implementation of this global ABS framework. Conceptions between nations, peoples, and cultures about the various issues related to ABS can be expected to differ. To a certain extent this is, of course, legitimate from an ethical point of view, and even desirable if one adopts Rawls' standpoint that a liberal political conception of justice should be able to accommodate diverse conceptions of the good that are associated with comprehensive doctrines held by individuals (see ch. 3.3.1). Further reasons for varying implementation among countries may be their position as mainly provider or mainly user of genetic resources, or the socio-economic structure of society with regard e.g. to poverty, resource consumption, and envisaged development pathways. Under the roof of the requirements illustrated so far in this chapter, therefore, national legislation should be conceded the possibility to implement ABS instruments and mechanisms according to domestic demands, even if they fall short of all desiderata of the previous chapters (especially ch. 4.4 to 4.7), or if they exceed them by stricter legislation than recommended. This scope could include, *inter alia*, the defi-

nition and acknowledgment of new, unconventional property rights, decisions to facilitate or to deny the privatisation of open access resources, the definition of a range or of a minimum amount of monetary benefits to be shared, or specific provisions for the distribution of benefits among receiving communities. Variations in these issues among countries may be necessary to best serve the aims and purposes of benefit sharing identified in chapters 4.2 and 4.3, and many of the criteria developed in chapters 4.4 to 4.7 are formulated in a way that such scope is provided for. Several authors recommend subsuming relevant issues under a comprehensive and coherent national policy on genetic resources and associated knowledge resp. traditional knowledge, including such matters as ABS, biosafety, intellectual property rights, and collective rights (e.g. Seiler 1998; Young 2004: 288).

The possibility of differentiated intellectual property rights for different genetic resources has already been pointed out in chapter 4.4.5.7, but intellectual property rights as a whole should also be a matter of more flexibility among national legislations: for many developing countries, it would be sensible to initially pursue a strategy of weak, individually designed national IPRs, possibly combined with the protection of domestic industries and markets, until the national economy is capable of competing in a globalised market economy (cf. Correa 2003; Dutfield 2003; Mahnkopf 2005: 122; Mgbeoji 2006: 36). Such measures may often not be welcomed by other (industrial) countries, but can be legitimate since they are able to stimulate economic development and technology transfer, thereby advancing international justice and alleviating poverty (ch. 4.2.2); actually, they would imitate the former strategies of some of today's most successful industrial countries (Dutfield 2003: 4; Frein 2007: 274; Lasén Díaz 2005: 8; Mgbeoji 2006: 34).[250] Of course, the individual design of national IPR legislation requires comprehensive legal expertise, which is often lacking in developing countries. Thus, these countries depend on legal advice for drafting legislation – again provided mostly by individuals or institutions from developed countries, and therefore likely to be biased (cf. Correa 2003: 214). A similar effect can be expected for the national implementation of ABS legislation (cf. Carrizosa 2004a: 300): developing country negotiators and legislators may tend to lack adequate technical and legal knowledge to exploit all possibilities for adapting national ABS legislation to domestic needs and interests (see ch. 4.7.2). In order to avoid this, or, at least, to identify the problem, I would like to address it in the following criterion of justice:

> **The international framework on ABS should provide adequate scope for the ethically legitimate adaption of national legislation to domestic needs and interests.**

Contrary to such demands of procedural fairness, the global political and economic reality remains dominated by Western or Eurocentric concepts of trade, knowledge, and property, with developing countries struggling with the costly introduction of foreign IPR regimes, and their businesses put at a disadvantage on global and industrial country markets, where established Western corporations can take advantage of

[250] As Dutfield (2003: 4) states, "the TRIPS Agreement can be regarded as an experiment being conducted on the poor to see whether the lessons of history are applicable to the present-day situation or not." Correa (2003: 215) comes to a similar conclusion: "The design of IPR policy and drafting of IPR legislation in developing countries has largely failed to consider their productive structures, cultural values, and development needs." Pogge (2008c: 226f) mentions the example of India: by granting only process patents and no product patents, the Indian generic pharmaceutical industry flourished and provided the world's poor regions; this ended when India had to introduce product patents after signing TRIPS.

their familiarity with the now common rules of business.[251] Industry lobby groups even use their influence to interfere quite directly with the legislative process in selected countries: in a 2006 letter to the US trade representative concerning "China's compliance with WTO commitments", the Biotechnology Industry Organization (BIO) claims:

> "Intellectual property is the life blood of the biotechnology industry. […] Biotechnology companies rely on the strength and predictability of their intellectual property rights (IPR) to entice investment in cutting edge projects".

BIO further states that a mandatory disclosure of the origin of genetic resources in IPR applications will not serve CBD objectives, but rather burden inventors. The letter encompasses detailed suggestions on how Chinese IPR laws should be changed in order to fulfil BIO's requirements. In a follow-up letter in June 2007, BIO urges the US government to work towards Chinese plant variety patents, which would exceed TRIPS requirements (Art. 27.3b).[252] In general, industry threatens to stop using genetic resources if IPRs are compromised, if mandatory certificates are introduced for IPR applications, if a strong and legally binding International Regime on ABS is concluded, or if national legislation fails to clearly define the indigenous and local communities to consult; the result is claimed to be that, due to inhibited or discouraged access, no benefits at all will occur (e.g. Bowen 2005; International Chamber of Commerce 2004: 5, 10). It is not difficult to imagine the narrow limits of self-determined national ABS regulation especially of small or poor countries in such a global business climate. The problem of fair inter-governmental negotiations will be addressed in chapter 4.8.7.3. One important area where national legislation should be able to adapt ABS regulation to domestic specifications is the consideration of indigenous peoples; their specific role will be discussed in the following.

4.8.7.2 Acknowledgment of the rights of indigenous peoples

National self-determination in implementing legislation, as demanded above, is of course no guarantee that governments adequately take into account the rights of all their citizens.[253] These should have the possibility to claim their legitimate rights and interests also towards their own government; thus, it is important that all stakeholders participate in national and international ABS policy-making, as explained in chapter 4.8.6. In addition, I would here like to briefly address the situation of indigenous peoples, i.e. peoples in regions invaded or colonialized in the past, which have retained their distinctness in a historical continuity with pre-invasion and pre-colonial societies (ch. 1.4.6). Today, they usually form non-dominant sectors of society, and the regions they inhabit are often not identical with national territories but cross national borders, so that their interests are not adequately represented in and by national governments. Often being overrepresented among the poor and disadvantaged, they should belong to those preferentially addressed by benefit sharing and other efforts for poverty alleviation and global justice. At the same time, they are important holders and providers of genetic resources and traditional knowledge; several of the prominently discussed cases of misappropriation concern resources and knowledge

[251] In the opinion of Dutfield (2004: 201f, 217-219), there are some developing countries (e.g. India) with strong domestic economies and legislative know-how that are well-placed to benefit at least partially from an international IPR regime, while others (e.g. Kenya) have little to gain from TRIPS-style patenting of genetic resources.

[252] The letter is available at *http://www.bio.org/foodag/action/20060918.pdf* (last accessed 07.09.2009; citation from p. 3). An informative collection of BIO publications concerning legislature lobbying can be found at *http://bio.org/foodag/action*, including the follow-up letter mentioned here at *http://bio.org/foodag/action/20070629.pdf* (both last accessed 07.09.2009).

[253] Pogge elaborates on the subject of governments' misuse of power in the context of criticizing the borrowing, treaty, arms, and resource privileges of governments (see ch. 3.5.4.1).

held originally by indigenous peoples and communities (see Hawaiian taro and brazzein in ch. 1.1.4). Given its usually holistic and collective nature and oral transmission, traditional knowledge held by indigenous peoples and communities is hardly compatible to formal intellectual property concepts, and the appropriation and utilization of genetic resources and knowledge by outsiders is often regarded as violating indigenous worldviews and customary law (see ch. 4.3.1). Respect for indigenous peoples and cultures, therefore, would require accepting such knowledge systems and worldviews as, in principle, equally legitimate as e.g. Western property rights, rather than assuming traditional knowledge as *per se* belonging to the public domain and being freely available. In chapter 4.3.2, the need to conserve traditional knowledge associated with genetic resources has been further explicated.

The special situation of indigenous peoples and communities is increasingly acknowledged and considered in national legislation as well as in international agreements. In several countries, indigenous peoples and their territories are subject to special treatment under national law, granting them a certain autonomy and self-administration (e.g. Native Americans in the USA, Inuit in Canada). Similarly, some national ABS laws especially of developing countries require the involvement of local communities in access activities, but details vary and often remain unclear (Kate/Laird 2004: 138f). A recent approach to more effectively implementing indigenous peoples' rights is the *United Nations Declaration on the Rights of Indigenous Peoples*, adopted in 2007.[254] In addition to repeatedly stating indigenous peoples' rights to self-determination and participation, the Declaration also specifically addresses such issues as discussed here in proclaiming e.g.

- "the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired" (Art. 26.1),
- "the right to own, use, develop and control the lands, territories and resources that they possess […]" (Art. 26.2), and
- "the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions […], including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions" (Art. 31.1).

Though it is a non-binding document, this Declaration exemplifies the growing international consideration of indigenous needs and interests and lends force to the demands made by indigenous peoples and communities. Such a sovereignty of indigenous peoples over their land, resources, and traditional knowledge implies a certain contrast to the CBD view of genetic resources being the national sovereignty of the provider country (Preamble), and access to them being subject to prior informed consent by the provider country (Art. 15.5). On the other hand, CBD Article 8j calls on countries to promote the application of traditional knowledge "with the approval and involvement" of its holders. Comparing the CBD of 1993 with the abovementioned Declaration of 2007, it is obvious that the rights and interests of indigenous peoples are receiving more and more attention globally, and it seems only fair that this development should not be thwarted by ABS contracts and ABS laws neglecting such rights and interests (e.g. with reference to the CBD, where indigenous rights are defined less clearly).

[254] It was adopted by the UN General Assembly in September 2007 against the votes of Australia, Canada, New Zealand, and the USA, and is available at *http://www.un.org/esa/socdev/unpfii/en/declaration.html* (last accessed 09.09.2009). After a change of government, Australia acceded to the Declaration in 2009.

From the rather general point of view taken here, it is obviously not possible to decide (or define exact criteria for deciding) which and where indigenous peoples' claims to land, resources, and traditional knowledge are legitimate. Where they can legitimately claim property rights in genetic resources or associated knowledge, however, these rights should be acknowledged and implemented in ABS legislation (cf. Dutfield 2004: 130; Harry/Kanehe 2005: 107f), and users should be required to share benefits accordingly. In concrete terms, this may mean e.g. that users have to enter into ABS negotiations and ABS contracts not (only) with authorities of the national government, but (also) with representatives of the indigenous peoples or communities holding the respective resource or knowledge. The involvement of such peoples or communities could also be secured by asking them to define general access procedures or by requiring their prior informed consent (PIC; see p. 204) for each access activity. Such provisions e.g. in national legislation could enable indigenous peoples to maintain control over their genetic resources and associated knowledge and to retain a certain level of self-determination; benefit sharing originating from such access activities could improve their often disadvantaged situation and could contribute to meeting their basic human needs (as demanded by principle 3). The acknowledgment of indigenous property rights and eligibility for benefit sharing may further act as an incentive to conserve genetic resources and associated knowledge, and even to use them for own innovations, including marketing and commercialisation in accordance with indigenous customs and worldviews. Since going into more details on indigenous rights is beyond the scope of this thesis focused on benefit sharing, the following criterion of justice towards indigenous peoples and communities is formulated rather abstractly, with the main intention to draw attention to the issue:

> **Where indigenous peoples or communities can legitimately claim rights to genetic resources or traditional knowledge, these rights should be acknowledged and recognized in ABS policies and legislation.**

Some authors go as far as stating a right of indigenous peoples and communities to completely refuse access to their genetic resources or traditional knowledge (e.g. Posey/Dutfield 1996: 44f). On the basis of the considerations in chapter 4.3.3 (esp. p. 128), indigenous peoples and communities may be justified in refusing any form of foreign access to their genetic resources and associated knowledge, if such access bears the risk of misappropriation e.g. by foreign IPRs. Since this is a legitimate concern at the moment as well as, probably, in the near future, a veto by indigenous holders of genetic resources and traditional knowledge should be respected, at least as long as there is no functioning global ABS framework in place.

4.8.7.3 International negotiations on equal terms

My last criterion of justice will address a central problem in international relations, i.e. the "slanting of the global playing field" which is diagnosed by Pogge e.g. for global rules of trade (ch. 3.5.4.1). Due to their superior economic, technological, and military strength, which often has not come about by ethically legitimate means (see ch. 3.5.4.3), the so-called developed countries largely control the rules of global institutions and benefit most from them (see ch. 3.5.2). In recent years, this has been readily observable in matters of global trade and in the global expansion of Western intellectual property rights (e.g. Seiler 2000: 18f; The World Bank 2006: 1; Wissen 2003: 155); the main fora have been the World Trade Organization (WTO) and various bilateral or regional agreements on trade and investments (see p. 222). But even

outside negotiations dedicated to such bilateral or multilateral agreements, pressure by industrial countries concerning e.g. the introduction of effective IPRs is obvious: the US Trade Representative, for example, publishes an annual review (*Special 301 Reports*) examining the adequacy and effectiveness of IPR protection in foreign countries and identifying challenges faced by US rights holders in protecting their intellectual property rights.[255] Further instruments to urge developing countries to adopt certain policies or to promote industrial country interests are development aid and credits tied to corresponding conditions. The US and the EU, for example, are criticized for tying foreign aid or technology transfer to the condition that developing countries adopt stricter legislation on intellectual property rights than would be necessary by international standards (Nilles 2003: 222; Wissen 2003: 143). Measures like these often mean drastic constraints for their previously permissive policies regarding generic drugs or seed exchange; a prominent example is India (see footnote 250).

A certain recklessness by the more powerful states versus developing countries is not only diagnosed by political activists and NGOs, but even by actors usually unsuspected of anti-globalisation propaganda: in his 2007 Berlin Address, the German Federal President Horst Köhler, who was previously president of the European Bank for Reconstruction and Development, as well as Managing Director of the International Monetary Fund, conceded:

> "That is the ugly side of globalization, the ruthlessness of the mighty, and unfortunately Europe plays a part here. For decades, Europe, too, used development aid primarily as an instrument of the Cold War and a way of promoting the export industry without really asking what people in the respective countries actually needed. Europe, too, is erecting trade barriers against developing countries, flooding them with food at dumping prices […] and thereby destroying the very livelihood of rural societies. Europe, too, is fishing Africa's coasts dry and when criticized takes callous pleasure in pointing to agreements concluded." (Köhler 2007: 4)

Köhler agrees with many critics of current economic globalisation that fairer world trade policies are needed to successfully integrate poorer countries into the global economy (Köhler 2007: 5).[256] Under the present circumstances, instead, their lack of bargaining power and of expertise often continues to leave poor countries with unfavourable results in international agreements. For more favourable results and a more just global order, this trend would have to be broken by conducting international negotiations among self-determined countries on equal terms; in chapter 3.6.4, this has led to the formulation of principle 10 requiring the consideration and compensation of differential bargaining power, especially the disadvantages of developing countries. Fairer and more equitable negotiations presumably would lead to fairer global institutions and conditions for e.g. trade and development. Concerning the issues of benefit sharing discussed in this thesis, these may include multilateral benefit sharing

[255] In its 2009 "Watch List", the report explicitly names and blames 33 countries falling short of US expectations concerning IPR protection, in addition to China and eleven further countries found in an extra "Priority Watch List" (see *http://www.ustr.gov/Document_Library/Reports_Publications/2009/2009_Special_301_Report/Section_Index.html*, last accessed 26.05.2009).

[256] Mahnkopf (2005: 138) goes further in demanding a new kind of organization concerned with world trade since the WTO is currently a "one-way-street" towards deregulation, and any substantial change in this mission would not gain the consensual approval needed. She envisages the "alternative WTO" to be integrated under the roof of the United Nations, to aim at the internalization of all (e.g. environmental and social) costs into "real" product prices, and to place human, workers', and environmental rights above principles of free trade. Similar suggestions are voiced by Sachs/Santarius (2007: 75-77).

schemes funded partly by public contributions, enforcement of ABS contracts across borders, disclosure requirements, reforms of patent legislation etc.

As hinted at by Pogge (ch. 3.5.5), a more just global institutional order is not only in the obvious interest of developing countries or of the global poor, but is also a matter of prudence on the part of developed countries: if developing countries were given more chances to self-determined, sustainable development in accordance with their needs and interests, they would be less dependent on conventional development aid and other continuing monetary transfers (even in the form of benefit sharing). Not any longer in the position of supplicants begging or fighting for a redistribution of the wealth accumulated by affluent countries and individuals, their citizens may be able to develop more initiative and innovation potential than hitherto and have the chance to contribute to global value creation, as pointed out in chapter 3.6.1. Furthermore, the currently affluent may be well advised not to alienate today's developing countries, as the balance of power may change in the future, and those countries that today feel treated unfairly may then be inclined to turn the tables and use the global rules and institutions (e.g. free trade, deregulation, foreign direct investments) to their own advantage. Without elaborating further on this complex issue, I will formulate the following criterion of procedural justice in international negotiations:

> **Countries should not pressure each other into accepting international agreements or institutions but should negotiate them on equal terms.**

Until a level playing field in international negotiations is implemented, it may be a promising strategy for developing countries, or countries rich in biodiversity, to form alliances in order to have a better standing in international negotiations and to lobby effectively for their interests – and, of course, for those of their citizens (see ch. 4.8.6). One example of this strategy is the Group of Like-Minded Megadiverse Countries (LMMC), which comprises 17 countries rich in biological diversity and associated traditional knowledge and which acts as a mechanism of cooperation e.g. in CBD and ABS negotiations. A similar group of countries cooperating in several matters of national interest is the Andean Community[257]. The fact that the International Regime on ABS is negotiated under the roof of the CBD, rather than within the WTO, for example, may raise hopes for a fairer negotiation process, especially since the USA as a non-Party is in a rather weak position, and developing countries have succeeded in forming alliances that speak with one voice in the ABS Working Group meetings; at least rhetorically, are indeed negotiating on equal terms with e.g. the EU.[258] However, all substantial results of the ABS negotiations will only bear fruit if their relation to other international agreements, especially WTO/TRIPS, is clarified – here, the USA again has a powerful vote, as have such countries as Japan, Australia, or Canada, whose reluctance towards any binding or broad ABS regime is clearly observable in the ABS Working Group. A more detailed evaluation of the emerging International Regime on ABS will follow in chapter 5, after the criteria of justice developed in the course of chapter 4 have been summarized and consolidated in the following.

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[257] According to its website at *http://www.comunidadandina.org* (last accessed 06.05.2009), current member countries are Bolivia, Colombia, Ecuador, Peru; associated countries are Chile, Argentina, Brazil, Paraguay, and Uruguay; observer countries are Mexico and Panama. Venezuela withdrew from the Community in 2006.

[258] Examples are the Group of Like-Minded Megadiverse Countries (LMMC), the African Group, the Group of Latin America and Caribbean Countries (GRULAC), the Asia and Pacific Group, and the Group of Small Island Developing States (SIDS); they are referred to e.g. in the final reports of the ABS Working Group meetings.

Free trade and investment agreements

National self-determination and domestic democratic control in legislative matters are seriously undermined by bilateral and regional agreements on trade and investments between industrial and developing countries. Due to discrepancies in financial and political power, negotiations of these agreements tend to lead to results favouring the already dominant party. Notorious examples of free trade agreements (FTAs) between unequal partners are the North American Free Trade Agreement (NAFTA, composed of the USA, Canada, and Mexico), and the Central America Free Trade Agreement (CAFTA, consisting of the USA and six Central American countries). The inequalities most easily observable are economic: the gross domestic product of all Central American CAFTA partners (Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua) combined, for example, in 2007 amounted to only 1% of that of the USA (based on the World Development Indicators database by the World Bank, available at *www.worldbank.org/data/countrydata/countrydata.html*, last accessed 09.09.2009). Higher standards for intellectual property protection than in TRIPS are envisaged both by NAFTA (Seiler 2000: 25) and by CAFTA (Hild 2007: 43), and agricultural markets of the respective partners are feared to suffer from falling prices through imports of subsidized US products (cf. Picard 2002: 15). The EU is pressing ahead with similar free trade agreements (Mahnkopf 2005: 125); for an exemplary evaluation of a draft EU-India free trade agreement, see Correa (2009).

Among other factors, the growing importance of trade and investment agreements is due to stagnating WTO negotiations (see ch. 2.3.1), and the agreements often require developing countries to raise levels of IPR protection beyond WTO/TRIPS: developing countries are coerced into installing UPOV 1991 or into not excluding plants and animals from patentability (Choudry 2005; Lasén Díaz 2005: 46). Conventional IPRs are also employed to protect traditional genetic resources and traditional knowledge (GRAIN/Rodríguez Cervantes 2006: 3f), contrary to the recommendations given in chapter 4.4.5. In these bilateral negotiations, developing countries are in an even weaker position than in multilateral ones since they are secret and countries can be pitted out against each other – GRAIN (2006: 15f) accuses the industrial countries of divide-and-conquer tactics. Once a bilateral agreement is in place, the most-favoured-nation principle of the WTO ensures that the preferential terms of e.g. a US bilateral agreement are not restricted to the USA, but extend e.g. toward the EU (Choudry 2005: 9; Correa 2003: 212). If agreement provisions are breached, sentences are passed by a court in the country chosen by the plaintiff (Mahnkopf, pers. comm. 22.09.2007), which again tends to favour actors from developed countries with better access to legal expertise and political lobbying. Due to such practices, governments of developing countries often lose their range of domestic policy options, forfeit chances for opposition to demands of industrial countries in WTO negotiations, and lose bargaining power in international negotiations (Choudry 2005: 10f; Lasén Díaz 2005: 7).

Box 14: Free trade and investment agreements

4.8.8 Results: Criteria of justice for implementation into national and international policy

The above discussion of possible instruments for implementation at the national and international level yields the following conclusions.

User country legislation:

7.1 User countries should adopt legislation that requires and incentivises users to comply with provider country ABS legislation.

International agreement on definitions, triggers, and minimum standards:

7.2 A global regulatory framework should define conditions that give rise to benefit sharing obligations as well as certain minimum standards of benefit sharing.

Global mechanisms for multilateral benefit sharing:

7.3 A global trust fund for multilateral monetary benefit sharing should be established.

7.4 A global mechanism for multilateral non-monetary benefit sharing should be established.

Default benefit sharing mechanism:

7.5 Default mechanisms for benefit sharing in the absence of an ABS contract should be agreed on internationally; they should focus on multilateral benefit sharing.

Documentation and communication mechanisms:

7.6 Users should be required to obtain a certificate of source from the actual provider or provider country of genetic resources and associated knowledge, and to disclose this source when benefits from utilization arise; the information should be forwarded at least to the respective providers and provider countries.

Participation of stakeholders:

7.7 All legitimate stakeholders who will be affected should participate in national and international policy-making on access and benefit sharing.

Self-determination of nations and peoples:

7.8 The international framework on ABS should provide adequate scope for the ethically legitimate adaption of national legislation to domestic needs and interests.

7.9 Where indigenous peoples or communities can legitimately claim rights to genetic resources or traditional knowledge, these rights should be acknowledged and recognized in ABS policies and legislation.

7.10 Countries should not pressure each other into accepting international agreements or institutions but should negotiate them on equal terms.

4.9 Synopsis of criteria for fair and equitable benefit sharing

In the previous chapters 4.2 to 4.8, I have developed 42 criteria for fair and equitable benefit sharing for crop genetic resources, formulated as answers to seven central study questions and in accordance with certain general principles of justice derived in chapter 3. Here, I will attempt to consolidate these criteria into a coherent conception of benefit sharing, which will also serve as the basis for the subsequent evaluation of the international legislative framework in chapter 5. For reasons of clarity, I will first summarize the criteria in the order and on the basis of the central study questions, before then sketching the envisaged benefit sharing scheme in a more procedural order and proposing a simplified flowchart. I will here not repeat terminological explanations or the reasoning in support of the criteria as discussed in the previous chapters, but will shortly refer to criteria and chapters by numbers.

4.9.1 Summary of criteria

4.9.1.1 Long-term aims of access and benefit sharing regulation

Considering the global inequalities and injustices in the distribution of genetic resources on the one hand, and of financial and technological resources on the other, as well as the needs of both the present and future generations, the three main aims of ABS regulation should be the conservation of genetic resources, international justice and poverty alleviation, and the encouragement of desirable innovations based on crop genetic resources. Since such innovations (e.g. innovations addressing the needs of small and subsistence farmers and the food security of poor population groups) will often not be the focus of commercial research, public regulation and funding of them should be possible. Since these aims can hardly be achieved by bilateral exchanges of benefits between individual providers and users alone, fair and equitable benefit sharing should incorporate aspects of distributive, commutative, corrective, and procedural justice. (See criteria 1.1 to 1.5 in ch. 4.2.4.)

4.9.1.2 Medium- and short-term purposes of benefit sharing

Given the general aims mentioned above, the purposes of the individual acts of benefit sharing should be twofold: those who have conserved and provided crop genetic resources and associated knowledge should be adequately compensated, and holders of such resources and knowledge should be incentivised to grant access to them. Special care should further be taken to conserve the associated traditional knowledge. These purposes of benefit sharing require considering the value and external benefits of genetic resources and associated knowledge more comprehensively than can be expected from bilateral ABS contracts within the current legislative framework; thus, they should be complemented with public funding and support for providers and conservers, as well as with certain regulatory measures protecting their rights to resources and knowledge. (See criteria 2.1 to 2.4 in ch. 4.3.5.)

4.9.1.3 Property rights in genetic resources and associated knowledge

On the basis that all property rights in genetic resources and associated knowledge should be regarded as conditional rather than absolute, their scope may be restricted so as to exclude the right to destroy resources and the right to exclude others from using them; genetic resources may be designed as publicly regulated open access resource, well-defined common property, or restricted private property. Intellectual property rights in genetic resources and associated knowledge should differentiate between various categories of protected subject matter; at least the four categories of unaltered genetic material, improved varieties and breeding lines, traditional genetic

resources, and traditional knowledge should be distinguished. For these categories, various conventional as well as alternative instruments of intellectual property protection may be employed. The main restriction I suggest concerns patents, which should cover only clearly attributable, novel inventive procedures and processes; this demand would exclude patents on all four categories mentioned here. Furthermore, unaltered genetic material should only be eligible for weak, non-exclusive protection such as trade secrets, while traditional genetic resources and associated traditional knowledge may be protected against loss and misappropriation by instruments like trademarks, geographical indications, certificates, and registers for positive or defensive protection. The proprietors of improved varieties and breeding lines may be granted stronger intellectual property rights, but these should not exceed plant variety protection of the type of UPOV 1978. All intellectual property rights in crop genetic resources should provide for the farmers' privilege and the breeders' exemption. (See criteria 3.1 to 3.9 in ch. 4.4.6.)

4.9.1.4 Benefit sharing obligations by users

In contrast to leaving benefit sharing to ABS contracts for newly accessed genetic resources, I suggest to extend benefit sharing obligations to the utilization of resources that are used at present but have been accessed in the past. As proposed by Tvedt and Young (2007), the utilization of genetic resources should trigger relevance for benefit sharing; any benefits arising from this utilization should trigger a benefit sharing obligation. With effective and enforceable user country legislation in place that defines the two triggers "utilization" and "arising benefits", this approach can make the tracking of individual biological samples or specimen obsolete. The concept has to be further elaborated, for example concerning the question what exactly constitutes the utilization of a genetic resource. I suggest including the uses of organisms or of biological material for breeding, genetic modification, taxonomic research, *ex situ* conservation, and for the identification and extraction of biochemical compounds. Benefits could be defined as arising with the creation of a commercial product, IPR applications, the publication of results etc. Contrary to what is sometimes proposed, I would not exempt non-commercial users from benefit sharing obligations; commercial as well as non-commercial users should in general be required to share benefits, with the exception of farmers. However, for non-commercial users and users aiming at weaker intellectual property rights, obligations should be lower and/or should focus on non-monetary benefits. In addition to these institutional users, I suggest to extend benefit sharing obligations to the food and feed industry or end-consumers, as far as they utilize crop genetic resources. Benefit sharing should in this case preferably be monetary, such as a tax on certain products. (See criteria 4.1 to 4.4 in ch. 4.5.5.)

4.9.1.5 Recipients of benefits

Extending benefit sharing obligations to the utilization of resources that are used at present but have been accessed in the past implies an extension not only on the user side, but also on the part of the receivers of benefits: benefits should not only be shared with all actual providers of a given resource and associated knowledge, but also with its potential providers, i.e. at least with all countries of origin. These benefits, which can arise from bilateral ABS contracts or from other sources, should partly be independent of the commercial success of products resulting from the genetic resources provided. In the conceivable case that neither the provider country nor the provider his/herself requires an ABS contract, the actual provider may be excluded from benefit sharing. However, this should not preclude the user's benefit sharing obligations that may exist towards further stakeholders. Benefit sharing in

general should further extend to regions or countries currently possessing high *in situ* agro-biodiversity, as well as to the original providers of resources and knowledge to public *ex situ* collections and databases, as far as they are identifiable. Such a broad extension of benefit sharing beyond what is commonly proposed will only be possible with a global ABS framework that can distribute benefits outside the restricted scope of ABS contracts. The distribution of benefits among the respective receivers should follow principles of justice, e.g. in addressing basic needs, considering differential abilities, and not discriminating unfairly. (See criteria 5.1 to 5.5 in ch. 4.6.6.)

4.9.1.6 Elements of benefit sharing

The question which elements and kinds of benefits are the most adequate should be answered in the light of principles and criteria of justice, rather than conceiving them merely as a payment for access to genetic resources. Consequently, the nature and use of benefits should follow the principles and criteria of justice identified in this thesis; benefits should be earmarked e.g. for local public services, conservation measures, or R&D serving the common interest. In addition to benefit sharing triggered by the utilization of genetic resources and associated knowledge (such as milestone payments, royalties, license fees), benefits may encompass access-triggered components (such as up-front payments, sample fees), which will typically be agreed on in ABS contracts. While utilization-triggered benefits will often be proportional to the commercial success of resource-based products and are feasible for resources accessed in the past resp. for multilateral benefit sharing, access-triggered ones will mainly concern fresh access activities and thus will be relevant especially for the actual providers of these resources. Non-monetary benefits are at least as important as monetary ones and should include technology transfer and capacity building in areas furthering the aims of justice. Especially where users are non-commercial, providers and users should further aim at participatory R&D, as well as at joint publications and joint IPRs. While both monetary and non-monetary elements are desirable, it may depend on the kind of user and recipient which respective proportions are feasible or desirable. (See criteria 6.1 to 6.5 in ch. 4.7.3.)

4.9.1.7 Implementation into national and international policy

I will treat implementation aspects in more detail than the above ones since they are important for the global benefit sharing scheme and flowchart proposed in chapter 4.9.2. As a first step in establishing such a functioning benefit sharing scheme, and independent of a future International Regime on ABS, user countries should adopt legislation which requires and incentivises users to comply with provider country ABS legislation. Such user country legislation should directly oblige users of foreign genetic resources and associated knowledge to comply with all relevant laws of the provider country, and it should establish the necessary domestic oversight measures to observe and determine when genetic resources and associated knowledge are utilized and when benefits arise.

In addition to such national legislation facilitating the enforcement of ABS contracts and provider country laws, a global regulatory framework should be agreed upon that defines

- the common conditions which give rise to benefit sharing obligations, e.g. in the form of the trigger approach described above, and
- certain minimum standards of benefit sharing, which have to be observed both by national ABS legislation and by ABS contracts.

While all countries should design their national legislation in accordance with these minimum standards, they may formulate stricter or more specific requirements ac-

cording to their respective needs and priorities. In order to cover those cases where benefit sharing is required according to the commonly agreed conditions, but there is no ABS contract or ABS requirement by the provider, default mechanisms focusing on multilateral benefit sharing should be agreed upon internationally. If, as here proposed, benefit sharing obligations are extended to the utilization of genetic resources and associated knowledge which have been in the public domain for some time, whose source is unknown or undisclosed, or whose provider does not require benefit sharing, these default mechanisms could be a sizable contribution to global benefit sharing, especially with those stakeholders usually not addressed in ABS contracts. In the case of resources and knowledge in the public domain, benefit sharing could focus on contributions by the food and feed industry resp. the end-consumers. For resources and knowledge of identifiable origin, benefits may be channelled specifically to these countries or regions. For resources by providers not requiring benefit sharing, demands could be less in quantitative terms, but should not be zero.

Mechanisms for multilateral benefit sharing, which have been shown to be desirable, should incorporate a global trust fund for monetary benefit sharing, as well as a global mechanism for sharing non-monetary benefits. Both mechanisms could be supported by a proportion of the benefits negotiated in ABS contracts and, more importantly, by benefits shared in the absence of an ABS contract. They are also able to integrate public monetary and non-monetary contributions, as necessary or desired. Since multilateral benefit sharing probably is more difficult to organise for non-monetary than for monetary benefits, a more active role of governments and existing international organisations might be required e.g. in setting up projects for technology transfer and capacity building, to which users of genetic resources could then contribute. The CGIAR Centres and similar research and conservation institutions may continue to play an important role in this respect. In order to support compliance with provider country ABS legislation, certain international disclosure and communication mechanisms should be installed. I propose that all users accessing genetic resources or associated knowledge should be required to obtain a certificate of source from the actual provider or provider country, and to disclose this source when benefits from utilization arise, i.e. the same actions that have been commonly defined as triggering a benefit sharing obligation should trigger a disclose of source. The disclosure information should be forwarded to the respective providers and provider countries. Where genetic resources or associated knowledge are accessed from the public domain, users should provide adequate documentation of this and, more generally, all users who cannot present an ABS contract should adhere to the default benefit sharing mechanisms mentioned above.

In addition to these concrete mechanisms and instruments, procedural justice ideally requires that all stakeholders who may be affected by an access activity or by the terms of ABS contracts, or who should be included in benefit sharing schemes according to criteria of justice, participate in the negotiation of the individual ABS contract. Since this is not feasible, these stakeholders should at least participate in national and international ABS policy-making. At the international level, procedural justice calls for self-determination of nations and peoples in negotiating and implementing ABS regulation. Such self-determination implies

- providing adequate scope for the ethically legitimate adaption of national legislation to domestic needs and interests, e.g. regarding new or unconventional property rights, the (non-)privatisation of genetic resources, domestic minimum standards of benefit sharing, or the distribution of benefits among receiving communities,

- acknowledging the rights of indigenous peoples or communities to genetic resources and traditional knowledge where they can legitimately claim them, and
- not pressuring countries into accepting international agreements or institutions, but negotiating them on equal terms.

(See criteria 7.1 to 7.10 in ch. 4.8.8)

4.9.2 Proposal for a global benefit sharing scheme

Following the above summary of criteria, I will here sketch my proposal for a global benefit sharing scheme in a more procedural order, concluding with a tentative flowchart illustrating my suggestion. While the components of this proposed scheme have all been discussed in the previous chapters, e.g. concerning who is to share benefits, who is to receive them, and what benefits should consist of, they will here be integrated into a tentative procedure for fair and equitable global benefit sharing. Naturally, it cannot cover the whole variety of potential cases of benefit sharing, and it is only one of various ethically feasible scenarios, i.e. of scenarios fulfilling the criteria of justice developed above. The scheme I propose combines the standard case of benefit sharing following an ABS contract with a default mechanism defining benefit sharing obligations in the absence of an ABS contract.

4.9.2.1 Benefit sharing following an ABS contract

I will first sketch the standard case of benefit sharing, as it represents the more straight-forward procedure:

1. A user accesses a genetic resource or associated knowledge from an identifiable provider, who may be an individual or an institution, the original holder or an intermediary, a local community or a government authority etc. The access activity is conducted in agreement with the providers' rights to the resource or knowledge in question (ch. 4.3.3, 4.8.7.2) and considers participation requirements (ch. 4.8.6).
2. The user obtains a certificate of source from the provider, possibly as part of the ABS contract (ch. 4.8.5.3).
3. If neither the provider country nor the actual provider requires an ABS contract, the user's benefit sharing obligations are defined by the default mechanisms illustrated below.
4. Where an ABS contract is required, it is negotiated on fair and equal terms (ch. 4.8.6) and defines the user's access- and/or utilization-triggered benefit sharing obligations (ch. 4.7) towards the actual providers and, possibly, other stakeholders (ch. 4.6.2 to 4.6.4). The contract provisions are in accordance with national legislation e.g. concerning property rights, as well as with international minimum standards of benefit sharing (ch. 4.8.2). Ideally, the ABS contract adheres to most of the criteria of justice developed in chapters 4.2 to 4.7, but to fulfil all of them is certainly too high an expectation for a private, bilateral contract (see ch. 4.3.1).
5. Independent of the exact content of the ABS contract, the country where the user is based (i.e. the user country) observes when the resource or knowledge is utilized and when benefits arise, according to internationally agreed definitions and triggers (ch. 4.5.1, 4.8.2). In this case, the user country legislation requires the user to disclose the source, and it facilitates the enforcement of the ABS contract (ch. 4.8.1). If no benefits arise (as defined by the agreed triggers), no action is taken by the user country authorities – although, of course, the individual ABS contract may still define certain user obligations.

6. The disclosed information on the source of resources and knowledge is forwarded to the (alleged) provider/s and provider country/ies (ch. 4.8.5.3).

4.9.2.2 Benefit sharing without ABS contract

A default mechanism for sharing benefits from the utilization of genetic resources and associated knowledge in the absence of ABS contracts is a central part of my proposal for a global benefit sharing scheme. Following the trigger approach suggested in chapter 4.5.1, probably the largest part of crop genetic resources and knowledge are utilized without an ABS contract: their source may be unknown or undisclosed, they may have been accessed in the past and been in the public domain for some time, or the provider resp. country may not require ABS contracts (ch. 4.8.4). Depending on the individual reason for the absence of an ABS contract, and on the kind of user and resource, the default mechanism may vary in focus and quantitative demands, but should have the following general design:

1. User countries observe when genetic resources or associated knowledge are utilized and when benefits arise, according to internationally agreed definitions and triggers.
2. When this is the case, user country legislation requires the user to disclose the source, if known (ch. 4.8.1), and to share benefits via two global multilateral mechanisms (ch. 4.8.3): while for commercial users, monetary contributions to a global trust fund may be the most adequate, non-commercial users may focus on non-monetary benefits (ch. 4.5.2, 4.5.3) contributed to a multilateral mechanism. For users aiming at weaker intellectual property rights, obligations are lower in quantitative terms since the waiving of intellectual property rights in itself represents a common benefit (ch. 4.4.5.5). In the case of resources and knowledge from the public domain, benefit sharing focuses on contributions by the food and feed industry resp. the end-consumers, who contribute to benefit sharing in the form of an extra tax on certain products (ch. 4.5.4). For resources by providers not requiring benefit sharing, demands are less in quantitative terms, but not zero (ch. 4.8.4).
3. The monetary contributions from these user groups are collected in a global benefit sharing trust fund (ch. 4.8.3), which is further supported by public funding (ch. 4.2.3, 4.3.4) and may be analogous to the benefit sharing fund of the ITPGR (ch. 2.4.2). Similarly, a global mechanism for multilateral non-monetary benefit sharing is installed, which collects and coordinates contributions from users as well as public support in the areas of technology transfer, capacity building, and participatory R&D (ch. 4.8.3).
4. Both global mechanisms distribute benefits primarily to those groups of holders of genetic resources and knowledge that are often not considered in ABS contracts: potential providers, regions of high *in situ* agro-biodiversity, and original providers to *ex situ* collections and databases (ch. 4.6.2 to 4.6.4). For resources and associated knowledge of identifiable origin, benefits are channelled specifically to these countries or regions (ch. 4.6.2, 4.6.4).
5. Benefits from these multilateral mechanisms are employed for projects, organizations, and institutions dedicated to the conservation of crop genetic resources and associated knowledge, international justice and poverty alleviation, and innovations that e.g. meet basic human needs and enhance food security (ch. 4.2, 4.3).
6. The further distribution of benefits among the respective receivers follows principles of justice, e.g. in addressing basic needs, considering differential abilities, and not discriminating unfairly (ch. 4.6.5).

Of course, neither the aims of global justice and poverty alleviation, nor those of adequate conservation and sustainable use of genetic resources, are attainable solely by instruments of benefit sharing such as the ones proposed here. Rather, they require more encompassing national and international biodiversity strategies, combined with appropriate social and economic policies. Nevertheless, they should find adequate consideration within ABS regulation and legislation, so that the latter at least do not run contrary to long-term aims of justice. The combination of a default benefit sharing mechanism with benefit sharing obligations arising from enforceable ABS contracts is able to turn global benefit sharing into an effective instrument in approaching such ambitious aims, provided that measures and procedures are indeed intended and designed for these aims, rather than for such purposes as uncomplicated access to genetic resources, their internationally harmonized privatisation, or selling them to the highest bidder (see ch. 1.1.3, 1.2.1).

4.9.2.3 Summarizing flowchart for global benefit sharing procedures

The following, tentative and simplified flowchart summarizes and illustrates my proposal for a global benefit sharing scheme as sketched above:

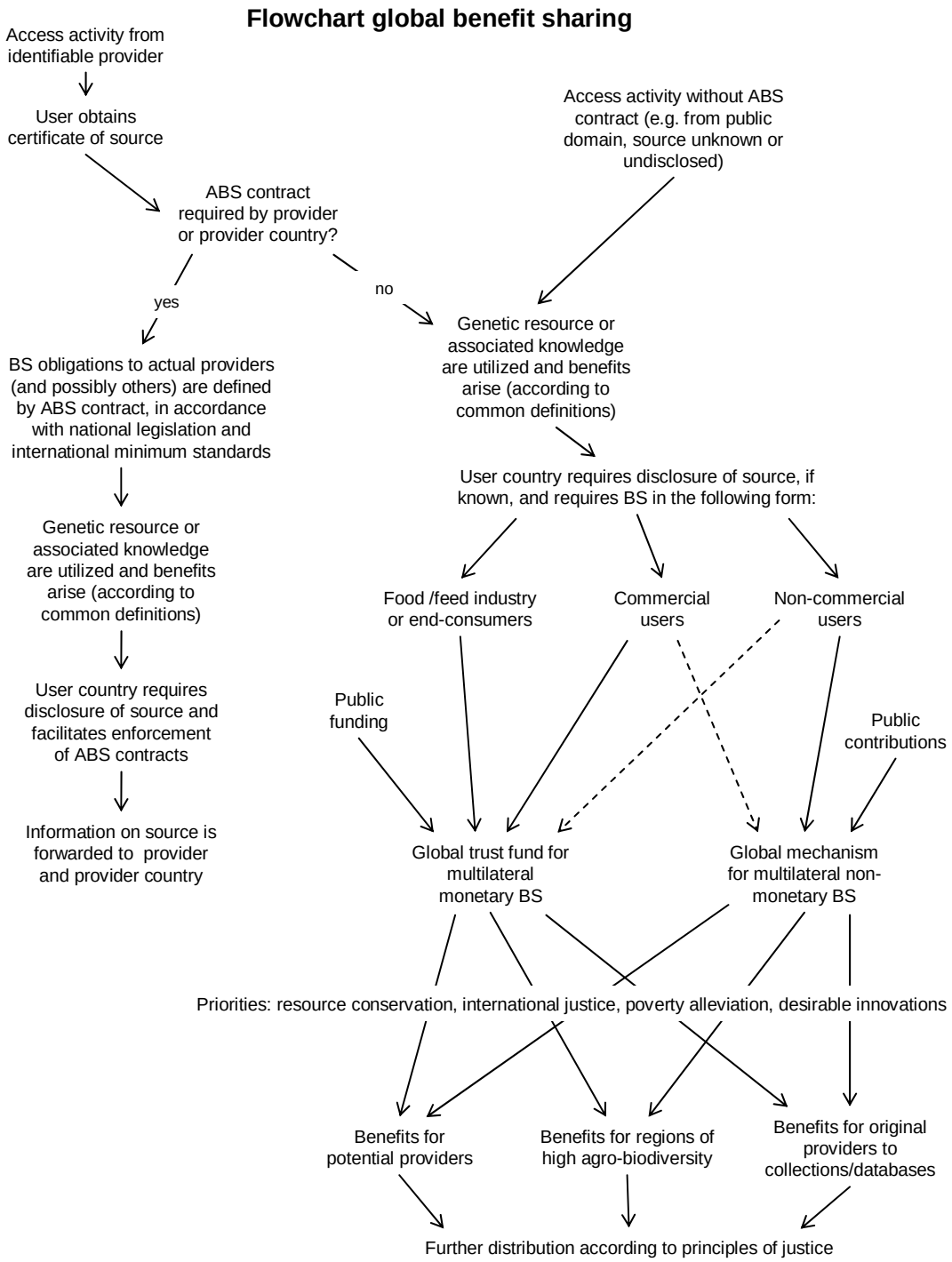

Figure 6: Tentative and simplified flowchart for global benefit sharing procedures

The left branch of this flowchart represents the standard case of benefit sharing following an ABS contract, while the right branch symbolises the default mechanism for sharing benefits in the absence of ABS contracts. Obviously, several important criteria for fair and equitable benefit sharing that I have developed cannot be integrated in such a flowchart, as they are part of the general regulatory and legislative framework both at the national and international level. Among them are

- the design of property rights, especially IPRs, in genetic resources and associated knowledge (ch. 4.4),
- the nature of monetary and non-monetary benefits (ch. 4.7) in ABS contracts and in the multilateral mechanisms, and

- the participation of stakeholders, countries, and communities in policy-making and in the legislative process on fair terms (ch. 4.8.6, 4.8.7).

4.9.2.4 Concluding remarks

A complex global benefit sharing scheme such as the one envisaged here is not easy to implement and, compared to the *status quo*, is rather demanding upon users of genetic resources and associated knowledge. However, I regard its main ideas and components as justifiable, if the principles of justice derived from Rawls' and Pogge's approaches are taken seriously: by its explicit dedication to certain aims and purposes, its extension beyond individual exchanges of benefits between user and provider, and its global focus, benefit sharing according to this scheme can, for example, effectively address basic human needs (principle 3), it fulfils the affluents' negative duties towards the foreseeably and avoidably disadvantaged (principle 2), and it appears to be acceptable to parties under a Rawlsian veil of ignorance concerning e.g. one's social position (farmer – scientist), living conditions (poor – affluent), and country of birth (industrial country – developing country) (principle 1). As Pogge writes in a "Rawlsian response" in defence of a global egalitarian or difference principle:

> "Yes, egalitarian institutions are demanding upon naturally and historically favored societies, as they would do better in a scheme with unlimited ownership rights. But then, symmetrically, a scheme with unlimited ownership rights is at least equally demanding upon naturally and historically disfavored societies, since they and their members would do much better under a more egalitarian global basic structure." (Pogge 1994: 213)

The global benefit sharing scheme envisaged above can be regarded as part of such a more egalitarian basic structure, where people are not morally entitled to the benefits they derive from their arbitrary, undeserved endowments, such as being born into a certain social or economic group or country (cf. Rowlands 1997: 238). As long as a global benefit sharing framework is not in place, however, it will remain the responsibility of national legislation and of the partners to ABS contracts to begin implementing adequate benefit sharing procedures and instruments that adhere to the criteria of justice developed here. Furthermore, the measures I have suggested, whether standing alone or combined in the form of an ABS regime, can only meet the legitimate expectations of their proponents if their relationships e.g. to TRIPS, the WIPO, and the ITPGR are clear-cut. As this is a matter of legal expertise and in dispute even among jurists, it is beyond the scope of this thesis, and I will in the following chapter only add some evaluative remarks on the existing international legislation, based on my criteria for fair and equitable benefit sharing.

5 Relating the criteria of justice to existing international legislation

5.1 Approach and objective

On the basis of the criteria for fair and equitable benefit sharing developed in chapter 4, I will here evaluate the international legislative framework presented in chapter 2 with regard to the question if and to what extent the demands expressed in these criteria are realized or seem realizable within current legislation. Due to the complexity of these issues, I will only be able to highlight some important aspects, and I will only in some instances consider how the various pieces of legislation relate to each other.[259] Furthermore, I will focus on those agreements that are most specific for benefit sharing from crop genetic resources and where there is still scope for negotiation and implementation, i.e. the CBD, the ITPGR, and the International Regime on ABS. The Bonn Guidelines will be considered less prominently since they are not legally binding and are conceived as inputs for national ABS legislation and bilateral ABS contracts (Art. 1). Rather than commenting on each piece of legislation separately, I will structure my evaluation according to the summary of criteria given in chapter 4.9.1, ending with some concluding remarks on the current state of implementation and negotiation.

5.2 Consideration of criteria of justice in the international legislative framework

For the content of the various pieces of legislation, the reader is kindly asked to refer to chapter 2, for a recapitulation of the criteria of justice, to chapter 4.9.1. In order to avoid unnecessary lengths, I will under each heading refer only to those pieces of legislation that are relevant for the respective subject.

5.2.1 Long-term aims of access and benefit sharing regulation

The long-term aims that I have identified (i.e. resource conservation, global justice, poverty alleviation, resource-based innovations) seem to be in accordance with the CBD, especially with its objectives stated in Article 1 (conservation, sustainable use, benefit sharing), the call for facilitated access (Art. 15.2), and the demand to share with provider countries the results of R&D and the benefits from the utilization of resources (Art. 15.7). The special consideration of the needs of developing countries, including poverty alleviation, is explicit in several provisions, e.g. concerning favourable terms in the access to and transfer of technology (Art. 16), participation in research (Art. 19), a publicly funded financial mechanism for the fulfilment of CBD objectives (Art. 20, 21), and the understanding that developing countries may prioritize on economic and social development and the eradication of poverty (Art. 20.4). In the implementation of the CBD, however, the focus of attention has shifted away from such overarching aims of global benefit sharing towards the enforcement of national ABS legislation and bilateral benefit sharing between individual providers and users, both of which do not necessarily follow the aims mentioned here. The TRIPS-Agreement and the ensuing global expansion of strong intellectual property rights are additionally exacerbating structural injustices and are impeding access to

[259] Recent analyses of the relationship between the International Regime and the WTO, the WIPO, and UPOV are available in Cabrera Medaglia (2009), between the International Regime and the ITPGR in Bulmer (2009).

IPR-protected resources and knowledge that are needed e.g. for food security and further innovation.

The ITPGR, which shares its main aims with the CBD, succeeds in alleviating some of the shortcomings of the CBD implementation by conceiving benefit sharing more comprehensively and multilaterally, albeit only for a limited scope of crop genetic resources, i.e. those of the species listed in its Annex I that are under national control and in the public domain (Art. 11.2). For these resources, access is indeed (re-)facilitated and desirable innovations are encouraged, which are important public benefits. Benefit sharing from the ITPGR's benefit sharing fund comes close to my criteria in prioritizing on farmers (resp. institutions) in developing countries who conserve and use crop genetic resources (Art. 13). On the other hand, the crops listed for the multilateral system lack important species, the benefit sharing obligations of commercial users are poorly defined and mostly unenforceable (Art. 13.2d), and the limited amount of monetary benefits in the fund will probably prevent a significant contribution to global justice and poverty alleviation.[260] Nevertheless, the ITPGR remains the international agreement whose stated objectives come closest to satisfying my criteria of justice for long-term aims of ABS regulation. The negotiators of the International Regime on ABS, in contrast, so far seem unable to agree to a commitment to these aims of intra- and intergenerational justice, and instead focus on harmonization of and compliance with national ABS legislation and bilateral benefit sharing.

5.2.2 Medium- and short-term purposes of benefit sharing

All of the pieces of legislation analysed seem to agree with the two main purposes of benefit sharing being the remuneration of providers and incentives for them to grant access. However, the existing legislation tends to neglect that the valuation of genetic resources in bilateral ABS negotiations or by similar market mechanisms can be expected to be inadequate, and that the possibility of users' overly broad IPRs may limit the providers' willingness to grant access. Furthermore, the commodification and privatisation of genetic resources entailed by ABS contracts may principally not be desirable (e.g. Brand 2007). I have therefore argued that providers and conservers should be additionally compensated by public funding, as well as by regulatory measures protecting their customary rights to resources and knowledge – a demand that is met to a certain extent by the wording of the CBD (Art. 15.7, 8j, 20, 21), by the Bonn Guidelines (Art. 43), and by the ITPGR, which recognizes farmers' rights (Art. 9) as well as the common benefits from unhindered access to crop genetic diversity (Art. 12) and integrates sizeable public contributions into its benefit sharing fund (Art. 18). In its present state, however, the ITPGR's multilateral system can be criticised for hardly extending beyond the *ex situ* collections of the CGIAR Centres and similar public institutions, whose initial policy it was to provide genetic resources freely on a non-commercial basis, and whose free transactions the ITPGR has mainly re-facilitated in a reaction to national access restrictions. However, the aim of benefit sharing in the ITPGR has been somewhat lacking behind the aim of facilitating access: although the unconditional facilitated access for private entities (esp. companies) that is granted by the multilateral system, without requiring that these entities in turn make their collections available, should have been reviewed after two years (Art. 11.4), this has not happened. According to GRAIN (2005a: 23), "this constitutes not benefit sharing but a massive subsidy to the global seed industry both from farmers and from taxpayers." The ITPGR can thus be regarded as slanted

[260] Similar criticism of the ITPGR not being able to meet its laudable aims is found e.g. in GRAIN (2005a: 21, 24), Jonge/Korthals (2006: 151), Lasén Díaz (2005: 45), and Meienberg (2006: 5).

towards the purpose of facilitating access, while installing rather weak and unenforceable instruments for remunerating providers and conservers and protecting their customary rights.

The conservation of traditional knowledge associated with genetic resources is addressed both in the CBD (Art. 8j) and, quite extensively, in the WIPO IGC, but so far has had few consequences e.g. regarding the effective acknowledgment of property rights in traditional knowledge or of instruments for its defensive protection against misappropriation.

5.2.3 Property rights in genetic resources and associated knowledge

On the question of legitimate property rights, the existing international legislation remains unsatisfying: the CBD and its follow-up agreements feature several desirable provisions, such as preferential terms for developing countries (CBD Art. 16), rights of indigenous and local communities to traditional knowledge (CBD Art. 8j), farmers' rights (ITPGR Art. 9), and a ban of IPRs on unaltered genetic material received from the multilateral system of the ITPGR (Art. 12.3d). However, these agreements, at the same time, mostly accept existing intellectual property rights legislation (e.g. CBD Art. 16.2, ITPGR Art. 9, 10.1, 12.3f); many phrasings are political compromises and open to interpretation (e.g. ITPGR Art. 12.3d). TRIPS and UPOV, to the contrary, do prescribe specific property rights to be implemented into national law, especially patents and conventional plant variety protection, which are problematic in various ways: they are unsuitable for adequately protecting traditional genetic resources and associated knowledge, they aim at international standardisation and privatisation instead of providing space for unconventional IPRs or common property regimes, and they set narrow limits to the farmers' privilege and the breeders' exemption. Although TRIPS does allow to exclude from patentability plants and animals, as well as inventions endangering *ordre public* and morality (Art. 27), applying these exceptions in national legislation is strongly discouraged by some industrial countries, who instead work towards TRIPS-plus standards e.g. in free trade agreements.

Although many countries still have to define IPRs in genetic resources and associated knowledge, it can be expected that they will often adhere to TRIPS or even TRIPS-plus standards and to the UPOV-Convention, instead of designing new, individual property regimes. This would amount to a factual priority of TRIPS and UPOV over the CBD and the ITPGR, whose more desirable provisions would be difficult to put into practice. Similarly, it seems that the draft provisions for the protection of traditional knowledge discussed in the WIPO IGC, which contain provisions e.g. on alternative property rights and defensive protection of traditional knowledge, as well as disclosure requirements, will not be agreed upon in their current form. Since no specific provisions on property rights (apart from disclosure requirements) are negotiated in the context of the International Regime on ABS, it will probably remain the responsibility of national legislation to design property rights in accordance with the criteria developed here, e.g. to ban all patents on genetic resources and to establish instruments for protecting traditional resources and knowledge against misappropriation.

5.2.4 Benefit sharing obligations by users

As far as the existing legislation focuses on benefit sharing as defined in bilateral ABS contracts for newly accessed genetic resources and associated knowledge, it can hardly meet the important demand that benefits should be shared also for resources

that are used at present, but have been accessed in the past. While the text of the CBD may not be explicit on this, Moore/Tymowski (2005: 9-11) clarify that its provisions concern only those access activities taking place after it entered into force; this implies that benefit sharing is not required for resources accessed previously.

The funding strategy of the ITPGR (Art. 18), by including public funding from contracting parties and other voluntary contributions, can be seen as an indirect way of sharing benefits for past access. However, funds at present are provided only by four governments and are not related to identifiable acts of resource utilization. For newly accessed resources from the multilateral system, in contrast, benefit sharing by commercial users is provided for (Art. 13.2d), although it remains to be seen how compliance with this demand can be enforced, and whether the exception for products that are "available without restriction to others for further research and breeding" will be upheld (Art. 13.2d(ii)). The ITPGR further fails to effectively define benefit sharing obligations for non-commercial users: since users of genetic resources from the multilateral system only seem to be obliged to share benefits if they commercialise a resulting product (Art. 13.2d), most non-commercial users are obviously exempt from benefit sharing obligations.[261] Very interesting in this respect, however, is the suggestion of voluntary benefit sharing contributions by food processing industries in Article 13.6: if the ITPGR's Governing Body should decide to establish such a strategy, it would be in accordance with my suggestion to extend benefit sharing obligations to the food and feed industry or to end-consumers. Benefit sharing obligations in the International Regime are still subject to intense debates, but it seems that they will consist mostly in compliance with ABS contracts and national ABS legislation, so that benefit sharing for resources accessed in the past will not be addressed.

5.2.5 Recipients of benefits

The various groups of stakeholders who, according to this thesis, should be eligible to receive benefits are not adequately addressed in most existing legislation concerning ABS. The CBD in Article 15.7 requires benefit sharing with the provider country, rather than with individual providers or with other countries of origin of a resource. In further articles, which are not primarily concerned with benefit sharing, the CBD does voice concern for the special needs of developing countries e.g. by asking for favourable and preferential terms (see ch. 5.2.1), so that a certain (non-commercial) benefit sharing with potential providers and with regions of high agro-biodiversity may result as a by-product. Original providers to collections and databases, however, are not considered in the CBD: collections or accessions that existed when the CBD entered into force in 1993 are under sovereignty of the country where they are located, so that appropriations of genetic resources before 1993 are largely legitimized independent of the circumstances (see ch. 4.6.4). The Bonn Guidelines go somewhat further in calling for benefit sharing (within ABS contracts) with all who have contributed to the management and value-adding of a resource, including institutions, indigenous and local communities (Art. 48).

The provisions of the ITPGR, especially its multilateral system, again are closer to my criteria of justice e.g. in defining multilateral non-monetary benefits such as mutually facilitated access, information exchange, technology transfer, capacity building, and in channelling benefits shared under the multilateral system to farmers who

[261] While Art. 13.2a-c of the ITPGR does call for further, non-monetary benefit sharing in the form of information exchange, technology transfer, and capacity building, this demand is addressed at contracting parties, not at users directly.

conserve and sustainably utilize crop genetic resources, primarily in developing countries (Art. 13). While the actual quantities of benefits shared in this way are not large, these provisions in principle fulfil the demands that benefit sharing should extend to potential providers and regions of high agro-biodiversity and should partly be independent of commercial success. Remaining shortcomings are e.g. the limitation to certain crop species and the failure to channel benefits specifically to the original providers of genetic resources accessed from the *ex situ* collections of the multilateral system (cf. Brand/Görg 2003: 103, 124f; Meienberg 2006: 5; Ribeiro 2005: 64). None of the pieces of international legislation regarded here comments in more detail on the distribution of benefits among receivers – this question probably has to remain one of national legislation.

5.2.6 Elements of benefit sharing

While the CBD repeatedly refers to technology transfer and research participation (Art. 16.1, 16.4, 19.1), the most specific piece of international legislation for the elements of benefit sharing are the Bonn Guidelines. Their Annex II includes a list of potential monetary and non-monetary benefits, most of which I have discussed in chapter 4.7 and all of which are in principle desirable. The Bonn Guidelines are further in line with my criteria of justice in stressing the importance of non-monetary elements like capacity building, joint research, and joint intellectual property rights (e.g. Art. 43, 50). Although the Guidelines aim at national ABS legislation and ABS contracts, the elements of benefit sharing they suggest are equally adequate for global mechanisms of multilateral benefit sharing as suggested here.

The ITPGR combines monetary and non-monetary benefits in its multilateral system (Art. 13.2), with monetary ones only shared via the central trust fund and only in case of commercialisation (i.e. utilization-triggered benefits proportional to commercial success). On the downside, the focus on technology transfer and capacity building as main elements of non-monetary benefit sharing may be regarded as neglecting participatory R&D, joint publications, and joint property rights as further important components, especially for non-commercial users. By setting the share of monetary benefits at 1.1% of product sales in the case of exclusive commercialisation by the user, the ITPGR's Standard Material Transfer Agreement remains at the lower end of the range of royalty rates mentioned in literature (see footnote 231).

5.2.7 Implementation into national and international policy

Hardly any of the implementation measures and instruments proposed in this thesis have yet been realized in the international ABS framework. While national legislation is able to address some of the demands e.g. as part of user country legislation, most of them (common definitions and triggers, minimum standards, default benefit sharing mechanisms, multilateral benefit sharing, certificates and disclosure) are a matter of international legislation or, at least, international agreement and parallel national implementation. This lag in implementation is obviously not only due to lacking awareness e.g. at the time of negotiations for the various pieces of legislation, but also mirrors the actual conflicts around binding mechanisms, starting with the still unresolved question of exactly which genetic resources or derivatives and which uses should be subject to benefit sharing.

The ITPGR is the most far-reaching effort so far in establishing measures and instruments similar to the ones I suggest; its multilateral system is the first operational global ABS system (albeit not yet funded by benefit sharing, but by donations) and can be a model especially for the global multilateral benefit sharing mechanisms that

I envisage. Although the scope of the multilateral system is limited to certain resources, benefit sharing is only required for certain uses[262], and enforcement of benefit sharing from commercial users will be difficult, the broad acceptance of the ITPGR, including its multilateral system and Standard Material Transfer Agreement, may facilitate the introduction of similar mechanisms for further genetic resources - especially in the International Regime, but also e.g. for the exchange of pathogens at the World Health Organization (see ch. 1.1.4). The Standard Material Transfer Agreement may serve as a model for standardised access and benefit sharing, and even functions as a certification of source (cf. System-wide Genetic Resources Programme 2007: 2). In the negotiations for the International Regime, certificates and disclosure mechanisms feature prominently and may emerge as one of the few new international instruments introduced by the Regime. Disclosure requirements are also discussed in the review of TRIPS Art. 27.3, but encounter opposition by developed countries (see ch. 2.3.2). Further desirable instruments such as global default and multilateral benefit sharing mechanisms are mentioned in some text proposals for negotiations in the ABS Working Group, but have little chance of success.

Matters of procedural justice are, more or less directly, touched by all pieces of legislation – at least by the way they came about.[263] While questions of adequate participation and fair terms of negotiations are difficult to answer on the basis of the resulting legal texts alone, some observations can be made concerning their substantive provisions: with their repeated qualifications such as "subject to national legislation", the CBD and the ITPGR seem to provide scope for the adaptation of national legislation – in contrast especially to TRIPS, whose provisions are formulated as more binding for parties and strongly standardise global intellectual property protection. For TRIPS, this may support the claim that many (especially developing) countries were left with less national self-determination than they would have wished, but had no choice if they did not want to jeopardize their WTO membership. Another important aspect of self-determination, the rights of farmers, indigenous and local communities, is often formulated as being subject to national legislation as well (e.g. CBD Art. 8j, Bonn Guidelines Art. 34, ITPGR Art. 9). Where this limitation leads to domestic neglect of their legitimate rights, needs, and interests, it is a misapplication of national sovereignty. One obvious item in ABS legislation that directly affects the rights of indigenous and local communities to genetic resources and associated knowledge are provisions on prior informed consent for access to genetic resources: the CBD, for example, requires prior informed consent only from the provider country, unless otherwise determined by that country (Art. 15.5). In the negotiations for the International Regime, prior informed consent from indigenous and local communities is prominently called for, but disputed, and may remain an issue for national legislation.[264] Quite remarkably, the Bonn Guidelines explicitly call for the participation of stakeholders such as indigenous and local communities in the national ABS implementation process (Art. 17-21).

[262] No benefit sharing is required e.g. for commercial products which remain available without restriction for further research and breeding (Art. 13.2d (ii)); this is in contrast to what I propose.

[263] One issue of fair international negotiations, for example, is the very practical question of translation: in the ABS Working Group, simultaneous translation into the six official UN languages is often provided during plenary, but not in the contact groups, where most of the operational text is negotiated, and everyone not fluent in English is placed at a clear disadvantage. Another problem for delegations from poor countries is that they often consist of only one or two members, with obvious difficulties in attending parallel meetings.

[264] Many developing countries have already formulated access regulations requiring prior informed consent from indigenous or local communities (see ch. 2.5).

5.3 Short concluding assessment

The existing international legal framework for the regulation of access to and benefit sharing from genetic resources does not sufficiently reflect concerns of justice as expressed in the criteria that have been developed in chapter 4. Although several pieces of international legislation ostensibly share aims and objectives with my account of fair and equitable benefit sharing, many of their concrete measures of implementation remain weak or inefficient, especially insofar as they conceive bilateral ABS contracts between individual users and providers as the basis for benefit sharing. These shortcomings are aggravated by the fact that questions of priority between the different legislative fora still wait to be resolved, which provides ample opportunity for stakeholders not interested in substantial benefit sharing to shift issues between the different fora (see ch. 2.3.3.2), thereby impeding substantial progress.

The ITPGR is not only the most specific piece of legislation for benefit sharing from crop genetic resources, but also the one whose provisions and instruments are the closest to my criteria of justice in benefit sharing. Although a more detailed evaluation will only be possible after more practical experiences with its implementation have been made and e.g. benefits from commercialisation start flowing into the benefit sharing fund, the multilateral system of the ITPGR is to be welcomed as the first operational global ABS system that has successfully re-facilitated access at least to state-controlled *ex situ* genetic resources. It can serve as a model for benefit sharing mechanisms for further genetic resources and uses, e.g. with a broadened scope of resources covered, improved funding and enforcement mechanisms, stronger rights for the holders of resources and associated knowledge, more restrictions for IPRs on genetic resources and derivatives, and a broader base of users who are required to share benefits. It would further be an important achievement to integrate the USA into any of these agreements since that they harbour important users of genetic resources and probably grant the most and broadest patents worldwide (see ch. 4.4.5.2).

Considering the substantial disagreements in the protracted negotiations for the International Regime on ABS (see ch. 2.4.3), it seems surprising that roughly the same parties could agree on similar issues in the ITGPR, and it may be doubted that they will be able to consent to stronger benefit sharing requirements in a regime covering a broader range of genetic resources. Non-binding and draft documents like the Bonn Guidelines, the IGC Drafts, or text submissions for the International Regime often contain substantive suggestions that would indeed contribute to a fairer benefit sharing, but in moving towards legally binding text, such provisions are often rejected, watered down, or qualifications and limitations are added. The ITPGR obviously representing the maximum to which negotiating parties could agree in recent years, its global benefit sharing mechanism will probably remain the leading one for crop genetic resources, with the International Regime on ABS possibly adding certain standardisation and harmonisation standards for national ABS legislation and ABS contracts and, at best, certain certification and disclosure mechanisms especially in IPR applications (if IPR issues will be addressed at all and will not be referred to other fora). The main advantage of an ABS regime, compared with coexisting but separate instruments, would probably consist in its compiling and integrating all relevant issues that negotiating parties can agree on. In addition, it is to be hoped that the problem of unclear priorities among the various international agreements that touch upon ABS issues will be tackled soon.

Since substantial and effective benefit sharing in accordance with all criteria of justice developed here will thus probably not be realized by international legislation in the short or even medium term, the responsibility to demand and ensure fair and equitable benefit sharing will continue to be one of national legislation and bilateral ABS contracts, as well as of the attentive public as representative of needs and interests potentially neglected by governmental delegates in international negotiations.

6 Conclusion and outlook

In this short conclusion, I will recapitulate the most important results of this thesis and relate them to some of the issues of debate that were illustrated in the introduction (ch. 1). The thesis was motivated by the lack of systematic and in-depth ethical argumentation in the global negotiation and implementation of policies and legislation concerning access to and benefit sharing for genetic resources. As a contribution to closing this gap and to identifying lines of justification for certain standpoints, I have developed and discussed ethical criteria for a fair and equitable benefit sharing in the utilization of genetic resources (ch. 4). These demands have been formulated as answers to seven central study questions and in accordance with certain principles of distributive, commutative, corrective, and procedural justice derived from the conceptions of justice by John Rawls and Thomas Pogge (ch. 3). I have focused on crop genetic resources, which pose certain specific problems and suggest specific solutions. In a nutshell, important demands resulting from this analysis are

- to strive for certain long-term aims in the regulation of access and benefit sharing (ch. 4.2),
- to grant intellectual property rights in genetic resources only where necessary for the encouragement of desirable innovations or for the protection against loss or misappropriation, e.g. patents only for clearly attributable, inventive technical procedures and processes and not for existing knowledge or for the biological material itself (ch. 4.4),
- to base benefit sharing not solely on private contracts between individual users and providers, but to extend benefit sharing to further groups of users as well as resource holders (ch. 4.5, 4.6),
- to design benefit sharing as an instrument of empowerment and participation (ch. 4.7),
- to define international triggers and minimum standards for benefit sharing, disclosure requirements, default and multilateral benefit sharing mechanisms (ch. 4.8.2 to 4.8.5), and
- to ensure adequate participation and self-determination of stakeholders in negotiations at all levels (ch. 4.8.6, 4.8.7).

Among concrete procedures, I suggest a global benefit sharing scheme which combines contractual benefit sharing with a default mechanism defining benefit sharing obligations in the absence of individual contracts (ch. 4.9.2). With the suggested international instruments in place, national access regulation and benefit sharing procedures, which currently often obstruct the access to and exchange of crop genetic resources for fear of misappropriation, could be simplified.

Benefit sharing is here conceived as a question of global justice, rather than as a matter of profit sharing between an individual user, an individual provider, and concerning an individual genetic resource. Biopiracy may be considered as those acts of appropriation of genetic resources and associated knowledge where no benefits have been shared, or where their sharing violates important demands expressed in the criteria developed here. This framework accepts that genetic resources and associated knowledge may, in principle, be subject to monetary valuation and privatisation, but demands tying this to certain conditions, restrictions, and compensation mechanisms that alleviate existing injustices. Of course, benefit sharing, however comprehensive, is neither sufficient nor the only way to achieve global justice or similar long-term aims; these have to be pursued additionally in various areas of national and international policy. Nevertheless, the instruments and measures proposed here can contribute to their achievement and may be a part of the reforms necessary in the global

institutional order. In applying principles from theoretical conceptions of justice to very practical problems of benefit sharing for crop genetic resources, I have demonstrated that sound ethical justifications for certain demands in the debate on access and benefit sharing are feasible, and that the approaches by John Rawls and Thomas Pogge can serve as a basis for overcoming difficulties in defining "fair and equitable", as well as for discussing the legitimacy of the various political positions. Their approaches suggest such principles as

- regarding benefit sharing as the affluents' negative duty towards those foreseeably and avoidably disadvantaged by the shared institutional order (ch. 3.6.2),
- giving priority to meeting basic human needs (ch. 3.6.1),
- designing property rights according to concerns of justice (ch. 3.4.5),
- aiming at the conservation of non-renewable natural resources (ch. 3.4.6),
- ensuring the participation of all stakeholders in policy-making (ch. 3.6.4), and
- considering and compensating differential bargaining power in international negotiations (ch. 3.6.4).

On the basis of these principles, quite far-reaching demands can be justified – provided the objective of fair and equitable benefit sharing is taken seriously, and benefit sharing is not considered merely as part of the routine commodification of genetic resources. Otherwise, the *status quo* of access to and utilization of genetic resources may be functioning and may accommodate certain commercial interests, but it can hardly be justified as fair and equitable.

It is to be hoped that, although the current impression may be to the contrary (see ch. 5), such ethical concerns will be respected in the negotiations for the International Regime on Access and Benefit Sharing as well as by national legislation and individual ABS contracts. A comparison with other pressing global problems such as biodiversity loss or climate change suggests that resource use, economic development, and human rights issues are increasingly conceived as interrelated, and values like sustainability and justice are becoming accepted as crucial principles in tackling these problems, where aims are ambitious and conventional market instruments often fail. Whether demands of justice will be adequately considered in the negotiation and implementation of international agreements depends also on the political discourse in user countries, where the public is often not yet conscious of the subject of access and benefit sharing. In the long term, benefit sharing as envisaged here may even succeed in overcoming the conflict-laden divide between the providers of "raw" genetic resources especially in developing countries, bearing the main costs of resource conservation for the benefit of all mankind, and the users in developed countries reaping the main commercial benefits (see ch. 1.1). The original resource holders could make better use of their genetic resources themselves, thereby reaping a greater proportion of the potential benefits in the value creation chain (see ch. 1.1.2) and avoiding dependence on benefit sharing by foreign commercial users, on conventional development aid, and other continuing transfers.

The assessment of whether genetic resources, via benefit sharing, will prove to be "green gold" for developing countries, their indigenous communities or marginalised populations (as is sometimes proclaimed) will only be possible after a longer implementation period. However, considering the disastrous consequences that the discovery and exploitation of gold, oil, and similar "riches" often have had for the local population, it may rather be hoped that the utilization of crop genetic resources will follow a more sustainable and justice-conforming path. After all, genetic resources

are still basic to human subsistence and ultimately more valuable than any gold, as implied by the following quotation with which I would like to close:

> "For all our technological wizardry, we human beings still owe our existence to a few inches of topsoil, an occasional thunderstorm, and a handful of crops." (Fowler/Mooney 1990: 3)

7 Summary

The Convention on Biological Diversity (CBD, 1993) states as one of its three objectives the "fair and equitable sharing of the benefits arising out of the utilization of genetic resources" (Art. 1). In this thesis, I develop ethical criteria for such a fair and equitable benefit sharing for crop genetic resources. In implementing this Convention, benefit sharing together with international access to genetic resources has proven to be one of the most difficult and contested issues. Additionally, the extension of exclusive intellectual property rights to genetic resources ("biopatenting") has repeatedly provoked accusations of "biopiracy", i.e. of illegitimate appropriation of such resources. The unresolved problem of benefit sharing for the appropriation and use of genetic resources has prompted many countries to limit international access to their resources. Especially for genetic resources used in agriculture such access restrictions are a substantial problem, because breeders and farmers depend on a diversity of species and varieties.

The regulation of benefit sharing is increasingly regarded as a procedural question of freely negotiated private contracts between users and providers of resources, as well as of the respective legislation; what remains missing is a debate on substantial provisions that make a certain benefit sharing agreement or legislation fair and equitable. In order to approach this issue on an ethically sound basis, I first distinguish seven central study questions regarding aims and purposes of benefit sharing, legitimate property rights, participation in benefit sharing, elements of benefit sharing, and its implementation. Basis for my reasoning are ten rather general principles of justice in benefit sharing, which I deduce from two contemporary approaches to a theory of justice (John Rawls) resp. to applied questions of global justice (Thomas Pogge). These principles address e.g. the global institutional framework, the just distribution of goods, intergenerational justice, and political participation. They are the basis from which I then develop concrete criteria for fair and equitable benefit sharing, which can be summarized as follows.

Aims and purposes of benefit sharing: The regulation of access and benefit sharing should aim for resource conservation, international justice, and poverty alleviation, and it should encourage desirable innovations e.g. enhancing food security. In the medium and short term, benefit sharing should adequately compensate the providers of genetic resources and associated knowledge, and it should offer incentives to grant access resp. not to hinder the desirable exchange of genetic resources more than necessary. Since private, bilateral contracts cannot adequately capture the total value of these resources, benefit sharing as defined in such contracts should be complemented by public financial and legal support for providers, e.g. via the protection of their legitimate rights in genetic resources and associated knowledge.

Legitimate property rights in genetic resources and associated knowledge: Patents should be restricted to novel inventive achievements (e.g. technical procedures) and should not extend to the biological material itself. Among the subject matter of protection, at least the categories of unaltered genetic material, improved varieties and breeding lines, traditional genetic resources (e.g. farmers' varieties), and traditional knowledge should be distinguished. For these categories, various conventional and alternative instruments for protecting intellectual property are available: unaltered genetic material should only be eligible for weak protection; for improved varieties and breeding lines, conventional plant variety protection is adequate. Traditional genetic resources and traditional knowledge should be better protected against ille-

gitimate appropriation and against loss, e.g. by trademarks, geographical indications, specialized registers and databases. All intellectual property rights in crop genetic resources should provide for the farmers' privilege and the breeders' exemption (i.e. the permission to freely use protected material for individual seed saving and for further breeding).

Participation in benefit sharing: I propose to extend benefit sharing obligations to the utilization of resources to which no fresh access is needed, e.g. because they are already in the public domain. Obligations to share benefits could be triggered by specific uses of genetic resources, provided that a certain defined benefit arises from this use. Non-commercial users should not principally be exempt from benefit sharing obligations, but they could focus on non-monetary benefit sharing. I further suggest to extend benefit sharing to the food and feed industry, e.g. in the form of a low tax. Similarly, I argue for an extension of benefit sharing on the part of receivers: benefits should be shared with all potential providers of a genetic resource, with the original providers to public *ex situ* collections, and, even more general, with countries and regions of high agro-biodiversity. The distribution of benefits among receivers should, again, follow principles of justice, e.g. in addressing basic needs.

Elements of benefit sharing and its implementation: In the long term, non-monetary benefits are at least as valuable as monetary ones and should include technology transfer and capacity building e.g. in the areas of resource conservation, sustainable use, and rural development. Especially non-commercial users should additionally aim at participatory research and joint publications with providers. A comprehensive concept of benefit sharing, as proposed here, requires a global institutional framework that allows the enforcement of individual benefit sharing contracts and that further regulates benefit sharing outside such contracts. In this framework, user countries should explicitly require users of foreign genetic resources to comply with the relevant provider country legislation. In order to facilitate the tracking of genetic resources, obligatory certificates of source and their disclosure in the case of resource utilization should be introduced. In addition, common triggers and minimum standards of benefit sharing should be defined at the international level. In cases where benefit sharing is required but no contract exists, a default mechanism should be installed on the basis of multilateral benefit sharing. Apart from these specific instruments, all stakeholders should participate in national and international policy-making. In international relations, especially industrial and developing countries should negotiate on equal terms; self-determination of countries, indigenous peoples, and local communities should be respected.

These ethical criteria also form the basis for my short evaluation of the existing international legislation, especially the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture, and the envisaged International Regime on Access and Benefit Sharing. Although some of the criteria developed here are reflected in their wording, most of them are not yet fulfilled. With my thesis I would like to refocus on the aims and purposes of benefit sharing and to regard its design as a problem of global justice, for which sound ethical criteria can be developed. Returning to the initial question what makes a certain benefit sharing agreement or legislation fair and equitable, a central conclusion from the various aspects analysed is that benefit sharing should be conceived and designed (also) as compensation for structural and historical injustices.

8 Zusammenfassung

Das Übereinkommen über die biologische Vielfalt (CBD, 1993) nennt als eines seiner drei Ziele die „ausgewogene und gerechte Aufteilung der sich aus der Nutzung der genetischen Ressourcen ergebenden Vorteile“ (Art. 1), was meist unter dem englischen Begriff benefit-sharing diskutiert wird. In meiner Dissertation entwickle ich ethische Kriterien für ein solches ausgewogenes und gerechtes benefit-sharing für pflanzengenetische Ressourcen in der Landwirtschaft. In der Implementierungsphase dieses Übereinkommens hat sich benefit-sharing, in Verbindung mit dem internationalen Zugang zu genetischen Ressourcen, als eines der schwierigsten und konfliktträchtigsten Themen erwiesen. Die Ausweitung geistiger Eigentumsrechte an genetischen Ressourcen („Biopatentierung“) provoziert zudem immer wieder Vorwürfe von „Biopiraterie“, d.h. der unrechtmäßigen Aneignung solcher Ressourcen. Die ungelöste Frage des benefit-sharing für die Aneignung und Nutzung genetischer Ressourcen hat viele Staaten dazu veranlasst, den internationalen Zugang zu ihren Ressourcen zu beschränken. Besonders für landwirtschaftlich genutzte genetische Ressourcen sind solche Zugangsbeschränkungen problematisch, da Züchter und Landwirte auf eine breite Arten- und Sortenvielfalt angewiesen sind.

Während die Gestaltung von benefit-sharing zunehmend als eine Frage frei verhandelter privater Verträge zwischen Nutzern und Bereitstellern sowie der entsprechenden Gesetzgebung gesehen wird, wird nur noch selten explizit diskutiert, worin ein ausgewogenes und gerechtes benefit-sharing im Einzelnen bestehen sollte. Um diese Frage ethisch fundiert zu behandeln, differenziere ich sie zunächst in sieben Leitfragen zu Ziel und Zweck von benefit-sharing, zu legitimen Eigentumsrechten, zur Beteiligung an benefit-sharing, zu seinen Bestandteilen und seiner Umsetzung. Als Grundlage meiner Argumentation leite ich zunächst aus zwei aktuellen Ansätzen zur Gerechtigkeitstheorie (John Rawls) bzw. zu globalen Gerechtigkeitsfragen (Thomas Pogge) zehn allgemeinere Prinzipien für gerechtes benefit-sharing ab. Diese beziehen sich u.a. auf den globalen institutionellen Rahmen, die gerechte Verteilung von Gütern, legitime Eigentumsrechte, Generationengerechtigkeit und politische Partizipation. Die daraus entwickelten konkreten Kriterien für ausgewogenes und gerechtes benefit-sharing lassen sich wie folgt zusammenfassen.

Ziel und Zweck von benefit-sharing: Die Regulierung des Zugangs zu genetischen Ressourcen sowie von benefit-sharing sollte drei Hauptziele verfolgen: die Erhaltung der Ressourcen, internationale Gerechtigkeit und Armutsbekämpfung, sowie die Förderung wünschenswerter Innovationen auf der Basis genetischer Ressourcen z.B. zur Ernährungssicherung. Mittel- und kurzfristig sollte benefit-sharing die Bereitsteller von genetischen Ressourcen und zugehörigem Wissen angemessen entlohnen bzw. entschädigen und ihnen Anreize bieten, Zugang dazu zu gewähren und den wünschenswerten Austausch genetischer Ressourcen nicht unnötig zu erschweren. Da private Einzelverträge den vollen Wert dieser Ressourcen nicht angemessen berücksichtigen können, sollte benefit-sharing aus diesen Verträgen ergänzt werden durch öffentliche finanzielle und rechtliche Unterstützung für die Bereitsteller, u.a. durch den Schutz ihrer legitimen Rechte an Ressourcen und zugehörigem Wissen.

Legitime geistige Eigentumsrechte an genetischen Ressourcen und zugehörigem Wissen: Patente sollten nur für echte Erfindungen (z.B. technische Verfahren) vergeben werden, nicht aber für biologisches Material selbst. Weiterhin sollte bezüglich der geschützten Objekte mindestens zwischen unverändertem genetischen Material, „modernen“ Sorten und Zuchtlinien, traditionellen genetischen Ressourcen (z.B.

Landsorten) und traditionellem Wissen unterschieden werden, für die verschiedene konventionelle oder alternative Formen geistiger Eigentumsrechte genutzt werden können. Unverändertes biologisches Material sollte dabei nur einen sehr schwachen Schutz erhalten; für „moderne“ Sorten ist der etablierte konventionelle Sortenschutz angemessen. Traditionelle Ressourcen und traditionelles Wissen sollten besser als bisher gegen unrechtmäßige Aneignung und gegen Verlust geschützt werden, z.B. durch geschützte Marken, Herkunftsangaben, spezielle Register und Datenbanken. Alle geistigen Eigentumsrechte an pflanzengenetischen Ressourcen in der Landwirtschaft sollten den Landwirtevorbehalt und das Züchterprivileg beinhalten, d.h. die Erlaubnis, geschütztes Material frei für den eigenen Nachbau oder für weitere Züchtung zu verwenden.

Beteiligung an benefit-sharing: Ich schlage vor, benefit-sharing auch auf aktuell genutzte genetische Ressourcen auszudehnen, für die kein neuer Zugang oder Zugriff mehr nötig ist, z.B. weil sie schon öffentlich zugänglich sind. Verpflichtungen zu benefit-sharing könnten dann durch bestimmte Nutzungen genetischer Ressourcen ausgelöst werden, sofern daraus ein definierter Nutzen („benefit“) entsteht. Nicht-kommerzielle Nutzer sollten nicht grundsätzlich von benefit-sharing ausgenommen sein, in ihrem Fall könnte es aber primär in nicht-monetärer Form erfolgen. Außerdem schlage ich vor, die Nahrungsmittelindustrie bzw. die Konsumenten an benefit-sharing zu beteiligen, z.B. in Form einer geringen Steuer. Auch auf Seiten der Empfänger von benefit-sharing plädiere ich für eine Ausweitung über die aktuellen Bereitsteller hinaus: Alle potentiellen Bereitsteller einer genetischen Ressource, die ursprünglichen Bereitsteller der Ressourcen in öffentlichen *ex situ* Sammlungen sowie, noch allgemeiner, Länder und Regionen hoher Agro-Biodiversität sollten an benefit-sharing beteiligt werden. Die Verteilung der „benefits“ im Einzelnen sollte sich wiederum an Gerechtigkeitsprinzipien orientieren und z.B. vor allem menschliche Grundbedürfnisse befriedigen.

Bestandteile und Umsetzung von benefit-sharing: Nicht-monetäre Komponenten von benefit-sharing sind langfristig mindestens so wertvoll wie monetäre und sollten Technologietransfer und Kapazitätsaufbau z.B. bezüglich der Erhaltung und nachhaltigen Nutzung von Ressourcen sowie ländlicher Entwicklung beinhalten. Vor allem nicht-kommerzielle Nutzer sollten außerdem gemeinsame Forschung und gemeinsame Publikationen mit den Bereitstellern anstreben. Ein umfassendes Konzept von benefit-sharing wie hier dargestellt benötigt einen globalen institutionellen Rahmen, in dem private Verträge zu benefit-sharing durchgesetzt werden können und der benefit-sharing auch außerhalb solcher Einzelverträge regelt. In diesem Rahmen sollten Nutzerländer die Nutzer genetischer Ressourcen aus dem Ausland explizit dazu verpflichten, relevante Gesetze der Herkunftsländer einzuhalten. Um die Verfolgbarkeit genetischer Ressourcen zu vereinfachen, sollten außerdem verpflichtende Herkunftszertifikate und eine entsprechende Offenlegung bei Nutzung der Ressource eingeführt werden. Darüber hinaus sollten international einheitliche Auslöser und Minimalstandards für benefit-sharing definiert werden. Für Fälle, in denen benefit-sharing vorgeschrieben ist, aber kein Vertrag dazu besteht, sollte ein Standardverfahren auf Basis eines pauschalen, multilateralen benefit-sharing vorgesehen sein. Abgesehen von diesen konkreten Instrumenten sollten alle Betroffenen am nationalen und internationalen Gesetzgebungsprozess beteiligt werden. Auf der internationalen Ebene sollten v.a. Industrie- und Entwicklungsländer gleichberechtigt verhandeln; die Selbstbestimmung von Ländern, indigenen Völkern und lokalen Gemeinschaften sollte geachtet werden.

Diese ethischen Kriterien bilden auch die Grundlage für meine kurze Bewertung der internationalen Gesetzeslage, v.a. des Übereinkommens über die biologische Vielfalt, des Internationalen Vertrags über pflanzengenetische Ressourcen für Ernährung und Landwirtschaft und des geplanten Internationalen Regimes zu Zugang und Vorteilsausgleich. Obwohl ihr Wortlaut einige der hier entwickelten Kriterien aufgreift, sind die meisten von ihnen bisher nicht erfüllt. Mit meiner Arbeit möchte ich daher noch einmal den Blick grundsätzlich auf Ziel und Zweck von benefit-sharing richten und seine Gestaltung als ein Problem globaler Gerechtigkeit betrachten, für das sich ethisch begründbare Kriterien entwickeln lassen. Zurückgehend auf die ursprüngliche Frage, worin ein ausgewogenes und gerechtes benefit-sharing besteht, lässt sich als Fazit aus den einzelnen untersuchten Aspekten feststellen, dass ein solches benefit-sharing (auch) als Kompensation für strukturelle und historische Ungerechtigkeit verstanden und konzipiert werden sollte.

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10 Glossary

This glossary compiles definitions as they are used in this thesis. Those that are subject of dispute are further explained in more detail in chapter 1.4.

ABS contract = Access agreement
A contract usually negotiated on a case-by-case basis between the provider (e.g. government, local community, land owner, gene bank) of a genetic resource and a party interested in its use, i.e. the user (e.g. company, research institution); standard material transfer agreements represent a form of standardised ABS contract. I mostly use the term *ABS contract* in preference to *access agreement* in order to clarify its contractual nature.

Access to a genetic resource
Any case where a genetic resource is acquired by a prospective user from an identifiable provider or from the public domain, independent of whether any property rights or other rights to the resource are conferred in this process (see ch. 1.4.1)

Access and benefit sharing (ABS)
Used broadly for the topic of this thesis (see ch. 1.4.1)

Benefit sharing (BS)
Any transfer of material or immaterial goods by the users of genetic resources in exchange for these uses (see ch. 1.4.1)

Biological resources
Biological material used in a rather unspecific way; its genetic characteristics are not central to its suitability for the respective use, and it could be replaced by organisms or biological material of other species (see ch. 1.4.2)

Biopiracy
Here largely avoided in favour of the less tendentious term *misappropriation* (see below)

Bioprospecting
Commercially oriented exploration of potentially useful organisms, usually *in situ*, including their collection and screening for valuable characteristics and biochemicals

Breeders' exemption
The right to use protected plant material for further breeding without authorisation of the rights owner

Country of origin
Used for any country currently possessing a genetic resource *in situ* (see ch. 1.4.3)

Crop genetic resources
Used as a shorter synonym for *plant genetic resources for food and agriculture*, which include cultivated plants, their ancestors and wild relatives, as well as wild plants used as food and fodder plants, comprising the levels of species, populations, breeding lines, varieties, and genes

Developing country
Used broadly for those countries with a relatively low standard of living, low gross domestic product, and low per capita income, often combined with a low level of industrialization; in contrast to the developed resp. industrial(ized) countries especially of the OECD

Ex situ collection/conservation
Collection/conservation of genetic resources outside their natural habitats, e.g. in botanical gardens or in seed/germplasm/gene banks in the form of seed, tissue, pollen etc.

Farmers' privilege
The right of the individual farmer to save seeds and exchange them on an informal and non-commercial basis, even of varieties protected by intellectual property rights

Farmers' rights
Here avoided in favour of their more specific components (see ch. 2.4.2.1)

Genetic resources
Biological material used specifically on grounds of its genetic characteristics; there are few or no other species or varieties which could effectively replace it in this specific kind of use (see ch. 1.4.2)

Improved varieties
Used for commercially grown varieties that are the result of "modern", targeted breeding and are usually merchandised under a recognisable name

Indigenous and local communities
I will consider as indigenous communities such communities that belong to an indigenous people according to the definition below. The notion "local communities" further encompasses communities that are locally distinguishable without necessarily considering themselves as indigenous. (see ch. 1.4.5)

Indigenous peoples
Used for ethnic groups regarding themselves as indigenous peoples (see ch. 1.4.6)

In situ collection/conservation
Collection/conservation of genetic resources in their natural habitats or in the surroundings where they have developed their distinctive properties, e.g. within nature reserves or on farm

Landrace
Internally heterogeneous variety which is developed by farmers in particular agro-ecological and socio-economic conditions (cf. Louwaars 2007: 148). Despite its genetic variability, it exhibits a certain phenotypic distinctness, is often regionally adapted, and continues to evolve under the local conditions. Also called *farmers' variety*

Misappropriation
Used for the illegitimate appropriation of genetic resources and associated knowledge, as perceived by the original holders (see ch. 1.4.7)

Plant variety
Grouping of plants below the species rank with reproducible phenotypical characteristics discernible from other varieties or specimen within the species; it can be the result of human selection/breeding or of natural origin[265], but here used mainly for cultivated varieties. Used in a broad sense including landraces, which might not fulfil strict criteria of distinctness and stability (see ch. 2.3.4). Varieties of certain species can be reproduced vegetatively, of others sexually by self- or cross-pollination.

Provider country = source country
Used for the country actually supplying the genetic resource to a user interested in accessing it (see ch. 1.4.3)

Specimen provenance
Used for the "real" origin of an individual resource specimen or sample, i.e. the country or region where the specimen or its progenitors or parental lines (from which it was propagated or reproduced) were originally collected (see ch. 1.4.3)

Sustainable use of biological resources
Used primarily in the context of the CBD, where it means "the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations" (Art. 2)

Traditional genetic resources
Used e.g. for existing landraces, traditional cultivars, and farmers' varieties that are grown mainly for subsistence and local markets

Traditional knowledge
Knowledge, innovations, and practices of indigenous and local communities; here mostly associated with genetic resources and relating to the characteristics, management, and use of crops (see ch. 1.4.8)

User country
Country with users of foreign genetic resources under its jurisdiction; in plural used for countries with (important commercial) users of foreign genetic resources under their jurisdiction, as antonym of provider countries

[265] This is contrary to the use e.g. in German, where "Sorte" usually only refers to cultivated material and "Varietät" to naturally occurring varieties (cf. Seiler 2000: 55).

11 Abbreviations and Acronyms

ABS	access to genetic resources and benefit sharing
ASEAN	Association of South East Asian Nations
BIO	Biotechnology Industry Organization
BS	benefit sharing
CAFTA	Central America Free Trade Agreement
CBD	Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
CIMMYT	International Maize and Wheat Improvement Center
CO_2	carbon dioxide
COP	Conference of the Parties
DNA	deoxyribonucleic acid
ETC Group	Action Group on Erosion, Technology and Concentration
EU	European Union
FAO	Food and Agriculture Organization
FTA	free trade agreement
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GEF	Global Environment Facility
GMO	genetically modified organism
GNP	gross national product
GRAIN	Genetic Resources Action International
GRD	Global Resources Dividend
GURT	genetic use restriction technology
HIF	Health Impact Fund
HIV/AIDS	human immunodeficiency virus / acquired immunodeficiency syndrome
ICBG	International Cooperative Biodiversity Group
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IGC	Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore
INBio	National Biodiversity Institute (Costa Rica)
IP	intellectual property
IPR	intellectual property right
IRRI	International Rice Research Institute
ITPGR	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
JaFR	*Justice as Fairness: A Restatement* (book)
LoP	*The Law of Peoples* (book)
MAT	mutually agreed terms
MTA	material transfer agreement
NAFTA	North American Free Trade Agreement
NGO	non-governmental organization
OECD	Organisation for Economic Co-Operation and Development
PhD	doctoral degree
PIC	prior informed consent
PVP	plant variety protection
R&D	research and development
SMTA	standard material transfer agreement
TJ	*A Theory of Justice* (book)

TK	traditional knowledge
TRIPS	(Agreement on) Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNAM	National Autonomous University of Mexico
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UPOV	Union for the Protection of New Varieties of Plants
US(A)	United States (of America)
UZACHI	Zapotec and Chinantec Communities Union (Mexico)
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Art.	Article
ch.	chapter
cf.	compare
e.g.	for example
esp.	especially
et al.	and others
etc.	et cetera
f	following
i.e.	that is
p.	page
pp.	pages
resp.	respectively
R&D	research and development
spp.	species (plural)
vs.	versus

12 Index of Boxes, Figures, and Tables

DANK

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Julia Rojahn, April 2010

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