

Innovative Financing mechanisms for Sustainable Ecosystem Management

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Executive Summary

The increasing human influence on ecosystems and the ensuing unsustainable exploitation and degradation has led in many places to depletion and loss of function of these ecosystems. These problems cannot be solved by (innovative) financing mechanisms, as the causes do not lie in a lack of financing mechanisms. Although deficit in funding in general is an important issue—the amount of finance available for ecosystems and biodiversity falls short of the funding needed. But the lack of funding can probably also not be solved by the implementation of innovative financing mechanisms. The amount of finance available for ecosystems reflects the willingness of people or their governments to make available funds for ecosystem management. This willingness in turn, is influenced by various factors, amongst others:

1. Recognition or awareness of the value of ecosystems other than the production functions that ecosystems and biodiversity fulfil. Although these functions and their potential value have been described by a variety of valuation methods, political recognition to include these values adequately in decision-making is still incipient.
2. Confidence in effectiveness of funding as a solution to ecosystem management (i.e. will more funding lead to better management). This is linked to the institutional environment in a country (how well does the legal system work; is there corruption; etc) and the governance regime of an ecosystem (how effective is the ecosystem management; is the management equitable etc.).

Thus, only when such conditions are fulfilled and there is a willingness to finance ecosystems, it is useful to discuss the question of how to finance—i.e. by which mechanism. Of course the financing mechanism itself may influence the willingness to make available funding for ecosystem management—there should be confidence in the effectiveness of the financing mechanism too.

The study has aimed to highlight a few innovations in financing mechanisms for ecosystem management. By no means it has tried to be complete or has meant to convey the message that ‘old’ financing mechanisms are no longer relevant. The innovative financing mechanisms seem to arise out of two innovations. First a revision in legislation such as in the case of agri-environmental schemes or new provisions under the Kyoto Protocol (or the Bali agreement). Second, the involvement of the private sector which is often linked to also financial innovations, such as the venture capital example.

New or adapted legislation is often crucial for the emergence of innovative financing mechanisms because it creates the conditions for these to emerge, creates a level playing field or enables the trading of ecosystem services so that a monetary value can be attached to them. But legislation alone is not enough – a well functioning institutional environment is necessary to implement and enforce this.

The involvement of the private sector seems to be feasible only in case there are financial returns to the ecosystem management—such as ecotourism, selling of goods (animals, timber, or other products). For ecosystem functions with a public goods nature where such financial returns are not possible, financial innovations linked to the private sector seem improbable.

Whether innovative financial mechanisms contribute to poverty alleviation depends on the goal of the financial mechanisms and at whom they are targeted. But an important factor influencing the outcome of financial mechanisms lies in the governance regimes of ecosystems: how rights and responsibilities over the use and management of ecosystems are distributed. Often, local poor stakeholders do not have rights or their rights are ignored or overruled.

In practice, very different financial mechanisms, transferring funds from different funding sources are combined and bundled. There is no one successful approach (one size fits all approach) and each ecosystem management project has its own unique combination. There are many reports, reviews and practical guides on (innovative) mechanisms. But it must be stressed that the following conditions must be in place:

- The existence of an institutional environment that:
 - Enforces rights of stakeholders in ecosystems and protects these from powerful interests groups
 - Provides safe financial institutions that are able deal with substantial financial flows
- The existence of a governance regime that ensures the sustainable management of ecosystems and in which roles and responsibilities of different stakeholders are defined and implemented
- The effectiveness of the financing mechanisms must be communicated, which means that it must be clear how funding has been used, and how this has led to improved ecosystem functions.

1 Introduction

This study was commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality (LNV) with the purpose to:

1. identify the available key actors and mechanisms for financing of functions of ecosystems (consumers, distribution mechanisms, producers, levels –local, national, global),
2. identify the factors that determine the acceptability and applicability (e.g. obstacles and conditions for implementation and institutionalisation in policy processes), the enabling environment (legislation regulation etc., willingness to pay)

The overarching goal for the Ministry for this project is to strengthen the acceptability and applicability of financial mechanisms to sustain functions of ecosystems and biodiversity.

Innovative financing mechanisms is a broad topic, constituting a myriad of different instruments and procedures that are being implemented for different goals. It is therefore not easy to combine being very specific on the one hand and discussing all (innovative) financing mechanisms that exist for all ecosystems. We have therefore opted for a more general approach, outlining general issues that are of importance in any innovative financing mechanisms. We have tried to add some specificity by presenting a few examples of innovative financing mechanisms as illustrations.

After the introduction, which specifies the problem statement and knowledge questions that will be addressed, the study addresses in chapter 2 the context of financing mechanisms that determines the factors that determine the acceptability and applicability of financing mechanisms as well as its enabling environment. Chapter 3 then gives an overview of existing financing mechanisms and some examples of innovative financing mechanisms that have been developed and implemented recently. In chapter 4 we conclude with some guidance on do's and don'ts. These consists of suggestions to policy makers who would like to facilitate the implementation of (innovative) financing mechanisms, as well as some pointers to those who would like to put into practice innovative financing mechanisms.

In this report we will not discuss how financing mechanisms and the funds they raise are implemented to manage ecosystems in an effective and sustainable manner. For this we refer to other studies such as Emerton *et al.* (2006). This paper builds on a previous reports that have been commissioned by LNV on innovative financing mechanisms for forests (see Lette and Rozemijer, 2005), the knowledge scan that was prepared in 2006 (Verschuuren *et al.*, 2007) and a meeting organised by LNV on knowledge questions (LNV, 2007).

1.1 Problem statement

The increasing human influence on ecosystems and the ensuing unsustainable exploitation and degradation has led in many places to depletion and loss of function of these ecosystems. In the Millennium Ecosystem Assessment (2005), the type, extent, causes and results have been described and it has been recognized that in many locations the situation is severe to such an extent that further degradation may lead to abrupt and irreversible damage, and that measures to reverse this development are urgent. The Assessment found that approximately 60% (15 out of 24) of the ecosystem functions it examined are being degraded or used unsustainably, including fresh water, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests.

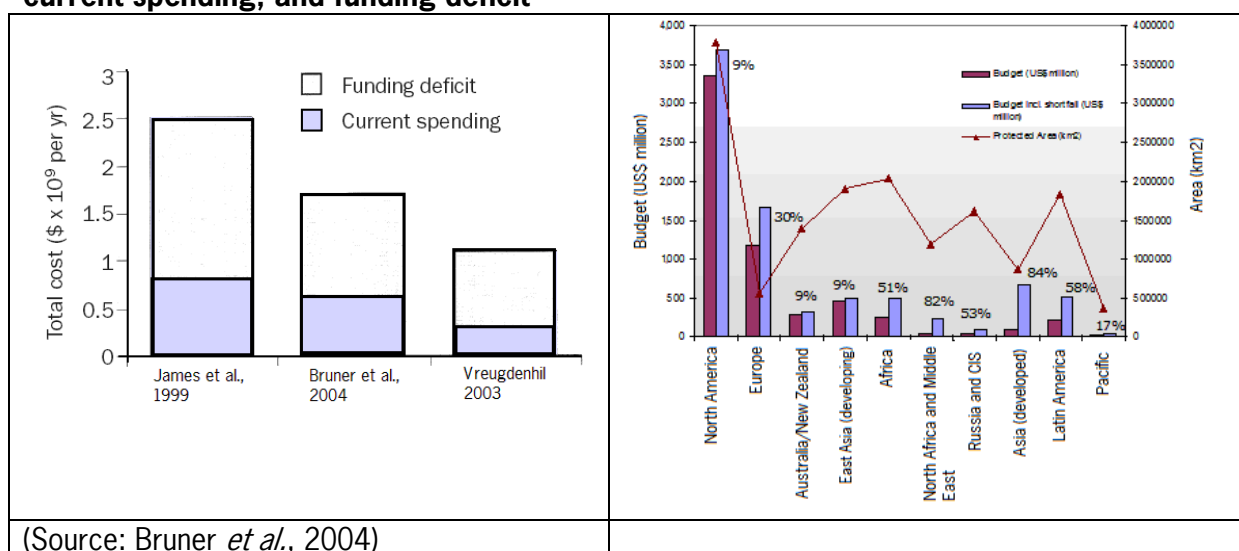
These problems cannot be solved by (innovative) financing mechanisms, as the causes do not lie in a lack of financing mechanisms. Although deficit in funding in general is an important issue—the amount of finance available for ecosystems and biodiversity falls short of the funding needed (see Figure 1 for the deficit for protected areas). In general, the funds invested in biodiversity in the world are not well known (Mulder *et al.* in prep.) but available estimates suggest a total global annual expenditure of 6.5 billion US\$ (see e.g. James *et al.*, 2001) and a shortfall of 2.3 billion US\$. The shortfall is highest in developing countries (see Figure 1).

But the lack of funding can probably also not be solved by the implementation of innovative financing mechanisms. The amount of finance available for ecosystems reflects the willingness of people or their governments to make available funds for ecosystem management. This willingness in turn, is influenced by various factors, amongst others:

1. Recognition or awareness of the value of ecosystems other than the production functions that ecosystems and biodiversity fulfil. Although these functions and their potential value have been described by a variety of valuation methods, political recognition to include these values adequately in decision-making is still incipient.
2. Confidence in effectiveness of funding as a solution to ecosystem management (i.e. will more funding lead to better management). This is linked to the institutional environment in a country (how well does the legal system work; is there corruption; etc) and the governance regime of an ecosystem (how effective is the ecosystem management; is the management equitable etc.).

Thus, only when such conditions are fulfilled and there is a willingness to finance ecosystems, it is useful to discuss the question of how to finance—i.e. by which mechanism. Of course the financing mechanism itself may influence the willingness to make available funding for ecosystem management—there should be confidence in the effectiveness of the financing mechanism too.

Figure 1: Annual costs of managing existing protected areas in developing countries, current spending, and funding deficit



Whatever the precise figures, it is clear that from a broader perspective i.e. sustainable use of land resources, funding for ecosystem functions in future will need to become much higher. An important issue is that (additional) funding will be effective in achieving sustainable ecosystem management.

Worldwide many initiatives have been started in the area of policy development and implementation that aim to broaden or diversify the financial basis of ecosystem management (eg. Katoomba-group, RUPES). These initiatives give increasing attention to the generation of additional cashflows for ecosystem functions. Often these initiatives are in the pilot phase and much still has to be learned and developed to scale-up and institutionalize these initiatives (e.g. in terms of governance, distribution of cost, benefits and responsibilities and creating a suitable enabling environment).

The Ad Hoc Technical Expert Group on Protected Areas (UNEP, 2003) observes that inadequate funding per se is not the only financing problem that ecosystems such as protected areas face. Worldwide, the bulk of funding for conservation comes from short-term development assistance projects (3-5 years) and erratic annual government allocations. This is why they call for sustainable, secure, long-term financing mechanisms, which are presently the exception to the rule.

1.2 Research questions

The following general knowledge questions were formulated at the beginning of the project:

- 1) On the basis of the stock taking study (Verschuuren *et al.*, 2007) which outlined which financing mechanisms are available/possible and which ones are currently used, an analysis of these instruments will be carried out. The following distinction in different financing mechanisms can be used¹:
 - a) Self organized private market arrangements (e.g, certification mechanisms, and private contracts);
 - b) Voluntary private, non-market funding mechanisms (e.g. donations and lotteries);
 - c) Government supported market creation (e.g. off-set and trading schemes/tradable permits to limit access, eco-labelling);
 - d) Government run financing mechanisms but also the creation of an enabling environment). (e.g. user fees, public funding, taxes and tax incentives, green venture capital funds, liability and compensation schemes, biodiversity offsets,
- 2) Which above-mentioned financing mechanisms are appropriate for which functions and on what level (local, regional, national and global)?
- 3) What are the strong and weak points of each mechanism?
- 4) What are the main obstacles and conditions for successful implementation to ecosystem management? (incl. institutional, technical, institutional economics (transaction costs), financial, social, psychological, political etc)
- 5) Based on 2, 3, and 4 what mechanisms have the best perspective to be introduced and under which conditions.
- 6) How can Financing mechanisms for Ecosystem functions contribute to poverty alleviation? How is the construction of the financial distribution mechanism arranged? How can the producers of the service be involved? What is being paid for and what monitoring is necessary to verify that the service is being rendered?

A stakeholder workshop was organised on 12 December 2007 to discuss the report as well as some practical do's and don'ts for both practitioners and policy makers. The results of this have been added to the appendix. It was decided not to discuss these in the report as much information is already available and it would not have been possible to be exhaustive in this report. References to practical guides is given in appendix 4. The focus in this report is therefore on the context and prerequisites for the implementation of innovative financial mechanisms.

1.3 Definitions

1.3.1 Ecosystem functions

Ecosystem functions are the goods and services an ecosystem delivers². There is a range of ecosystem functions, which can be categorized as:

- Biodiversity
- Carbon-sequestration
- Watershed protection
- Preserving landscape beauty

Ecosystem functions can be characterized by two qualities: (i) rivalry (sometimes also called subtractability) and (ii) excludability. Rivalry can be illustrated by timber production: timber can only be cut down and used once. Using the function makes it more scarce. The expression “you can’t have your cake and eat it” illustrates rivalry. Different functions may also be rival – timber production is for instance rival with watershed protection (if you cut down the forest you can no longer maintain the watershed protection function). But in other cases functions are not rival – for instance, a forest can provide watershed functions and recreation functions at the same time. Excludability can be illustrated by the fact that it is difficult to exclude parties downstream from enjoying the benefits attached to watershed protection, especially when these are many. Recreation is easier to regulate – for instance by setting up gates at the entrance.

The extent of rivalry and excludability will determine the degree of market failure (Landell-Mills and Porras, 2002). Ecosystem functions that are excludable and non-rival are described as club or toll goods since markets can be set up in the form of tolls or clubs. An example of a toll good is that of roads in national parks where entry is controlled. Where goods are both excludable and rival they are described as private. These may be easily supplied by the private sector based on market transactions but not necessarily (see below). Finding financing mechanisms for public and common-pool functions is the most difficult. This is because the high costs of exclusion (termed demarcation by Vatn *et al.*, 2002) so that it is only accessible to those who pay specifically for it.

Table 1: Public and private environmental functions: excludability and rivalry

Excludability	Rivalry	
	Low	High
Low	Type: Public goods, e.g. most ecosystem functions	Type: Common pool resources, e.g. community woodland, meadow or water resources
High	Type: Toll/club goods e.g. forest park roads for recreation	Type: Private functions, e.g. timber and NTFPs

NB The shade of grey displays the degree to which it is a private good
(Based on: Landell-Mills and Porras, 2002; Ostrom *et al.*, 1994)

Ecosystem functions are also often described as a positive externality. In much of the literature it is taken for given what is a gain and what is a cost, what is a positive or negative externality, what is a harm or a sacrifice (see also Vatn *et al.*, 2002). But it is in fact difficult to define what constitutes an ecosystem function. This can be explained better when we define externalities (and ecosystem functions) as interdependencies³. Interdependencies exist when an action of one agent influences those of another. It creates conflicts when interdependent actors cannot realize their interests simultaneously. Conflicts have to be resolved in the sense of defining whose interests

are to prevail and to what degree. These interests are often translated into rights: e.g. does someone have the right to pollute or does the person who suffers from pollution have the right to clean water? Does a farmer who pollutes groundwater through the use of fertilizers deliver an ecosystem function when he reduces the level of fertilizers and be compensated for the costs he has made? Or should he not be allowed to pollute groundwater in the first place and should he be fined when he does⁴? Or in the case of forests, the question is whether someone has the right to cut the forest for timber or whether others have the right to enjoy the forest for recreation, or its watershed functions.

The issue of rights can be usually solved when externalities/interdependencies or ecosystem functions arise on a local level and the parties can come to an agreement. However, on a global level (e.g. with greenhouse gases and global warming) coming to an agreement is much more difficult. Who has the right to emit carbon dioxide, and who has the right to expect others to lower their emissions are the difficult topics of agreements such as the Kyoto Protocol.

1.3.2 Financing mechanism

For this study, we adopt the definition of Verweij (2002:3) who defines innovative financing mechanisms (financing mechanism) as “*an institutional arrangement that results in the transfer of new or increased financial resources from those willing to pay for sustainably produced goods and/or forest ecological services, to those willing to provide these functions in turn*”⁵.

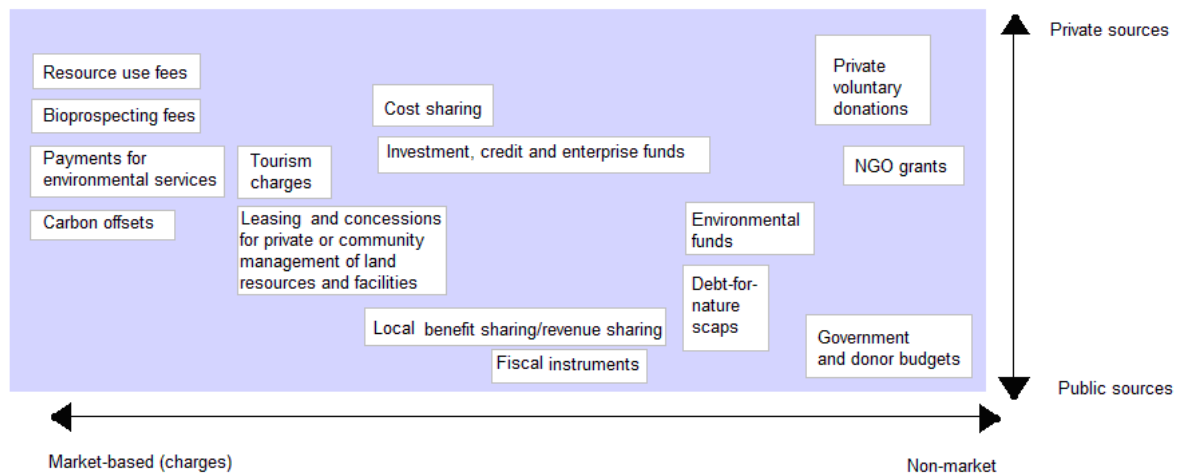
Financing mechanisms can be directed at paying for outputs (environmental goods and services) or for inputs (investment costs). We make no distinction between these two in this report. According to Powell & White (2001) financing mechanisms can be characterised by the degree of government intervention in the administration of the mechanism including self-organised private deals, trading schemes, and public funding schemes. Emerton *et al.* (2006) have categorised the set of financing mechanisms according to two dimensions – the source of funding (private versus public) and the mechanism (market based versus non-market based), see Figure 2. The financing mechanisms shown in the picture are not exhaustive but serve as an illustration. Appendix 6.2 gives a more definitive overview of possible financing mechanisms.

The set of four main categories of financing mechanisms that we will use throughout the report easily fit into this typology:

- Self organized private market arrangements (left hand upper corner);
- Voluntary private, non-market funding mechanisms (right hand upper corner);
- Government supported market creation (left hand bottom corner);
- Government run financing mechanisms but also the creation of an enabling environment (right hand bottom corner).

We have to note (in accordance with de Groot *et al.*, Forthcoming) that people not only donate their money, but also their time (Holl and Howarth, 2000).

Figure 2: A typology of financing mechanisms



(Source: Emerton *et al.*, 2006)

Financing mechanisms also entails the rules, regulations etc in place that specify the agreements between the supplier of ES and beneficiaries, administer the contribution, and deal with default or other conflicts. These rules and regulations can be formal (e.g. binding legal contract, or membership of an organization) or informal (one-off donations to a fund) or in between (buying a ticket to a national park).

Any set-up for implementing financing mechanisms must also be able to mobilize support for the protection of the ecosystem functions (see Ruhweza and Masiga, 2007 for Uganda). To do so, it must be able to locate the beneficiaries (or their delegates), encourage them to provide support. Scope, number of beneficiaries, whether beneficiaries have delegated decision-making to representatives, etc, influence the set-up of the financing mechanism.

2 The context and preconditions of innovative financing mechanisms

Main points of this chapter

- Innovative financing mechanisms (financing mechanism s) cannot be viewed in isolation of their institutional environment in which they are embedded
- The institutional environment affects whether property rights, laws on ecosystem protection etc. are upheld and to what extent powerful interests prevail over those of more vulnerable and poor resource managers.
- financing mechanisms are also linked to the governance regime that manages the ecosystem, whether it is state, community or privately owned and managed. The governance regime of an ecosystem also determines how rights and responsibilities are shared.
- Ecosystem functions that constitute public goods are the most difficult to link to financing mechanisms.
- Beneficiaries' willingness to pay for ecosystem functions is influenced by the information they receive on the importance of the ecosystem function, the effectiveness of the governance regime managing the ecosystem functions, as well as their knowledge on who receives funds.
- The scope on which ecosystem functions manifest (from local to global) has an

2.1 Valuation of ecosystem functions

For ecosystem functions that have a private goods nature and are traded through market mechanisms, valuation and financing (payment) coincide. For ecosystem functions that have a public goods this does not always apply. This is why much effort has been put into valuation (methodologies). What is measured are preferences of people and their willingness to pay, a concept that is key in valuation studies. Many valuation studies assume that people have a set of stable and measurable preferences and are therefore able to value each ecosystem function. But these assumptions may not be correct for two reasons. First, people may be unable to value in a common currency (e.g. in monetary values) their individual benefit for each possible ecosystem function⁶. Even if they would be able to rank their preferences, which assumes that they know the complete list of potential ecosystem functions, it would be impossible to aggregate their preferences⁷. Second, it is safe to assume that people in fact do *not* know the complete list of potential ecosystem functions. People in general or decision-makers specifically (e.g. government) therefore cannot decide which project to realize – i.e. whether to manage and sustainable use ecosystem functions or which one, if means are limited⁸.

With the risk of generalization, two directions can be discerned in the valuation debate. One direction, consisting of 'pro-valuation' economists, continues to put effort into refining methodologies and tries to increase accuracy. The other direction is more difficult to put under one heading, but consists of economists who question the premises of valuation (i.e. that

preferences can be measured) and therefore think that further refinement of valuation methodologies is not useful. They differ in terms of what they suggest as alternatives to valuation. One group has been focusing on the fact that preferences are not exogenous (i.e. fixed and given) but endogenous and shaped by institutions (in terms of rules, laws, norms etc). Thus instead of focusing on measuring preferences and then basing decisions on these, one must focus on the institutions themselves and how they shape and express preferences. The 'pro-valuation' line of thinking seems to assume a central planner (e.g. government) who takes decisions on the basis of valuation studies—it weights different options in for instance a cost-benefit analysis. But often decisions are not made this way because there are many stakeholders involved, with different interests and different rights and responsibilities. In such circumstances it might be more useful indeed to focus on different mechanisms (and institutions) by which these interests and rights can be accommodated.

Financing mechanisms can be an integral part of such mechanisms. And it is not always necessary that the monetary valuation of an ecosystem function is known before a financial mechanisms can be implemented. However, what seems to be clear is that preferences and valuations of ecosystem functions are influenced by information. Specifically, information about the way ecosystem functions are provided (which institutional context) and the role ecosystem functions play—i.e. the benefits they generate. We will examine this in the next section.

Even when the ecosystem functions that are provided (as well as the resource managers providing them) are clear and well-established, the beneficiaries and potential demand party may not. Especially when the ecosystem function is a global one, identifying beneficiaries who are also willing to pay for the generated ecosystem function may not be clear-cut. Therefore, identifying who are the beneficiaries and who are willing and able to pay for the provision of services is one of the basic steps of establishing an innovative financing mechanism. Brousseau *et al.* (2007) identify two types of 'orientation': whether beneficiaries have individual or collective welfare as their goal. Individual welfare can be seen as private interests (e.g. when people visit a protected area for their own pleasure). Orientation to collective welfare is when people acknowledge that others are also affected by their actions (e.g. when they invest in forestry to reduce CO₂).

2.2 Information flows and valuation of ecosystem functions

Information, knowledge and communication are important issues in maintaining ecosystem functions and implementing financing mechanisms. The willingness to contribute to maintaining ecosystem functions by beneficiaries (or their representatives) is shaped by what they know about the (importance of) ecosystem functions. This means that understanding ecosystem functions, how they relate to other vital parts of the ecosystems, their importance in sustaining human existence. Scientific research will play an important part in achieving this understanding. But research in itself is often not sufficient, because it will not lead to changes in political and societal behaviour. Scientific findings must also be communicated to the broader audience (see Box 1).

Box 1: Nobel prize for communication

An inconvenient truth

A good illustration of communication has been the work of Al Gore on the problem of climate change. The scientific findings of many scientists as well as the IPCC⁹ were ignored or contested by politicians for a long time, quoting a few dissenting scientists, belittling the problem, pointing out the great uncertainty of the scientific results and the huge economic costs that would have to be spent to tackle the problem. The work that Al Gore did was to communicate the scientific findings of the IPCC by publishing a book, going round the world giving presentations and finally making the movie “an inconvenient truth” that then won an academy award. In 2007 he and the IPCC won the Nobel Peace prize “for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change” (from the Nobel Prize report).

Information and communication thus changes people’s ideas, knowledge, choices and preferences and as such may increase people’s willingness to contribute to ecosystems. But this is not the only function of information. Information and knowledge is also necessary to find solutions to problems (Brousseau et al., 2007). People may be willing to contribute to conserving an ecosystem under threat, but the question how is not always clear. Thus Brousseau et al. (2007) make a distinction between knowledge about *issues* and knowledge about *solutions*. The first is more oriented toward the establishment of (collective) preferences (i.e. willingness to pay), while the second is oriented toward the search for the most effective, equitable or efficient (less costly) way of addressing these issues (e.g. financing mechanisms).

Knowledge on the importance of ecosystem functions is therefore crucial as the extent of knowledge on ecosystem functions is directly related to willingness to make available funds for ecosystem management and therefore impacts on the success of financing mechanisms. Thus, Brousseau et al. (2007) propose that before individuals and communities can express a willingness to pay, they have to know the (global) issues relating to provision of ecosystem functions and the conditions and costs of addressing these. This requires the development of knowledge to identifying ecosystem functions, understanding the complex web of causal relationships and discovering how best they can be delivered.

A key element in this is conditionality. Wunder (2005) has identified two key obstacles for financing mechanism. The first is limited demand: too few service users are so confident about the mechanism that they are willing to pay — in some cases, because the link between land use and ecosystem functions is insufficiently understood or ambiguous. There are various aspects to this problem. First of all, a clear definition of the ecosystem function will be necessary to convince beneficiaries to contribute to ecosystem functions (Mayrand and Paquin, 2004). However, it might be difficult to define the ecosystem function. Especially concepts such as biodiversity, landscape or ecosystems are difficult to encapsulate into a specific set of indicators. Often broad and vague goals are set. Whitfield (2006: 908) illustrates this problem by stating that “most of Europe’s agri-environment schemes have very vague goals, such as to ‘prevent damage to the environment’ or ‘provide wildlife habitats’. Specific targets are not set; progress is rarely monitored; the baselines from which they start are not defined. The good that they do is thus hard to measure, which in some eyes makes the schemes hard to justify”. This is essentially a problem of defining the function and therefore the funding may be compromised. Generally speaking, beneficiaries will be more inclined to pay for very specific ecosystem functions, as opposed to general conservation services.

The second problem that Wunder (ibid) has indicated, is that the link between the land use (input) and the provision of ecosystem functions (outcome) is insufficiently understood or ambiguous, the beneficiaries are not sufficiently confident about the outcome that they are willing to invest in input measures (see also Meijerink, 2007). Scientific modelling exercises simulating complex processes and showing the relation between input measures taken and expected outcomes may solve the problem. How important this is, can be illustrated by the political commotion when a study evaluated Dutch agri-environmental schemes and found them to be less effective than assumed (Kleijn et al. 2001). This led to a storm of discussion and possibly to reduced funding for such schemes (Whitfield 2006).

2.3 Governance regimes managing ecosystems

An important precondition for financing mechanisms is that a well-functioning governance regime must be in place. If this is not the case, then either the willingness to pay or invest in ecosystem management may dissolve, or funds are mismanaged. One may make the argument that in order to have a well-functioning governance sufficient funding is needed. What we will discuss here are the prerequisites that must be in place before financing mechanisms can be implemented.

The governance regime¹⁰ that manages ecosystems in a sustainable manner and that provides ecosystem functions, consists of a (i) property rights structure¹¹ and (ii) a set of rules that determines how the nature area (ecosystem) is managed. The property rights system can take different forms (see Box 2). Within each property rights system, the right holders (i.e. those with ownership and user rights) establish a set of rules on how the natural area is managed, and on how user rights and responsibilities are distributed. These rules thus include the incentives, safeguards, dispute resolution processes and enforcement mechanisms that are used to control and co-ordinate the actions of various self-interested parties (i.e. stakeholders) interacting in a bilateral and multilateral exchange relationship (cf. Kester, 1992).

A forest for instance may have a common property rights system, and be managed by a community. But the rules (which can be formal and informal) in place on what is allowed by the members of the community determines how well the forest is managed (see Ostrom, 1990). The rules may specify who has the right to hunt in the forest and when, or that members should plant trees in areas that they have cleared for agriculture. The rules also include enforcement mechanisms, which determine how well the rules are abided by¹². These rules do not only determine the way the ecosystem is managed but also how equitable the outcomes are with respect to who reaps the benefits from the ecosystem and who bears the costs. Who has the authority to set or change the rules, who can use his or her power to appropriate benefits etc are all issues that have to be taken into account. Rules are not value free.

These rules may also be (partly) dictated by an overarching institutional environment. The government may, for instance, have banned the logging of certain species of trees, or determined the type of nets used in fishing. Sometimes these rules have been agreed in international agreements such as the CBD or Kyoto Protocol or within the framework of the European Union. Enforcement of the rules in place under the governance regime also relies on the provision made for this (e.g. court systems).

The property rights system determines how property rights are allocated and thus to whom the financing mechanism is targeted. The rules in use to manage the ecosystem determines what kind of ecosystem functions and goods are supplied, and the quality.

Box 2: Property rights systems

(1) State

In a state governance regime, ownership and control over use rests in the hands of the state. Individuals and groups may be able to make use of the resources, but only at the forbearance of the state. National (or state) forests, national (or state) parks, and military reservations are examples of state governance regimes. Shifts from state property to other types, or vice versa, are possible.

(2) Individual

Individual property regimes are the most familiar, though of course much "individual" property is, in fact, co-owned by members of the family. Usually the best land in most settings has already been privatized and the worst has been left in the "public domain"

(3) Commons

Common property represents private property for the group (since all others are excluded from use and decision making). Individuals have rights (and duties) in a common property regime. Common property has something very much in common with private (individual) property – exclusion of non-owners; common property is corporate group property. The property owning groups vary in nature, size, and internal structure across a broad spectrum, but they are social units with definite membership and boundaries, with certain common interests, with at least some interaction among members, with common cultural norms, and often their own endogenous authority systems. Villages, communities, neighborhoods, transhumant groups, kin systems or extended families are all examples. These groupings hold customary ownership of certain resources such as farm land, grazing land, and water sources

(4) open access (non-property)

There are no property rights in an open access situation: "everybody's access is nobody's property." Whether it is a lake fishery, grazing forage, or fuelwood, a resource under an open access regime will belong to the party to first exercise control over it. If property and management arrangements are not determined, and if the investment is in the form of a capital asset such as improved tree species or range revegetation, the institutional vacuum of open access insures that use rates will eventually deplete the asset.

Open access results from the absence – or the breakdown – of an authority system whose very purpose was to assure compliance with a set of behavioral conditions with respect to the natural resource. Valuable natural resources that are available to the first party to effect capture have become open access resources through a series of institutional failures that have undermined former collective management regimes. There is no authority in an open-access regime. Governments who have appropriated forests from local-level management bodies – primarily villages – and have failed to manage them in an effective manner have created *de jure* state property, but *de facto* open access; the absence of effective management and enforcement has simply turned the forest into a resource that can be exploited on a firstcome- first-served basis. This situation (sometimes incorrectly referred to as "tragedy of the commons") is typical of many developing countries, where the institutional environment is weak.

(Source: Bromley, 1992: 10-13)

A crucial element of governance regimes is thus the allocation of property rights. Property rights consist of the rights, or the powers to consume, obtain income from and separate from these assets. These rights are not constant; they are a function of the proprietors' own direct efforts at protection, of other people's capture attempts, and of government protection (Barzel, 1989). In exchange (e.g. funding for ecosystem functions), property rights define sellers and buyers, the goods or services exchanged, the nature of funding, timing of transactions, enforcement and dispute resolution (Libecap, 2002). Murtough *et al.* (2002, cited in Whitten and Shelton, 2005) discern seven property right attributes that should be in place:

1. Clearly defined: nature and extent of the property right is unambiguous.
2. Verifiable: use of the property right can be measured at reasonable cost.
3. Enforceable: ownership of the property right can be enforced at reasonable cost.
4. Valuable: there are parties who are willing to purchase the property right.
5. Transferable: ownership of the property right can be transferred to another party at reasonable cost.
6. Low scientific uncertainty: use of the property right has a clear relationship with ecosystem functions.
7. Low sovereign risk: future government decisions are unlikely to significantly reduce the property right's value.

A financing mechanism will not be sustainable or effective when these attributes are not in place. The question who has what property rights is important because it determines who is responsible for protecting and providing ecosystem functions as well as who should contribute to the costs. With ecosystem functions this is not always a simple matter because there are often multiple contributors (e.g. numerous farmers implementing soil conservation measures). If this is the case, the question arises which property regime is most suitable. For a long time it was believed (and sometimes still is) that the lack of individual property rights was one of the fundamental reasons of resource degradation. The idea behind this is that when resource managers (such as farmers) do not have property rights over resources (e.g. land), and are uncertain whether they can appropriate the revenues derived from that resource, they have no incentive to invest in that resource. It is not clear how property rights in governance regimes combined with financing mechanisms should be allocated in case of a (large) group of resource managers. The conventional approach seems to prefer private property rights (e.g. rewarding land owners) (Rosa *et al.*, 2004). However, Larson & Bromley (1990) have shown that no specific property regime can be expected a priori to provide the solution to resource degradation and will lead automatically to resource conservation to provide ecosystem functions. It cannot be concluded that the resource manager values his or her resources more highly under one property regime than another. This issue plays an important role with respect to ongoing market initiatives to establish voluntary mechanisms to keep carbon stored in forests and peatlands (Diemont personnel communication).

Alston *et al.* (1999) put forward that exchange is promoted through a broadening of the market beyond informal, local ownership arrangements. This means that for market-based financing mechanisms to be successful, more formal property rights will be necessary. This increases the role of the state, which retains certain rights or places restrictions on individual rights and is assumed to be able to enforce a new set of property rights (i.e. those defining ecosystem functions) (Larson and Bromley, 1990). An example of this is that tradable rights are defined and allocated by the government (e.g. in carbon emission or water).

But an increased role for the government in defining and allocating rights is not always applicable in many parts of the world. The imposition of state control, either directly through the state ownership or indirectly through individual private property without the ability to enforce the

arrangements, has been an important factor in resource degradation. In that case, financing mechanisms to prevent resource degradation will clearly be ineffective. North (1990) has stated that transaction costs also arise in enforcing property rights. This will be especially true in the case where property rights are contested, or weakly enforced. Some alternative or additional mechanisms are necessary to be able to enforce property rights when a financing mechanism is involved.

2.4 Institutional environment

A second pre-condition for successful financing mechanisms is a well-functioning institutional environment. We define the institutional environment (or institutional framework) as the system of formal laws, regulations, and procedures, and informal conventions, customs, and norms, that broaden, mould, and restrain socio-economic activity and behaviour. It is thus broader than a governance regime. An enabling institutional environment is therefore also often crucial for a governance regime but has broader implications for financing mechanisms.

To be able to function effectively, a financing mechanism must be embedded in a well-established institutional environment. For instance, establishing a CDM mechanism requires certain institutions to be in place in the host country (Meijerink et al., 2004; Ruhweza and Masiga, 2007) such as a certification body, a court system that can deal with jurisdiction and resolve conflicts, and the country must be a signatory to an international convention. In some developing countries, this may be a bottle-neck¹³. The institutional environment not only establishes the context in which financing mechanisms can operate but also determines the economic conditions (e.g. opportunity costs and benefits). This leads to another important element of the institutional environment, which is the regulation that is put into place by governments. This regulation can establish a 'level playing field'. If a certain activity is banned by law (e.g. logging in a forest), then this not only rules out any financing mechanism linked to this, but also decreases the opportunity costs of forest conservation. It also gives an incentive to stakeholders to engage in collective action, that on a voluntary basis would not have occurred. For instance, in January 2007 ten large US corporations called for measures to combat global warming (The Economist, 2007) – they did this to create a level playing field across the group to promote fair competition.

A weak institutional environment can also lead to a weakened governance in a country¹⁴ leading to more corruption, and the prevalence of the interests of powerful groups in society. Kaufmann et al., (2007) distinguish six dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Inadequate governance usually has a detrimental effect on the management of ecosystems, which may fall prone to exploitation. It is the question to what extent financing mechanisms can be implemented in such a situation, and whether in general financing does not exacerbate bad governance.

2.5 Transaction costs

Transaction costs of financing mechanisms are important (Paavola, 2007). Transaction costs are defined as “the costs other than the money price that are incurred in trading goods or services” (Johnson, 2005). Before a particular mutually beneficial exchange can take place, at least one party must find out that there are other parties with which such an exchange is potentially possible, search out one or more such possible partners, inform them of the opportunity, and negotiate the terms of the exchange. All of these activities involve opportunity costs in terms of time, energy

and money. If the terms of the exchange are complicated (e.g. if the agreement involves such complications as funding in instalments, prefunding for future delivery, warranties or guarantees for quality, provision for future maintenance and service, options for additional future purchases at a guaranteed price, etc.), negotiations for such a detailed contract may itself be prolonged and very costly in terms of time, travel expenses, lawyers' fees, and so on. After an exchange has been agreed upon, there may also be significant costs involved in monitoring or policing the other party to make sure they are honouring the terms of the agreement (and, if they are not, to take appropriate legal or other actions to make them do so). In short, transaction costs include contact, contract & control (North, 1990: 28-33).

3 Analysis of Innovative Financing mechanisms

Main points of this chapter

- Almost all innovative financing mechanisms rely on an institutional environment and thus a well-functioning government, except voluntary private, non-market funding mechanisms that are less dependent on these.
- Governments set the rules how markets function to achieve socially desirable results. For market mechanisms for ecosystem functions, the government therefore has a crucial role to play.
- Scope, which we have defined as the distance between the provision of the ecosystem function and the beneficiaries (from local to global), influences the type of financing mechanism that is most appropriate.
- Each type of financing mechanism has its (dis)advantages which must be assessed for each specific situation. There is not one mechanism that is most appropriate under all circumstances.
- Poverty reduction is becoming increasingly an important factor in ecosystem management and protection. The issue of who has rights over what and receives funding thus is important in implementing financing mechanisms.

In this chapter we will analyze the knowledge questions that were put forward in chapter 1 with the information brought together in this study. We will review each knowledge question in turn.

3.1 Financing mechanisms per function and level (local, regional, national and global)

We cannot answer the question of which financing mechanism is most suitable for which function and at which level, when we do not take into account the governance regime (and thus also the property rights) that are in place to manage the ecosystem and the provision of environmental functions. Some environmental functions have a more public goods nature (they are enjoyed by many people who cannot be excluded and their enjoyment does not reduce the quantity and quality of the environmental function). Other environmental functions have a more private goods nature (people can be excluded from enjoying or using these functions and the use of the function reduces its availability).

Self organized private market arrangements

These financing mechanisms are expected to be implemented for functions that have a private good nature (such as timber) and thus have a high degree of excludability and rivalry (see Table 1). Most production functions of ecosystems fall into this area, because they are tangible and thus can be traded in a market. The level (or scope) can be from local to international, depending on the market. It must be noted however, that when the level of the market becomes more wide (from local to international), the role of the government in setting the institutional environment conditions becomes more important. Although private parties may agree on a certain financing mechanism, such as certification, the legal framework for enforcement must be in place. At a

local level, parties (with the help of local authorities) may sort out any conflicts they have with each other. At an international level, usually some type of formal legal system is necessary.

Voluntary private, non-market funding mechanisms

These financing mechanisms are quite flexible, in the sense that they can be applied to any environmental function supplied by different governance mechanisms at different levels. However, one could expect that they play more at a local, regional and national level than an international level. Mechanisms such as lotteries often are not relevant at a global level. And one may expect that those willing to make private non-market donations would do so to for a goal that is in close proximity so that they can see how the funding is used. However, for some functions that are of a global nature, such as biodiversity, international organisations such as the World Wildlife Fund or Greenpeace have been very succesful in rallying support (and funding). These organisations are well-known and trusted names.

Government supported market creation

This financing mechanism can be for any environmental function that is rival or not. For instance, the function of CO₂ fixation (with market creation to trade carbon credits) is not rival, while timber production is (with market creation for sustainable timber trade). The important characteristic here is excludability. Creating a market means assigning property rights to particular functions that can be exchanged ("first allocate then trade"). This means that the environmental function must be excludable. The arrangement is most unproblematic on a national level. At a global level it means that different governments must come to an agreement on how a market is created and will function. As difficulties surrounding the Kyoto protocol shows, this is a fairly complex process.

Government run financing mechanisms

This financing mechanism is typical for environmental functions with a high public goods nature and thus with a low excludability and low rivalry. For these functions, creating markets is extremely difficult. Environmental functions with a public goods nature often fall into the category of externalities and are typically not rewarded. Thus government action is warranted. However, it must be stressed that even in cases concerning environmental functions with a high public goods nature, government action may be combined with more market-based instruments. This arrangement usually is relevant at a national level.

3.2 Strong and weak points of each mechanism

In this section we will briefly address the main strong and weak points of each mechanism. This is closely related to the obstacles and conditions of the mechanism, which will be discussed in section 5.1 and we have tried to avoid overlap.

Self organized private market arrangements

The strong point of this mechanism is that it links up beneficiaries of ecosystem functions with the providers of these services in a more or less direct way. The mechanism itself can be fairly straightforward (in the simplest case a contract), not needing much in terms of complex coordination mechanisms and thus keeping transaction costs relatively low.

However, a weak point is that it usually relies on a well-functioning institutional environment. This condition is not always present in developing countries. For instance, certification can only be a reliable mechanism when forgery can be avoided or dealt with, which requires an effective and efficient judicial system. A well-functioning institutional environment is also necessary to protect

the rights of parties involved in the market arrangement. It is often the (poor) resource users that are relatively vulnerable to exploitation by more powerful market parties.

Voluntary private, non-market funding mechanisms

Again, the strong point of this mechanism, like the one above is that it is fairly straightforward, linking beneficiaries with ecosystem function providers. In fairly simple mechanisms, the coordination costs and transaction costs can be kept low.

A weak point is its voluntary nature, which may lead to fluctuations in the level of contributions. It may be difficult to achieve commitment from the beneficiaries who pay for ecosystem functions. They may lose interest at some point, or may be very sensitive to information (e.g. bad news).

Government supported market creation

The strong point of this mechanism is that it applies to public goods that are difficult to integrate into a market mechanism (between private parties). It uses the market mechanism to achieve efficiency, where hierarchical, top down government-led mechanisms would be bureaucratic and cumbersome.

A weak point is related to its strong point in that this mechanism needs a capable government and also a well-functioning institutional environment. This mechanism can only work when property rights over the ecosystem function can be delineated, allocated and traded. The institutional environment is crucial in protecting these rights. Not all developing countries can rely on such a well-functioning institutional environment.

A more general point about markets is that establishing markets may be a costly way to provision the good (Vatn et al., 2002). Markets may be the cheapest solution for allocating private goods, but not for others. The costs of exclusion may be very costly.

Government run financing mechanisms but also the creation of an enabling environment

The strong point of this mechanism is that it applies to (pure) public goods that have a high degree of non-rivalry and non-excludability are difficult to integrate into any market mechanism. Basically this means that property rights are difficult to assign to beneficiaries¹⁵ and that therefore the government assumes responsibility for the beneficiaries in supporting (and financing) the ecosystem functions.

A weak point is the incapability of the government to collect all information pertaining to the ecosystem functions such as preferences (and values) of people, costs of supplying the ecosystem function, the quality and quantity of ecosystem functions supplied etc. This is in general the common complaint about centralized decisions (Farrell, 1987), in that they cannot properly adjust to the special circumstances of each case. People have (private) information that affect decisions, which might not be available to a central authority. Governments are also not always the most efficient or effective when it comes to implementation and enforcement (e.g. they are prone to corruption or rent seeking). In short, besides market failure, there is also government or policy failure.

3.3 Scope

Scope or whether the ecosystem functions reaches many heterogeneous and distant beneficiaries (wide) or limited homogenous nearby beneficiaries (narrow) is important. If the scope is wide, it will result in higher costs of decision-making (and for establishing a financing mechanism), and

more pertinent information needs (making the global community aware of the ecosystem functions and costs of supplying them). But at the same time it will reach more beneficiaries (Brousseau et al., 2007). Especially when ecosystem functions (such as biodiversity) cross national boundaries, implementing a financing mechanism that will manage contributions from abroad is difficult, as often an overarching governance regime is lacking. The overarching governance regimes consist usually of treaties to which different states are signatories (such as the CBD). When governance regimes are lacking, coercion or enforcement are difficult to implement, thus leading to free riding. To illustrate: the global community benefits without paying for efforts made by for example the Indian government and people to save the Indian tiger.

Which financing mechanisms are appropriate for which functions *and on what level (local, regional, national and global)*? With respect to scope, local can be defined as being narrow in scope, while global as being wide in scope. As was described above, it is not in fact the physical distance that matters, but the scope of the governance regime, the communication between supplier and beneficiary of the ecosystem function (which become more difficult as distance increases), and in particular the power that the institutional environment has over implementation and enforcement of the particular financing mechanism (e.g. how well are property rights protected).

Local level

If the governance regime functions mainly at the local level, which is usually the case with private or common property regimes, and the beneficiaries are also local, it is easier to arrive at agreements as communication and enforcement are relatively easy. Work by Ostrom (1990) has shown that coercion can emerge spontaneously at the local level because, in certain circumstances, local communities can control the behavior of their members due to the stability of groups, the repetition of interactions, the high cost of exclusion through ostracism and the easy diffusion of information on the behaviors of members that sustain reputation effects. At the local level you would expect financing mechanisms such as:

- self organized private market arrangements (a water using company pays farmers to maintain watershed) or
- voluntary private, non-market funding mechanisms (communities help to maintain a certain ecosystem).

State intervention may only be necessary to protect rights, but for the rest relatively little involvement is to be expected.

Regional level

At the regional level, similar financing mechanisms as found on the local level may apply, although communication and enforcement become more difficult:

- self organized private market arrangements (a water using company pays farmers to maintain watershed) or
- voluntary private, non-market funding mechanisms (communities help to maintain a certain ecosystem).

The government may start playing a more important role in facilitating these.

National level

At the national level, the providers and suppliers of ecosystem functions emanating from ecosystems find it increasingly difficult to coordinate (i.e. communication and enforcement) financing mechanisms. Financing mechanisms found on this level are:

- government supported market creation (e.g. a national system of tradable water rights)

- government run financing mechanisms and the creation of an enabling environment become important as

However, with much improved communication and a well-functioning enforcement system, distance between supplier and beneficiary of environmental functions becomes less important. Through various communication devices (such as the internet, newspapers, telephone, television) contact between suppliers and beneficiaries is facilitated. In such situations, we may also see financing mechanisms expected to be mainly found at local/regional levels:

- self organized private market arrangements or
- voluntary private, non-market funding mechanisms.

International level

The main difficulty of the international level is enforcement: agreements between countries are notoriously difficult to enforce. Financing mechanisms that require a high level of government involvement is therefore difficult: on the international level there is no “supra-government” that can implement and enforce these. Agreements signed between governments (such as the Kyoto protocol) may serve as

- government supported market creation (e.g. CDM mechanism)

As is the case at the national level, improved communication and a well-functioning enforcement system may encourage more private-led financing mechanisms:

- self organized private market arrangements or
- voluntary private, non-market funding mechanisms.

Again enforcement can be a problem. A citizen of country A may support the conservation of a certain ecosystem in country B, but has very little influence over how that ecosystem is managed, how property rights are protected etc. An example of this is that many citizens (in rich countries) are willing to support the conservation of endangered animals such as the tiger, panda, gorilla or the whale but that preventing another country or private parties within a country to destroy the habitat of those species is extremely difficult. It depends on the one hand on the strength of international agreements that are made and complied with (e.g. Japan and Norway failing in their controversial bid to overturn an international ban on the commercial trade in whales). On the other on the institutional environment in countries themselves (e.g. no system to define and enforce property rights over water, as is the case in many countries) and the capacity of countries to enforce rules (e.g. the existence of illegal logging in the Amazon that is against Brazil's official rules).

3.4 Poverty alleviation

Emerton *et al.* (2006) observe a shift in official donor and government priorities away from biodiversity conservation and protected areas to poverty reduction, following the 2000 Millennium Summit and the 2002 World Summit on Sustainable Development. Most ODA¹⁶ has become closely tied to the implementation of country-level poverty reduction strategies and to investments which are perceived to contribute more directly to achieving the Millennium Development Goals. Accordingly, international financial assistance for biodiversity conservation has become increasingly driven by social and economic objectives, and especially by its perceived ability to contribute to poverty reduction. This section addresses the issue of poverty alleviation by discussing (i) how the construction of the financial distribution mechanism is arranged, (ii) how the producers of the service can be involved and (iii) what is being paid for and what monitoring is necessary to verify that the service is being rendered.

To assess the the impact of innovative financing mechanisms on poverty, three questions should be asked (Pagiola *et al.*, 2005):

- Who are the actual and potential participants in the financing mechanism, and how many of them are poor?
- What are the obstacles to the poor's participation in the financing mechanism ?
- What are the impacts of financing mechanism on participants?

The Millennium Ecosystem Assessment has identified that some of the people and places affected by changes in ecosystems and ecosystem functions are highly vulnerable to the effects and are particularly likely to experience much of the damage to well-being and loss of life that such changes will entail, while many others throughout the world benefit and prosper from human interactions with ecosystems¹⁷. Thus, the question of financing mechanisms cannot be viewed solely in terms of paying for maintenance costs of ecosystem management (such as demarcating boundaries, developing infrastructure, patrolling, research, monitoring). It must also encompass compensatory mechanisms to mitigate the impact of private, local benefits foregone, especially in developing countries (UNEP, 2003).

Poverty issues tie in with the governance regime and the distribution of property rights as these specify who has a right to what and who has what responsibility. With respect to this, it must be noted that the institutional environment again plays a role in enforcing these rights. And it is equally important in identifying who does not have any rights, or whose rights are violated. Often the rights of more powerful (and wealthy) interests groups prevail over those of weak, poor groups. Powerful and wealthy groups can usually lobby more effectively for their interests (up to paying bribes).

4 Examples of Innovative financing mechanisms

Main points of this chapter

- There are a multitude of financing mechanisms available and in recent years many new mechanisms have been added
- There is no one-size-fits-all approach possible as each financing mechanism is tailored to a specific situation, taking into account the ecosystem function, governance regime, institutional environment, scope and types of beneficiaries.
- Different ecosystem functions can be combined ('bundled') under one financing mechanism
- Beneficiaries often pay through other parties such as government, donors or (international) organizations who play an important role in financing mechanisms
- Revised or new regulation, laws etc can generate new financing mechanisms
- The private sector is actively involved in financing mechanisms. Innovations in financing mechanisms may be expected especially from the private sector, but only when ecosystem functions can generate (short term) profits.

This study will not list and discuss all the financing mechanisms available, as the list would become too long. There is much literature on different financing mechanisms. Meijerink (1995) identified and inventorised several financing mechanisms¹⁸ to manage and sustainable use forests (also applicable for other ecosystems) at the local, national and international level. In the 15 years since this report came out, these financing mechanisms still exist and have been expanded. But many new financing mechanisms have been developed. A quick search on Google demonstrates the scope of the amount of information there is on financing mechanisms combined with environmental or ecological services: it rendered 23.000 hits in December 2007. This shows that there is a multitude of information as well as initiatives available. For thorough and practical overviews we refer to WWF, which has compiled a guide of over 30 different financing mechanisms for species conservation (Koteen, 2004) and a survey of 52 financing options for sustainable natural resource management in developing countries (Gutman, 2003). The mechanisms cover both revenue-raising and economic incentive mechanisms as well as sources of revenue and are presented in Appendix 2. These are the most comprehensive overviews of (innovative) financing mechanisms we have found. ILED compiled a database of 284 projects in which different financing mechanisms were used for various ecosystem functions (Landell-Mills and Porras, 2002) that distinguishes between five different ecosystem functions (See Figure 3).

- Carbon sequestration (27% of projects)
- Biodiversity conservation (25%)
- Watershed protection (21%)
- Landscape beauty (21%)
- Bundled¹⁹ (10%)

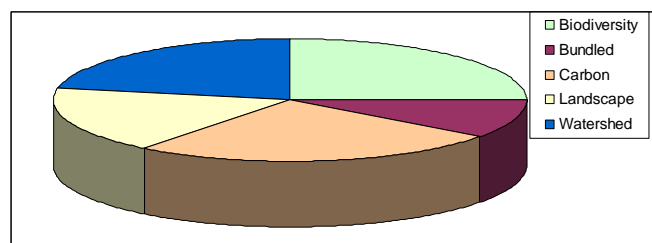


Figure 3: Share of main ecosystem functions targeted by financing mechanisms
(Source: Landell-Mills and Porras, 2002)

4.1 Some innovative financing mechanisms

In this section we will focus on a few innovative financing mechanisms that have been developed and implemented. We claim by no means to be exhaustive.

4.1.1 *Adopt an acre of rainforest*²⁰

This is an example of a voluntary private, non-market funding mechanism. The Rainforest in Cocobolo Nature Reserve in Panama is a mixture of lowland and submontane neotropical rainforest of over 1000 acres (over 400 ha). There are over 300 species of birds including endangered species that are rare or extinct in other areas of Panama. Also highly endangered species like Harlequin frogs - extinct in western Panama, pumas, jaguars, tapirs and at least four species of monkey including the endangered spider monkey, can be found in the area. But even though these forests are home to highly diverse flora and fauna, they are not immune from the threats of hunting and illegal logging.

The NGO CREA is currently protecting Cocobolo Nature Reserve by demonstrating the importance of conservation to local communities and as an educational resource for school groups and visitors. CREA provides training to subsistence farmers to find sustainable alternatives to traditional slash and burn practices. Within Cocobolo Nature Reserve is CREA's field school where school groups and local communities participate in educational activities. In one area of the reserve, CREA has set up an agricultural demonstration farm that shows ways in which agriculture can comply with local ecological systems. The purpose of Cocobolo Nature Reserve is to primarily protect habitat for biodiversity while aiding local communities to develop local solutions for specific agricultural practices that increase wildlife habitat, food production and protect remaining forests simultaneously.

CREA has found an innovative way to obtain funds for their activities by setting up a 'adopt an acre' scheme, in which people all over the world can become a 'guardian' of an acre of rainforest within Cocobolo Nature Reserve. The donation is used for:

- 1) The conservation and protection of Cocobolo Nature Reserve by employing local forest rangers;
- 2) Providing farmer training and conservation activities for local communities;
- 3) Increasing the educational capacity of Cocobolo Nature Reserve by producing educational materials and developing programs

Each guardian will receive confirmation of the adoption by email and an e-certificate that can be printed. The guardian will also receive periodic newsletters about the Rainforest and his/her name with a photo will be represented on the Guardians section in this website.

The donations asked for are 36 US\$ or 26€ to CREA to become the guardian of 1 acre of Rainforest for one year. The procedure is simple and entails low transaction costs. Donations can be made by going to either the website of Charity Choice (UK based) or Network for Good (US based), which are both web-based guides (or brokers) to various charities which allows users world-wide to access over 10,000 charities and non-profit organizations. The Charity Choice online donations service uses an advanced encryption technology provided by Secure Sockets Layer (SSL), a recognized authentication and encryption software. The Network for Good giving states that it meets "the BBB Wise Giving Alliance standards for charity accountability" and has received more than \$100 million dollars in contributions from around 400,000 donors.

Both Charity Choice and Network for Good lower transaction costs by making it easy to donate. But because they are respectively British and US based, they rely on the strong institutional environments and legal systems of Great Britain and the US and can guarantee security of funding. Thus relying on these organisations, CREA does not need to rely on the institutional environment of Panama, which may be less reliable²¹.

Using the Internet, CREA can disseminate information about conservation activities and other 'guardians' in a fast and relatively cheap way. Through emails guardians are kept informed. These again lower transaction costs and are an effective way of communication.

4.1.2 Financing mechanism emanating from carbon markets

This is an example of a government supported market creation. The Kyoto Protocol outlines three types of market-based mechanisms: emissions trading, Joint Implementation (JI) and the Clean Development Mechanism (CDM). Emissions trading allows the 39 governments committed to collective reductions under the Protocol to trade the right to pollute among themselves. Under this scheme, due to start in 2008, a country may choose to buy emission credits from another country that has managed to reduce its emissions below its Kyoto targets.

The CDM has two main objectives:

1. To assist developing countries who host CDM projects to achieve sustainable development.
2. To provide developed countries with flexibility for achieving their emission reduction targets, by allowing them to take credits from emission reducing projects undertaken in developing countries.

The CDM mechanism provides developing countries with an additional source of income through an ecosystem function: carbon sequestration. The market as it is now emerging is still in its infancy. As for any market, prices will depend largely on supply and demand relations and the risks involved. The possibility of getting paid for carbon management is expected to stimulate environmental protection and conservation and is expected to be beneficial for social circumstances as well. The implementation of the trade mechanisms and how this will benefit the local poor will differ per region. The Kyoto agreement has triggered several carbon trade initiatives²².

Besides the financial initiatives linked to carbon, the UNFCCC agreed in 2001 to establish new funds to support technology transfer, capacity building, and adaptation planning in developing countries. More specifically, these are the Special Climate Change Fund, the Least Developed Countries Fund and the Adaptation Fund. The Adaptation fund receives part of the money via a 2% charge of the Certified Emission Reductions from CDM projects.

All funds are ready to receive money from industrialized countries but so far these money flows have not materialized. There are two reasons for this. First, Heller and Shukla (2003) argue that there is only marginal potential for development related work via CDM projects. There remain uncertainties about the rules and practices governing the certification of projects. And perhaps more significantly, the removal of U.S. demand for mitigation has depressed prices for all emissions trading programs, including CDM²³. Second, CDM and development are not a good mix. Targets and priorities are set by industrialized countries and designed to engage developing countries in climate change regimes. Steering investments and technologies toward a more climate friendly development can however have a positive contribution to development. A critical

case to test the potential for CDM in the development process is Africa. Lecocq and Capoor (2003) show that the volumes are low and only a few projects also include development priorities.

So far limiting carbon emission from deforestation is not taken into account in the Kyoto treaty. Deforestation is the single most important source of emission²⁴. In the period 2000-2005 7.3 million ha (nett) was deforested. In the short term carbon mitigation benefits from deforestation are greater than from afforestation (Nabuurs, 2007). The issue is whether deforestation will be taken on board by the UNFCCC. To date, various structures have been proposed for a mechanism for providing positive incentives to reduce emissions from deforestation and degradation (REDD) in developing countries. In order to be effective, the mechanism must continually generate money and create incentives for land-use activities that reduce or avoid deforestation and degradation. Ogonowski *et al.* (2007) identify two types of REDD mechanisms:

1. A market-based approach that would allow developing countries undertaking voluntary actions that reduce their deforestation rate or maintain carbon stocks to generate carbon credits, which they can sell at a market-determined price per tonne CO₂e reduced. Most current proposals envision this market mechanism to be linked to a 'post-2012' carbon market envisioned as an extension of the existing carbon market created under the Kyoto Protocol. In such a system, credits generated from REDD actions would be equivalent to 'post-2012' carbon credits (e.g., those generated through the CDM or its successor) and could be traded along with or in place of such credits.
2. Non-market approaches that would rely on contributions to a fund or funds from developed country governments and sources such as through official development assistance (ODA), international financial institutions, and the private sector. For the REDD mechanism, financing is then distributed from this fund to activities that either reduce deforestation or reward countries for successful forest protection. Contributions could be either voluntary or mandatory.

The most likely options are peat forests in SE Asia (Silvius & Diemont in prep). Also private initiatives underway now being discussed could provide options to link finance options for both biodiversity and carbon conservation, while improving the income for local poor people through mechanisms such as Bio-rights, where local people are compensated through alternative income opportunities and micro-credits for their opportunity costs (www.bio-rights.com).

A mechanism related to REDD is the system of "Voluntary stock carbon credits". This system is being developed by Global Eco Investment and backed by venture capital. Funding is based on the available carbon stock in tropical forests. The price of these - not yet accredited - credits will be determined by the market. There are interested parties in the market ready to buy these carbon stock credits. The system has been launched before the Bali Conference and more details on how the system operates are evolving.

4.1.3 *Farming for Nature*²⁵

Farming for nature is a policy instrument that supports farmers who are confronted with low prices due to changes in the Common Agricultural Policy by offering them the opportunity to switch from intensive farming towards extensive farming systems. Farmers' original incomes are compensated by agri-environmental measures. These are funding for *green* (improved landscape and biodiversity) and *blue* (water retention and conservation) services. The compensation is on an annual base and can be as high as 1000 euro per ha. This high funding for agri-environmental services demonstrates that there is a high demand for these kind of services in Dutch society.

Around 20 percent of the Netherlands (720,000 ha) is designated now as nature area by the government. Most is concentrated in the National Ecological Framework (EHS), which is also more or less the Dutch contribution to *Natura 2000* as agreed by the EU. In the EHS about half of the land is forest (planted on former heathlands) and the other half is arable land, grassland and meadows. The base area of the EHS are existing nature reserves including forest and heathlands and meadows to support the meadow birds. The policy of the government in the early 1990s was also to buy all private agricultural land within the EHS, but this policy has changed because policy-makers believe that farmers should be involved.

In 1995, farmers in Gaasterland (an area of 500 ha and one of the proposed areas of the EHS) did not agree to sell their land. They wanted to continue farming taking on board the public demand to generate more biodiversity in agricultural land. Farming for Nature is somewhat different from other approaches such as in Gaasterland. Its focus is on continuation of farming but with provision of services such as nature, landscape and conservation of water resources.

The income generated for farmers in the Farming for Nature concept is about the same as other agri-environmental funding systems (SN and SAN) applied in Gaasterland and elsewhere in the EHS. The difference is that in Farming for Nature the ministry shares the costs with local stakeholders. In Farming for Nature the ecological prerequisites (water level; level of nutrients/manure allowed) are included in the farming system. This provides more freedom for the farmer-entrepreneur and probably also more sustainable results for biodiversity and landscape.

Farming for Nature experiments sponsored by the ministry and local interest groups are ongoing in the polder region (Polder van Biesland; 100 ha) and in the sandy part of the country in the Twickel estate (1000 ha). Within Interreg projects other Farming for Nature projects are in progress.

Another interesting case is the 'farm estate de Bleek'. The concept of a farm estate was invented by the municipality of Boxtel taking on board the Farming for Nature approach. Financing is through a compensation mechanism called 'red for green'. In the case of 'red for green' financing, the project is achieved by compensation funding for depreciation of the value of the farm land as this land is allocated in the future in the zoning plan as nature area. This change in land use causes a depreciation of the land value of about 25,000 euro per ha. The financial compensation is provided by allowing to build one or more landscape friendly houses in the farm estate. In a region where housing is permitted land costs 300 euro/m³ as compared to 3 euro/m³ for agricultural land. The interesting issue here is that the farm estate concept allows to combine farming in a 30 ha farm (outside the EHS) with arable land with the management of 1000 ha of heathland (Kampina nature reserve). The presence of what is now a nature reserve (Kampina) is of vital importance for the extensive beef producing farm, whereas the private arable land outside the EHS is important to grow sufficient fodder crops.

In conclusion a few remarks. There is a high demand for nature in The Netherlands, which provides new opportunities for farming. But already now farmers manage a lot of grassland and heathlands in public owned nature areas. If these farmers disappear due to changes in the EU Common Agricultural Policy also nature conservation will be badly affected. Now farmers are even paying nature organisations to allow their cattle to graze grassland and heath in the public nature reserves. In case farmers abandon their farm there will no longer be a net income from the farm to nature organisations. Without farmers there is no longer an income for nature conservation organisations, but a cost of 1000 euro per ha to maintain grasslands designated as *Natura 2000* area. Farming for Nature is a tool for both rural policy and achieving goals of *Natura 2000*.

Recently the EU administration has agreed with the funding mechanism developed for Farming for Nature as far as the demonstration farms are concerned.

4.1.4 Bio-rights²⁶

Bio-rights is an innovative financial mechanism that combines sustainable livelihood development and environmental conservation. By providing incentives to poor local communities for conserving their natural environment, Bio-rights reverses the ongoing pattern of environmental degradation that increasingly threatens livelihoods and economies around the globe.

Bio-rights is based upon three simple but powerful elements:

- Step 1. Local communities receive micro-credits for development of sustainable income generating activities.
- Step 2. Communities don't repay their loan and associated interest by financial means, but instead pay interest in the form of conservation services, such as reforestation, habitat protection and alteration of unsustainable practices.
- Step 3. Micro-credits are converted into grants, and subsequently into community-based revolving funds for sustainable development, once conservation measures prove successful and sustainable.

Combined with well established natural resource management activities such as awareness raising, training and community empowerment, this innovative approach renders high levels of efficiency and sustainability, extending well beyond those of many ongoing conservation and development initiatives.

The Bio-rights initiative has been established to address the following issues:

- Unsustainable practices resulting from poverty are a driving force behind nature degradation, climate change and biodiversity loss.
- Environmental degradation in turn leads to loss of natural resources and poverty.
- The negative loop of poverty and nature degradation causes increasingly severe social and environmental problems and economic losses at international scale.

An integrated multi-sectoral approach is needed to solve these problems. Bio-rights is a tool to accomplish this. Bio-rights' integrative approach brings along a range of distinct advantages: it improves livelihoods of local communities in a sustainable way and at the same time safeguards nature's environmental functions for future generations. The mechanism also builds awareness among local stakeholders with regard to sustainable natural resource management. As such Bio-rights unifies the priorities and needs of local communities, conservationists, development organizations, governments and the corporate and finance sector.

The approach is of interest to all stakeholders that deal with people or natural resources. The concept might directly suit the business needs of the corporate sector. It might as well comply with corporate responsibility and global obligations such as reduction of greenhouse gases. For governmental bodies it might be a tool to combat large-scale problems such as climate change and biodiversity loss and to target objectives stated in the UN Millennium Development Goals. For conservation and development organizations, Bio-rights provides an innovative multi-sectoral approach to complex socio-environmental issues.

4.1.5 Trust Funds

Trust Funds are not new but are receiving more attention as a sustainable financing mechanism. The WWF²⁷ states that (conservation) trust funds provide an investment avenue that can be used to finance program costs over many years. Trust funds also establish the administrative and management mechanisms that help involve local people and enable non-governmental organizations to work together with government agencies to carry out conservation activities. By providing sustainable funding, building local capacity, and encouraging stakeholder coordination, conservation trust funds can greatly enhance the impact of conservation investments.

A trust fund can be broadly defined as a financial asset that fulfils three criteria:

1. is legally restricted to a specified purpose;
2. must be kept separate from other sources of money (such as a government agency's regular budget); and
3. is managed by an independent board of trustees or directors. Depending on the legal system of the country, trust funds can be established as foundations, nonprofit corporations, common-law trusts, or special institutions.

Trust funds can be financed by debt swaps, through grants or donations, or through other financing mechanisms such as earmarked taxes and fees. There are three primary types of trusts funds: an endowment fund (where the interest, but not the capital is spent); a sinking fund (where the income and part of the capital is spent every year, eventually sinking the fund to zero over a pre-determined time); and a revolving fund (which continually receives new revenues from earmarked taxes or fees and continually spends these revenues).

An alternative to a trust fund is the "regional account" that has been implemented in the Netherlands²⁸. The objective of the Regional Account in the Province Noord-Brabant is to generate financial means for sustainable management of Het Groene Woud, a green area between the cities of Tilburg, Eindhoven and den Bosch which was designated a national Landscape by the Dutch government in 2005.

The concept of the Regional Account is simple but attractive. It allows people, public institutions and the private sector to contribute towards the sustainable development of Het Groene Woud, by opening a special savings account at the bank (an Isis Account), and depositing a certain amount. ASN donates 0.15% of the total savings to the Horus Fund. This is the fund from which innovative projects that ensure the sustainability and quality of Het Groene Woud can apply for financial support (as of the 1st of January 2008). The customer receives the market rate of interest and the usual facilities for withdrawal of the deposit. However, customers can choose to donate their interest to Het Groene Woud.

A cost-benefit analysis done for Het Groene Woud has shown that every euro invested has a return of three euros. In July 2006, already 34 million Euro was pledged in savings. This approach is also interesting for the ASN bank in getting new customers. Plans are being made to also make possible to save via the internet.

4.1.6 Shares in conservation projects²⁹

A very innovative financing mechanism consisting of conservation sanctuaries financed by shares that were traded in the stock market was developed by Earth Sanctuaries Ltd (ESL) in Australia. The Earth Sanctuaries Ltd was set up in 1985 by John Wamsley to provide a private sector

vehicle for the conservation of biodiversity, specifically mammals. It set up 10 sanctuaries spanning around 90,000 hectares. Several endangered species were bred in captivity. The company was listed on the Australian Stock Exchange in 2000. To fund its activities, ESL involved in a number of income generating activities, such as ecotourism, provision of consultancy and services (such as the removal of feral species from private properties) and the sale of non-endangered captive animals. The sanctuaries thus provided both a mix of private and public functions.

However, by early 2002, the company faced a number of major problems that threatened its survival, including difficulties relating to the uniqueness of its business model, cash-flow management, the process of securing capital from external investors and an overly ambitious growth agenda. Since ESL had listed on the Australian Stock Exchange, the prices of its shares decreased progressively. Many investors found that it was not a particularly appealing investment because the potential profits and earnings growth was perceived as being some years in the future. Short-term returns were unlikely and revenue was almost non-existent. In 2005, it spent \$1.5 million more than it earned, and despite raising \$30 million, the company could not continue without a further cash injection of \$10 million. The company was delisted in 2005.

We have included this financial mechanism because there are some important lessons. First of all, it is very difficult to set up such a financial mechanism for ecosystem functions that are essentially public goods which do not generate any (immediate) financial revenues. For instance, a difficulty in promoting private conservation efforts in Australia stems from the prohibition on the sale of captive bred native species. It is also problematic if the public sector provides access to substitutable biodiversity resources via national parks and reserves at close to zero cost. Moreover, such parks and reserves receive subsidised infrastructure provision and have most of their operating costs met from the public purse. Markets for viewing (rare) flora and fauna are narrow and there is simply not a sufficiently 'level playing field' for initiatives such as ESL to survive.

4.1.7 Venture Capital³⁰

Several initiatives involving venture capital have been established the past decade (Landell-Mills and Porras, 2002). We highlight one – the Canadian Global Environment Emerging Markets Fund (GEEMF). This venture capital intermediary makes equity investments in environment-oriented companies, projects and privatizations in emerging market countries, with a particular focus on environmental infrastructure and environmental municipal services such as clean energy (small hydro, natural gas-fired power, natural gas/LPG distribution), clean water (potable water treatment and delivery, wastewater treatment for municipalities and industry), and waste management. GEEMF especially seeks co-investment opportunities with established operating companies engaged in joint venture or other operational partnerships with local firms serving environment-related industries in eligible emerging market countries. Investment size generally ranges up to \$10 million, though can on occasion be greater.

Its regions include Region: NIS as well as emerging markets in Asia, Latin America, Europe, the Middle East, and Africa. The Fund aims at operating companies or projects with demonstrated cash flows, significant long-term revenue growth potential, and high anticipated margins of profits from operations. Projected rates of return to the investor should substantially exceed the current risk-free return available in individual markets, with additional consideration for risks related to the volatility and convertibility of currency and the degree of liquidity for the investor.

This example shows that venture capital in environmental projects look for “high anticipated margins of profit” and therefore are not very attractive for ecosystem functions that have a public goods nature.

4.2 Conclusion

This chapter has aimed to highlight a few innovations in financing mechanisms for ecosystem management. By no means it has tried to be complete or has meant to convey the message that ‘old’ financing mechanisms are no longer relevant. The innovative financing mechanisms seem to arise out of two innovations. First a revision in legislation such as in the case of agri-environmental schemes or new provisions under the Kyoto Protocol (or the Bali agreement). Second, the involvement of the private sector which is often linked to also financial innovations, such as the venture capital example or the shares in sanctuaries listed at the Australian Stock Exchange.

New or adapted legislation is often crucial for the emergence of innovative financing mechanisms because it either enables these to emerge, creates a level playing field or enables the creation of monetary value of ecosystem services that can be traded. But legislation alone is not enough – a well functioning institutional environment is necessary to implement and enforce this. Thus it is the question whether these can be implemented in developing countries with weak enforcement capacity.

The involvement of the private sector seems to be feasible only in case there are financial returns to the ecosystem management—such as ecotourism, selling of goods (animals, timber, or other products). For ecosystem functions with a public goods nature where such financial returns are not possible, financial innovations linked to the private sector seem improbable.

5 Conclusions

In this chapter we will lay out some conclusions that were derived from the previous chapters and provide some “best bets” or pointers for implementing innovative financing mechanisms for ecosystem management. We would like to stress that the list of pointers is by no means exhaustive.

5.1 Obstacles and conditions for successful implementation to ecosystem management

In setting out how innovative financing mechanisms are embedded in the institutional environment and linked to governance regimes and beneficiaries (in chapter 2: The context and preconditions of innovative financing mechanisms), we already discussed some conditions as well as obstacles. In this section we will bring these together and focus on the main ones that are related to innovative financial mechanisms.

We have established that the **type of governance regime of ecosystems is important for ecosystem management**. In essence, governance regimes exist of a property rights system and the rules in place that regulate how the ecosystem is managed. The main obstacles and condition for successful implementation to ecosystem management lie in these two issues.

First, unclear or unprotected property rights often lie at the basis of most environmental destruction (Pearce and Turner, 1990; Heltberg, 2002). It is important to note that rights on paper (*de jure*) are not sufficient. The actual implementation and enforcement of those rights (*de facto*) are crucial and require a well-functioning institutional environment (e.g. judicial system). The type of property rights system does not a priori define the success of ecosystem management: a state owned ecosystem may be managed just as well as an individually owned ecosystem. However, **the type of property rights system should fit the type of ecosystem and the type of services and goods it produces**. Vatn *et al.* (2002) make the point that while private goods may be provisioned under a variety of systems, public goods seem to demand some type of public property rights system (thus state or common property rights) and funding structure if they are to be produced at all.

Having set out this first set of conditions, it is easy to see that the obstacles for successful implementation to ecosystem management consist of situations where these conditions are not in place. In many developing countries property rights are not always well-defined or have eroded through the influence of powerful elites. Especially **the property rights of poor communities over local resources are often not well-protected and prone to capture by more powerful groups**. Ecosystems that were once managed in a sustainable way become de facto open access resources, or have become the de facto property of other groups. It is often the governments who have an important role in protecting the property rights. But difficulties in mending such situations arise when members of the government have an interest in capturing rights over certain resources.

Secondly, clear rules must be in place that define not only **who has what rights but also what responsibilities with respect to the management of the ecosystem, but also on how the ecosystem is managed**. These rules will differ per ecosystem and per group of resource

managers, and there is not “one size fits all” prescription possible. Common property resources are often difficult to manage, as rules must be agreed on and enforced by a number of people – i.e. depend on collective action. Ostrom (1990) has outlined several successful cases in which this was achieved.

Rules will be successful when the incentives for sustainable management are aligned with the interests of the resource managers (i.e. all stakeholders involved in the management). There has been a growing literature on this, making use of game theoretic situations (Ostrom *et al.*, 1994). The famous prisoners’ dilemma in which two prisoners do not cooperate and end up in a second-best situation has been thought to apply to many (common pool) resource management problems. For instance, two fishers may agree on keeping a certain quota of fish that will achieve sustainability, but each has an incentive in secretly fishing a bit more. If both do this then they will end up in an unsustainable situation. The ability of stakeholders to come to agreements, communicate and enforce agreements is crucial in the success of ecosystem management. The larger the number of stakeholders involved, the more important formal rules become, as well as mechanisms that can enforce these. A small group of stakeholders may not need these and can function well with more or less informal rules. Cultural preferences are an important factor in how these rules are formed.

Transaction costs play an important role in whether the rules in place lead to sustainable management of ecosystems. Transaction costs consist of:

- Contact costs consist of finding and exchanging information between people who want to agree on some transaction.
- Contract costs refers to the specific agreements that are made between the people in the context of a transaction.
- Control costs entails the subsequent monitoring and enforcement of these agreements.

Transaction costs usually consist of time and energy spent on contact, contract and control and can often not be measures in monetary terms. This may be one reason why they are often overlooked. However, transaction costs are important in determining whether a certain set of rules that are in place are successful. If the time and energy spent on applying these rules are too high for stakeholders, they will abandon them or search for other rules.

The rules in place are not only important in determining the sustainability of ecosystem management, but also in determine how equitable the management is. **Who reaps what benefits (e.g. from an innovative financing mechanism)** is determined by these rules. If they lead to inequitable outcomes, people who are disadvantaged may start pushing for change.

Information is crucial in several

5.2 “Best bets”

Based on the previous paragraphs we will assess what mechanisms have the best perspective to be introduced and under which conditions. We have found that the institutional environment is a crucial factor in determining the successfulness of mechanisms, even in the case of self organised private market arrangements.

So what to do when the institutional environment is not conducive? Then a mechanism which is least dependent on the institutional environment is the best bet, which would be voluntary private, non-market funding mechanisms. The CREA example illustrates this well. It relies on webbased mechanisms that are embedded not in the institutional environment of Panama, which may be less reliable but in the more reliable institutional environments of the UK and US.

If we assume that the institutional environment is functioning and reliable, the question is which mechanism constitutes another “best bet”. There is a tendency among economists to favor market transactions and market allocations in general. Vatn *et al.* (2002: 6) observes “a search for finding ways to privatize the provisioning of public good attributes either in the form of constructing or mimicking some market allocations or by establishing various types of ‘clubs’”. This has for example fostered a search for ways in which tourists may pay for landscape experiences via hotel prices or toll on roads.” But they note that “there is nothing inherent in markets or clubs that should give them any a priori superiority.” For them the criteria that will help decide which mechanism is most appropriate are the transaction costs involved: that transaction costs vary between types of goods and types of regimes (Bromley, 1991). Thus market-based mechanisms may be the best solution for certain private ecosystem functions but not for others. This is in the line with institutional economics literature, which postulates that the financing mechanism chosen (in this case financing mechanisms) depends on the transaction costs involved in that arrangement (Williamson, 1998).

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6.1 Appendix 1: NGOs, international organizations, and GAAs involved in funding ecosystem management

1. CARE
2. Center for International Forestry Research (CIFOR)
3. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)
4. Conservation International (CI)
5. Danish International Development Agency (DANIDA)
6. Directorate-General for International Cooperation (DGIS) of the Netherlands Ministry of Foreign Affairs
7. Edinburgh Centre for Carbon Management
8. Forest Trends
9. Global Environment Facility (GEF)
10. German Technical Cooperation (GTZ)
11. Inter-American Development Bank (IDB)
12. International Fund for Agricultural Development (IFAD)
13. International Institute for Environment and Development (IIED)
14. IUCN–The World Conservation Union
15. Katoomba Group
16. Rewarding the Upland Poor in Asia for Ecosystem functions They Provide (RUPES)
17. The Nature Conservancy (TNC)
18. United Kingdom Department for International Development, Forestry Research Programme (DFID)
19. United Nations Environment Programme (UNEP)
20. United Nations Food and Agriculture Organization (FAO)
21. Wildlife Conservation Society (WCS)
22. Winrock International
23. World Agroforestry Centre (ICRAF)
24. The World Bank
25. WWF

6.2 Appendix 2: Overviews of Financing mechanisms for nature conservation

A: Financing species conservation

Financing mechanism	Source of Revenue
Government Revenue Allocations	
Taxes and Bonds Earmarked for Conservation	Taxpayers, investors
Real Estate and Development Taxes	Property owners, property developers
Lottery Revenues	Gamblers
Premium-Priced Motor Vehicle License Plates	Vehicle owners
Wildlife Stamps	Postal customers, hunters and fishers
Economic Instruments to Stimulate Environmental Investment	Investors
Debt Relief	Donors, governments, NGOs
Grants, Donations, and Loans	
Bilateral and Multilateral Agencies	Donor agencies
Foundations	Individuals, corporations
Conservation Trust Funds	Multi-source
Nongovernmental Organizations	NGO members and supporters
Private Sector	Private companies
Tourism Revenues	
Protected Area Entry Fees	Visitors to protected areas
Recreation Fees	Users of additional protected area resources
Species Related "User Fees"	Wildlife reviewers
Hunting Fees and Green Safaris	Hunters, wildlife sportsmen
Commercial Operations in Protected Areas	Tourism operators, tourists
Airport Passenger Fees and Hotel Taxes	Tourists
Voluntary Contributions from Tourists and Tourism Operators	Tourists, tourism operators
Revenue from the Sale and Trade of Wildlife	
Revenue from Illegal Hunting and Wildlife Trade	Hunters, wildlife traders
Wildlife Auctions	Game parks, private purchasers
In Situ-Ex Situ Species Conservation Partnerships	Zoo agencies
Species Product Certification	Consumers
Financing Habitat Acquisition and Management	
Purchase or Donation of Land or Property	Property owners, donors
Conservation Easements	Property owners, donors
Wildlife Conservancies	Property owners
Conservation Concessions	Conservation investors
Tradable Development Rights and Wetland Banking	Property developers
Natural Resource Extraction Revenues	
Fines	Natural resource extraction companies
Royalties and Fees	Natural resource extraction companies
Taxes	Natural resource extraction companies
Hydroelectric Power Revenues	Power producers
Voluntary contributions from natural resource companies	Natural resource extraction, power companies
For profit investment	
Market investments promoting species biodiversity	Private investors

(Source: Koteen, 2004)

Mostly public funding

- 1 Public budget funding of SNRM projects and programs
- 2 Earmarking for SNRM financing a percentage of one or more general taxes collected at the national, state, or local level
- 3 Special laws delivering extra-budgetary financial support to particular social groups, geographical areas, or activities
- 4 Tax breaks or subsidies for SNRM activities
- 5 Earmarking for SNRM financing a percentage of one or more selective taxes collected at the national, state, or local level (eg, taxes on alcohol, tobacco, energy, airports, ports, cruise ships, hotel and resorts charges, and others)
- 6 Earmarking for SNRM financing a percentage of one or more charges, fees, fines, and penalties related to the use or abuse of the natural resource eg, water charges, groundwater charges, stumpage fees, and other natural resource extraction fees; hunting fees and entrance and user fees in protected areas; charges on emissions and feedstock, release or dumping of fertilizers and pesticides; charges related to solid waste, toxic waste, and environmental fines and penalties; etc)
- 7 National, state, and local development banks' loans
- 8 Debt-for-nature swaps
- 9 Environmental funds (endowment, sinking, and revolving)
- 10 Multilateral aid and aid from development agencies
- 11 International development banks' loans
- 12 Bilateral aid and development agencies

Mostly private not-for-profit sources

- 13 Community self-support groups and other forms of social capital
- 14 Secular and faith-based charities
- 15 Special fundraising campaigns eg, "Save the pandas," "Friends of the national park," etc)
- 16 Merchandising and good cause marketing
- 17 Lotteries
- 18 Social and environmental NGOs
- 19 Foundations

Mostly private for-profit sources

- 20 Household saving and labor assets
- 21 Community-based enterprises—formal (co-ops) and informal
- 22 Micro-saving, micro-credit, and micro-insurance
- 23 Semiformal and informal micro-finance institutions
- 24 Private investment by local businesses
- 25 Commercial bank loans
- 26 Direct investment by nonlocal investors
- 27 Private-public partnerships
- 28 Private sector–community partnerships
- 29 Compensatory environmental investment of large developments
- 30 Venture capital
- 31 Portfolio investors (green funds)

Mostly payments for environmental products

- 32 Markets for organic agricultural products
- 33 Markets for sustainably harvested non-timber forest products
- 34 Markets for certified forest products
- 35 Markets for certified fishery products
- 36 Resource extraction charges directly collected by the SNRM project
- 37 Allocating part of national, state, or local extraction fees to SNRM projects in the extraction areas

Mostly payments for environmental services

- 38 Markets for biodiversity conservation and bioprospecting
- 39 Markets for carbon offsets
- 40 Markets for watershed protection
- 41 Markets for landscape beauty, including ecotourism and tourism
- 42 Markets for development rights and conservation easements
- 43 Quasi-markets and non-market systems of payments for environmental services
- 44 Users fees and entry fees directly collected by the SNRM project
- 45 Allocating part of national, state, or local user fees to SNRM projects in the area providing the environmental services
- 46 Global Environmental Facility (GEF) payments for the global commons
- 47 Funds for SNRM associated with international treaties
- 48 Other possible systems of international payments for global commons
- 49 Earmarking for SNRM part of one or more international taxes

Mostly reducing the need for additional financing

- 50 Freeing up existing public resources (eg, redirecting money from harmful public subsidies to SNRM projects)
- 51 Encouraging the mobilization of private resources (eg, securing tenure, promotion, regulation streamlining)
- 52 Mechanisms to increase the accessibility to and reduce the need for and cost of financing (pooling, insurance, guarantees, leverage, charrettes, financial literacy training)

Source: (Gutman, 2003)

C: Type of contribution according to ecosystem function (in terms of number of projects)

Contribution \ ES	Biodiversity	Carbon	Landscape	Watershed	Bundled	Grand Total
Agri-environmental scheme	2			2	3	7
Biodiversity business (NTPF)	3				2	5
Bioprospecting	12					12
Carbon offset by companies		55			1	56
Carbon offset by companies & biodiversity		8			6	14
Carbon offset by government		7				7
City / province				9		9
Conservation funding	24	2	1		4	31
Debt for nature swap	5					5
Fair trade	10			2	1	13
Hydropower				9		9
Local users				18		18
Market created by policy	4		1	7	1	13
CSR	6				1	7
Various credits				1	4	5
Water authority				12		12
Recreation	2		48	2	4	56
Recreation & bio-prospecting	1					1
Recreation & conservation					1	1
Undefined	2				1	3
Grand Total	71	72	50	62	29	284

(Based on Landell-Mills and Porras, 2002; calculations by the authors)

D: Source of funding per ecosystem function (in terms of number of projects)

Financer	Biodiversity	Bundled	Carbon	Landscape	Watershed	Grand Total
Private	20 (28%)	10 (34%)	46 (64%)	47 (94%)	34 (55%)	157 (55%)
Private (Multinational)			6 (8%)			6 (2%)
Private & international NGO	9 (13%)					9 (3%)
Private & NGO	5 (7%)	6 (21%)	4 (6%)	1 (2%)	1 (2%)	17 (6%)
Public	11 (15%)	6 (21%)	3 (4%)		25 (40%)	45 (16%)
Public & NGO	2 (3%)		1 (1%)			3 (1%)
Public & international NGO	6 (8%)		1 (1%)			7 (2%)
Public & Private	3 (4%)	4 (14%)	7 (10%)		2 (3%)	16 (6%)
Private, Public & NGO	3 (4%)		2 (3%)	1 (2%)		6 (2%)
NGO	1 (1%)			1 (2%)		2 (1%)
International NGO	10 (14%)	1 (3%)	2 (3%)			13 (5%)
International donor	1 (1%)					1 (0%)
Grand Total	71 (100%)	29 (100%)	72 (100%)	50 (100%)	62 (100%)	284 (100%)

(Based on Landell-Mills and Porras, 2002; calculations by the authors)

NB We have distinguished the source of funding according to financer. More often than not, interests are bundled and delegated to the government, a nature conservation organisation (such as WWF), or a donor agency. In the IIED database we labeled the financers as public (national governments, city), private (private persons or firms), including multinationals (e.g. Shell), NGO (local or international organisation), and international donor (ODA or UN agency). Usually a combination of the categories was made to contribute to the governance regime providing the ecosystem functions. These are very broad categories, as usually a mixture of financers is associated with the different projects.

6.3 Appendix 3: Some do's and don'ts – results of the workshop of 12 December 2006

Practitioners

Practitioners whose aim is to protect an ecosystem usually have to combine different ecosystem functions with various financing mechanisms and beneficiaries. A one-size-fits all approach cannot be determined (cf. Lette and Rozemijer, 2005). Practitioners must review their own situation and find solutions that fit best. But some general suggestions can be made. Emerton *et al.* (2006) have assembled several suggestions for practitioners, six of which we will repeat here:

- 1) As there are multiple different ecosystem functions and financing mechanisms, practitioners should build a diverse **funding portfolio**, going beyond conventional mechanisms and including multiple funding sources. Building a diverse, stable and secure funding portfolio will also minimize funding risks and fluctuations.
- 2) Making good use of financing mechanisms also means that funds are managed and administered in a way that promotes **cost efficiency and management effectiveness**, allows for long-term planning and security.
- 3) The costs of conserving ecosystems do not only include direct costs but also **indirect and opportunity costs**, for instance local development benefits. Thus targeting cash and in-kind support to groups who incur costs, while also securing fair contributions from beneficiaries, is critical to financial and economic sustainability. Thus practitioners should take a comprehensive view of costs and benefits: covering the full range of ecosystem costs, ensuring that those who bear costs are recognized and adequately compensated, and that those who benefit make a fair contribution to their maintenance. This is easier at a local level than a global level as was discussed in section 3.3 on Scope.
- 4) Often there are broader **market, price, policy and institutional distortions** that act as obstacles to ecosystem funding and financial sustainability. Although correcting them is a role for policy makers (see below), practitioners have a role in identifying and communicating these to relevant stakeholders.
- 5) Practitioners are advised to develop a **business and financial plan**. As Emerton *et al.* (2006) state “ Just as managers in the private sector are expected to understand financing issues and tools, [ecosystem] managers are increasingly required to develop the same competency. No private business manager could expect an enterprise to thrive without good information on costs, cash flow, investment strategies and potential sources of funds. [Ecosystem] managers (...) need a similarly detailed understanding of the financial implications of managing their site or system.” Such business and financial plans identify not only how much money is needed for different activities, but also locates the most appropriate funding sources for short, medium and long-term needs. They can also form the basis for priority setting, both in collecting revenue and spending it.
- 6) Practitioners should put much effort in **communication and information dissemination about** the importance of ecosystem functions, the success by the ecosystem managers in securing the provision of ecosystem functions. The internet can be a very cost-effective way of doing this, while meeting potential donors face to face may be costly but more effective³¹. Lette and Rozemijer (2005) also make the point that it is important to clearly identify the services being provided. Instead of providing information in general terms

such as “water catchments protection” it may be more important to define the service into a service that beneficiaries enjoy, such as “reliable water supply”. Pagiola *et al.* (2002) therefore suggest to translate the ecosystem function into a marketable service, which may be difficult in some cases.

- 7) **Beneficiaries should have confidence in the effectiveness of the financing mechanism** (see also Lette and Rozemijer, 2005). They should know whether their contribution (whether an indirect tax funding or a direct funding) has been effective in the sustained provision of the ecosystem functions (Meijerink, 2007). This is why practitioners should contribute to monitoring the ecosystem functions adjust the functioning of the mechanism should problems arise (Pagiola *et al.*, 2002)
- 8) Providers of environmental services should actively explore funding possibilities, which might mean **finding out who is willing to pay, promoting the importance of the environmental services provided** (e.g. by disseminating information), and offering funding mechanisms that are easy to use for beneficiaries (i.e. lower transaction costs). Various providers of environmental services could lower costs by working together.

Policy makers

- 1) For policy makers an important role is to understand the needs and requirements of practitioners. Establishing effective communication channels with practitioners and other stakeholders involved in ecosystem management and ecosystem functions provision is crucial. The needs and requirements of different practitioners may be diverse, as ecosystem, ecosystem functions, and financing mechanisms are diverse.
- 2) Policy makers have a more general role ensuring that property rights are in place and enforced, and that the right property rights system that fits with the governance regime is defined. In ensuring this, it has an important role in determining what rights vulnerable and politically weak groups have (or do not have) and how these can be protected against exploitation of more powerful groups in society.
- 3) The previous point also links up with the overall institutional environment. Policy makers should try to create an institutional environment that enables parties to come to agreements and enforce these agreements. This can involve different cases. We have seen that a well-functioning institutional environment is requires for three of the four financing mechanisms for financing mechanism s:
 - Self organized private market arrangements (left hand upper corner);
 - Government supported market creation (left hand bottom corner);
 - Government run financing mechanisms but also the creation of an enabling environment (right hand bottom corner).
- 4) Policy makers should also be aware of policies that have a detrimental effect on the protection of ecosystem functions (e.g. perverse incentives or taxes and subsidies) as well as on the implementation of financing mechanisms and try to change these where possible.
- 5) Governments often represent the (public) interests of groups in society. This is especially the case for ecosystem functions that have a public nature. The government is expected to protect these ecosystem functions in the interest of the public, and therefore (e.g. through taxation) pay for the maintenance. But government may find it difficult to know the preferences of the public, their willingness to pay (i.e. be taxed). This problem is sometimes

couched in terms of “how to gain public support”. Taxation is an unpopular measure, and policy makers must find good reasons to implement this. Policy-makers may ask researchers to do a valuation study of an ecosystem, which basically measures the value that society attaches to an ecosystem. But preferences and values are not fixed and can change through information and communication. Policy-makers have thus an important role in information dissemination and communication on the importance of ecosystem functions.

- 6) Policy-makers may play a role in reducing the transaction costs of financing mechanisms. They can do this by:
 - Making it more easier for practitioners and potential beneficiaries to contact each other.
 - Facilitating contracts (i.e. agreements) that are established between different parties involved in financing mechanisms
 - Facilitate monitoring and enforcement of agreements that have been made between different parties involved in financing mechanisms. Parties usually have the option of going to court, but other more flexible conflict resolution mechanisms may be more appropriate, especially in development countries.
- 7) The role of policy-makers is also crucial in global public ecosystem functions. In these cases not only the interests of their constituents are involved, but the interests of the earth's inhabitants. Here poverty issues may come into the picture. Governments of rich countries may feel the obligation to support the interests of poor countries or poor people in general. As the Millennium Ecosystem Assessment has observed, these interests play an increasingly important role in environmental issues. Policy-makers in rich countries can address these issues by creating an institutional environment through international treaties which will enable financing mechanisms to be implemented, persuading governments of poor countries in not only protecting ecosystems but also supporting the implementation of financing mechanisms.
- 8) Finally, policy makers can support (international) organizations that are involved in protecting ecosystem functions, but more importantly, also are involved in creating and implementing financing mechanisms. A list of such organizations is given in Appendix 1.

Results from working groups

A general conclusion in the working groups was that information, communication, raising awareness is key to ecosystem management, raising funds and implementing successful financial mechanisms:

- 1) Publicize the lessons learned of a successful initiative – success will breed success.
- 2) Keep the message simple and clear
- 3) Messages should have an identifiable image (e.g. polar bear for climate change)

Policy-makers play an important role in facilitating financing mechanisms:

- 4) Often the most essential bottleneck for financing mechanisms is not the availability of funding but the institutional environment. When the institutional environment is extremely weak (and will only lead to negative outcomes), it might be better not to implement financial mechanisms.
- 5) Let income generated from national park revenues flow back into ecosystem management projects and not into general funds
- 6) Facilitate promising pilots, and use “local champions”
- 7) Bring together stakeholders – identify key policy makers with power and try to bring him/her into the process to change things
- 8) Start small with a pilot project, achieve critical mass and change.

- 9) Be creative: an example was used of a project with “leasing black rhino’s” private reserves with black rhino’s who remain the property of the government.
- 10) More emphasis should be placed on international agreements: they should get more authority (“teeth”)
- 11) But international problems should be small and a solution must be attainable (e.g. ozon hole).
- 12) Aim to achieve coherence between different ministries and policies. For instance when The Netherlands decides not to extract gas or fish for cockles in the Waddensea but allow extraction of gas in Russia or cockle fisheries in Mauretania.
- 13) Policy-makers should not participate in projects but should create the conditions in which initiatives can be implemented and succeed (e.g. macro-economic policy, regulation etc). In developing countries, the government is sometimes regarded with suspicion by the local population and active participation would be detrimental to the success of financial mechanisms.
- 14) The Ministry of Finance often has more financial instruments at its disposal than the Ministries that usually engage in ecosystem management (Ministry of Environment, Ministry of Agriculture etc). Examples are taxes, subsidies.

Three types of practitioners can be identified: the suppliers (providers of ecosystem functions), brokers (intermediaries) and beneficiaries.

Suppliers:

- 1) Take into account opportunity costs
- 2) Focus on “commodification” or marketing of ecosystem functions
- 3) Organise: take into account power relationships

Brokers:

- 1) Identify (local) partners and facilitate international cooperation
- 2) Identify stakeholders
- 3) Raise awareness
- 4) Organise

Beneficiaries

- 1) Become problem owner

Finally: “be creative and persevere”!

6.4 Appendix 4: Recent Practical guides to (Innovative) Financing Mechanisms³²

Conservation Finance Alliance. 2002. Mobilizing Funding for Biodiversity Conservation. A User-Friendly Training Guide for Understanding, Selecting and Implementing Conservation Finance Mechanisms

To download: www.conservationfinance.org or <http://guide.conservationfinance.org/>.

Organization: The Conservation Finance Alliance is a partnership of CI, GEF, GTZ, IUCN, Ramsar, Redlac, The Nature Conservancy, UNDP, UNEP, USAID, The World Bank, Wildlife Conservation Society (WCS), and WWF.

Description: Created in 2002, the Conservation Finance Alliance, is a joint initiative of 13 institutions encompassing NGOs, international agencies, and donor agencies to foster the financing of conservation projects. Their Web site describes the Alliance's activities; provides links to related initiatives and institutions, including case studies; and provides links to the Training Guide mentioned above. The Guide is designed to help expand the use of sustainable finance mechanisms to support the conservation of biological diversity. The Guide is an interactive tool that also provides instructions for project financial planning and links to other similar training material.

Country case studies: Ecuador, Suriname, Trinidad and Tobago, Mexico, Uganda, Belize.

Financing options: Markets for watershed protection, biodiversity conservation and bioprospecting, public budget funding of SNRM projects and programs, environmental funds, debt-for-nature swaps, international development banks' loans.

Interagency Planning Group on Environmental Funds (IPG) (2002). The IPG Handbook on Environment Funds

To download:

www.strategyguide.org/Pdfs/GEF/EnvironmentalFundslessonslearnedandfutureprospects.pdf

Organization: IPG is a network of several public and private institutions.

Description: This is a resource book for the establishment and operation of environmental funds. It is intended to share with a wide audience the experience gained by directors and specialists who have been involved over the past 10 years in designing, setting up, managing, monitoring, and evaluating environmental funds.

Country case studies: Mexico (The Mexican Nature Conservation Fund), Costa Rica (FONAFIFO), Puerto Rico (Puerto Rico Community Foundation), Brazil (Abrinq Foundation for Children's Rights), Philippines (Foundation for the Philippine Environment).

Financing options: Environmental funds, multilateral aid and development agencies, and bilateral aid and development agencies.

The Green Buck: using economic tools to deliver conservation goals, a WWF field guide (2005)

Tom Le Quesne and Richard McNally

To download: <http://www.biodiversityeconomics.org/document.rm?id=715>

Organization: WWF-UK

Description: This guide is intended to provide an introduction for the non-specialist to some of the approaches that economics can offer. Rather than being focused on economic theory, it

demonstrates the ways in which economics can be used, illustrated by case-studies from around the WWF network where economics has contributed to conservation.

Financing options: financing conservation, creating markets that support conservation, and influencing policies and plans.

Business and Biodiversity: The Handbook for Corporate Action (2002) Nick Bertrand

Downloadable: <http://www.biodiversityeconomics.org/document.rm?id=716>

Organisation: Earthwatch Institute (Europe), IUCN, WBCSD

Description: In 1997, IUCN and the World Business Council for Sustainable Development published a path-breaking book: Business and Biodiversity - A Guide for the Private Sector. For the 2002 World Summit on Sustainable Development, IUCN and WBCSD joined forces with Earthwatch Institute (Europe) to develop a fully revised 'Handbook for Corporate Action'.

Financing options: the business case for biodiversity, an overview of hot issues, and guidance on biodiversity management strategies.

Markets for Ecosystem Services - A Potential Tool for Multilateral Environmental Agreements (2006)

Anantha Kumar Duraiappah

Downloadable: www.iisd.org/pdf/2007/economcs_markets_eco_services.pdf

Organisation: IIED

Description: As legally-binding instruments, Multilateral Environmental Agreements (MEAs) offer an appropriate institutional structure for supporting market-based instruments such as payments for ecosystem services.

Financing options: use of pro-poor markets for ecosystem services as a tool for increasing synergies between MEAs.

Raising Revenues for Protected Areas, A Menu of Options (2001)

Barry Spergel

Downloadable: <http://www.biodiversityeconomics.org/document.rm?id=398>

Organisation: WWF

Description: In an age of government budget cuts and declining international aid, this guide is intended as a practical tool for those involved in and interested in how protected areas can be creatively funded. The guide covers government budget allocations; grants and donations; and user fees, taxes, fines, and other revenues generated to fund protected areas. Included are examples of how such mechanisms are hard at work around the world and WWF's role in their development and implementation. This paper describes more than 25 different ways of raising revenues for protected areas. It summarises their relative advantages and disadvantages and lists sources for obtaining further information. It is intended as a practical tool for protected-area managers, finance ministry officials, international donor agencies, and local conservation organizations

Financing options: Incentives, finance and policy; Taxes and subsidies; Conservation finance; Protected areas and species

7 Endnotes

¹ This differs slightly from the typology used by (Lette and Rozemijer, 2005)

² In contrast to more biological definitions which highlight the interactions between organisms and the physical environment (such as nutrient cycling, soil development, water budgeting), this report takes the economics point of view.

³ This ties in with Coase (1960; see also Ng, 2005) on the reciprocal nature of externalities.

⁴ This problem has been solved in agri-environmental schemes in the EU by setting a reference level. If farmers produce environmental services below this reference level, the polluter-pays-principal prevails, but if farmers produce above this level, they are paid for this additional production (and funding for environmental services prevails) (Bensted-Smith, 2007).

⁵ Verweij (ibid) also points out the difference between financing mechanisms and economic incentive measures. The latter category includes economic measures, regulatory measures, the provision of information, and institutional capacity strengthening. An overlap between incentive measures and financing mechanisms exists of economic incentives (taxes, charges, tradable use rights and subsidies) and regulatory measures as far as these result in compensation funding (e.g. development or access restrictions, compensation for negative environmental impacts). The difference is that financing mechanisms comprise a wide(r) range of market mechanisms that finance the desired outputs fully, or to a large extent.

⁶ This is called “bounded rationality”: bounded rational agents experience limits in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information

⁷ Because of the so-called “Condorcet-Arrow paradox of social choice”. This occurs when an individual prefers A over B, B over C and C over A.

⁸ This problem of not being able to measure preferences appears in valuation studies using contingent valuation, which uses surveys to ask people directly for their preferences. Contingent valuation received a “stamp of approval” by a panel (with two Nobel Laureates) reporting on whether CV could be used in the Exxon-Valdez oil spill . However, it is widely recognised that, in order to be useful, respondents to CV surveys must have a large amount of information regarding the projects and the environmental resources they are asked to value (Gans, 1999; Ajzen et al., 1996). The panel has written:

“Suppose information is desired about individuals’ willingness to pay to prevent a chemical leak into a river. Presumably, their responses would depend importantly on how long it would take for the chemical to degrade naturally in the river (if it would at all), what ecological and human health damage the chemical would do until it had degraded, and so on. In the absence of information about such matters, it is unreasonable to expect even very bright and well-informed respondents to place meaningful values on a program to prevent leaks”(Arrow et al., 1993: 4605).

⁹ Intergovernmental Panel on Climate Change

¹⁰ Called resource regime by Vatn (2005)

¹¹ In property rights structure, property rights are defined as a structure of duties that will give any particular benefit stream protection against adverse claims. Rights have no meaning without correlated duties. (Bromley, 1992)

¹² Brousseau *et al.* (2007) distinguish rules for decision-making and for enforcement

¹³ CDM arrangements related to funding for additional sequestration of biomass in developing countries such as Indonesia have not materialized due to the administrative burden to implement CDM (Silvius & Diemont in press).

¹⁴ Defined as the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them (The Worldwide Governance Indicators (WGI) Project) Available at www.govindicators.org

¹⁵ Note that property rights can be assigned to the resource managers supplying the ecosystem function. A natural area that provides certain ecosystem functions that are enjoyed by many people (such as landscape beauty) may be owned and managed by one entity.

¹⁶ Official Development Assistance

¹⁷ In Chapter 6 Vulnerable Peoples and Places:

<http://www.millenniumassessment.org/documents/document.275.aspx.pdf>

¹⁸ Or 'resource transfers'

¹⁹ Bundled is a category in which various environmental services are "bundled" within one project

²⁰ This information is obtained from CREA <http://www.cocobolonaturereserve.org/>

²¹ Information about Charity Choice can be found on <https://www.charitychoice.co.uk/> and Network for Good on <http://www.networkforgood.org/>

²² see <http://carbonfinance.org/Router.cfm?Page=Funds&ItemID=24670>

²³ Projections of the annual mitigation market in 2008-2012 have dropped from 300-700 million tons of carbon equivalent (Mtce) to 0-300 Mtce. Carbon price estimates for 2010 have dropped from a range of \$60 to \$160 per tce with U.S. participation in the Kyoto regime to \$3 to \$87 per tce without U.S. participation. (IEA, 2001; Heller & Shukla, 2003).

²⁴ The impact of the need for biofuels in the world could even increase deforestation, taken in account that profits for instance of oil palm are over 1000 US\$/Ha/year. On the other hand there is a lot of marginal already opened land for agriculture in the tropics, which could be (conditionally) be used for palm oil plantations and probably soy and sugar cane (Diemont et al 2002; Silvius & Diemont 2007).

²⁵ This has been taken from a paper written by Herbert Diemont, Albert Corporaal, Anne Katrin Engelbrecht, Anton Stortelder, Raymond Schrijver. 2007. Alterra & LEI (Wageningen-UR) and interreg Lifescape / Northsea project

²⁶ Taken from the Biorights brochure. Available from Wetlands International

²⁷ This information has been provided by WWF:

<http://www.worldwildlife.org/conservationfinance/trustfunds.cfm>. Accessed at 29/11/07

²⁸ Information from <http://www.streekrekeninghetgroenewoud.nl/>

²⁹ Information from (Landell-Mills and Porras, 2002; Arentino *et al.*, 2001; Volery, 2002); <http://www.delisted.com.au/Company/2772/EARTH%20SANCTUARIES%20LIMITED> and <http://www.abc.net.au/7.30/content/2002/s459194.htm>

³⁰ Based on (Landell-Mills and Porras, 2002) and information provided by Industry Canada:

<http://www.ic.gc.ca/epic/site/ea-ae.nsf/en/ea02023e.html>

³¹ A business plan also has an important communication role. It can indicate funding needs to government agencies and other donors (and beneficiaries). Finally, a coherent business plan serves to demonstrate management competence with the benefit that fund-raising may be easier than would otherwise be the case (Emerton *et al.*, 2006).

³² Information from (Gutman, 2003) and www.biodiversityeconomics.org