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Financing National Protected Area Networks Internationally –The Global Environment Facility as a Multilateral Mechanism of Transfer

by

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The Global Environment Facility as a Multilateral Mechanism of Transfer

Abstract:

Nationally implemented protected area measures for biodiversity conservation generate cross-border externalities. For internalizing these externalities at the international level, the Global Environment Facility (GEF) has been established as a multilateral mechanism of transfer. This paper empirically analyzes the use of GEF funds for protected area projects in biodiverse developing countries. It turns out that transfers generally do not play the role of compensations in that they directly balance foregone payoffs from alternative land uses. The funds are also not primarily directed to the expansion of protected area systems but address improvements in the management of already legally designated sites.

Keywords*:* Biodiversity, Conservation, Land Use; Global Environment Facility; International Institutions.

JEL classification*:* O13, Q28, Q56, Q57

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Contents

1 Motivation

To cease or at least slow down of the current decline of biodiversity, multiple measures have been implemented on the various levels of national and international policies. In this context, it is generally agreed that, valuable components of biodiversity can in some cases only be preserved if the sensitive natural areas that carry these components are withheld from land development and put under some type of protection.

Benefits from a protection of natural areas are generally not confined to the country where protection measures are implemented but also reach other countries beyond national boundaries. These external benefits are described by non-use values of biodiversity, like existence values and bequest values, or indirect use values, like external ecological values through climate regulation. As a result a nationally enforced protected area policy clearly shows an international dimension.

This dimension has been recognized and addressed in the 1992 Convention on Biological Diversity (CBD). In this multilateral environmental agreement that constitutes the foundation of current national as well as international biodiversity policies, the conservation of valuable biodiversity components has been set out as one of the major policy objectives. In this respect, protected areas are regarded as an effective mean to achieve conservation. Countries that have ratified the CBD have agreed to establish national systems of protected areas within their territories. Furthermore, the industrialized countries that are endowed with comparatively few biodiversity resources have committed themselves to support the developing countries to preserve their resources, which represent a great and significant part of the global biodiversity. The parties of the CBD have appointed the **Global Environment Facility (GEF)** as the relevant mechanism to facilitate transfers for such a support. Thus, with

respect to the protection of biodiverse natural areas, the GEF is perceived as the instrument that intends to contribute to the conservation of global biodiversity. This includes the establishment of an effective global network of protected areas in the interest of the parties of the convention.

Generally, the establishment of protected areas is rather an instrument to preserve biodiversity than an objective on its own. Accordingly, recent policies have not formulated explicit global targets with respect to protected areas, but have focused more on the single components of biodiversity like species richness or the diversity among ecosystems. This is also illustrated by the aim to reduce the loss in species richness adopted at the 2002 World Summit on Sustainable Development in Johannesburg. The implementation of these objectives can include the protection of natural areas[1].

According to the 2003 United Nations List of Protected Areas (Chape et al. 2003), natural areas that are presently put under various types of protection cover about 17 million square kilometers, which corresponds to 11.5% of the Earth's terrestrial surface. This includes areas with only minor use restrictions. The annual costs to effectively operate a global network of protected areas which would be appropriate to preserve representative ecosystems have recently been estimated to be US $45 billion (IUCN 2003), even though alternative estimates by James et al. (1999a) and Balmford (2003) are lower. However, this amount necessarily overstates the actual demand for financial resources to be provided as transfers for to the developing countries since it includes the

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[1] More explicit targets with regard to protected areas have been formulated in the 1987 *Brundtland Commission Report* which recommended that, for effectively preserving biodiversity, the amount of protected areas has to increase three-fold relative to the amount prevailing at the time the report was published. Since at that time about 4% of the global land surface has been put under some status of protection, the recommendation has been loosely interpreted in that 10% to 12% of it should be protected – whereby it is unclear whether this share should refer to strict protection or protection that also includes less strict restrictions to human uses (Soulé and Sanjayan 1998).

domestic costs of protection in large-area industrialized countries, like the USA, Canada and Australia, and, furthermore, does not consider a contribution of the developing host countries according to their domestic benefits from protection.

The purpose of this paper is to provide a detailed economic description of the GEF as a multilateral mechanism of transfer in global protected area policies. The focus is on the allocation of GEF funds on different conservation projects as well as on the allocation of project costs between national and international financiers. Section 2 presents the analytic foundation for protected areas as an instrument for biodiversity protection and explains the rationale for an international financing of national protected area networks. The subsequent sections enfold the empirical analysis of the GEF expenditures on biodiversity conservation in general (Section 3) and on protected areas in particular (Section 4) using data from the GEF project database and official GEF project documents. Section 5 gives some concluding remarks.

A major result of the analysis is that financial resources provided within the GEF mechanism for funding of protected areas are not primarily directed to the expansion of protected areas but address improvements in the management of areas, which have already been legally designated. In this regard, the provided transfers do not play the role of compensations in that they directly balance foregone payoffs due to relinquished land uses. They primarily serve to purchase inputs for an effective management of natural areas, which, from a global perspective, therefore seems to be the scarcer input for biodiversity protection relative to natural areas.

2 Protected Areas, Transfers and Multilateral Co-Ordination: An Analytic Perspective

2.1 Natural Areas, Scarcity and Positive Externalities

In a broad sense, sites are considered as protected areas if they remain close to their natural state and undisturbed by human uses (van Kooten and Bulte 2000). Protected areas become an economic issue due to the scarcity of land, which is represented by competing uses for natural areas that host biodiversity. If there would be no profitable alternative uses, there is also no need to reallocate a natural biodiverse area from the land use that generates valuable ecosystem services. Otherwise, when there are competing land uses, some of these uses may not be compatible with biodiversity conservation and the flow of services may only be maintained by withholding the areas from certain human uses. Depending on the sensitivity of biodiversity to disturbances, this can include nearly all kinds of resource extraction or just a sub-set of land uses that appear particularly detrimental to biodiversity. In practice, appropriate conservation results in strictly protected areas like reserves or protected landscapes, which allow only for certain types of sustainable resource extraction[2].

Given a scarcity of natural areas, protected areas are apparently underprovided by private actors because of the public good properties of some of the ecosystem services, which protected areas can generate[3]. In particular, because of the

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[2] Protected areas often not only address *immediate* threats but also *potential* threats to ecosystem services. This is justified on the basis of irreversibility in the loss of biodiversity combined with the prevalence of ecological thresholds effects, i.e. nature may respond to human disturbances with a decline in provided ecosystem services which sometimes happens in an unpredictable and non-linear fashion (Perrings and Pearce 1994). To prevent disastrous losses of biodiversity, such fragile ecosystems are put under (strict) protection. In this regard, the assignment of protected areas is consistent with the precautionary principle of environmental policy.

[3] This holds for several ecological services like for example water purification, climate regulation, erosion control or the preservation of in situ-genetic information.

difficulties in controlling and excluding the use of these services by others, a private landowner who preserves his land in its natural state may not be able to appropriate substantial parts of the values his land provides. Other land uses that rather lead to a decline of biodiversity may therefore seem to be relatively more beneficial from his perspective. In effect, this discrepancy between privately appropriable values and social values results in an inefficient land allocation at the expense of biodiversity.

2.2 Domestic Protected Area Policies

To correct the allocation at a domestic level, policymakers can make use of command-and-control regulations or/and price-based instruments like taxes or subsidies respectively transfers. In addition, private landowners and beneficiaries of local ecosystem services may agree on transfer payments in return for biodiversity conservation.

Concerning *land use regulation*, public authorities may restrict the property rights, especially possessory rights of current landowners by enacting specific laws on land uses. Instead of trading property rights, regulations in this regard reallocate property rights without compensating the previous holder of the possessory rights. Nevertheless, for political reasons, the use of such an instruments by the authorities is often confined by legal provisions: Before restricting the rights, the authorities have to find convincing evidence that the concerning human uses are harmful to biodiversity and justify the intervention into the existing property rights (Polasky 2001).

In contrast to regulation by charges, *price-based instruments* leave the property rights untouched. These instruments aim at prices and costs that influence land use decisions of the landowners. They represent taxes but more often subsidies or transfers paid by the government to internalize the positive externalities from undisturbed natural areas. Parallel to programmes by governmental institutions,

private actors such as non-governmental organizations may also provide resources for transfers to landowners if they propose to forgo certain land uses.

When landowners show a utility- or profit-maximizing behavior, the setting that underlies the *transfer payments* can be characterized in the following way: Landowners choose among alternative land uses. Each type of land use provides a distinct bundle of outputs whereas the composition of the bundle varies among the land uses. With regard to conservation, typically two opposing stylized uses are considered– on the one hand, cultivation yielding only private goods like agricultural or forestry outputs and on the other hand, an environment-friendly production yielding marketable private goods and, as joint products thereof, ecosystem services which show public good properties (Ferrano and Simpson 2002). Private goods that are perceived to be compatible with the conservation of biodiversity are, e.g., eco-tourism, bioprospecting or specific non-timber forest products. In this regard, biodiversity conservation may not necessarily demand for a complete set-aside, but can be obtained by preventing some land uses, which are obviously not compatible with preservation.

Transfers are then provided to influence the private land use decision in such a way that relatively more natural areas are allocated to the biodiversity-friendly uses. When neglecting unconditional income transfers, these transfers can be designed in two alternative ways: First, they represent conditional payments to landowner who commit themselves to just forgo land uses that negatively affect biodiversity. If, for this reason, they choice a type of land use, which would otherwise not be payoff maximizing, the transfer payments can be conceived as a subsidy of natural areas as an input in the biodiversity-friendly production process. Second, transfers may not address natural areas directly but take the role of an output subsidy for the biodiversity-friendly productions or of a subsidy for inputs other than land (Ferraro and Simpson 2002). Examples for the

latter are capital transfers for the infrastructure that enables eco-tourism or transfer for facilities to the supply of genetic resources.

Considering the two described options for transfers schemes, Ferraro and Simpson (2002) have studied the relative effectiveness of both schemes. They conclude that for a given transfer amount, subsidizing the input that generates the positive externality, i.e. natural land, is actually more effective than subsidizing any substitutional input or the final output.

The creation of market incentives for biodiversity-friendly production on private lands crucially depends on whether there is a production process of a private good that can simultaneously contributes to the preservation of biodiversity in an adequate way – or to put it differently, whether it is possible to create markets for goods which are jointly produced with conservation (Heal 2000, Chilchilnisky and Heal 1998)[4]. If it this is not the case but ecosystem services generated by biodiversity show a positive net social value, protection can be achieved by fully compensating the private landowner for foregone revenues from his payoff-maximizing land use.

Transfers that are compensating for forgone payoffs are part of a contract between the transfer donor and the holder of the property rights, i.e. the landowner. They can be perceived as a price paid for purchasing ecosystem services as economic good that is generated by conserving a natural area. The remaining property rights on the area remain in possession of the present landowner who commits himself to the biodiversity-friendly management. If the duration of this contract is finite, it is uncertain what happens to a presently conserved land when the contract expires. Either a new contract may be

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[4] A question related to this is whether the private provision of biodiversity as a public good can guarantee conservation to the efficient extent. For the discussion of this aspect, cf. Heal (2003), Holm-Mueller (1998).

concluded or the landowner may decide to convert and thereby destroy the biodiversity endowments.

Addressing this aspect of long-term protection, the money that is used for compensation may alternatively be directed to the acquisition of the natural area, i.e. the resource stock that provides the relevant ecosystem services. Such a transfer of a land property title to an actor who intends to withhold the area from converting uses can take place among private individuals, in particular when natural areas serve as an input in the production of some marketable goods, or among private persons and public sector institutions.

Public sector engagement in the protection of natural areas and public landownership manifests in the establishment of national parks or nature reserves on public lands. As far as natural areas have not been traditionally in public hands, governmental authorities can expand their holdings of protected areas in two ways. First, property rights in areas that have so far represented open access resources and for which until recently competing uses have not prevailed can be redefine into be state property. Second, state authorities may acquire natural land from private landowners by either bargaining with them over a property purchase or by exercising their eminent power and by just taking the land property. In the case of takings, the authorities typically has to compensate the previous landowner. However, in contrast to bilateral bargaining, the state unilaterally fixes the amount of the compensation (Kaplow and Shavell 1999). From an efficiency perspective, both types of acquisition can have its advantages and disadvantages (for discussion, cf. Kaplow and Shavell 1999, e.g.).

State property is typically justified because of the undersupply of conservation in the market. Nevertheless, it does not necessarily represent the effective property institution to enable sustainable conservation. For example, local

communities often have customary use rights in natural areas that are proposed as protected public property. Restricting the use rights of such communities because of the expected negative impacts from resource extraction could on the one hand lead to political conflicts (Brandon and Wells 1992, e.g.). On the other hand, it is often argued that the support of the communities that live adjacent to protected areas is crucial for achieving effective long-term conservation (Ferraro 2002)[5]. Accordingly, the choice of the appropriate property rights regime is – aside efficiency aspects – driven by political aspects concerning the distribution of the economic surplus from previously undisturbed natural areas.

Efficiency valuations of property rights regimes take into account particularly transaction costs in enforcing land property rights. The existence of transaction costs also affects that conservation in an environment of relatively scarce productive land – no matter whether it is in private or public hand – is not done by setting aside biodiverse natural areas. Moreover, the access to the areas that are set-aside has to be controlled and guarded. Thus, in contrast to just foregoing

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[5] This aspects highlights the two opposing views in conservation policy that, in stylized way, can be described as follows:
On the one hand, human uses in biodiverse ecosystems is perceived as being incompatible with biodiversity conservation – independently on whether they represent traditional subsistence uses or industrial commercial uses. In this regard, biodiversity degradation is assumed to be mainly driven by economic growth and technological changes. Due to new (land use) technologies, previously unproductive and therefore unmodified natural areas become of interest for cultivation. Since natural areas generate public good-like ecosystem services that modified ecosystems do not, an inefficient degradation occurs. These driving forces work rather independently of any solution to the poverty issue.
On the other hand, restricting traditional human uses in biodiverse ecosystems is often considered as counterproductive to biodiversity conservation since conservation sometimes demands for human management. In addition, use restriction in one site may not effective since this increases the pressure on biodiversity in other sites. In sum, biodiversity degradation is supposed to be driven a large extent by scarcity natural resources and poverty. Due to increasing population and increasing food demands, landowners discount future benefits they would be able to receive from present sustainable land uses and choose land uses that are more productive in the short run but unsustainable in the long run, last but not least because of harmful impacts on biodiversity. In this regard, policies to conserve biodiversity have to fight the causes of poverty and alleviate poverty in the first place.

certain profitable uses, protection demands for ongoing management inputs to enable an effective provision of public good-like ecosystem services.

Protection as a type of land use on public land holdings, respectively the expansion of public protected areas, does not result from immediate market interactions; moreover, protected areas are designated by law whereas the decision on their establishment is ideally based on cost-benefit considerations of the government. For this purpose, domestic external benefits of protection that a private landowner would not be able to appropriate are typically taken into account. Costs accrue due to potential land purchases for newly established protected areas and due to purchases of the inputs for administering the (already) established network (James et al. 1999b).

National parks as entities of public protected areas may as well generate some revenues by selling some joint private goods, like tourism services. However, in practice, the administration entities hardly behave as profiting maximizing actors and potential revenues may not be sufficient for a self-financing of appropriate protected area measures. Moreover, in addition to park revenues, the administration is endowed with financial resources from public budgets to cover the costs for guarding and managing the protected area. Such endowments determine the quantity and quality of the provided flow of ecological services[6].

2.3 Cross-border spillovers and international financing of protected areas

When endowing the administration with financial resources, respectively when subsidizing biodiversity-friendly productions, domestic governments – as well as domestic non-governmental organizations (NGO) – typically only take into

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[6] As far as revenues can be obtain from managing publicly owned protected areas like national parks, some forms of private-public-partnership can be established in that private actors are contracted for the management of such areas in turn for the tourism revenues but without touching the underlying land property regime (Economist 2003).

account positive externalities of their policies that accrue within the own national territory. However, benefits of some ecosystem services in protected areas spread across national borders as well as it can be illustrated by non-use values and indirect use values of biodiversity. These cross-border or global externalities are systematically disregarded in domestic policies. Consequently, the resources, which governments provide for the protection in national boundaries, at maximum attain an amount that is efficient from a national view but that falls short of the amount that would be optimal from an international perspective.

To correct the allocation at the international level two specific characteristics have to be considered. First, since biodiversity is unevenly spread at the global scale, it is reasonable to assume that spillovers from biodiversity protection are unidirectional rather than multidirectional: spillovers flow from abundant developing countries to less abundant developed countries. Second, the described spillovers result from unilateral protection efforts. They represent international or global public goods that are produced as joint products of national efforts.

Given this background, the relative size of the domestic benefits is crucial for the gap between the level of protection that is efficient from the domestic viewpoint and the one that is internationally optimal (Anand 2004). For substantial gaps in some developing countries, transfers from international sources aim to reinforce protected area measures within the territories of these countries in excess of the domestically optimal level. At the international level, external benefits that more exclusively accrue to single developed countries can be distinguished from non-exclusive external benefits that accrue at the global level. Accordingly, transfers can be distinguished in bilateral transfers provided by a single donor country and multilateral transfers provided by a multilateral financing institution.

If international support in this regard leads to an expansion of conservation both in the spatial and qualitative dimension, it remains the question whether a globally efficient level of conservation is attained. In Deke (2004a), we show that several incentives problems among developing countries as recipients and developed countries as donors as well as among members of both groups, such as free riding (in the multilateral framework) or other strategic behavior due to irreversibilities or asymmetric information, can lead to a sub-optimal level of conservation.

Nevertheless, as far as international agreements on transfer payments exist, they by definition must satisfy the individual participation constraints for collaborating to internalize cross-border externalities. In this regard, these agreements actually represent Pareto-improving contracts. Compared to a situation without internalization at the international level, both contract parties, i.e. the host countries and the donor countries, have to experience an increase in well-being.

Considering the increase in aggregate well-being, meaning the surplus from international cooperation, the question is, how is this surplus divided among the involved countries. In this context, it is assumed that efficiency of cooperation, i.e. the effective maintenance of a representative global network of protected areas, and the distribution of the cooperation surplus is closely related to each other (Gatti et al. 2004).

In providing money for transfers, developed countries aspire to obtain as much conservation as possible for a given amount of mobilized resources. They can do so by offering a transfer scheme where the participation constraint of the developing countries is just met (Cervigni 2001, Nunnenkamp 1992). Under perfect information, this leaves the entire cooperation surplus for developed countries.

Developing countries in turn may not agree with this division of the surplus and refuse to cooperate on the basis of such a transfer scheme. Instead of this, they may insinuate that they will convert their natural areas and thereby irreversibly destroy biodiversity endowments, if the offer is not adjusted in a way that leaves them a relatively larger part of the surplus (Gatti et al. 2004, Sandler 1993, Mohr 1990). If developing countries can make a credible threat to reduce biodiversity conservation below current levels, i.e. the hypothetical domestic optimum, they have more bargaining power to enforce their aims in international cooperation relative to a situation where this threat would not credible.

Given these conflicting interests, it is predicted that strategic biodiversity destruction will actually continue on as long as endowments that generate cross-border externalities exists and an agreement is not yet reached. Consequently, the conversion process only holds if developed countries realize their relative disadvantage in the bargaining process and agree to offer transfers above the domestic costs of marginal conservation and thus provide a substantial surplus to the developing countries (Gatti et al. 2004, Sandler 1993).

Considering finally the design of the payment scheme in a transfer agreement, it is generally possible to compensate for the costs of conservation in excess of a given level of compensation, i.e. to compensate at the margin (Cervigni 2001, Øygard and Bromley 1998). Alternatively, transfers can be based on payments per unit, i.e. to compensate for the stock (Stähler 1996). Van Soest and Lensink (2000) show that under certain assumptions, effective long-term conservation can be best achieved if payment schemes combine positive transfers for the conserved stock and negative transfers for changes at the margin. Nevertheless, their findings as well as the one by Stähler (1996) refer to the preservation of renewable natural resources and not to a static stock of natural areas. Actually, undisturbed natural area as well as the stock of a renewable natural resource both serve as a proxy for the extent of preserved biological diversity in

biodiverse regions. Since we do not see how the latter can do better in this regard than the former, the derived implications on an efficient payment-scheme may need not necessarily hold for compensations in the context of protected areas.

Given this analytic background of positive externalities from protected areas and international transfers, we will empirically analyze an mechanism that facilitate transfers in this regard and that plays a dominant role in international biodiversity policy. This is the multilateral **Global Environment Facility (GEF).**

By analyzing the expenditures of the GEF on biodiversity, the following sections try to give on answers to the questions that have been derived in this section. After the allocation of resources within the GEF biodiversity portfolio is described in general terms, we study the questions, Whether the GEF support refers to private or public land property?, What biodiversity-friendly productions are addressed and how are local communities treated in this context?, How are the provided resources allocated between land acquisition for protected areas and protected area management?, What is the proportion between domestic and external benefits from support conservation activities?, How do bilateral and multilateral financing intertwine?, and What is the basis of the transfer flow and how is it organized in the temporal dimension? Given the results to these questions, Section 5 gives some concluding remarks

3 GEF Expenditures on Biodiversity Conservation

This section builds on the theoretical findings on positive externalities from biodiversity and protected areas. First, empirical facts about the GEF as mechanism of transfer in international biodiversity policy are summarized (3.1). Then, it is studied how funds for biodiversity conservation are allocated and in particular how many funds are directed to protected area policies. For this

purpose, the GEF's total expenditures on overall biodiversity conservation (3.2) and on specific project programmes as part of the GEF's operational biodiversity strategy (3.3) are described. As the study wants to focus on projects that address protected area measures and since projects are not classified in a specific operational programme, the relevant projects are separated as a subset of GEF biodiversity project portfolio in section (3.4).

3.1 The GEF in International Biodiversity Policy

Though GEF has been appointed as the CBD's mechanism of transfer, it is not confined to the issue of biodiversity but – as an international funding institution – serves several international environmental agreements. In the past, about 40% of total GEF funds have been directed to the focal area of biodiversity. Existing data show that after some volatility in the first years when the GEF itself and the link between the GEF and the CBD was established, the GEF has provided about US$ 200 million per annum. Furthermore, while the provided financial resources seem to be slightly but steadily increasing in the late nineties, this trend cannot be confirmed for the last years. After all, the GEF also sees itself in a catalytic role by making available additional resources for environmental protection but compared to other multilateral transfer mechanism like the Ramsar Small Grant Fund or the World Heritage Fund, it is definitely of outstanding importance in transfer-making policy (Deke 2004a).

To get an impression of amount that developed countries provide to support the preservation of global biodiversity endowments, the resources provided by the GEF have to be considered in connection with the resources provided by other multilateral transfer mechanism and bilateral funding (Deke 2004a, Harrison 2002, Lapham and Livermore 2003). The resulting total amount can then be compared with estimates on the costs of effectively preserving global biodiversity (cf. Balmford 2003, Lewandrowski et al. 1999, James et al. 1999a).

When neglecting for a moment that biodiversity conservation includes measures other than protected area management and considering recent estimates on financial needs for establishing a representative and effective network of protected areas, it is shown that currently transferred resources can only cover a marginal share of the estimated total management cost. Moreover, even the sum of current transfers and the domestic resources invested in protected area systems in developing countries cannot guarantee an effective management of existing systems.

This shortfall of financial means may be attributed one the hand to policy failures within developing countries, where, e.g., management entities in protected areas are not properly endowed with resources to fulfill an effective monitoring and control of existing protected sites or where enacted taxes or subsidies create incentives for non-sustainable local resource uses. On the other hand, incentive problems in international cooperation can be made responsible for that not enough resources being available to support protection measures in developing countries in excess of domestically optimal levels (Deke 2004a). The latter particularly holds for free riding behavior among developed countries in providing resources for transfers[7].

With respect to an analysis of GEF expenditures, this implies that it cannot be expected that the GEF in its current form will be able to guarantee an effective management of a global network of protected areas. Moreover, the success of the GEF depends on several other factors like rational domestic policy in the developing countries that receive GEF grants or the size and direction of associated bilateral co-financing. Nevertheless, besides these factors, it may not be ruled out that changes in the present institutional structure of the GEF, in particular in its funding activities, may strengthen effectiveness of international

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[7] We study the financing of the GEF in another paper (Deke 2004b).

protected area policy. The following analysis aims to provide a better understanding and additional information on this issue.

3.2 The GEF Biodiversity Project Portfolio

The support of the industrialized countries in the GEF framework has so far mainly taken place in the form of financial payments. Transfers by the GEF are generally based on a medium term contract between the host country represented mainly by public sector authorities and the international donor community represented by the Implementing Agencies, i.e. the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), or the World Bank. Generally, the subject of the contract are activities enforced by domestic as well as international agents that are summarized in projects.

For the empirical analysis of these projects, two data sources on project funding are used: The GEF "Project Tracking System" and the World Bank "GEF Database"[8]. The World Bank database is basically confined to GEF biodiversity projects that are implemented by the World Bank. Consequently, this database contains less project entries than the GEF database (179 relative to 603 project entries). Nevertheless, the World Bank database provides additional information on the co-financing of projects by the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) that are not available in the GEF database[9].

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[8] Downloads from the GEF Project Tracking System (http://www.gefonline.org/home.cfm) and the World Bank GEF Database (http://www-esd.worldbank.org/gef/) were made in January/April 2004.

[9] Comparing the data on the single projects that are contained in the GEF database as well as in the World Bank database, for most projects the presented numbers on total project cost and the GEF grant amount are fairly identical. Only for a few projects, the indicated

With respect to the co-financing, the GEF database only distinguishes two types of funding sources: the GEF grant and the remaining "cofinancing". There is no further information about whose financial contributions are compiled in this aggregated item, i.e. which countries or institutions provide co-financing[10]. Potential World Bank payments but also payments from bilateral foreign sources and from domestic sources of the host countries are obviously contained in this item. World Bank payments are presumably completely described by the World Bank's own database. Here, only 32 projects of all GEF biodiversity projects show a co-financing by either the IBRD or the IDA. Detailed information on other co-funding sources of the projects is also lacking.

The data from both sources refer to GEF biodiversity projects that have been approved during the period of 1991 to 2003. Results from a straightforward descriptive analysis with these data is presented in Table 1.

Considering the 603 projects in the GEF database, the costs of all projects together amount to US$ 4.87 billion. Grants, which have been provided by the GEF, recover US$ 1.62 billion or 33.3 % of the aggregated project cost. The aggregated funding by domestic sources and international donors other than the GEF amounts to US$ 3.25 billion. As it is indicated in the World Bank database, the World Bank, i.e. the IDA and the IBRD, altogether provide US$ 638.6 million of the co-funding for these projects.

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numbers differ between the two databases. For the further analysis, we use the GEF data in case of inconsistencies.

[10] In most projects, the sum of the GEF grant and the "cofinancing" amount equal the total project cost.

Table 1: Costs and Provided Financial Resources for GEF Biodiversity Projects

Data Base		GEF database (603 entries)	World Bank database (179 entries)
Project cost	Project costs in US$M	4867.2	2873.8
Project financing	GEF amount in US$M	1618.6	838.9
	Total co-financing in US$M	3248.5	2034.9
	IDA co-financing in US$M *)	n/a	336.5
	IBRD co-financing in US$M **)	n/a	302.1
Cost recovery	Cost recovery by GEF	33.3%	29.2%
	Average cost recovery by GEF	69.8%	57.5%
	Cost recovery by the World Bank	n/a	7.6%
	Average cost recovery by IDA*)	n/a	45.3%
	Average cost recovery by IBRD**)	n/a	35.6%

Note: Projects have been approved during 1991 to 2003. US$ M is million US$.
*) 17 projects with IDA funding **) 15 projects with IBRD funding.
Source: GEF project data base, own calculations.

The cost recovery as the share of GEF grants in aggregated project costs represents a first key figure at the aggregated level. It can be contrasted to the mean of the GEF share in funding of individual projects. This average cost recovery by the GEF (69.8%) is more than twice the GEF's share on total cost recovery (33.3%). Apparently, the cost recovery by the GEF is quite large for a lot of small scale projects but comparatively low for projects of a larger scale.

3.3 The GEF Operational Strategy and Expenditures on Biodiversity Conservation

The funding of projects by the GEF is based on a specified operational strategy that is the same for all focal areas. The elements of the strategy are *Operational programs*, *Short-term measures* and *Enabling Activities*. For the biodiversity focal area, four Operational Programs (OP) are of concern. Each of them addresses a different type of critical ecosystem: *Arid and semi-arid zones*

(OP 1), *coastal, marine, and freshwater resources* (OP 2), *forests* (OP 3) and *mountains* (OP 4) (GEF 2003a)[11]. Projects funded under these Operational Programs represent the core of the GEF's biodiversity portfolio. Short-term measures add some flexibility to the strategy since they support activities which are not part of an operational program but which are favorable as they are overall cost-effective and address urgent needs for or promising opportunities of conserving biodiversity. An example for such short-term measures are protection and rehabilitation activities after the Galapagos Oil Spill in January 2001. Enabling Activities aim at assisting developing countries in establishing national strategies and plans to preserve their biodiversity endowments. Aside policy analyses and the development of conservation strategies and actions plans, Enabling Activities include measures on inventorying, compiling and disseminating the information which is relevant for essential communication on the national and international level. Capacity building as a potential follow-up to Enabling Activities will then be covered by Operational Programs (GEF 2000, GEF 2003b). The projects that are funded as part of one of the three strategy components belong to one of three specific project types: Regular or *Full-Size projects*, *Medium Size projects* and *Enabling Activities*[12]. The type of the project is generally correlated to its size. The GEF's grant for Medium Size projects must not exceed US$ 1 million. For Enabling Activities, the maximum size of the GEF grant is US$ 450,000. Furthermore, also the procedures of processing and approval vary among the project types.

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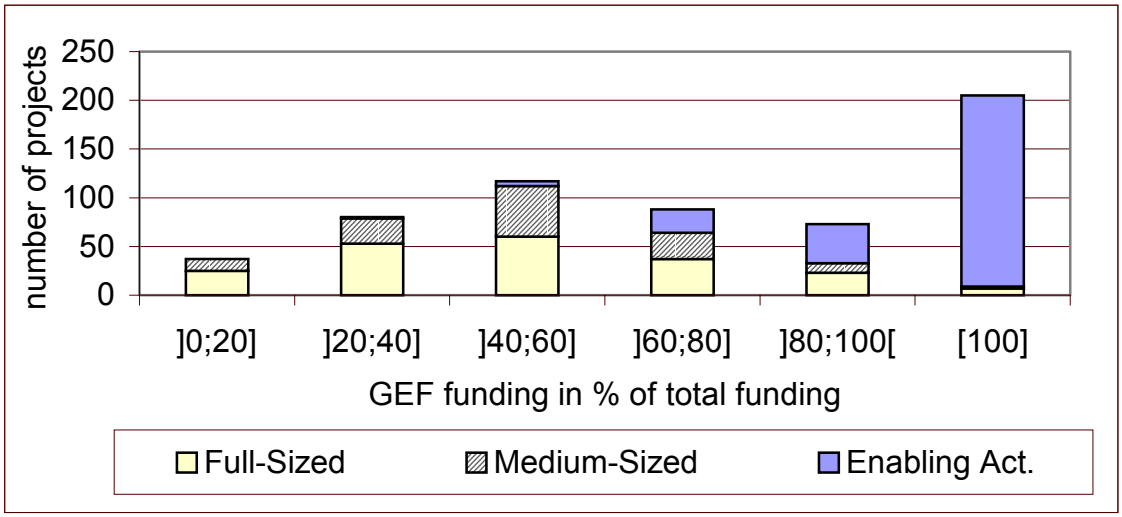
[11] Recently, "*Conservation and Sustainable Use of Biological Diversity Important to Agriculture*" has been introduced as a new operational program for the biodiversity focal area (GEF 2003).

[12] Hence, Enabling Activities constitute both a project type and a component of the GEF biodiversity strategy.

Figure 2: Recovery of Project Costs by GEF Grant for All GEF Biodiversity Projects



Source: GEF project data base, own calculations.

Figure 2 that shows a density distribution for the percentage share of the GEF's grant relative to the projects' total cost also confirms this. The right column in the figure indicates that for more than 200 of all 603 projects, the GEF covers the complete project costs (100%). However, these completely funded projects are small sized Enabling Activity projects. Neglecting projects of this type, the figure further implies that average funding by the GEF for the remaining projects is on average about 50% with a substantial variance across the projects. These projects represent Medium-size and Full-size projects. The later can even amount to project cost of about US$ 100 million. Comparing these figures with the derived average cost recovery it is implied that such larger scale projects have substantial funding from sources other than the GEF.

As shown in the World Bank database, only 17 GEF biodiversity projects show an IDA co-financing, which altogether amounts to US$ 336.5 million, respectively only 15 GEF biodiversity projects have some funding by the IBRD

that altogether amounts to US$ 302.1 million[13]. On average, these payments cover a significant share of 45.3% of total project cost in projects with IDA participation respectively 35.6% for projects with financial contributions by the IBRD[14].

Besides the sources for providing financial resources for biodiversity conservation, the data show to some extent how the raised resources are allocated at the global level, i.e. the distribution among projects in different countries or regions. Table 2 summarizes the results for the allocation of the financial resources among the five continental regions that are classified in the GEF databases.

Table 2: GEF Biodiversity Projects and Their Regional Allocation

	Latin America & Caribbean	Africa	Asia	Europe & Continental Asia	Global & Regional
Projects	158	202	153	70	20
Total Project Costs	1765.18	1416.75	1076.21	312.44	296.44
GEF amount	524.89	445.69	388.83	136.83	122.31
Co-financing(US$M)	1240.29	971.06	687.39	175.61	174.13
IDA amount (US$M)	10.00	255.40	57.90	13.20	0.00
IBRD amount	95.50	0.00	182.6	1.00	25.00
Average funding share of the GEF	63%	76%	67%	77%	56%

Note: Projects have been approved during 1991 to 2003.

Source: GEF project data base, World Bank data base, own calculations.

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[13] Note that, although the World Bank functions as the implementing agency of all 179 projects in the database, only a small number of these projects actual receive money from the World Bank. Furthermore, in contrast to the grants provided by the GEF, World Bank payments often represent loans that have to be repaid by the recipient countries in which the funded project activities take place.

[14] It has to be noted the World Bank has financed many actions outside the GEF portfolio. According to World Bank, funding for biodiversity in 226 projects has been provided over the past years. The total funding by IBRD and IDA in this regard amounts to about US$ 1.0 billion (World Bank 2004).

The figures show that more than US$ 1.7 billion is invested in Latin America and the Caribbean within the considered period. A comparatively smaller size is indicated for Africa (US$ 1.4 billion) and for Asia (US$ 0.8 billion). The composition of this project funding varies among the regions: For Latin America and Africa, the GEF recovers about 30% of the aggregate project cost. Both regions show a comparatively high share of funding from sources other than the GEF and the World Bank (about two-thirds in Latin America and 50% in Africa), which is a sign of relatively strong bilateral assistance and/or domestic efforts in biodiversity protection. For Africa, the IDA plays a relative important role in funding and recovers nearly about 20% of the aggregated project cost. In Asia, the GEF finances about one third of project activities, and the World Bank (primarily IBRD) more than one fifth of it. The remaining financiers cover only about 40% of Asia's aggregate project cost. Europe and Continental Asia show the highest relative GEF funding (more than 40%), though the funding in absolute numbers is the smallest among the regions. The World Bank provides funding for less than 5% of project activities[15].

In summary, the results of this first descriptive analysis of the GEF provide information on the total size of resources that are employed to conserve biodiversity within the multilateral framework of the GEF. Furthermore, the numbers give only some information on how these resources have been raised – more specifically how much the GEF and the World Bank as multilateral institutions contribute to the funding of the protection activities. Unfortunately, there is no information on the contribution of host countries on whose territories the projects are implemented. This point is of particular interest since host countries receive benefits from protection measures, which are enforced on their

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[15] For completeness, the last column covers projects which are not assigned to one specific regions but to cross-regional activities as well as activities at the global level.

territory in excess of domestically optimal levels, and therefore might participate in the funding such incremental project activities[16].

3.4 Distinguishing Protected Area Projects from Other Biodiversity Projects

Unfortunately, the previous analysis provides only little information on how precisely the raised financial resources have been allocated. The categories of the provided information only enable a distinction of the recipients by country or by continental regions. Furthermore, little is said about specific conservation activities in the single projects. This is of importance though, since the analysis is concerned with the role of the GEF in funding protected areas generating biodiversity services as global public goods, and protecting biodiversity can often also be achieved by means other than strict protection and relinquishment of land development. To get a more precise picture about the use of protected areas as a particular policy instrument, ideally projects should only be considered if they aim at the establishment and management of such areas.

For classifying GEF projects with respect to the implemented conservation instruments, additional and more detailed information is needed. This information is partly contained in official project documents published by the Implementing Agencies. These documents are publicly accessible for the majority but not all, of the approved projects. For this reason, the sample of projects to be used in the following analysis is adjusted by excluding the projects, which predominately apply to other instruments than the protection of

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[16] Furthermore, the more detailed information in official project documents indicate that the gap between multilateral funding by the GEF and the World Bank on the one hand and the total project cost on the other hand is not necessarily closed by domestic actors. Moreover, in certain cases international bilateral donors as well as other multilateral donors provide funding.

natural areas. The data for the remaining projects in the sample is augmented by information from the project documents.

The sample of projects is adjusted in the following way: First, all Enabling Activity projects are excluded from the sample since these projects often serve the national biodiversity policy of the host countries' in its entirety and the contribution to efforts in protected areas cannot be isolated[17]. In addition, all projects of the GEF Operational Program 13 are excluded, since this program predominantly addresses 'agro-ecosystems' and thus is generally more concerned with the management of already modified ecosystems. In the next step, those projects that indicate keywords like 'protected areas', 'National Parks' or 'Biosphere Reserves' in the short project description provided in the GEF and World Bank databases are identified and kept in the sample. For classifying the remaining biodiversity projects, a decision is made on a case-by-case basis using information presented in the accessible project documents[18].

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[17] Note also that the costs of Enabling Activity projects are significantly lower in comparison to the costs of Full Size or Medium Size projects in the GEF Operational Programs 1 to 4.

[18] As it is illustrated in the project documents, there is typically a multiplicity in activities and addressed issues in the individual projects. To structure the different tasks, activities in GEF projects are typically subsumed under four to five project components which themselves may be divided into several subcomponents. Each component addresses one or several specific tasks in biodiversity conservation. Given the described procedure for the classification, projects are included in our sample whenever protected areas seem to be involved in at least one project component. The project is then considered with its full project cost and funding.

It has to be noted that taking into account the entire project implies that also all implemented actions in the projects are considered. This fact can lead to some distorting effects since protected area measures may constitute only a fraction of the entire bundle of project actions. Including those that are not explicitly related to the protection lead to an overstatement of the extent of protected area measures in the GEF project portfolio. Nevertheless, this procedure seems to be the only tractable way for a classification since detailed information on the funding of components is not available for all projects and since it is often hardly possible to unambiguously distinguish components that refer to protected areas from those components that do not.

Finally, it has to be noted that several project documents indicate that funding by the GEF or by other donor institutions may vary among (sub-)components within a project. Some

In this context, funded activities, which aim at protecting biodiversity in natural areas and which therefore should be included in the sample, have to be separated from actions that help to conserve biodiversity in a general way or more specifically in (sustainably) managed or already modified ecosystems. To accordingly separate the projects, information from the "Guidelines for Protected Area Management Categories" by the World Conservation Union (IUCN) is used (IUCN 1994). These guidelines provide criteria for the definition of protected areas and categorize them in different types. If the criteria for the six core categories of protected areas are found in the proposed actions of a project, this project is considered for the further analysis. Furthermore, strictly protected core areas are typically surrounded by areas, which are protected to some extent but where also some sustainable resource extraction is allowed. In addition, "biological corridors" are sometimes established on partly managed lands, which is located in-between protected areas. If a project refers either to buffer zones or to corridors in the context of strictly protected areas, this project is included in the final sample.

Following the described procedure, the sample of projects for the analysis reduces to 262. Total costs of these GEF projects that are related to protected area measures are US$ 3.9 billion. The GEF's share on the funding of these projects comprises US$ 1.28 billion. Project documents are publicly available for 237 of them.

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components are partly or even completely financed by GEF, other components do no show any GEF funding. However, it can be observed that those projects components that refer to protected areas typically have some or even very substantial GEF funding.

4 Analysis of GEF Funded Protected Areas Projects

Given the adjusted sample of GEF funded protected area projects, this section investigates in more detail the size and the character of natural sites that are underlying the projects (4.1). Furthermore, the project activities taking places with in these sites are studied (4.2) and as well as who are the financiers of these activities besides the GEF (4.3). The subsequent Section (5) summarizes the empirical findings.

4.1 Natural Areas as Proposed Project Sites

In this section, it is studied how the provided resources are invested, in particular what kind of natural areas are put unter newly estabilished or reinforced protection. The protected natural areas in the projects can be categorized with respect to biological or geographical criteria as well as with respect to economic criteria like property right regimes and tpyes of human uses. As mentioned in section (3.3.), GEF biodiversity projects are basically assigned to four different operational programs which refer to broad biological and geographic characteristics (cf. Table 3).

Table 3: GEF Biodiversity Projects and Their Allocation Across Operational Programs

Operational program	Projects	Total Project Costs (US$M)	Share of total GEF grants
Arid & Semi-Arid Ecosystems	47	762.08	17%
Coastal, Marine & Fresh Water Ecosys.	77	823.20	24%
Forest Ecosystems	101	1861.99	43%
Mountain Ecosystems	25	253.14	10%

Source: GEF project data base, own calculations.

Looking at how the 262 identified protected area projects are allocated across these categories, it turns out that the majority of the projects (101) is assigned to "forest ecosystems", which amounts to an aggregated total project size of US$ 1.862 billion. 43% of the GEF grant size for the subset of the identified projects is spent on measures in forests. The funds for "Arid and Semi-Arid Zone Ecosystems" (47 projects) and "Coastal, Marine, and Freshwater Ecosystems" (77 projects) amount to US$ 762 respectively 823 million. However, about 24% of the GEF grant resources are allocated to marine ecosystems while a smaller share of about 17% is directed to actions in ecosystems in arid climatic zones. "Mountain ecosystems" are addressed in 25 projects. The aggregated total project size is about US$ 253 billion which represents about 10% of the GEF funds that is allocated to the identified projects[19].

In summary, the numbers show even though the GEF grants are diversified across the different types of ecosystems, a strong focus is put on forests. From this, it can concluded that either forests generate substantial parts of global benefits from biodiversity or that the GEF project approach is most suitable for funding activties in forest ecosystems. Furthermore, GEF projects not only address terrestrial ecosystems but also provide funding for marine ecosystems within the sovereign territory of recipient countries. Marine areas outside national territories, for example at the High Seas, are not addressed within the GEF project portfolio.

Though specific natural areas represent an integral part of the identified projects, no evidence can be found that the size of the area or the stock of biological resources that the area hosts serves as a basis for the size of the provided GEF grant. Moreover, the grant amount is derived from an incremental cost

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[19] The remaining 12 projects, these are the so called "Biodiversity short term measures" make for aggregated costs of US$ 194 million.

assessment, which includes multiple types of benefits and costs from biodiversity conservation. Accordingly, payment schemes that refer to the stock of a biological resource like they are suggested by economic theory (cf. Section 2) are not applied in the GEF projects[20].

With regard to the land uses and land tenures in the project sites, it can be observed that areas of various types of landownership are involved in the projects.

Concerning marine ecosystems, these often represent commonly owned resources with certain access regulations. Conservation in these cases aims at a change of use rights, in particular for fisheries. Concerning terrestrial ecosystems, a lot of projects address national protected area systems, which to a large part consist of natural areas that are owned and administered by the public sector. The building blocks of such systems are "national parks". These parks often comprise a core area that is strictly protected and a surrounding buffer zone where the local population is permitted to extract resources for subsistence. Several other projects support government initiatives to protect biodiveristy on private lands. Empirical evidence can be given, for example, for the "Eco-markets Project" in Costa Rica or the project on "Private Lands Mechanisms for biodiversity conservation" in Mexico. These projects implement mechanisms that provide payments to private landowners for environmental services. In Mexico, for example, these mechanisms are particularily applied to establish

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[20] There are some examples where consolidating populations of species in the project site is named as one of serveral aspired project outcomes (Project on "Poison Dart Frog Ranching to Protect Rainforest and Alleviate Poverty" in Peru) respectively where species populations are used as one indicator for an ex-post project evaluation ("Integrated Conservation of Priority Globally Significant Migratory Bird Wetland Habitat" project in Kazakhstan). However, following the incremental cost principle, the project documents shown that the size of the grant is related to overall cost figures from a bundle of measures that aim at maintaining global benefits.

conservation corridors on private lands that connect state-owned strictly protected areas.

This type of sub-contracting for private conservation is regarded as an appropriate instrument for conservation depending on the needs to protect certain biological species or ecosystems and on the extent to which private landowners already take care of the environment. Often this type of community-based conservation strategy is chosen to avoid potential conflicts on land property rights by maintaining traditional property rights of indigenous people, as it has been claimed in the project on „Indigenous Management of Natural Protected Areas in the Peruvian Amazon“.

As mentioned, the considered GEF projects typically contain several components that address different types of conservation activities. In this regard, it can also be observed that a number of protected area projects comprise actions in different systems of land tenure, like the Colombian project on “Conservation and Sustainable Use of Biodiversity in the Andes Region” or the “Jozani-Chwaka Bay National Park Development Project” in Tanzania. The latter includes actions on “community-based natural resources management” where communities adjacent to the park “are committed to, and empowered to manage and benefit from their own natural resources”. Because of the mixture of the involved land tenures (which is also often not explicitly described in the projects documents), the GEF-funded activities cannot be distinguished or categorized unambiguously according to the types landownership. Therefore, a systematic analysis of the proportion of public land tenure to private or communal land tenure is not possible.

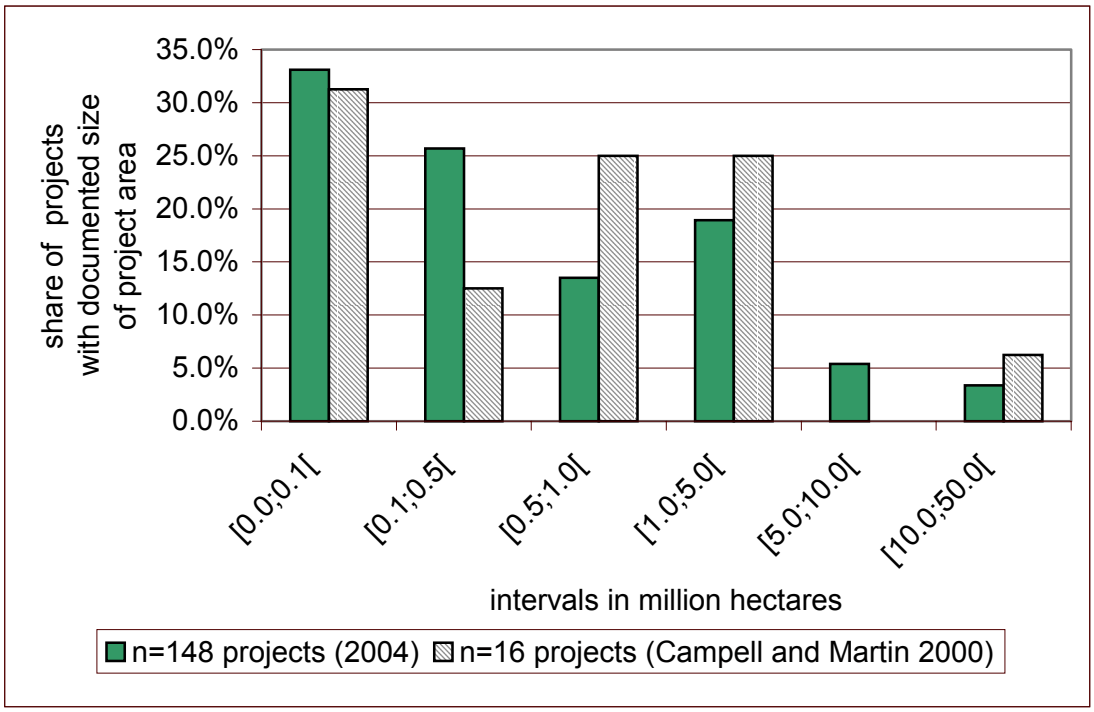
Furthermore, the multiplicity of project activities also inhibits the identification of the degree of protection that is aspired and thereby of the human uses which are excluded in the project sites. Such different degrees of protection are

identified by the ICUN categories of protected areas (IUCN 1994). Referring to these categories, James et al. (1999b) has argued that in developing countries, strictly protected areas of category I are mostly unhabitated areas and that "exclusion is felt most acutely in II, III and IV areas". In this regard, it is interesting that some projects consider resettlement like in Benin or in Uganda, which in some respect may indicate that a high level of protection is aspired. By contrast, in other projects like the one in the Colombian Andean Region, resettlement is strictly avoided due to political reasons. In this latter case, natural areas serve as multiple use protected areas or V and VI areas, which allow resource uses for the local inhibitants. Considering the identified protected area projects, it is, however, not feasible to unambigously assign IUCN categories of protection to each of them. This is not only because projects often bundle actions on strict protection with community-based conservation activities but also due to the fact that project sites often represent protected areas of different categories that are contiguous in the sense that one category nests within another (IUCN 1994).

Finally, we are interested in the total size of natural areas that have been put under some kind of protection. For this purpose, the available project documents are screened for reliable information on the size of the project areas. It turns out that apparently some projects focus on actions at a specific and clearly definied site while other projects rather address a general program with a more broadly defined geographically scope. Out of the 262 projects, information on the project area is available for 149 apparently more site-specfic projects. The sum of identified project areas in these projects is 426.7 million hectares. 19.3 million hectares can be identified as strictly protected areas, about 5.1 million hectares rather represent managed buffer zones. For the rest, a distinction is not possible.

Area sizes reach from less than 200 hectares for an island in Mauritius to more than 45 million hectares for sites in the Algerian desert. On average, a project covers a total area of about 1.5 million hectares[21]. Nevertheless, for more than half of the considered projects, the project area is smaller than 500 thousand hectares, respectively more than 70% of the project areas cover less than one million hectares. This is shown in the Figure 3, which shows the distribution of protected area sizes. For a comparison, the striped columns in the figure represent data from an earlier analysis on 16 project sites in the GEF biodiversity portfolio presented in Campell and Martin (2000).

Figure 3: Frequency Distribution with Respect to the Size of Project Areas (n=148)



Source: selected GEF project documents , Campell and Martin (2000), own calculations.

[21] For calculating the mean value, hotspot areas underlying the Critical Ecosystems Partnership Fund (CEPF) are considered as outliers and are not taken into account.

In most cases, project sites have already been legally assigned as protected areas before the projects is implemented. For 55 projects, though there is some evidence that the proposed actions involve newly established protected areas and thus lead to an expansion of the national system of protected areas. In this respect, it has to be defined when a previously unmanaged natural area actually represents a protected area. A World Bank project appraisal document in this context defines that a protected area shall be considered as protected once certain benchmarks for the legal creation of the area and for the establishment of a basic management capacity are met.

Applying this definition to those projects which address expansion, it can be observed that newly established protected areas often refer to the second component of protection, i.e. guarding and managing the area. This result corresponds to recent observations on poorly managed parks. It is observed that biodiversity in such environments as well has to be considered as threatened, which implies that designing protected areas alone is not sufficient for effective protection (Stolton and Dudley 1999)[22]. Depending on the specific conservation needs and the relative costs of conservation, a way of efficient protection could therefore be to allocate relatively more funds to management tasks than to a spatial expansion of natural areas under protection.

Nevertheless, some empirical evidence for an expansion of the national system of protected areas can be found. The size of the expansion can be identified for 23 projects and ranges ranging from some 1,000 hectares to 12.6 million hectares[23]. Furthermore there are typically two channels in which an expansion

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[22] An example that illustrates this is the "Biodiversity Conservation in the Azov-Black Sea Ecological Corridor Project" in Ukraine. The project area has already been assigned as a RAMSAR site in the past, but it is assumed that the area is not effectively managed without the GEF support.

[23] When again the project with the largest expansion is regarded as an outlier, the mean value for size expansion is some 400 thousand hectares.

occurs. On the one hand, natural areas, apparently private property, are purchased to integrate them in the public protected area system. Evidence on land acquisition is found for several projects like the "Choco-Andean Corridor" project in Ecuador, the "Biodiversity Conservation" project in Argentina, the "Cape Peninsula Biodiversity Conservation Project" in South Africa or the "Protected Areas and Wildlife Conservation Project" in Sri Lanka. On the other hand, unmanaged open access areas or "unclaimed government lands" like in the "Amazon Region Protected Areas Project" in Brazil is legally declared and managed as protected areas[24].

Considering projects that envisage land purchases, it is interesting to know whether the funds tha are used for the acquisition of natural areas are actually provided by the GEF so that the GEF indeed serves as a multilateral mechanism that provides direct compensations for relinguishing land development. The documents of the relevant projects indicate though that whenever additional natural areas are purchased for protection, it is mainly the domestic government or some local NGO who carries out the transactions of land property titles[25].

However, project funding from foreign sources can be regarded as a direct compensation in a broader sense if it replaces domestic funding so that domestic funds can be reallocated and used for land purchases. For identifying this impact of foreign funding, one needs to know what actions would have been undertaken also without GEF support. Information on such a domestic benchmark relative to a GEF supported project alternative is given in the Incremental Cost

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[24] An example from the "Biodiversity Conservation Project" in Boliva can illustrate this point: on the project site that represents a proposed national park, commercial uses have once been exercised but than been abandoned due to lack of profitability – "A small part of the area has been divided into logging concession, however, the isolation of the region, and the lack of access to high value trees has led to the area being abandoned by the timber companies." (cf. project document).

[25] This is primarily due to the fact that – for political reasons – these titles are seldomly transferred across national borders (Swanson 1999).

Assessment in the project documents. In 23 of the identfied projects, a spatial expansion of protected areas is presumably an integral part of the GEF project alternative that would not have been reinforced to the same extent in the benchmark. For the remaining projects, the acquistion of land for biodiversity conservation is completed under the domestic benchmark or information for a distinction is incomplete. For the “Biodiversity Conservation Project” in Argentina, figures on area expansion as well as on expenditures for area acquisition are given. The ratio yields a price per hectare of US$ 4.7. Similarly, for the “Sustainable Protected Area Development in Namaqualand” Project in South Africa, a gross land price of 17.95 US$ per hectares can be calculated which, however, includes the costs for zoning. Futhermore, in another Argentine project "Management and conservation of Wetland Biodiversity in the Esteros de Ibera", private landholdings are acquired at a price of 50 to 100 US$ per hectares to establish protection areas. All these examples represent cases where apparently marginal and less productive land is considered for the expansion of protected area networks.

4.2 Protection Measures as Proposed Project Actions

If only minor financial resources provided by the GEF are used as compensations for forgone revenues from land uses other than conservation, it has to be investigated what activities are actually financed by the GEF. In this respect, the documents for some projects contain a Project Checklist, which serves as a pattern to categorize actions that are addressed in the projects and that thus potentially receive funding from the GEF for generating global externalities. The Checklist is generally a non-mandatory but recommended element of a Project Brief Document for Medium Size projects. It is available for 33 projects. Furthermore, four Full Size projects contain Project

Categorization Sheets, which have a similar structure as the Checklist and are therefore included in the analysis.

In the Checklist, the applied measures are distinguished in eight *Project Activity Categories* plus seven *Technical Categories*. Given the data for 37 projects, it is first studied how frequent each Categories applies. In each project, multiple categories can apply. Considering first the *Project Activity Categories*, it turns out that – aside from Protected Area Zoning/Management – Inventory/ Monitoring is most frequently addressed (84%). In addition, Ecotourism (76%), Buffer Zone Development (68%) and Benefit-sharing are common measures. By contrast, measures on Agro-Biodiversity (43%) and Trust Funds (11%) are addressed in less than half of the cases.

Turning to the *Technical Categories*, it is observed first that Awareness/ Information/Training is addressed in nearly every project. Further technical support is apparently focused on Technical/Management Advice (92%) as well as on Institutional Building (89%). Furthermore, Targeted Research is applied in 57% of the projects. By contrast, Investment (43%) and Technology Transfer (41%), which seemingly demand for a larger input of physical capital are only part of the actions in few cases.

In a subsequent step, the different profiles of the Project Activity Categories and Technical Categories are compared to identify possible complementary or substitutional relationships among the various actions. For this purpose, the binary checklist entries for individual categories are summarized to one-dimensional arrays and the Pearson correlation coefficient among the arrays is calculated. The matrix of the coefficients is presented in Table 4.

A statistical testing on the basis of the calculated coefficient cannot be performed since the checklist entries do not represent normal distributed variables. We therefore interpret the correlation results as suggestive

implications on the relationship between any Category (X) and Category (Y). As the correlation among the categories is quite low in most cases, there is obviously no unique pattern for actions in the considered projects. The establishment and management of the protected areas thus seems to demand for a bundle of measures whose composition depends on the specific ecological and socio-economic surroundings of the project site.

When studying the single categories with respect to their linkage to the other applied categories, Buffer Zone Development are apparently complementary to Protected Area Zoning/Management. Furthermore, Institution Building shows complementary relationships to Inventory/Monitoring and Policy Advice. Rather weakly pronounced linkages are also shown between Inventory/Monitoring and several other technological categories. Substitutional relationships are found for Trust Funds and Awareness/Information/Training respectively for Investment and Agro-Biodiversity. In sum, these results however give only few reliable evidence on general technological relationships of protection in the considered projects.

Concerning these results, some caveats have to be mentioned: First, it is unclear what set of criteria proposed project actions must fulfill for a specific category to apply. The GEF guidelines on project documents do not define such criteria so that the Checklist assignments may be arbitrary. Furthermore, the sample of Checklists mainly refers to Medium Size projects, which reverses the proportion relative to Full Size projects that is observed in the study sample. The latter type of projects typically requires a relatively larger size of financial resources, as it has been described in Section (3.3.). In this respect, the results may be biased against actions that include large scale investments that cannot be an element of Medium Size projects due to restrictions on the maximum size of this project type.

Focusing on the issue of investments in the projects, additional information can be found in another part of the documents: For 40 projects, total project costs are broken down into *investment costs* and *recurrent costs*. Though again, these two categories are not explicitly defined, some documents provide insights on the activities that are subsumed under each of the two items: According to these documents, investment costs comprise costs for infrastructure development, technical assistence, vehicles and equipment, but also for training, civil works, research and surveying, and costs in the context of international cooperation like expenditures for regional meetings, travel and consulations. By contrast, recurrent costs represent costs due to incremental salaries, vehicle operations and maintenance, subsistence and travel allowances.

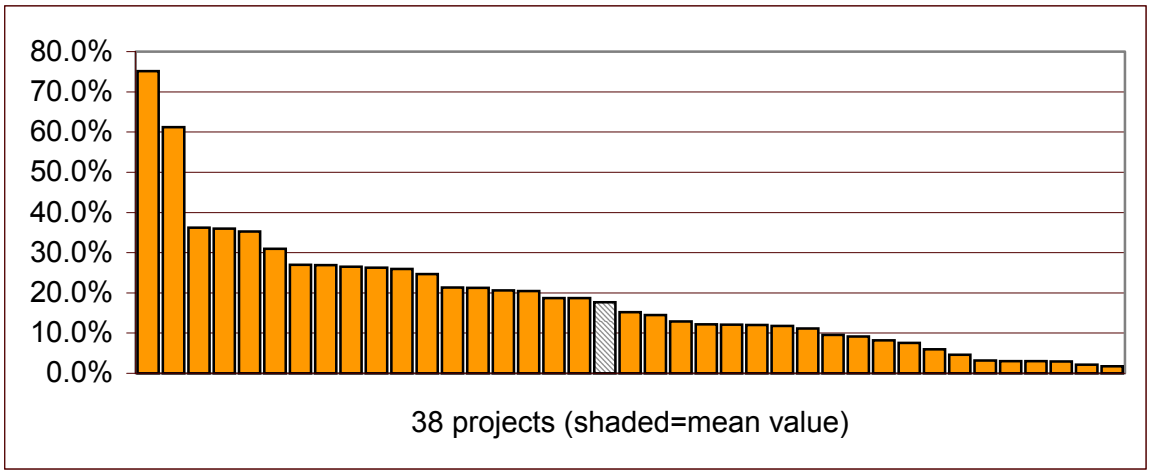
In these examples, ‘investment costs’ seem to include investments in human as well as in physical capital while in the Checklists, the Investment category likely refers to physical capital in the first place. Furthermore, the described distinction of costs also defines actions with respect to the temporal occurrence of the costs they cause. Investment costs primarily occur at the beginning of a project because of project setup actions. Recurrent costs are caused by the demand for recurrent inputs in the management of a protected areas over time.

Table 4: Matrix of Pearson Correlation Coefficient for Entries in Project Checklist (n=37)

Correlation (n=37)	PA zoning & managemt.	buffer zone development	inventory/ monitoring	eco-tourism	agro-biodiversity	trust funds	benefit-sharing	other activities	institution building	investment	policy advice	targeted research	techn/ mgt advice	techn. transfer	awareness./ info./train.	other tech.ctg.
PA zoning & mgt.																
buff.zone dvlpment	0.428															
inventory/monitor'g	-0.131	-0.305														
eco-tourism	0.293	0.280	0.09													
agro-biodiversity	0.259	-0.09	0.384	0.113												
trust funds	0.103	0.055	-0.08	-0.01	-0.304											
benefit-sharing	0.158	0.016	0.085	0.173	0.165	0.287										
other activities	0.011	0.268	-0.291	0.285	-0.185	-0.074	0.031									
institution building	-0.091	-0.213	0.751	0.058	0.269	0.106	0.153	-0.426								
investment	-0.135	0.040	-0.350	0.129	-0.463	0.135	0.076	0.198	-0.354							
policy advice	-0.181	-0.161	0.393	0.080	0.039	0.015	0.117	-0.062	0.486	-0.069						
targeted research	-0.255	-0.239	0.312	0.033	-0.151	0.299	0.086	0.120	0.357	0.176	0.231					
techn/mgt advice	0.274	0.006	-0.131	0.062	0.059	0.103	-0.245	0.011	-0.091	0.135	-0.181	-0.051				
technolg. transfer	0.043	-0.016	0.363	0.083	0.279	0.244	0.233	-0.031	0.254	-0.025	0.379	-0.086	0.245			
aware./ info./train.	-0.050	-0.115	0.379	-0.090	0.146	-0.479	-0.138	0.123	-0.051	-0.189	0.274	-0.143	-0.05	0.138		
other tech.ctg.	-0.106	0.364	-0.125	0.298	0.071	0.029	0.166	0.301	-0.106	0.267	-0.124	-0.012	0.156	0.235	0.086	

Source: Selected GEF project documents, own calculations.

Figure 4: Recurrent Costs as Percentage Share of the Total Project Cost (n=38)



Source: selected GEF project documents , own calculations.

The sustainable recovery of recurrent costs is eventually crucial for an effective long-term protection of the considered sites. Since GEF projects on average span only a period of 4-5 years, project funds can either be used to cover recurrent costs only during that period or to make investments, which facilitate a future stream of financial resources that can be used to finance the recurrent management tasks also after the project is completed.

Since actions that are funded in GEF projects have more frequently the character of investments, this suggests that the aim of sustainability in protected area management is actually addressed or is even in the focus of the projects. In this regard, it is worth mentioning that, in some cases, GEF grants are indeed directed to trust fund mechanisms that just aim at the financing of the recurrent management costs. This is illustrated, e.g., by the "Trust Fund for Environmental Conservation" project in Bhutan. However, such arrangements obviously do not represent the regular case. In addition, based on the above definition, not all investments generate financial payoffs, which in addition may not (completely) be spent on the recurrent management tasks.

The conclusion on the financial sustainability in protected areas should be treated with care for another reason: Since projects are considered with their whole costs and funding whenever protected areas measures are addressed in at least one of its components, the projects in the sample under study also include measures that do not directly refer to protected areas. Therefore, investments included in the figures in Figure 4 may refer to measures which are not directly connected to protected area management and may therefore have an distorting impact on the result as it has been interpreted here.

For three projects, the total costs are not only split up into the two cost categories at an aggregated project level but also according to the single project components. Thus, the shares of recurrent costs for components that are directly related to the management of protected areas can be calculated. However again, the results are mixed: For the “El Kala National Park Project” in Algeria and the “Biodiversity Protection Project” in Belarus, shares for recurrent costs are quite low (13% respectively 7%). By contrast, in the “Transfrontier Conservation Areas Pilot Project” in Mozambique, recurrent costs represent a substantial share of 43%. Hence, from the relationship between the two cost categories it can only be inferred that projects address investments like decribed above in the first place, and that project actions in protected areas have not followed a uniform pattern.

According to its principles, the GEF supports actions that help to conserve biodiversity of global significance. Since domestic environmental policies do not account for the full total economic value of biodiversity within the sovereign territory, GEF projects generally lead to protection in excess of the domestically optimal levels. Such additional protection is connected with additional costs for which the involved parties have to find an appropriate way of cost-sharing. In particular, when it is sometimes cost-effective to purchase and employ domestic

management resources instead of importing them from abroad, countries as project applicants do not only accrue opportunity costs because of relinguished land development but also welfare impacts due to changes of relative prices which are induced by the input demands of a GEF project (Øygard and Bromley 1998).

Since, a sovereign state would only accept a contract with the GEF if the project is associated with some net welfare gains (or at least no net losses), though, there has to be some type of compensation in the projects, even if it is not named this way in the official documents. For the analyzed projects, evidence for actions that come close to compenstions is found for some projects. For example, in the "Hon Mun Marine Protected Area Pilot Project" in Vietnam, the "development of alternative income generating activities" are proposed or in the "Samar Island Biodiversity Project" in the Philippines the promotion of alternative livelihoods for inhabitants of the project site is a subject of the activities. It is also proposed that revenues from ecotourism could compensate for opportunity costs of conserved natural areas when the projects promote the establishment of infrastructure and facilities that are necessary in this context.

4.3 GEF Funding Relative to Funding from Other Sources in Protected Area Projects

Considering the financing of the projects, detailed information in the project documents can be used to describe the funding structure more precisely than in Section (3.2) (cf. Table 3). For this, the potential financiers besides the GEF are categorized in the following groups: multilateral donors (for example UNDP, the Worldbank, UN Foundation, Ramsar Fund), bilateral donors (mainly development assistence agencies in industrialized countries), domestic governmental institutions like national Ministries of the Environment or other

agencies and, finally, private financiers, which on the one hand comprise local communities and stakeholders at the projects sites and on the other hand, foreign or domestic firms, foundations or NGO that provide finanical resources for non-profit activities on environmental protection.

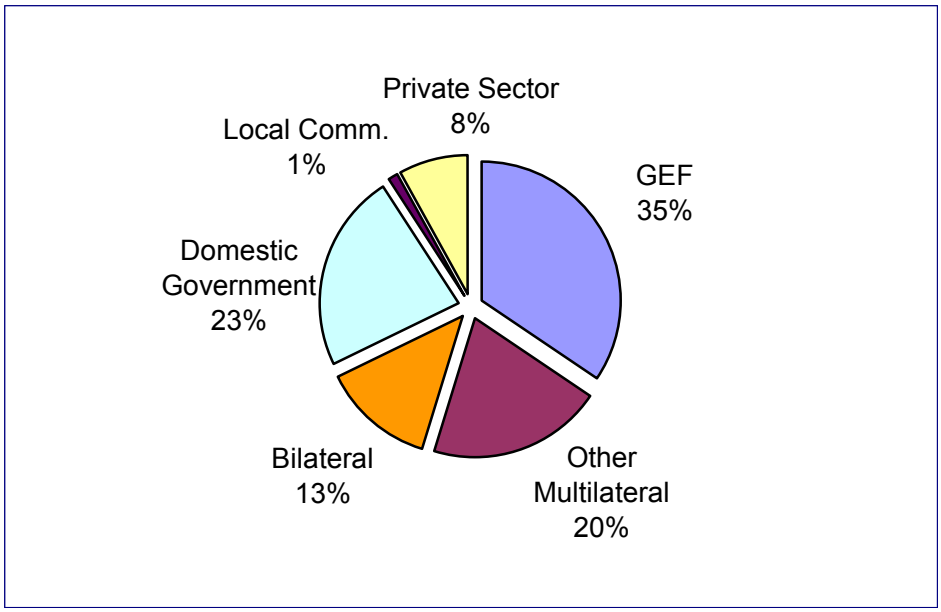
Out of the 262 identified projects, project documents for 226 of them show relatively consistent information on the funding structure of the project. The aggregated cost of these projects amounts to US$ 3.3 billion. The shares of the different groups are illustrated in Figure 5.

The numbers in the figure confirm again that the GEF funding covers one third of the aggregate project costs. Other multilateral and bilateral donors together provide financial means for about another third, so that international donors cover nearly 70% of the costs of GEF biodiversity projects.

Governmental institutions in the host countries together with the local communities supply resources to cover about one quarter of the costs. These domestic contributions suggest that the projects generate significant domestic benefits – in addition to cross-border benefits.

Whether these figures represent the *incremental* domestic benefits from GEF supported conservation activities and what kind of relationship between the incremental cost principle and project costs prevails, will be discussed in more detail in another paper. For the moment, we note that in the offcial documents show that the projects which underly the shares in Figure 5 are not delineated a uniform way: In some cases, project actions refer only to incremental activities, i.e. activities that are implemented only because additional resources are made available. These activities are then strictly separated from activities that are implemented regardless of the GEF support (baseline activities). In other documents, however, the project activities comprise both incremental and

Figure 5: Financing of GEF Projects Addressing Protected Areas



Source: GEF project data base, selected GEF project documents , own calculations.

baseline activities. For this reason, the share of domestic governmental institutions does not give much information on the extent of *incremental* domestic benefit[26].

Finally, contributions from the private sector (excluding domestic local communities) cover about 8% of the aggregate project costs. This item also includes revenues from eco-tourism within the project sites. However, this type of self-financing of protection activities – as far as it is actually an integral part of a single project – consistitute only a very minor share of the raised project funding. Furthermore, even though private domestic and foreign donors often cannot be distinguished precisely (mainly because of close collaborations between private international donors like a NGO on the one hand and their local

[26] Things become even more complicated when some types of *incremental* domestic benefit should be deducted from the transfer amount that is derived in the incremental cost assessment while other types should not (GEF 1996). For example, cost savings in baseline activities due to GEF support should be substracted from the transfer amount while uncertain or unintended incremental benefits should not.

partners on the other hand) anecdotal evidence in the project documents give the impression that the private donors from abroad generally provide the larger part of funds.

One interpretion of the large share of international funding is that there are substantial cross-border and global externalities involved in the considered projects. However, as mentioned before, it is often difficult to separate the funding of individual components so that projects are accounted with the total project cost even if substantial parts may address other objectives like improvements of human livelihood in ecological sensitive ecosystems or poverty alleviation. In this regard, a straightforward inference from the funding structure to the extent of cross-border *environmental* externalities could be misleading.

Furthermore, parts of the other multilateral funds are provided on a loan basis, i.e. these funds have to be repaid by the governmental instutions. Therefore, the actual share of government funds is higher respectively the one of other multilateral donors is lower. Nevertheless, in many cases, no explicit information is given in the project documents on whether payments by multilateral donors represent loans. Based on best knowledge, the adjusted share for bilateral donors other than the GEF is about 2% to 8%, the one of domestic government institutions is about 34% to 41%.

Considering the international funding, it is often supposed that the participation of the GEF in project funding leverages additional bilateral and other multilateral funds, i.e. GEF funding is a prequiste for some extra funding from international sources. The shares presented in Figure 5 cannot be used to confirm this assertion since the underlying figures on project funding are not distinguished in payments that are associated with the GEF grant and payments that are provided regardless of this support.

5 Concluding Remarks

This paper has addressed the functioning of the present multilateral system for international financing of national protected areas. Taken together, this system does not represent a homogenous institutional mechanism but a patchwork of several multilateral institutions and bilateral contractual relationships. To implement and maintain an effective global network of protected areas, each element of this patchwork has to function properly and the elements have to intertwine without a loss of effectiveness. Against the background of an ongoing irreversible loss of biodiversity in unprotected habitats and improper managed protected areas, the multilateral system has to address all relevant sites within the aspired network and to ensure sustainability in conservation.

This study has focused on the analysis of the Global Environment Facility (GEF) that serves a mechanism of transfer for the Convention on Biological Diversity (CBD) and currently plays a prominent role in the multilateral system. In particular, it is analyzed how far the GEF creates incentives for existing and proposed networks of protection and establishes a compensation scheme at the international level.

By analyzing the resource flows that are associated with GEF approved biodiversity projects the following basic results have been found:

- GEF funding is made available for activities that support the preservation of globally important ecosystem services. These activities are proposed by the host country summarized in projects that on average span over 4-5 years period.
- The projects typically address multiple objectives which all refer to the goal of biodiversity preservation in the first place but also take into account other objectives. That is, they try to mitigate potential conflicts of

environmental protection with other objectives, especially with economic development, poverty alleviation and/or the acknowledgement of traditional rights of indigenous people. To achieve the different objectives, the projects typically make use of a bundle of instruments – protecting natural areas being only one of them. Protected areas are one tool for biodiversity preservation but the establishment or expansion of a system of protected area is actually not an objective on its own.

- Considering only the projects that address the establishment and management of protected areas, the size of the sites on which preservation measures are implemented varies widely among the projects. Financial resources provided by the GEF mechanism are primarily directed to the effective management of existing protected areas and only to a smaller extent to the spatial expansion of the protected area systems. Thus, project means more frequently serve for purchases of resources for protected area management than for a direct compensation for foregone payoffs from a relinquished land development. Accordingly, the GEF's current payment scheme does not match with the incentive-compatible schemes that are described in the theoretical literature and that refer to compensation payments for preserved resource stocks. However, considering our empirical results, it may be implied that the literature has so far neglected the importance of management input and resulting transaction costs in enforcing property rights in protected areas.
- Though there is limited evidence for direct compensations, area management sometimes refers to the establishment of facilities for income generation, especially in the context of eco-tourism. Received revenues may compensate for the potential opportunity costs of protection. Again, the economic literature suggests that transfers for subsidizing

biodiversity-friendly productions is only the second best option to preservation in comparison to direct compensation for environmental set-aside. Otherwise, in many cases, biodiversity-friendly productions may represent the first-best option when a composite of environmental and development objectives is considered. However, the assumption of multiple underlying objectives does not change the general evaluation of GEF transfers for eco-tourism facilities with respect to biodiversity preservation.

- Projects that are considered for GEF support also attract substantial funding from other bilateral and multilateral sources. However, based on the figures on total project funding it cannot be qualified whether they represent additional bilateral and multilateral funds that is leveraged by the GEF support or funds that are provided also in the absence of the GEF funding.

Caveats and Questions That Have Not Been Addressed

Considering these results, two caveats have to be mentioned: Since the GEF-funded projects only represent a – even though substantial – part of the global biodiversity project portfolio, the results from the presented analysis are hardly conclusive with respect to the entire multilateral framework for funding the protection of natural areas. In addition, since biodiversity can also be protected by means other than protected areas, the result cannot be generalized for all GEF biodiversity projects. Furthermore, due to incomplete data breakdown of project actions and corresponding costs and funding, projects are considered with the complete set of actions and the associated funding, which apparently leads to an overstatement of the GEF portfolio on protected areas.

Three further questions of importance which the paper does not address in detail shall be mentioned: First, this concerns the question related to the application of the incremental cost principle. This is an instrument to calculate the grant amount that the GEF should provided to maintain biodiversity endowments of global significance. In this context, it is often argued that for a cost-effective operation of a transfer regime, incremental benefits for the host country should be deducted from the incremental projects when determining the grant amount. Otherwise, it is assumed that host countries may have few incentives to cooperate if they cannot appropriate any net welfare gain from incremental activities (Cervigni 2001). Against this background, it would be interesting how the principle is applied in practice, i.e. to what extent do host countries participate in the funding of incremental activities and what implication with respect to incremental domest benefits can be derived thereof[27]. In addition, figures from the incremental cost analysis in project document can give a more precise impression on whether the GEF actually leverages additional financial resources.

Second, this is the question of financial sustainability which refers to the long-term funding of resource management and how it is currently adressed in the projects. This aspect has been touched in the context of the recurrent costs but needs a further and more detailed analysis. The question in this respect is, how sustainability in the funding is addressed in the project, and for what period is sustainability actually secured. Furthermore, to what extent can trust funds, for example,be used as an instrument and what role does the GEF play in this context.

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[27] There are several empirical papers that study this issue on a case-study basis. In contrast to this, we compare figures presented in incremental cost analyses across a larger set of projects. The results will be represented in a forthcoming paper.

The third question refers to the principle of additionality and to the extent it is guaranteed. Additionality means that the donors in the industrialized countries commit themselves to provide funds for the conservation of global biodiversity in addition to already provided means that are allocated to development assistance or the handling of other global environmental problems. In this regard, the financial resources provided by donors to the GEF are not to lead to a reduction for other multilateral and bilateral means for international environmental protection. To answer this question satisfactorily, more data on international transfers than presented in the GEF context is need.

Outlook

After all, to guarantee a sustainable conservation of global biodiversity the effectiveness of the GEF mechanism of transfer depends on the proper implementation of complementary policies at the international level and at the domestic level of the host countries. Since there is currently a substantial gap in financing an effective protected area network, more GEF funding for protected areas could alleviate the problem – provided that these resources represent additional funds and do not crowd out funds provided by bilateral donors and other multilateral institutions.

It can be observed that investments as components of the GEF projects often aim at establishing facilities (in particular with regard to ecotourism) that generate income from protected areas that can be used to recover management costs. Since projects usually run only for a limited number of years, a further question is whether this income can ensure a sustainable funding of the recurrent management tasks and accordingly enable an effective long-term management. If this is not the case, there will be an ongoing demand for resources in existing protected areas. This again would imply that future GEF payments cannot be

allocated to a spatial expansion of protected area systems but are fixed to the existing areas if the management quality and accordingly the level of protection in these areas should be maintained.

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