

Rewarding the Upland Poor for Environmental Services: A Review of Initiatives from Developed Countries

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Developing Mechanisms for
Rewarding the Upland Poor in Asia for Environmental Services They Provide

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EXECUTIVE SUMMARY

Learning from existing mechanisms

Developed countries have already established a number of mechanisms to implement environmental transfers either within their own country, or towards other countries, including developing nations. The present review looks at a number such of mechanisms with a common matrix of analysis and tries to draw lessons for the design of RUPES mechanisms in Asia. All these mechanisms have been designed to provide reward to farmers for environmental services, and we put the priority on the ones which were clearly targeting upland farmers. Not all these schemes had poverty alleviation as their objective, but many did have a clear social orientation, and in all cases we tried to look at whether these schemes could be targeted to reach poor upland communities.

Matrix of Analysis

The matrix of analysis is based on a number of parameters. First, we identified the type of environmental services that were supposed to be promoted by each mechanism. The following point is to identify who benefits from the said services. Another important point in the analysis is the origin of the resources for the reward. It should be directly related to the beneficiaries of the services, but because of market imperfections and lack of capacity of certain communities to finance the environmental services they need, this is not always the case. We identified four types of origins: public budgets, indirectly concerned stakeholders, directly concerned stakeholders and 'polluters' –firms or communities that have been identified as emitting an excessive quantity of waste or harmful elements, including carbon.

The main challenge found in all RUPES mechanisms is how to make sure that the rewards are effectively reaching the upland poor. This is all the more difficult since upland communities are remote, isolated, and usually lack institutions able to represent them in a democratic and effective way. There are three main types of institutions that have been found to channel environmental rewards to the poor.

The first is government, whether at national, regional or local level. They usually take part in the coordination and regulation of RUPES mechanisms. When they are the ones counted on to deliver the rewards, lack of capacity and corruption are important constraints to effective delivery.

For this reason, NGOs – including international ones, national ones and community or local level ones - have increasingly been relied upon to deliver benefits to the rural poor through their capacity and their representativity and legitimacy. Finally, a number of mechanisms rely on the market to deliver the benefits to the farmers, such as eco-labelling and trade in carbon emissions offsets. However, even in such cases, NGOs are often needed to make sure that the poor really benefit from the transfer.

Another way to differentiate amongst RUPES mechanism is through the type of rewards. We identified three main types. The first are direct financial rewards, such as subsidies given in exchange of the implementation of a particular land use change . The second is rewards in kind, like is the case in many community development projects providing infrastructure, training or other material benefits or services to the upland poor. The third is access to resources or markets, such as land tenure, or access to better markets through eco-labelling, or schemes in which the allocation of public contracts is given partly based on environmental quality.

The most effective RUPES systems are the ones in which a clear link of conditionality between the environmental service and the reward, with some sanctions exists, usually in the form of a contract. This is the case of targeted agri-environmental subsidies in Europe and the USA, and is also the case of most eco-labelling schemes, as well as some bio-prospecting schemes. However, these schemes require a sophisticated institutional setting, with the capacity to understand contracts and to enforce them.

This directly leads to the last point in the RUPES analysis, i.e. whether there is a monitoring and evaluation system to ensure that the poverty alleviation and environmental targets are met. Schemes that are based on

a contract usually have such evaluations, in order to check that the contracts are respected. Mechanisms that are project-based usually rely in classical project cycle evaluations.

We used these criteria to analyse a number of RUPES mechanisms identified through bibliography, internet search and interview with experts. Five main types of mechanisms were identified, as summarized below.

5 Main Types of Mechanisms

1. **People-friendly conservation strategies** group all the projects in which conservation objectives are linked with interventions aimed at making sure that the rural population benefits from conservation activities and has an interest in contributing to them. This includes Integrated Conservation and Development Projects (ICDPs), community forestry, community-based resource management projects, etc. These activities are usually funded out of public expenditures, including levies on environmentally harmful activities, local taxes, and international development funding. In some cases they are also financed or co-financed by private donors and NGOs.

ICDPs have been criticized a lot. This review found that contrarily to some optimistic paradigm, there is no inherent strength in the ICD concept that will make it easier to attain both conservation and development objectives within the scope of integrated projects. However, our review indicates that there is space for integrated conservation and development strategies and projects that actually deliver on both fronts. To succeed, ICDPs need to be based on strong economic realism and real economics-environment linkages also supported by an adequate policy framework and a local institutional setting that enables to implement real people consultation and participation.

2. **Contractual rewards for environmentally-friendly agriculture and forestry.** This includes several types of instruments in which environmentally beneficial practices are defined, and rewards are proposed to their users on a contractual basis. This contractual basis usually includes payments from a public source (for example, public subsidies), sometimes from a private source (from an NGO), or certification of products (eco-labeling), in which case the reward is an improved market access. Several sources can be combined. The main limitation of contractual approaches in developing countries is the degree of institutional development needed for their design and implementation, and the costs involved in the process. They can be applied in developing countries, but there are a number of conditions.

First, there must be some institutions able to design contracts adapted to local conditions. Second, funds must be available to finance the process if it has to benefit the rural upland poor, who cannot pay for requested changes or even for the certification of existing beneficial environmental practices. This can be done through public aid, through NGO funding, or through private companies marketing eco-labeled products purchased from the poor. Finally, the whole process depends on the credibility and accountability of the institutions managing it.

All these conditions mean that contractual approaches, despite the huge hopes that they create – especially in the case of certification – remain difficult to implement on a large scale in developing countries, especially if the upland poor are the target beneficiaries.

3. **Environmentally and Socially Sound Tourism (Eco-Tourism)** includes all interventions in which tourists are brought to a natural area in conditions that are aimed to benefit environmental conservation and the welfare of local people.

Like in all other RUPES instruments, eco-tourism, to be sustainable and to succeed in actually reaching the poor, must be based on a proper institutional framework. Adequate institutions and funds are also needed to provide capacity building to local players, in the form of training, marketing support, and seed financing when needed. Finally, eco-tourism projects need to ensure that there is a dialogue between the stakeholders to avoid harmful conflicts, and set up a participatory monitoring and evaluation system managed by the stakeholders. Eco-tourism can be subject to eco-labeling to guarantee consumers and other stakeholders that it actually meets a number of social and environmental conditions. But this brings in the constraints associated with certification, i.e. complexity and costs.

4. **Share of benefit of genetic resources** includes all kinds of rewards received by rural people and other stakeholders in exchange for the conservation and provision of genetic resources that can be used commercially by the agriculture, pharmaceutical or biotechnology industries. However, there are a number of issues to be considered, which explain the controversies surrounding these schemes.

First, the earnings from genetic resources use are uncertain and take at least 10 years to materialize. The recipe for success seems to combine public funds to start a program, and royalties from private companies as a "bonus". The involvement of public institutions, especially international ones, can also help to ensure that the host country receives assistance in its negotiations with the foreign private partners, and that there is some transparency in benefit sharing within the country.

Another cause for controversy is the fact that because the largest part of the added-value in the creation of a new crop variety or drug is made in high-tech developed countries laboratories, the share of the benefit going to the suppliers of the raw genetic information will always remain small – unless they can access that technology. Hence, technology transfer and capacity building should be key components of any genetic resources benefit sharing project.

- 5. Trade in Emissions Permits** includes watershed conservation strategies based on waste emissions trade and, more recently, carbon trade. Direct trade of waste emissions in watershed was found to be difficult to implement in developing countries, due to the institutional conditions required to establish and regulate such a market – too many occasions of fraud would be possible. Levies and funds from industrial polluters or users of water can, however, be used for funding community-based natural resources management projects.

This mechanism remains weak for a number of other reasons. First, the funds available are not that great yet. For the moment, the market seems rather experimental and based on the goodwill and image strategy of companies, and their anticipation of the market. If this market fails to materialize and if countries and private companies can continue emitting carbon without any clear sanction or benefits in case of emission offset, they might lose interest in this type of projects. Another worrying element is the number of projects and countries that are offering carbon credits or planning to develop some. When compared to the actual low requirements of carbon emissions reductions, this means that supply could become so abundant that prices will fall. This means that the future of such projects will depend a lot on the success of international organizations to make international treaties stronger and binding.

Conclusion: to not punish is to reward

There are three main conclusions to this review. The first is that the path leading to effective implementation of RUPES mechanisms is very narrow. All the mechanism reviewed here require a fair amount of institutional development, and hence need funding for capacity building, if they have to actually reach the poor and effectively promote environmental conservation. This is bad news since the funds available for such projects are very limited when compared to the needs.

The second lesson is that market-based mechanisms seem to have a much larger potential in terms of funding available and that they can be effective RUPES whenever they are implemented by the private sector in cooperation with NGO or other institutions enabling the involvement of all stakeholders. Market-based mechanisms are defined here as the ones which are the most efficient at internalizing the social environmental costs or benefits of a particular practice. The involvement of private companies often result in a greater efficiency, under the condition that their activities is closely monitored and complemented by NGOs representing all stakeholders, and ensuring that the benefits of these mechanisms actually reach the poor.

The last and first lesson of this review is that these mechanisms in most cases have little chance to be of use because their potential impact is contradicted by a number of perverse incentives running against the upland poor and against environmentally-friendly practices. Identifying and trying to remove these penalties should be the first step before starting to design and implement RUPES mechanisms. The effectiveness of removing them rather than try to implement complicated RUPES mechanisms with limited resources need to be assessed. In many cases, it is likely that removing the penalties will provide a more effective way of meeting environmental conservation and poverty alleviation objectives than any RUPES mechanism.

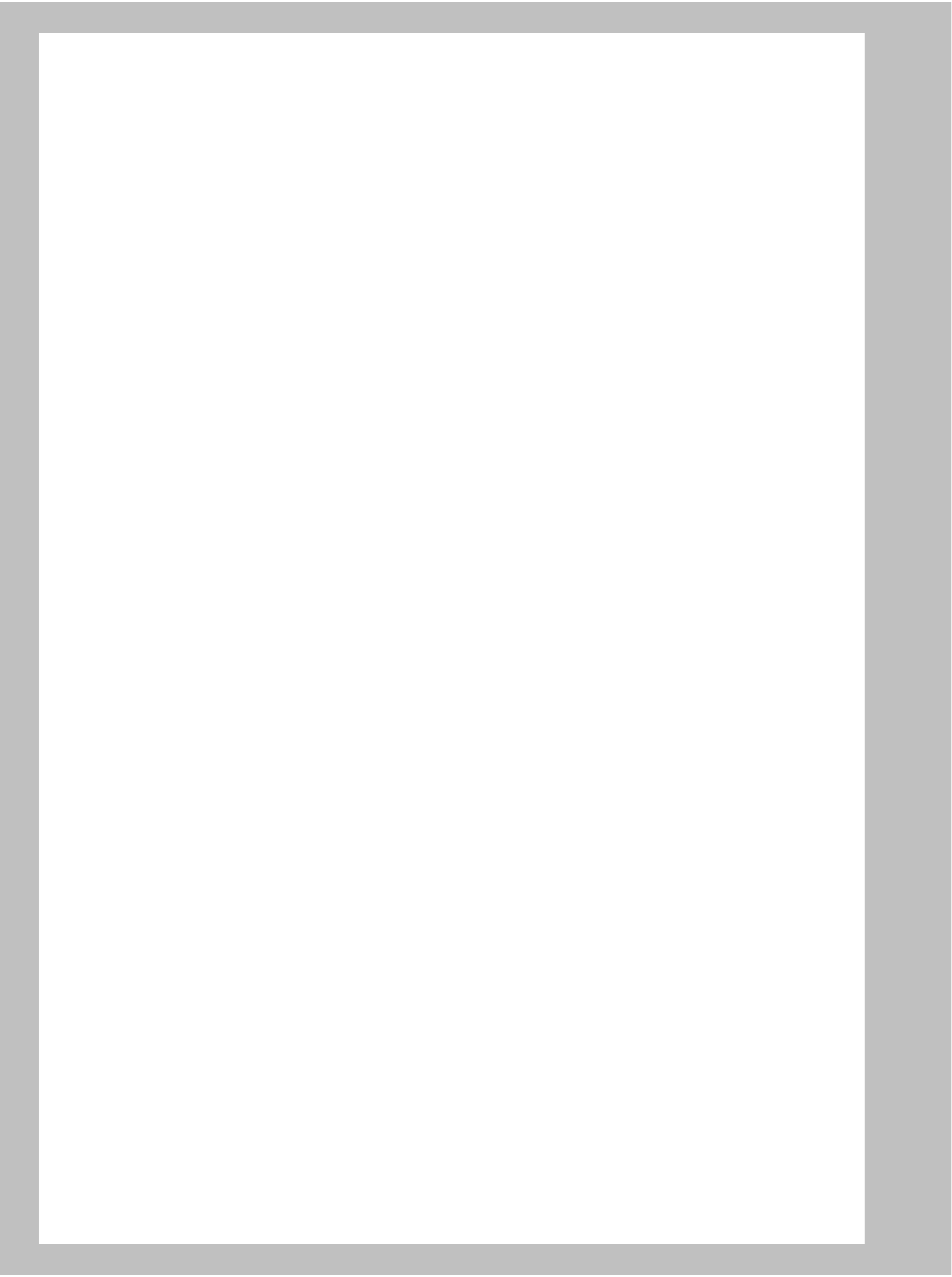


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SETTING THE FRAMEWORK

Why this review

The idea of rewarding the rural upland poor for the environmental services they provide (RUPES) stems from several observations:

1. Some of the land-use practices of the rural poor, especially farmers in upland areas, deliver environmental services - such as watershed conservation, biodiversity protection and carbon storage (see **Box 1** for a definition of environmental services).
2. These environmental benefits are mostly enjoyed by external stakeholders, who may be downstream users of water, biotechnology companies collecting genetic information and, in the case of carbon storage, humanity as a whole.
3. Some of the most environmentally-beneficial land use practices are less rewarding financially than alternative land uses, at least in the short run. When this is the case, farmers are likely to shift to less environmentally beneficial practices as soon as they are able to.
4. In the mean time, the rural poor are unwillingly incurring costs in the form of foregone income, without being financially compensated for the environmental services they provide.

This reflects a general market failure in environmental values. Despite attempts to establish market mechanisms that place financial value on environmental services, most environmental goods such as clean air, fresh water and biodiversity remain principally public goods – and often international public goods. In most cases, there is no market mechanism to reward the people who maintain these goods, while those who damage and deplete them reap private benefits in this modern tragedy of the commons. If we would like the rural poor to continue providing environmental services, intervention is needed to compensate for these market failures, by rewarding practices that preserve and improve the environment.

Another reason to promote environmental rewards for the rural poor is that it provides a new framework for financial transfers between rich countries and developing countries. As stated by Munasinghe (1995): *"Environmental transfers from developed countries are premised on the fact that rich countries have already attained most reasonable objectives of development, meaning that they can afford to commit resources to global environmental protection*

even at the expense of material growth. By contrast, developing countries have a limited capacity to resolve even domestic environmental problems. They can be expected to contribute to global environmental programs only if such participation is consistent with more urgent priorities, such as economic growth and poverty alleviation."

Indeed, it can be considered that such transfers represent an obligation of rich countries, which have been using a higher share of the world's natural resources than poor countries. Although the valuation of this "Ecological debt" is controversial, taking it into account is especially important since developing countries tend to have higher adjustment costs to global environmental change. Hence the proponents of the "debt-for-nature" swap advocate an abatement of the financial debt of poor countries in exchange of the "ecological debt" of rich countries, or over forms of financial compensation (Simms, 2001).

Despite such claims, development aid from rich countries is on the decline. The failure of some development assistance strategies has provided an excuse to reduce the amount of spending. The growing ideological preference for market liberalization over aid as a development tool, has led to a dramatic drop in transfers. This was not compensated by direct foreign investment, which remains a trickle and is highly geared towards exploitation of natural resources (UNCTAD, in Simms 2001). Most OECD countries have abandoned their commitment to transfer 0,7% of their GDP to development assistance. The total volume of their aid was about US\$40 billion in the beginning of the 1990s, and has fallen down to US\$30 billion now. By contrast, it was estimated at the 1992 Rio Earth Summit that meeting environmental conservation targets would require an additional funding of US\$600 billion, of which 125 billion was supposed to be provided by the international Community, the rest (475 billion) being provided by the countries themselves (Tubiana, 2000).

In this context, environmental transfers – i.e. direct or indirect financial transfers based on environmental services – could provide a venue for increasing the flow of financial resources from rich countries to developing countries. If such transfers are targeted towards the rural poor, they could enable to meet objectives of environmental conservation, economic growth and poverty alleviation at the same time. This would then alleviate the concern common in developing

countries, i.e. the fear that environmental conservation can only be obtained at the expense of the income of their population.

Experience from Developed Countries: towards Market-based Instruments

Developed countries have more experience than developing countries in environmental policies, either in their own countries or in international cooperation projects. A review of their experience is then a useful start before trying to develop such mechanisms in Asia.

Environmental policies in developed countries have been conventionally based on "command-and-control" mechanisms, in which potential polluters are given highly specific regulations, often including specific technologies to adopt (De Andraca and McCready, 1994). These are thought to be of lower efficiency since each player has a different marginal adjustment cost for attaining a particular environmental objective (Hussen, 2000). It would be more efficient to design mechanism to ensure that entities with the lowest adjustment costs make the changes first. Hence, market-based instruments (MBIs) have been proposed as a mean to reduce environmental degradation at the lowest possible social cost - by aligning private costs with social costs in such a way that "externalities" become part of the decision making of each economic actor (Huber et al., 1998).

Despite their growing popularity with environmental economists, there is no single standardized definition of MBIs, and the literature lists hundreds of different types of such mechanisms (Huber *et al.*, *op.cit.*). There is not even a clear-cut frontier between "non-market" and "market-based" instruments. In practice, there is rather a continuum between different mechanisms, depending on their capacity to internalize externalities, and equate the individual value of an environmental damage or service with its social value. As stated by Huber *et al.*: *"The particular strength of an MBI depends on the degree of flexibility that a polluter has in achieving a given environmental target. A "weak" MBI essentially dictates through regulation the type of process that must be used; failure to comply results in economic sanctions. A "strong" MBI would allow market forces to determine the best way to meet a given standard or goal (...), and thus decentralizes decision making to a degree that the polluter or resource user has the flexibility to select the production or consumption option that minimizes the social cost of achieving a particular environmental goal."*

This definition covers all the field of what is usually designed as "economic instruments" in environmental policy. Economic instruments have been increasingly used by developed countries especially for the reduction of pollution. They typically include a number of charges, fees, liability payments instruments as well as deposit refund systems, tradable emissions and targeted subsidies (see **Box 1** below for a definition of these instruments).

Box 1. A Few Definitions

Environmental Services. In its broadest sense, all goods and services provided by the environment and the ecological systems, including environmental quality (Hokby and Soderqvist, 2001). The present document focuses mostly on three types of environmental services: (1) watershed services, such as soil conservation and regulation of water cycles; (2) biodiversity; and (3) carbon sequestration.

Economic or Market-Based Instruments. Market-based instruments are meant to achieve the goal of reducing environmental degradation at the lowest possible social cost, by aligning private costs with social costs in such a way that "externalities" become part of the decision making of each economic actor. (Huber *et al.*, 1998).

The OECD classification of economic instruments includes (Anon, 1997):

- ❑ *Emission charges/taxes:* direct payments based on measurements or estimates of the quantity and quality of pollutant discharged.
- ❑ *User charges:* payments for the cost of collective services, primarily used as a financing device by local authorities e.g. for the collection and/or treatment of solid waste or sewage water.
- ❑ *Product charges/taxes:* payments applied to products that create pollution during their lifecycle (for example: fertilizers, pesticides, batteries, etc.). Product charges/taxes are intended to modify the relative prices of the products and/or to finance collection and treatment systems. One form which product charges/taxes may take in practice, is that of tax differentiation leading to more favorable prices for "environmentally friendly" products and vice versa.

- ❑ *Deposit refund systems*: a payment/surcharge is made when purchasing a product contained in a designated type of product (e.g., packaging). The payment (deposit) is reimbursed when the product is returned to the dealer or a specialized treatment facility.
- ❑ *Marketable (tradable) permits/quotas (also referred to as emissions trading)*: based on the principle that any increase in emission from a given source must be offset by a decrease in emissions of an equivalent, and sometimes greater, quantity. For example, when a statutory ceiling on pollution levels is fixed for a given area, a polluting firm can set up a new facility or expand its activities only if it does not increase the total pollution load. The firm must therefore buy "rights" or permits to pollute from other firms located in the same control area which are then required to abate their emissions by an amount equal to the additional pollution emitted by the new activity.
- ❑ *Non-compliance fees*: fees imposed on polluters which do not comply with environmental requirements and regulations. They can be proportional to selected variables such as damage due to non-compliance, profits linked with reduced (non) compliance costs.
- ❑ *Performance bonds*: payments made to authorities in expectation of compliance with the environmental requirements. The bonds are refunded when compliance is achieved.
- ❑ *Liability payments*: Liability payments are made to compensate for the damage caused by a polluting activity. Such payments can be made to "victims" (from chronic or accidental pollution) or the government. They can operate in the context of specific liability rules and compensation schemes (e.g. funds). NB: Neither non-compliance fees, nor liability payment can be construed as fines which are lump sum legal sanctions.
- ❑ *Subsidies*: Under the term "subsidies" all forms of financial assistance to polluters or users of natural resources is understood, e.g. grants, soft loans, tax breaks, accelerated depreciation.

In fact, although they are not always categorized as market-based instruments, targeted subsidies, can be considered as such as long as they enable to internalize some external costs or benefits, and they are included in the OECD classification of economic instruments. As long as they are flexible and based on some competition, subsidies may result in the creation of new markets. For example, in some European countries, funding for changes in farming practices that result in an environmental betterment are allocated on a competitive, tender-like basis. Farmers submit proposals, which are evaluated by public commissions, which then select the ones that provide the better environmental services for the lowest cost. This mechanism is comparable to any kind of competitive, open-tender allocation of public procurement contracts. It results in the creation of a market for environmental services, albeit a non perfect one since there is only one client – the State.

Hence, rather than proposing a separate presentation of "Non-market" and "market-based" instruments, we will review a number of existing mechanisms and try to identify their capacity to internalize social values for the providers of environmental services.

The Basics: Stop Punishing Before Rewarding

To Punish or to Reward?

Two types of policies have been used to promote environmental conservation, depending on whether the accent is put on the carrot or the stick. Command-and-control instruments are usually more of the "stick" type: they regulate against practices which are environmentally harmful, such as waste discharges, or impose practices thought to be beneficial, such as planting hedges. In both cases, a refusal to abide results in a penalty, such as a fine, a jail sentence, the cancellation of a license or resource use permit, etc. Economic instruments, on the contrary, can be either punishing or rewarding, or both.

"Punishing" instruments aim to **internalize environmental costs**, and they have been the most widely used in developed countries, especially when the accent has been on the prevention of environmental damage, based on the "polluter-pays" principle. "Punishing" instruments include charges and taxes, deposit-refund systems, non-compliance fees, performance bonds, and liability payments.

In all cases, the failure to reach some environmental objectives results in a cost for the responsible party. "Punishing" instruments, for example emission fees, are increasingly used in developing countries, but they can only be applied to those stakeholders who have an economic surplus enabling to pay the related cost. For both practical and moral reasons, they cannot be applied to the rural poor.

"Rewarding" instruments, which are the focus of the present study, are aimed to **internalize environmental benefits**. They have been increasingly used in Europe and in Northern America during the last two decades, and are now a major part of the "agri-environmental measures" of the European Common Agricultural Policy. The most common of them is targeted subsidies and tax or tariff exemptions. Other creative measures include conditional allocation of resource use (for example, building permits are allocated based on environmental impact studies), or the preferred allocation of public markets (a recent Law in France requires that local government units must take into account eco-efficiency in choosing suppliers).

Some market-based instruments combine a "punishing" and rewarding" element. This is clearly the case of tradable emission quotas and the newly designed Clean Development Mechanism. In such cases, the party which is above quota incurs a cost, and the parties which are below quota receive a payment in exchange for selling their unused "rights to pollute". Eco-labelling schemes include elements of penalty and reward. They result in a penalty when a supplier which does not meet certain environmental criteria is excluded from a market, or in a reward when certified products command a higher price.

To Not Punish is To Reward

While the main focus of the present review are the policy instruments that are based on providing rewards, it is important to remember that the rural poor can be rewarded in an indirect way for environmental services by being exempted from penalties applied to other parties. A good example is all the cases of taxes and tariff exemptions, which can take direct or indirect forms.

This is the case for example if a tax is imposed on pesticide use. In appearance, farmers who do not use pesticides do not receive any reward, but on a competitive market for farm products, they will end up with an advantage over farmers who use

pesticides and are subject to taxation. Such a mechanism will be all the more effective since poor farmers were likely not to use pesticides anyway because of their cost. Hence it is very important to include an analysis of "punishing" schemes when devising RUPES policies. Any scheme that impose a cost on the environmentally harmful practices of other natural resources users is indirectly a reward for the environmental services of the rural poor.

In that respect, the first step into a RUPES-oriented policy analysis is to make sure that first, all policies that promote environmentally harmful practices or/and discriminate against the poorer or smaller farmers are lifted. In reality, not only are there few mechanisms for rewarding the providers of environmental services, but policies often promote environmentally-harmful practices. This is true of all those policies aimed at promoting input-intensive agriculture, notably through subsidies for pesticide and chemical fertilizers. Policies that fail to provide natural resources managers – be it poor indigenous farmers or large forest concession holders - with clear, long-term rights over land and resources also work against environmental conservation. Many agricultural policies are also heavily biased against the poor: in developing countries, especially where corruption is rife, large companies are more likely to access subsidized credit and land permits than poor farmers.

This is especially true when international economic relations are considered. In the international trade scene for agricultural and forestry products, there is a huge bias *against* the rural poor of developing countries. This is due to the fact that most rich countries are heavily subsidizing their own agricultural sector, and that within rich countries, agricultural subsidies are likely to benefit first large farms which make a high use of chemical inputs, irrigation water, etc. This is slowly changing as rich countries are shifting from production-oriented agricultural policies to programs that take into account the environmental functions of agriculture.

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There is indeed a long way to go, both in developing and developed countries, in **removing the penalties and perverse incentives** against the environmental services provided by the rural poor. This is extremely important to remember: an analysis if the biases against the rural poor and against environmental conservation should be conducted before any development of RUPES mechanisms be considered in any country. In many cases, policy makers are likely to find out that

rather than designing complex rewards systems, lifting perverse incentives to environmental degradation benefiting the rich is a more efficient first step towards implementing a RUPES policy.

Framework of Analysis of Existing Instruments

In order to compare the different types of instruments and to provide a framework for their analysis, we have identified a number of criteria. First, the most important is the actual type of environmental services rendered by the rural poor. Then, we have to consider who benefits from these services, and who is willing to pay for them – it may not always be the same stakeholders. Finally, we take into account the intermediaries in the transaction – the ones who channel the reward to the rural poor.

Interlinked Environmental Services

There are three main types of services considered in this review.

Watershed services

Watershed services encompass soil protection and regulation of water flows. Since we mostly consider the rural poor, this applies in particular to all the situations where the conservation of a dense vegetation cover is needed in the upper parts of a watershed to avoid erosion and siltation, as well as to store water from rains and to regulate its flow to the lower parts of the watershed, limiting the incidence of extreme droughts and floods. Although the very existence of these functions are sometimes controversial and depend a lot on local situations, it remains clear in most cases that the rural upland populations, by their land use practices, can have a significant effect on soil conservation and water cycles. This effect can be positive or negative. Negative effects occur every time when pollutants are discharged in the water, and when the bare soil is exposed to erosion, especially close to water streams. Positive effects are supposedly linked with the maintenance of a dense vegetation cover all year long, especially during rains. In the tropics this mostly takes the form of tree crops, agroforestry or forest.

The beneficiaries of watershed services are usually relatively easy to identify. They include:

- the users of waters in a river basin;

- the populations who live downstream of a given area;
- the potential future users of the soil in the area under concern.

Biodiversity Conservation

Biodiversity in its broadest sense covers the diversity of all life forms in an ecosystem. It can be considered at different levels in natural and man-made ecosystems.

The inter-species and intra-species diversity of flora and fauna, both at micro and macro level, is particularly high in tropical forest ecosystems. The rural poor can contribute to its preservation by preserving forested areas, and using them (for example for the collect of timber and NTFPs) in a way that maintains the biodiversity.

Agro-ecosystems differ a lot by their degrees of inter-species diversity. This depends first on the choice of cultivated species. The upland farming systems, especially in poor areas, tend to be less specialized and more diverse than in lowland areas with good road access and easy mechanization. Besides, the conservation of non-cultivated flora and fauna depends a lot on cropping practices, and the link is not always well documented. Land-clearing, tilling, watering and fertilizing practices have an important effect on the biodiversity, both below and above the ground surface. Weeding practices and pest management play an important role (the rubber agroforests of Sumatra are rich in flora and fauna because the farmers do not eliminate the species growing with rubber). Because they have a low access to chemical inputs and mechanization, the rural upland poor tend to have practices that result in a relatively high degree of inter-species diversity.

Agro-ecosystems also vary a lot as far as intra-species diversity is concerned. The upland farming systems found in poor areas present a high variety in landraces, both between areas (because of the use of locally-selected cultivars) and within an area (because farmers minimize risks by planting several varieties at the same time). Again these strategies can change if farmers acquire the capacity to use selected cultivars with a higher potential productivity.

It is important to also include indigenous traditions, cultures, knowledge and technologies in biodiversity. Again, their conservation is not necessarily a matter of deliberate choice, but

sometimes simply a lack of exposure to more appealing alternatives, and indigenous cultural diversity is easily eroded as the rural upland poor gain access to new technologies and to the dominant mass-culture.

Finally, landscape conservation is an important aspect of biodiversity conservation, especially in developed countries which place a high value on the conservation of "traditional" landscapes. This is an extremely difficult point to evaluate because beauty is subjective, and the links between biodiversity, tradition and the aesthetic values of landscapes are far from being simple (**Box 2**).

The direct beneficiaries of the preservation of inter- and intra-species diversity include:

- ❑ the biotechnology companies and laboratories, which exploit genetic diversity for the improvement of cultivated species, or for new pharmaceutical or industrial applications;
- ❑ the coming generation of farmers who will benefit from the higher productivity of an area due to high biodiversity, such as better soil properties or abundance of predator insects for integrated pest management;
- ❑ the whole set of beneficiaries of the local tourism nature and culture-based industry.

Box 2. Uneasy Relations between Indigenous Practices and Landscape Conservation

Conserving landscapes is an important point in the European programs aimed at rewarding farmers for environmental services, also called "agri-environmental measures". Traditional landscapes, especially in upland areas, are considered as an important part of the common and local cultural patrimonies, and an important component of "biodiversity". In developing countries, governments and people may be less sensible to the charms of forest landscapes, terracing, manual rice planting and buffalo-ploughing, which they may consider as nothing less than the signs of the low productivity and hard living conditions of the rural poor. Tourists, however, are there to remind them that some people do value these as beautiful traditions, and are ready to pay to enjoy their presence. This can be a high motivation towards landscape and cultural preservation.

The difficulty is to define what is "traditional" and "aesthetic". Two examples from developed countries exemplify these ambiguities and illustrate the difficulty in drafting RUPES policies based on the preservation of such values.

The striking, dark purple-blue tubular rows of lavender grown in Southern France has now become a landmark and symbol of beautiful Provence. They are found on postcards, paintings and symbolic representations of the area. For the tourist, they have come to represent the traditional Provence landscape. But what is tradition? Few tourists know that this form of landscape results from recent changes in agricultural technique (B. Ehrwein, pers. comm.). Fifty years ago, lavender was cultivated in small squares, using pale lavender blue varieties with animal traction. Mechanization of weeding and harvest has led to the planting of lavender in rows, hence the striking tubular landscape of today. As for its beautiful, dark purple-blue, it is the color of a recently introduced hybrid, the *grosso* variety, chosen for its robustness and productivity. In a massacre of intra-species diversity, the *grosso* has replaced the numerous paler versions cultivated before, covering 80% of the landscape. Conservationists interested in preserving the traditional landscape and biodiversity of Provence 50 years ago would have wanted to prevent this change, yet the resulting landscape draws thousands of tourists to poor villages, and the modern lavender *grosso* variety is now sold for decorative purposes in gardening.

While the diverse landscapes of rural upland areas seem to have much appeal to tourists from rich countries, it should also be remembered that the monotonous landscapes of Northern France's Beauce wheat monoculture areas have inspired famous poets, just like the flat, homogenous industrialized farms of the US Midwest are considered a landmark and have inspired more than a photographer. In such case, it is not diversity which is prized, but the sheer striking scale of a homogenous landscape. Biodiversity advocates, who would have tried to prevent the progressive mechanization and uprooting of hedgerows which led to these changes, would have prevented the birth of what is considered in those areas as the local cultural patrimony.

These examples remind us that aesthetic values change with time and culture, and that there is no simple, linear correlation between tradition, biodiversity, and landscape beauty. This means that no simple solution can be designed for landscape and biodiversity preservations, without a deep knowledge of the local relationships between the various components of the equation, and a dialogue between all the stakeholders.

The indirect beneficiaries are the consumers, producers and industries benefiting from the better crops, medicine and other industrial products derived from the use of genetic resources.

Besides, biodiversity also has non-economic existence values, such as spiritual, ethical, aesthetic values, which are particularly significant in the case of the preservation of local cultures and landscapes.

Carbon Sequestration

Carbon sequestration refers to the removal of carbon from the atmosphere to counterbalance the effects of fossil fuel emissions and mitigate their effects on global warming. As far as rural upland ecosystems are concerned, carbon can be stored either in the soil or in the above-ground biomass, in natural and artificial landscapes.

There are a number of ways by which the rural upland poor can contribute to carbon sequestration. The first one is through the conservation of existing carbon storage, for example by avoiding deforestation, or any conversion of existing land use systems to new ones with a lower carbon storage capacity. The second one is through the conversion of existing land-use to new ones with a higher storage capacity, which is also called carbon sinks. This can be done through reforestation programs, for example. The third one is through changes in the management of existing land-use types, incorporating practices that will result in a higher carbon sequestration. This can be done, for example, by promoting practices which increase carbon sequestration in soil organic matter (Uri and Bloodworth, 2000).

Before the Kyoto protocol, the beneficiaries of carbon sequestration were the whole of mankind, and the capacity of the atmosphere to absorb carbon was an international public good on which everybody seemed to have an infinite free right of use. This means that the only way to finance carbon sequestration programs was through international public expenditure, or through the contribution of concerned individuals and institutions.

The Kyoto protocol allows for international trade in greenhouse gas emission allowances between countries, but also directly between private parties. This trading involves transfers of emissions allowed under a Party's emission limitation commitment, between Annex I Parties only. It also sets up some

joined investment programs, by which a country can increase its emissions rights by investing in a carbon sequestration program in another country. The mechanisms are known as the Joint Implementation (emissions-cutting investment projects by industrialized countries in other industrialized countries) and the Clean Development Mechanism (emissions-cutting investment projects by industrialized countries in developing nations).

This means that we will be able to identify direct beneficiaries of carbon sequestration services. First, it can be said that all the Annex I Parties financing CDM projects will benefit in the form of reduced emissions limitations. As the market for trade emissions develops, there will be private intermediaries who may benefit from carbon sequestration projects. For example, a firm may become a broker in trade emissions, and acquire carbon emissions reductions through CDM projects, and sell them to the governments or the industries of Annex I Parties.

Links between Environmental Services

Although RUPES mechanisms may be set up with only a particular type of environmental service in mind, it is very rare that these services can be separated in practice, and in fact, efficiency in resource use recommends that all services should be blended in practice.

Enhancing watershed services, for example, usually results in higher biodiversity. This is because watershed protection normally requires the conservation of a dense vegetation cover in key areas of the watershed, such as along rivers, terraces, or field contours. These vegetation strips usually harbor components of the local natural flora and fauna. They will also act as carbon sinks, removing carbon from the atmosphere during their growth period, or avoiding carbon releases if they are mainly protected.

Because soils store carbon in organic matter, soil erosion protection could be considered as a way to limit carbon release. However, erosion being mostly a transport process, it is not clear whether erosion, at the regional level, increases or decreases stocks in the soils and sediments (Uri and Bloodworth, 2000, Van Noordwijk et al., 1997). However, conservation practices which increase soil carbon organic content do contribute to carbon sequestration, and this also includes tree planting and forest conservation, since the soil

under forests or tree crops has a higher C content than under crops (Van Noordwijk *et al.*, 1998).

In a similar way, practices aimed at preserving biodiversity will often result in the maintenance of a vegetation cover, in the form of meadows, forests or agroforests, which is likely to perform other services such as watershed services and carbon storage.

Carbon sinks taking the form of tree crops can play a watershed service if they are placed in areas of a watershed where the existence of a tree cover makes a difference. When they take the form of monospecific plantations, they do not support biodiversity conservation. Hence, such "mono-species" carbon sink plantations have been heavily criticized by NGOs and scientists, and it is now recommended that carbon sink projects take into account biodiversity objectives.

Hence it means that whatever the initial goal of a RUPES project, it is likely to contribute to increasing several types of environmental services. This means that it would be difficult and not very relevant to classify projects based solely on the environmental services provided.

Who gains? Multiple Beneficiaries of Environmental Services

Another point in the analysis is to consider who are the parties involved in the transfer of services and payments.

Several cases can be considered as regards the **beneficiaries of an environmental service**:

- ❑ the first obvious case is when there is a limited, well-defined number of stakeholders benefiting directly from the service. This often occurs in watershed conservation: a bottled mineral company reaps direct benefits from watershed conservation services resulting from agroforestry practices in the upward part of the river basin. Similar examples are found when agro-industrial companies make benefits from genetic resources collected in the upland rice systems of poor farmers, where genetic intra-species diversity is still high. In such cases, the environmental services is rendered to a **private individual** party, and designing a compensation system seems relatively simple.
- ❑ another case is when the beneficiaries is a more loosely-defined group of stakeholders,

who may benefit in varying degrees and in a non-obvious way from environmental services. For example, if rural poor refrain from clearing steep slopes for cultivation, all the population and industries in the downstream part of the basin are likely to benefit from the resulting conservation of water flow and quality. However, we are already in a case of **public goods or services**, whereas in the previous case, there were well-identified individual beneficiaries of the service.

- ❑ an even more loose case is when the beneficiaries are the whole of mankind, as is the case in carbon sequestration. Then we fall in the category of **international public goods**, which are the less-well appropriated and defended of all categories.

Most practical cases of environmental conservation are likely to entail a **combination** of the types of services above. A poor farmer who refrains from clearing a protected forest on a steep slope renders a private service to the company who has an exclusive right over the local mineral water source, a public service to the whole downstream community, and a global public service to the international community through carbon sequestration. This results in complexity in the design of transfers.

Besides, as indicated above, each service may have **direct** or **indirect** beneficiaries. The direct beneficiaries are the ones who derive an immediate value from the environmental service, like a bottled mineral company, or a tourism lodge in a natural forest. But in many cases direct beneficiaries may act only as intermediaries, supplying other parties with indirect benefits. For example, in the case of the use of genetic resources for pharmaceutical research, the direct beneficiaries are the pharmaceutical research companies, but the indirect beneficiaries all the users of the medicine.

Who Pays? The Stakeholders behind the Transfers

The logic of a perfect market according to the standard economic theory would mean that each stakeholder should pay for these services according to the value they derive from it. Given the general difficulties in valuing environmental services and the lack of related property rights and markets, the present situation is very far from such a case. In practice, for the moment, direct or indirect payments for environmental services are likely to

originate from four types of sources, going from the more public to the more private.

In most cases, payments originate from **public budgets**. This is the case when the externalities of a particular environmental damage or service are borne by the whole regional, national or even international community of inter-government donors. This is the most common case, since economic instruments are normally used to internalize the costs of using public goods. In that case, the payments originate from the community of regional, national or international **tax-payers**, as well as international financial institutions. They are supposedly channeled to the rural poor either through community development projects or national policies such as subsidies, tax exemptions or preferred rights and markets allocation.

A particular case is the one where the payments originate from **polluters**, i.e. from stakeholders wanting to conserve the right to emit waste or harmful gases, and ready to pay other parties to compensate for their emissions, at a lower cost than if they had to reduce their own. This is the case of tradable emission permits and the Clean Development Mechanism. In a way, this case is similar to the first one because it refers to the use of a public goods (a river, the atmosphere), and the scheme is set up by public policy. However, instead of the State levying a tax on polluters and using it to subsidize environmental services, the payment can be made directly between the two parties.

There are many **concerned individuals and institutions**, especially in rich countries, who consider that public expenditures, as of now, are not sufficient to meet the costs of a number of environmental targets such as those set in the Rio conference. They place a sufficient value on environmental services to be ready to contribute to the cost of promoting them beyond their tax-payers duty. This is the case of most eco-labeling schemes, in which consumers give a preference to products which lifecycle is more environmentally-friendly than others. This is also the case of all projects financed through private donations to environmental or social NGOs. A related case is when private companies finance environmental and poverty-alleviation schemes to improve their image.

Finally, there is the case where payments originate from **directly affected stakeholders** or group of stakeholders, who have a direct interest because they directly bear the externality cost or benefit of the environmental practices of other parties. This is

typically the case in watershed conservation: for example in Indonesia, the Aqua mineral water group finances community development and environmental conservation activities in the watersheds which are needed to sustain mineral water flow.

Given the relatively blurred line between private goods and regional, national and international public goods, in most cases the various types of payments mentioned above are likely to be combined in a given area. As we will see in the review of cases below, differentiating between these cases in much more difficult in practice than in theory. This lack of clarity reflects the general market and policy failures of the whole environmental scene, where benefits and rights are not clearly identified and defined. As time passes and information improves, distinctions are likely to become clearer.

Passive or Active Environmental Services: the Value of Information

Another dimension of analysis of RUPES cases is whether they refer to "passive" conservation – preserving existing practices against less beneficial ones – or "active" services – promoting changes in behaviors that will result in an environmental gain.

In developing countries, there are many cases where rewards are proposed for the continuation of a practice which is thought to be environmentally useful, and the prevention of its replacement with a more environmentally damaging option. This is typically the case when farmers who have never used pesticides and chemical fertilizers are given the possibility to enter an eco-labeling scheme, in which they commit to sustain their organic methods in exchange of higher prices for their products. In this case there is no immediate environmental gain, but there is a clear income gain for the farmers.

One may actually wonder why there needs to be a reward for continuing things as they are. The answer is rather straightforward. Poor farmers in many cases use "environmentally-friendly" methods for lack of possibilities to do otherwise. For example, they use manual weeding before there is no local distributor for herbicides. Once a road is opened to the village and input transportation costs fall, the same farmers may rapidly switch to chemical weed-killers. This example highlights the bases for environmental services conservation, i.e. the necessary flow of information (Van Noordwijk, pers. comm.):

- ❑ external stakeholders benefiting from the environmental services need to be aware that they exist
- ❑ the farmers who render them need to be aware that they are doing it and that some parties are putting a value on them
- ❑ then only a mechanism can be devised to transfer financial rewards from the first group to the second.

This is typically how organic farming labeling works when dealing with isolated communities who have never used chemicals for lack of possibility of doing so. First, the eco-labeling organism (representing the consumers, i.e. the stakeholders ready to pay for chemical-free goods) has to identify a group of farmers who practice organic farming. Then, they have to inform the farmers that their current way of farming is considered as valuable by external parties, who would like them to commit to continuing it. Then an agreement can be reached in which the products are certified and traders commit to buy them at a higher price than non-certified goods.

This **information and commitment** loop is extremely important. It explains why products cannot be certified under any eco-labelling scheme if the farmers are not committing to sustaining their environmental services. A case of what happens when there is an information failure is given below in the case of an eco-tourism scheme, in which local guides failed to inform local populations that the money they received from tourists was an appreciation of the value of their "traditional" manual methods of food processing. The following year, the farmers had used the money to purchase mechanical food processing equipment. The same is likely to happen in all cases where farmers are not informed of what they are rewarded for. Beyond the information, there must be a commitment from the farmers to sticking to their part of the contract. Beyond commitment, there needs to be **enforcement mechanisms**, i.e. a way to make the reward conditional to the continuation of the environmental service. If not, it is likely that at least some farmers will pocket the reward and switch to other less environmentally-friendly practices if those are more profitable. This is why **control** is a very important aspect of all rewards schemes.

In developing countries, rewards are often proposed in exchange of a **change in practices** that will result in better environmental services. This is the case of the European agri-environmental measures, where farmers commit to better

environmental practices (for example, increasing the biodiversity of meadows) in exchange for subsidies. In this case, there is a clear environmental gain, but there is a poverty alleviation gain only if the reward is higher than the cost of changing the practice. In all cases, the change of practice is likely to take place only if there it results in a net financial gain, or if the reward scheme is combined with coercitive measures (for example, a farmer can be forced to change a practice *and* be offered a compensation payment to bear the adjustment cost). Again in such schemes, conditionality of the reward, enforcement and control are key elements.

Financial and Other Rewards

Another point to consider in the analysis is the kind of rewards proposed. They can include :

- ❑ financial rewards: this is the case of the European LIFE scheme, or of some North-American schemes in which farmers receive subsidies or tax abatements in the exchange of environmental services such as not farming a particularly sensitive area. Financial rewards include subsidies, tax abatements, tradable permits, subsidized credit rate, higher prices for products and lower prices for inputs.
- ❑ rewards in kind, through the provision of infrastructure or other services. This is typically the strategy used in integrated conservation and development projects in which farmers are rewarded in the form of community development projects
- ❑ improved access to resources and markets, through the provision of better land tenure for example, conditional access to credit, or preferred access to public or private markets.

Climb that Mountain or How to Reach the Upland Poor

The ultimate constraint of all RUPES schemes is that they will succeed based on two conditions:

- ❑ they manage to transfer value to the rural poor in exchange for clearly-identified services
- ❑ they manage to make sure that farmers have a clear perception of the link between the said reward and a given practice, which means that they understand what they are being rewarded, how, and what would be the sanctions if they failed to render the service in question.

The complexities involved in setting such arrangements are best exemplified by the French "CTE" measures aimed at giving subsidies to

farmers committing to environmentally-friendly practices. The amount of time and the bureaucratic complexity of a system enabling to identify the environmentally-beneficial practices, to evaluate their value in economic terms, to make contracts between the farmers and the administration, and then to evaluate and control their implementation is mind-blowing. Thinking how such complex mechanisms could be implemented in resource-poor countries defies the imagination.

This means that channeling and implementing institutions are the key element of success of RUPES in the field. In practice, several types of institution intervene, be it in rich or poor countries:

- ❑ government institutions are present in most cases at one stage or another of the process. They may not be the ones directly delivering payments to the farmers, but at least they usually coordinate the process. When they are the ones who actually deliver the environmental rewards, corruption and bureaucratic red tape is a huge constraint.
- ❑ because of the failure of many government institutions, especially in developing countries, to reach the rural poor in an efficient way, NGOs have often been called to the rescue as the next best intermediary to reach the rural poor. This is often the case of projects implemented with private sector funds, and also increasingly with public funds. They are used to communicate with the Rural poor, identify their needs, negotiate and sometimes implement projects, especially community-development. While they often do better than governments, NGOs have also their limitations, especially in terms of implementation capacity, representativity and legitimacy, as will be seen in the examples below.
- ❑ the final case is when the reward is delivered directly by the market through buyers of goods, for example purchasers of organic products. Even then in many cases, especially in developed countries, they often work through NGOs or farmers associations.

Scope of this Review

The aim of the present review is to identify the main types of interventions which have been developed so far at the initiative of developed countries – including those developed in cooperation with developing countries – that aim at RUPES. Conducted over a short period of time, this

review does not pretend to be exhaustive. Rather, it aims to be representative, i.e. to:

- ❑ illustrate the main issues at stake when developing RUPES mechanisms (whether within developed countries or with a financial transfer between a developed and developing country);
- ❑ provide a typology of the main types of mechanism developed so far, including market-based and non-market mechanisms;
- ❑ analyze the advantages and constraints, successes and failures of these mechanisms;
- ❑ for each mechanism, discuss the involvement of the main stakeholders
- ❑ analyze the conditions, especially institutional and policy conditions, for the successful implementation or replication of these mechanisms
- ❑ provide examples representatives of the advantages and constraints associated with each type of mechanisms.

The Review concentrates on watershed services, biodiversity conservation and carbon sequestration. Although it is acknowledged above that coercitive, punishing schemes that restrict environmentally harmful behavior can indirectly result in rewards for environmental services provided by the rural poor, the present review concentrates on schemes that aim directly at providing rewards, either financially or non-financially. Although the Review provides examples of instruments which are applied within developed countries, we selected only those types of instruments who bear some relevancy and have a chance to be applied – event with significant adjustments – in developing countries.

Not all the schemes aimed at rewarding environmental services in rural areas are directly targeted at the poor. Some of them have an explicit "pro-poor" component, while some of them are targeted at the rural population or the farming population in general or at particular segments of them which may or not be the poorest ones. Restricting this review to explicit, specific "pro-poor" policies only would have excluded a lot of interesting cases. So we included in the review all the main types of schemes aimed at rewarding rural people, in particular farmers, for environmental services, and then in each case discussed what is the likely distribution of the rewards amongst the rural population base.

The methodology used for the review was as follows:

- ❑ first, we reviewed some background, theoretical literature to identify the issues at stake and the possible RUPES mechanisms
- ❑ second, we collected information on various types of RUPES mechanisms and analyzed them based on the previous framework of issues.

The information was collected through library searches, internet searches and consultation with experts, especially through relevant mailing lists and newsgroups in Europe. The review includes case studies and policy reviews from European countries and developing countries, with transfers from developed countries. We presented the European and developing countries cases together, grouped by type of mechanisms and interventions, rather than by country. This enables to highlight the similarities of concepts between interventions within Europe and interventions involving transfers with developing countries. For example, the European concept of Natura 2000, which integrates agricultural areas within conservation areas, is very similar to the concept of Integrated Conservation and Development Projects conducted in the South. The French "Panda Shelters" (rural homestays with special "green" features aimed at raising environmental awareness in the public, and promoted by the WWF) is based on the same bases as eco-tourism lodging in Northern Thailand. The comparison between the implementation of similar concepts in very different cultural contexts highlights the importance of the policy and institutional conditions in making RUPES successful.

Based on our review, we identified several main types of strategies and instruments which have been initiated by developed countries, which main focus is on rewarding rural populations for environmental services, and which bear relevancy to the situation of developing countries.

These strategies are:

1. **People-friendly conservation strategies**, i.e. all the projects in which conservation

objectives are linked with interventions aimed at making sure that the rural population benefits from conservation activities and has an interest in contributing to them. This typically includes Integrated Conservation and Development Projects (ICDPs), community forestry, community-based resource management projects, etc. These activities are usually funded out of public expenditures, including levies on environmentally harmful activities, local taxes, and international development funding. In some cases they are also financed or co-financed by private donors and NGOs.

2. **Contractual rewards for environmentally-friendly agriculture and forestry.** This includes several types of instruments in which environmentally beneficial practices are defined, and rewards are proposed to their users on a contractual basis. This contractual basis usually includes payments from a public source (for example, public subsidies), sometimes from a private source (from an NGO), or certification of products (eco-labeling), in which case the reward is an improved market access. Several sources can be combined.
3. **Environmentally and Socially Sound Tourism (Eco-Tourism)**, which includes all interventions in which tourists are brought to a natural area in conditions that are aimed to benefit environmental conservation and the welfare of local people
4. **Share of benefit of genetic resources**, which includes all kinds of rewards received by rural people and other stakeholders in exchange for the conservation and provision of genetic resources that can be used commercially by the agriculture, pharmaceutical or biotechnology industries.
5. **Trade in Emissions Permits**, which includes watershed conservation strategies based on waste emissions trade and, more recently, carbon trade.

PEOPLE-FRIENDLY CONSERVATION STRATEGIES: ICDPS AND BEYOND

The first conservation parks were created toward the end of the XIXth century in North America and in South Africa. The first international treaty drafted to define their role was the Convention on the Preservation of Flora and Fauna in their Natural State, enacted in 1933. Conservation Parks aim at protecting forest areas (or other habitats such as grasslands or swamps) for their role in water cycle regulations and soil conservation, and biodiversity conservation. Since the first definitions of the concepts, which were heavily geared toward nature conservation following the North American Wilderness movement, the concept has evolved to recognize the fact that conservation can be compatible with the use of land and natural resources under certain conditions.

Besides, it has become accepted that it is no longer sufficient to have land use systems which cater for conservation needs only within restricted areas, while the rest would be free of conservation requirements (Gilmour, 1994). Hence, even if the "segregate vs. integrate" debate remains in the background of environmental policies (Van Noordwijck, comm.pers.), the "integrate" option occupies some rather high position in the formulation of conservation strategies. Yet even in these conditions, the revised classification of protected areas recommended by IUCN (1994) includes six categories, of which only one (Managed Resource Protected Area) is explicitly designed to cover the sustainable use of resources – while the only ones only take into account conservation, scientific and recreation uses.

At the end of the 1980s, changes in perception regarding the interaction between environment and development saw the emergence of a new concept, realized in form of the Integrated Conservation and Development Projects (ICDPS), which aimed to combine the objectives of environmental conservation with poverty alleviation and greater participation of local communities in conservation strategies and activities.

Pulling Down the Electric Fences

The ICDPs grew up upon the ruins of conservation approaches that had been based on heavily guarded protected areas, in which the state attempted to prevent all human activity.

In the 1970s and 1980s, it became obvious that most developing countries did not have the will or

capacity to effectively protect such areas. In some cases, this was simply because poor farmers badly needed new areas to extend their farms or because rural dwellers needed the resources provided by timber or NTFPs. In other cases, it was due to the fact that government officers could not resist the gains they could obtain by granting logging or conversion rights on previously protected areas to wealthy individuals or companies. In most cases, there was deep-seated disagreement with policies aimed at placing large areas of forest or other natural ecosystems out of the reach of development. Economic growth, poverty alleviation and personal enrichment were perceived as more valuable and more pressing needs than nature conservation.

Moreover, with a growing concern for the rights of indigenous people, approaches based on "electrified fences and shooting poachers" (Brown and Wyckoff-Baird, 1991) became less and less acceptable. The traditional rights of indigenous people to forest areas began to be more widely recognized, especially after the ILO convention on indigenous peoples rights in 1989. With this came the discovery that respecting such rights was not compatible with denying the owners access to land which they considered as hunting and gathering grounds or reserves for future cultivation. Even where the people "encroaching" on protected areas were not native to the area in question, more voices began to question the morality of shooting or jailing someone who was attempting to escape deep poverty by cutting trees in a protected forest. Eventually, even the most doctrinaire preservationists began to concede that the growing conflicts resulting from such approaches would make them unsustainable.

Finally, progresses in ecological science led to a recognition of the need to include areas with human activities in conservation strategies. In many parts of the world, human interventions have contributed to shaping existing ecosystems which are not fully natural, but yet are the unique depositories of particular life forms. This is especially true in areas with a long history of human settlement like Europe, where the survival of some wild animal species has become dependant on farming activities (see below the case study on Natura 2000 reserves). This is also becoming more and more true in developing countries, where the destruction of the last remnants of undisturbed natural ecosystems means that the last reserves of the species they safeguarded are now found only in man-made ecosystems. This is the case, for example, of the rubber agroforestry systems of Sumatra and Kalimantan, which will soon be the last

preserve of the biodiversity that was once found in the Sumatran lowland forests. Hence, while fully-protected, totally natural areas may still be desirable in some areas, some form of protection of semi-natural areas is also needed, as are buffer zones providing a transition between natural ecosystems and agro-ecosystems (GCEA, 1996).

At the end of the 1980s, strategies based solely on the use of force to protect conservation areas appeared as ineffective, morally unacceptable and ill-adapted to the task of biodiversity conservation. As stated by Brown and Wyckoff-Baird (1991): *"Unless people most directly impacted by conservation projects perceive their interests in the manner in which conservation is being promoted, it is unlikely that over the long term a combination of fencing and guarding will prevent unsustainable use of resources in wild lands and protected areas."* The solution adopted was an attempt to integrate conservation and development, so that rural populations would benefit from the environmental services generated by conservation projects and, as such, have an incentive to contribute to the success of such projects.

Nowadays, no national or even regional environmental conservation strategy incorporating the latest advances in development and conservation sciences is based on pure "protection, fencing and guarding" methods. All environmental projects try to integrate concerns for the participation of local people and try to ensure that provisions are made for them to benefit from the projects – at least in the design of the projects. This universal concern has led to a number of concepts such as "community-based environmental projects," "community forestry," "community development and environment conservation", etc. All involve a combination of environmental conservation, community participation, local economic development and poverty alleviation.

ICDPs are funded by national budgets and international aid, which can come from multi-lateral or bilateral cooperation institutions or NGOs. ICDPs are based on aid mechanisms which are not market-based. They can, however, be combined with market-based tools such as eco-labeling, eco-tourism, benefit sharing of the use of genetic resources and carbon sinks.

The vagaries of development mean that the "community participation," "community development" and "poverty alleviation" components of such projects have met with greatly varying

levels of success. This applies also to the "environmental conservation" components. Indeed, many critics of ICDPs consider that they have repeatedly failed on all counts. The review below will try to look more closely at various approaches to such conservation-cum-development strategies.

Stakeholders in ICDPs

People First, People Last

Unlike previous conservation strategies, ICDPs emphasize the role of local people and communities. The projects are meant to benefit the people (people last) and this is to be guaranteed by securing their participation at all the project cycle stages (people first) - from design to implementation, monitoring and evaluation. People are also expected to provide resources to the project to ensure that they have a real interest in its realization – even if the contribution is limited to labor and the use of local materials.

The concept of community is increasingly used in conservation and development projects. In its broadest definition, it means a group of people sharing some resources or territory, and who are hence expected to share some interests. Unfortunately this concept is too vague to be very useful. The main problem encountered by ICDPs trying to mobilize people is that the communities in question tend to be too loose and to have much less in common than that which would be needed to secure effective participation. Thus the danger of frequent repetition of the word "community" is that it becomes a mere mantra. Indeed, far from aiding a scientific approach, the term is misleading: it draws attention away from the realities of people in most conservation and development areas, such as the lack of common institutions and the abundance of conflicts at all "community" levels, from village to nation-state. Fortunately, these realities seem to be more and more accepted lately, and conflict resolutions skills are increasingly mobilized in ICD programs.

The main problems encountered in ICDPs are usually at the social and institutional level, e.g.:

- ❑ social stratification and unequal access to resources within the communities, which means that not all the members of the community will benefit equally from a project. Usually this results in the poorest being obviously the ones who are on the least favorable position to benefit from the projects activities, unless specific action is taken to

target them, which can then result in conflicts with the community leaders or dominant members

- ❑ lack of functional institutions to represent communities in a legitimate way. This often happens in countries which have had tried to force a fast transition from traditional institutions to more formal, centralized institutions based on either western democracy models or authoritarian regimes. During that transition, traditional institutions usually stop functioning and fail to have a chance to change and adapt to the new social, technical and economic context. In the end, such societies are left with a combination of dysfunctional modern institutions and debilitated traditional ones, neither one being able to provide a framework for peoples' consultation, not to mention effective community involvement in the project.
- ❑ conflicts between the institutional requirements of the project and the legal and policy framework. Effective people participation can only be secured as much as the people are given some kind of legal recognition, i.e. as long as their participation is sanctioned in national institutions, and their rights over the resources mobilized in the project, especially land and resources derived from natural ecosystems, are secured. In many countries, this is simply not the case and the first problem encountered by ICDPs are often the impossibility to provide tenurial rights to natural areas to the people who are suppose to contribute to protect them and benefit from it.

Despite growing awareness and the development of multiple tools for participatory development and poverty alleviation, such as Participatory Rural Appraisal, Goal-Oriented Participatory Planning and other methods developed in the 1980s and 1990s, these pitfalls remain as present as ever and are still the main causes of failures of ICD strategies.

Of course, one of the main advantages of ICDPs and Community-based projects is that they may be the occasion to draw the attention on institutional and policy failures and to contribute to their resolution, at least at the local level. However, obviously, unless ICDPs and Community-based projects manage to integrate a Policy component, any kind of temporary institutional solution or mechanism used by the Project to achieve its goals is bound to be a "quick-fix" which may not last longer than the projects' involvement.

Not Without my NGO

International and domestic NGOs play multiple roles at various stage of ICDPs. Many ICDPs or community-based environmental and conservation projects have been designed and funded by international NGOs such as the WWF, CARE international, Save the Children, etc. NGOs have also often been called upon to provide the institutional services that are missing in a dysfunctional framework. They are more and more used by international donors as providers of various key project services such as design, monitoring, evaluation and facilitation. Indeed, in contexts where there is a lack of institutions representing the people and legitimate, *bona fide* consultation mechanisms, NGOs are often asked to fill in this role.

There is no doubt that the participation of NGOs have brought an immensely valuable contribution toward changing biophysical, technocratic, top-down approaches and allowing for more participation of the rural populations in project design, implementation, monitoring and evaluation.

Problems arise, however, when a dysfunctional institutional setting requires NGOs to go beyond their capacity and legitimacy. A lot of NGOs claim to represent rural people, the poor, or native people. Yet in most cases this is either a self-proclaimed mandate, or a mandate given only by a tiny portion of the said population. Failing to recognize these limits can lead to many mistakes, especially when NGO leaders project there own priorities and visions of the rural societies on people who have very different needs and perceptions. For example, in Indonesian Kalimantan, a recent workshop on participatory resources management ended up in a conflict in which environmental NGOs and members from rural communities where physically fighting each other over different perceptions of rural development priorities (D. Simorangkir, comm.pers.)

Indeed, any conservation and development strategy should start with a cold-hearted diagnosis of the various institutions in presence, including NGOs, trying to map their position depending on the social origin of their leaders, their sources of funds, and the means by which they actually integrate the concerns of particular social groups within their actions. Only then can it become possible to allocate functions to NGOs which are within the scope of their capacity and representativity.

This whole debate over the role of NGOs, however, should not be an excuse to escape the other potent debate: what is the role of government and what should it be?

Governments: a Problem of Commitment and Consistency

Active, Sitting in the Back Seat or Steering the Other Way?

ICD strategies can be successful as long as there is a real government support. Indeed, some developing countries like Costa-Rica, have managed to integrate environmental concerns in their national policies and to turn them into a strategy to harness international aid and private funds.

Countries which have relatively democratic regimes allowing for some expression of opposition and participation of civil society have usually more environmentally – friendly governments, because they are obliged to respond to environmental NGOs.

Unfortunately, many governments in developing countries – and also in developed countries – tend to consider that environmental problems are not immediate enough to be of their concern. Hence the danger that the government may pay a lip service only to ICDPs, while providing no real support or, in some cases, while continuing to draft policies and to make decisions which may actually be contrary to the objectives of the projects.

In such cases, donors financing ICDPs are faced with the difficult choice of withdrawing their aid while waiting for a real commitment of the recipient country, or continuing to fund projects which meet partial or total failure while hoping for some gradual progress. Until recently, environment was a relatively minor concern of donor agencies, and hence there was no strong pressure to start conflicts with recipient countries based on environmental agenda. Donors were more interested to make sure that countries met their objectives in terms of structural adjustment (for international donors) or trade and investment (for bilateral donors). With environment getting a bit higher in the agenda of international cooperation, things are starting to change. The GTZ, for example, announced recently the end of its cooperation with Indonesia in the forestry sector, considering that the conditions were not conducive to its effective implementation.

Is Decentralization Environmentally-Friendly?

Many developed and developing countries have undertaken a decentralization process during the last two decades. In the long run and in a democratic decentralization process, giving an increasing role to regional governments should logically result in a better stewardship of natural resources, with more emphasis on sustainability. As pointed by Wellings (1994) in a study of ICDP strategies in Australia, local people can be expected to have a more in-depth understanding of local ecological processes, and a higher stake in long-term conservation of local natural resources on which they depend for their livelihood.

Problems may arise, however, when regional governments have little representativity of local groups depending on natural resources for their livelihoods. In many cases, regional governments represent only particular fractions within the regional society, and it is often a wealthy fraction which has more interest in extractive, short-term economic activities than in long term conservation of natural resources. The necessity to cater to short-term poverty alleviation goals or, more often, the enrichment strategies of local elites can lead to policies which will deplete natural resources as quickly or even quicker than centralized governments do.

Hence it can be concluded that decentralization can be environmentally friendly as long as the regional government is accountable to groups of people that have a stake in long-term environmental conservation – be it native people depending on natural resources, or local environmental NGOs.

Another issue to consider is the role of regional integration within economic zones, such as the NAFTA, the ASEAN or the European Union. Such integration can lead to a faster depletion of natural resources by opening new natural areas for investment and conversion. However, regional economic zones often have provisions for environmental policies aimed at mitigating the costs of environmental degradation, especially the Transboundary costs.

The Role of Funding Agencies

ICDPs are traditionally funded by a number of sources which can be combined, such as International Development Banks and Donors, NGOs, and local governments. An interesting new

trend is the development of private conservation funds, which may ultimately lead to some kind of market for conservation and development areas.

Just as ICDPs have raised great hopes at the end of the 1980s, it seems that the disenchantment is just as great as the hopes were. We provide below a few cases studies which illustrate the potential successes and difficulties faced by ICDPs.

A Few Approaches by Different Actors

A Success Story: The Natura 2000 European Program

Natura 2000 is a European network of areas, proposed under the Birds Directive and the Habitats Directive, where human activity must be compatible with the conservation of sites of natural importance. This directive aims at protecting nature through better management of these specific sites.

The first stage is a scientific assessment at national level of each habitat or species of Community interest. The important sites are identified on the basis of common ecological criteria and presented to the European Commission in the form of national lists. The sites which will form the Natura 2000 network are evaluated and selected by the Commission on the basis of their relative conservation value.

The European network of Natura 2000 sites today covers approximately 9% of European territory, and could eventually cover 12% of the territory. As stated by Currie *et al.* (1999): *"many of these sites are managed by agriculture: contrary to a commonly held view, it is not a question of creating complete nature reserves or of freezing all human activity. Quite the contrary, the areas concerned are "semi-natural" areas, created and maintained by human activity, which might even disappear if farming ceased. Without grain production, the great bustard (Otis tarda) would desert central Spain. Without humid hay- or grazing-meadows, the corncrake (Crex crex) would abandon the banks of the Loire. Without the guaranteed pastures of open wooded meadows, the hermit beetle (Osmoderma eremita) would disappear from southern Sweden".* Indeed, apart from marine and fresh water areas and high-altitude rocky land, most of the natural habitats covered by Natura 2000 are in agricultural or wooded areas.

For this reason, Natura 2000 has been a source of concern among farmers and foresters, and this

resulted in a delayed implementation of the program. However, the experience of the project so far is that it is perfectly possible to develop farming practices that maintain, and even improve, the nature value of habitats and species. In fact, by paying for a service provided by farmers to society, this type of support helps to diversify agricultural income, particularly in animal-rearing areas and areas of diversified farming (Currie *et al.*, *op. cit.*).

The type of "agri-environmental measures" implemented in Natura 2000 sites – i.e. various forms of subsidies to farmers for environmental services - are not different from the ones used in other areas (See below, next section). But being in a Natura 2000 site means that farmers are the targets of special environmental awareness and information campaigns, and that they are given priority eligibility for receiving this type of aid.

This policy aims at enabling to reverse what a recent EU (2001) report called the "locational disadvantage" for farmers in biodiversity hotspots: *"The European Common Agricultural Policy has so far been geared towards optimum performance and rationalisation. Environmental and social considerations have frequently been neglected. Under such circumstances, a species-rich, diverse landscape came to be regarded as a locational disadvantage for agriculture. There is a need to reverse this situation in a manner beneficial to farmers. If society wants agricultural production to take account of nature conservation, it must also be prepared to pay for [these] services".*

Several Member States and regions are now giving priority to Natura 2000 sites by co-financing agri-environmental measures. Demonstration projects co-financed under Life-Nature measures (see below, next section) have been used to determine the farming practices best suited to maintaining or even enhancing the natural value of sites in terms of the habitats or species that society wishes to protect.

Accordingly, farming and the protection of Natura 2000 sites have everything to gain from coexisting on the same land:

- ❑ The sites are farmed in a way that is better suited to the land and there is a continuous human presence which is often less costly than management by an external body;
- ❑ Farmers are remunerated for the environmental services they provide in a transparent way which their fellow citizens can understand;

- ❑ Regions of the Union with the greatest biodiversity are generally farmed the least intensively. They therefore receive preferential Community support.
- ❑ Related activities become more attractive, e.g. the direct sale of meats, cheeses or wines labelled as coming from Natura 2000 sites, the promotion of rural tourism linked to the discovery of nature, etc.

This aspect is particularly important. While many of the agri-environmental measures offered to farmers in Natura 2000 areas are contractual public aid, the promoters of the network want to complement these aids with more market-based incentives. Hence Natura 2000 is also expected to become a support for market-based environmental services remunerations, such as the sales of organic farm products or eco-tourism. Natura 2000 could therefore become a clear sign of the multifunctionality of agriculture in the third millennium (Currie et al., op.cit).

One of the key reasons for the success of Natura 2000 is that it makes use of existing agri-environmental policies and targets them more specifically at given sites. However, it still met difficulties in its beginning because it was launched after the Common Agricultural Policy shifted from a the productivist orientation of European Agriculture after the Second World War to the orientation towards sustainable development, and environmental soundness that prevails now. When the project was launched, many stakeholders in the European Agriculture were still living under the productivist paradigm, and national policies geared in that direction were – and sometimes, still are – in place.

This means that in Europe, like in any other developed or developing country, consistency between overall policies and ICDP local strategies are the key to success.

A key question raised by the Natura 2000 project, like any other agri-environmental subsidies, is sustainability. The promoters of Natura 2000 took a long time to convince participating farmers that the project would help them, and are still meeting with resistance. With the new emphasis on environmental services, European farmers are getting confused as to what their role in society is. They are afraid that environmental subsidies will only last a short time and that when they will be lifted, they will be in a situation where they will have made changes in their farm structure that will

leave them less competitive than before on the market for agricultural products. This is why the development of market-based instruments in complement of subsidies are important – although they themselves also raise other sustainability issues.

ICD through Community Forestry

The approach common to many ICDPs is to provide alternative incomes sources so that the rural poor would not need to conduct activities that would encroach into a core conservation area. This can be done by developing conventional agricultural activities outside the conservation areas, in which case there is little scope for the integration of conservation and development objectives, and encroachment in conservation areas may well continue as farmers combine intensive agriculture with natural resources exploitation within the protected areas.

This recognition led to the concept of buffer zones, where lower conservation targets can be set, allowing for some agricultural practices that have a relatively high conservation value, such as a higher biodiversity (like some forms of species-rich agroforestry or pastures) or higher watershed conservation functions (such as planting woody perennials, using low tillage, maintaining a year-long green cover, etc.) than other forms of agriculture.

Even then however, buffer zones may fail to prevent people from depleting natural resources. Hence community forestry has been designed to promote full ICD strategies, through activities which profitability is dependant on the conservation of natural resources.

An example is the Biodiversity Conservation Network, which is a competitive grants program for Asia and the Pacific that supports enterprise approaches to the *in situ* conservation of biological resources (Hicks, 1995). This program has supported a number of projects such as:

- ❑ Non-timber forest product harvesting in Palawan, the Philippines
- ❑ Eco-tourism and community forests in Nepal
- ❑ Non-timber forest products and timber stand improvement in Luzon, Philippines
- ❑ Small-scale logging in Pauan New Guinea
- ❑ etc.

The projects have received planning grants (for pre-project appraisal and project design) and implementation grants. Planning grants vary from US\$27,300 to US\$324,500, while implementation grants can be as high as US\$636,600.

The strength of the approach lies in two aspects which are too often neglected in ICDPs: economic realism and economics-conservation linkages.

Economic Realism

This aspect is too often missing in ICDPs, especially when the proponents carry an idealistic version of the ecosystem and its values – failing to realize that for impoverished people, only very short term financial and utility values prevail. As stated by Durst (1995): *"One of the major flaws of many foresters and environmentalists is that we love trees too much. We think all trees are fantastic. We tend to believe that every vacant piece of land should be covered with trees. And we all too often fail to recognize the human dimension of forest management. In the process, we often lose the very forests and trees we try to protect. We must not lose sight of the human needs and demands that are placed on forests or we will surely fail in our efforts to conserve them. Meeting people's immediate needs must be a primary objective of forest management"*.

The BCN project, on the contrary, specifically aimed at promoting economically viable activities based on forest products – including logging. This last detail is important: too often, community-based forestry projects concentrate on NTFPs and exclude the rights of local people to harvest timber. This is either because timber extraction is felt to be incompatible with conservation objectives, or because timber extraction is reserved for forest logging companies, as is the case in Indonesia where forest people living in "HPH" (logging) concessions can only harvest timber of limited commercial value or NTFPs. Unfortunately, despite the enthusiasm of many conservationists for honey marketing, mushrooms and other medicinal herbs, the sad reality is that in many cases, there is much less profitability in NTFPs than in timber extraction (G. Michon, comm.pers.).

Another lesson learned from such projects is that conservationists, NGOs and farmers have limited capacity in changing markets. One of the BCN projects tried to improve the bargaining position of farmers so that they would receive a "fairer" (greater) share of the prices of NTFPs. The project proponents found it very difficult to reach that goal,

and found that it needed years of patient capacity-building of NTFP collectors and farmers before they could be in a position to extract better prices from traders.

In all cases, the only viable approach to community forestry and ICDPs is one that recognizes the need to develop profitable activities within the scope of existing markets – including eco-markets such as organic product markets and fair trade (see below section on eco-labeling).

Economics-Environment Linkages

Another interesting aspect of the BCN is that the grants are given only if there is a clear, established link between the sustainability of the proposed economic activity and the conservation of natural resources. This is important because in many ICDPs, project managers get carried away by community development activities which may not be linked with conservation. Hence a criterion for funds allocation is whether the enterprise would fail if the local biodiversity became degraded. If the answer is yes, then the project fits within the BCN mandates, because it creates an economic incentive for conservation (Hicks, 1995).

Protecting my Land: ICD in Australia

Good examples of initiatives led by rich countries are the ones that integrate concern for their own indigenous people communities, for countries which have such people, like North American Countries or Australia and New Zealand. Wellings (1995) gives account of a project, the Kakadu National Park, which succeeded in making Aboriginal traditional landowners active participants and beneficiaries of the Parks management. Land tenure was a key instrument in the process, since as mentioned by Woene-Green *et al.* (in *op.cit.*): *"Aboriginal participation in the management of protected areas continues to be fundamentally a land-rights issue"*

The strategy adopted to protect the park and include the indigenous people in this objective was then to grant them a Title on one-third of the Parks' area (which in total covers 20,000 km²), after which the Kakadu Aboriginal Land Trust leased the land to the National Parks' Direction. The lease included provisions for:

- ❑ a commitment to world standard management procedures
- ❑ the maintenance of traditional usage rights

- ❑ employment training, employment opportunities and support for Aboriginal business enterprises
- ❑ annual rental payments
- ❑ benefits from Park revenue.

In the year 1993-94, the financial benefits to traditional landowners from the last two points amounted to AU\$540,000, and of the 60 Park staff, 35% were aboriginal people.

Besides clear land rights, the Project succeeded in maintaining its conservation goal by giving a strong participation of aboriginal people in the Parks' management.

Learning from the Field: the DGIS-WWF Tropical Forest Portfolio

The aim of the DGIS-WWF Tropical Forest Portfolio is to provide interregional guidance and support to seven integrated conservation and development projects in Honduras, Ecuador, Gabon (2), Ethiopia, Pakistan and Philippines through identification, synthesis and reintegration of factors which are identified as contributing significantly to the success of the ICDP-approach. Special emphasis is being given to the active role of local people in linking their development with conservation measures.

The Project is based specifically on the recognition that the failure of many ICDPs is the lack of skill and capacity of local communities, and the contradictions between projects' objectives and national policy frameworks, that result in a lack of sustainability of the ICDPs. Hence the Portfolio aims at providing assistance to the 7 projects in overcoming these constraints.

The project enabled to learn 4 broad lessons to make an ICDP successful. The following are excerpts from a paper by McShane (2000) presenting these 4 lessons.

Learn from Doing

The realities of implementing ICDPs are not always straightforward, implementers operate in situations where the outcomes of their actions are uncertain, with unexpected side effects being the rule more than the exception. As a result, the process of implementing ICDPs must be consciously

structured to cater for these uncertainties, as well as for changes in value systems, policies, and technical capabilities. The Portfolio has hence

developed a monitoring system to aid in synthesising lessons and progress, and serve as a control on progress and problems as measured against conservation goals and objectives. This process has resulted in two projects, Philippines and Pakistan, reviewing and revising their project goals. It has also been the process whereby the interregional component has identified these four lessons as specific areas of intervention in terms of addressing factors critical to ICDP intervention.

Policy Environment and Natural Environment

Supportive laws, policies and regulations must be in place if interventions are ultimately to be successful and sustainable. Projects cannot simply address field-based issues. They must take a vertically integrated view towards project implementation meaning policy advocacy and change is as critical to project success as is infrastructure on the ground.

Two particular problems have limited the effectiveness of many ICDPs: first, the failure to establish coherent linkages between project conservation objectives and their investments in local development, and second, project inability to appreciate and confront national policy and institutional factors which often pose barriers to project success. While there has been better success at integrating agricultural development and natural resources management, policy problems are especially present in forest management.

Hence, solving problems in ICDPs and Community-Based Forest Management must:

- ❑ Recognise the linkages between national and international policies and local actions, and vice-versa, before setting out to implement field actions or affect policy change.
- ❑ Develop approaches that attack issues simultaneously at all levels (i.e. field programmes demonstrating what works and what does not; policy initiatives influencing and changing factors across broader constituencies; and campaigns encouraging action to achieve change).
- ❑ Use the lessons derived at the various levels (local, national, international) to adapt approaches so that the ability to respond remains flexible and creative.

Leave something behind

ICDPS need to ensure that the capacity and confidence to make decisions is in place by the end of the project. This is an important sustainability indicator, which requests :

- ❑ building institutional capacity to train and develop skills
- ❑ devolve management to institutions who will be ultimately responsible (communities, NGOs, government, etc.).

The Portfolio field projects recognise the need to focus on capacity building, and are starting to address some of the gaps in capacity. Currently, this is largely being done through training of project staff and government counterparts. However, there is a need to expand capacity building initiatives both in terms of target groups and issues addressed.

Tell the story

If projects and programmes are to have an impact well beyond their area of immediate operations, then they must be able to capture the attention of those who do not have a direct or technical interest in the activities being undertaken. The object of this approach is to promote sharing and learning amongst various target groups in the following ways:

- ❑ regular information and documentation about what each Portfolio project is doing based on adaptive management approaches to project monitoring;
- ❑ regular input from target groups to specific Portfolio projects concerning project success, direction and approach, etc.;
- ❑ sharing of information between different target groups.

The Portfolio is employing professional writers to visit all the projects and write stories upon which all Living Documents are based. Such documentation includes, but is not limited to, information on biological diversity, people and resources, threats, incentives, opinions, activities and lessons learned, drawing on local knowledge, prospects, further reading and facts for visitors. Photographs are available to illustrate the documents. Additionally, separate smaller stories are being developed around issues of human interest. The stories are being further developed over the next three years by regular updates building on the existing information and by developing new stories as the projects progress. Towards the end of the project, professional writers will again visit with the primary task of taking the original work and looking at how the project progressed over four or so years, what has changed, what are the lessons that have been learned, and how effectively did the project accomplish what it set out to do? In this way, the

Living Document not only tells the project's story over time in a popular form, but provides a popular evaluation of what has happened.

A Future for Integrating Conservation and Development?

As mentioned by Mc Shane (2000), ICDPs remain "perhaps the most popular approach among NGOs, government departments and development agencies, and as a result, need to be better understood. Questions about the effectiveness of ICDPs have been raised regularly over the last five to ten years, interestingly by both the conservation and development communities, though usually for different reasons. Barrett and Arcese (1995) argue that while ICDPs excite the interest and imaginations of conservation groups and international development agencies, they are not yet analytically or empirically sound approaches. In fact, they usually proceed from untested biological and economic assumptions, many of which are likely false."

This means that there is no inherent strength in the ICD concept that will make it easier to attain both conservation and development objectives within the scope of integrated projects. In fact, in many cases, the noble, idealistic goal of integrating conservation and development may actually make it more difficult to attain either one of these objectives.

It does not mean, however, that there is no space for integrated conservation and development strategies and project that actually deliver on both fronts, as the examples above indicate. As the WWF review above and other authors mentioned, we have now enough perspective on ICDPs to start learning a few lessons. They include the following harsh realities:

- ❑ no ICDP will succeed unless it is based on strong economic realism and real economics-environment linkages, i.e. unless it provides income benefits to people that are actually dependant on the conservation of environmental features.
- ❑ no ICDP will succeed unless it is supported by an adequate policy framework and a local institutional setting that enables to implement real people consultation and participation.

Indeed, successful ICD strategies can bring many lasting benefits to the rural poor and to the environment, such as:

- ❑ improved legal framework, especially improved tenurial rights on natural resources
- ❑ improved policy framework
- ❑ services and use values derived from infrastructures built up or improved by community-development projects
- ❑ higher income derived from economic activities promoted through technical assistance, extension or financial assistance (such as improved agriculture, marketing of NTFPs, etc).

Checking that conditions for success are met should be the first step into ICDP implementations,

and in many cases would lead to rejecting projects. On the projects' institutional side, there are two main limiting factors to the effective use of such diagnosis or pre-project evaluation tools. Firstly, ecological and economic scientists often still lack a deep enough understanding of economics-conservation linkages in most ecosystems. And secondly, projects are often designed or managed by biophysical specialists rather than socio-economists, and hence fail to give a prominent place to the only party which may have such an understanding, if only a pragmatic one: the local people.

PROMOTING ENVIRONMENTALLY FRIENDLY AGRICULTURE AND FORESTRY THROUGH CONTRACTUAL APPROACHES

While ICDPs are specifically targeted to conservation areas, a number of approaches have been developed during the last 20 years to integrate environmental concerns within agriculture and forestry practices. There can be two types of underlying objectives there:

- ❑ the first one is to reduce the negative environmental impacts of agriculture and forest exploitation, such as soil erosion, pollutions or lost biodiversity: it was the only objective prevailing in the beginning and is still the dominating one
- ❑ a more recent objective – which is often targeting areas with special conservation values - is to promote activities that will result in an improved environment, like an expanded habitat for endangered species, or increased net carbon sequestration.

These objectives can be reached by removing land from production and establishing permanent grass or tree cover – a relatively simple measure which has the drawback of reducing production – or through the promotion of changes in farming practices.

Historically, these measures were first targeted at watershed conservation, i.e. mitigating soil erosion and water degradation. Since the 1990s, the concern has shifted more towards biodiversity conservation. Finally, after Kyoto in 1997, the new concern is greenhouse effect mitigation.

As stated in a EU report (2001), these objectives can be reached either through consumer-based or public aid mechanisms *"Possible solutions [to compensate farmers for environmental services] are for consumers to be prepared to pay a higher price for products or for farmers to be compensated from public funds for the additional expenditure incurred in using methods which are more in tune with the environment and nature"*.

The approaches described and analysed below are all the ones in which the user of a natural resource manager commits to practices that are expected to have a positive environmental and social impact, in exchange for a financial reward. The use of natural

resources can be farming, harvesting of NTFPs, timber exploitation or nature-based tourism (which is studied separately because of its complexity and importance). In the case of agri-environmental measures managed by the State, this financial reward can take the place of a direct payment, a loan or a tax credit, paid through public institution or an NGO, or an expected better market access for their products through eco-labelling.

The important aspect there is the fact that all the mechanisms described here are regulated by a form of **contract**. In agri-environmental measures, farmers commit to specified practices for a number of years. The implementation is controlled, and the delivery of the subsidy is conditional to the respect of their term of the contract.

In eco-labelling, there is usually a contract between the certified and the certifier – at least an oral, informal commitment but an explicit one – which means that the label is granted under specific conditions.

Eco-labelling schemes which fall in this category are very varied. They include:

- ❑ forest certification schemes certifying that a forest product has been produced under Sustainable Forest Management practices
- ❑ organic farming certification and labelling schemes
- ❑ fair trade certification schemes, which combine environmental objectives (all fair trade products must be produced in ways that respect the local ecology and are sustainable) with social objectives (a "fair" remuneration for producers, enabling them to sustain and develop their economy and welfare).

Although the primary aims of these instruments is to promote environmental services, they have been usually designed within a sustainable development paradigm, and this means that they take into account the three dimensions of sustainability, i.e. economic soundness, environmental conservation and social justice. The subsidy or gains in market prices are there to help a given economic unit, which is supposed to be profitable to start with, to meet the costs of improving their impact on the rest of society. Besides environmental goals, agri-environmental measures and eco-labelling schemes often include a number of social objectives, such as employment preservation, development of local communities, and the respect of indigenous people and workers' rights.

The Stakeholders: Implementers, Payers, Controllers and Advisers

Farmers and Foresters as Implementers

Contractual approaches are in most cases voluntary. Their success rests on the ability and willingness of natural resources managers – farmers or foresters – to implement the proposed measures. This will happen if several conditions are met.

Firstly, the implementers must understand the measures to be taken. This may seem trivial, but given the complexity of some of the European agri-environmental measures, it seems surprising that it happens at all. Identically, there are some strong barriers to entry into certification processes, due to the fact that they are complex. This means that such measures may be biased against practitioners who have little understanding, resources or patience for heavily formal approaches. Simplifying the procedure is not necessarily an option. The less formal a scheme, the more likely it is to be subject to variation in interpretations and implementation, leaving room for failure and criticism.

Secondly, the implementers must have or be provided with the financial resources to bear the costs of such schemes. These costs are of several types:

- ❑ in the case where changes are required as part of the contract, then there are costs to implement these changes. In the case of public aid mechanism, the investment costs that may be needed are partially taken care of by the funding agency, but a contribution of the farmer is also expected. In the case of private certification, there are not necessarily changes required to meet the eco-labelling standards. For example, farmers who grow coffee under shade can be certified for growing "Shade Coffee" without requiring specific adjustments (Terrachoices, 2000). However, most certification schemes have such high environmental standards that adjustments are needed in most cases to meet them.
- ❑ then there is the cost of the contractual process: evaluating the management unit, deciding on the measures to implement to obtain the aid or be certified, filling requests, drafting contracts, and regular audits, monitoring and control. This process is often very costly. In the case of subsidies, they often include the possibility to include the valuation

of the time spent by the farmer or the cost of consultants in the grant request. In the case of certification, the cost is normally borne by the certified management unit, but in some cases specific aid programs by NGOs or governments can take them in charge.

This means that certification again may be biased against poor farmers, unless it is linked with some aid mechanism to finance the costs of certification and adjustment to certification standards.

Finally, the operation must result in a net benefit. In some cases, the income from the new practices may actually end up being higher than the former practices, even without any aid. For example, a recent study on organic farming yielded the result that in many cases, after a few years of adjustment, it ends up providing higher net returns. Indeed, such cases are likely to be the only ones which will result in a sustainable change in practices. In other cases, it is the price differential carried by the certified products that enable to support the additional costs or lesser income from the new practices – although as we will see, it is in fact seldom the case. Finally, there are all the cases when only some public aid enables to maintain the environmentally-friendly practice. These cases have a poor sustainability outlook.

The Payers: the State, Consumers and Distribution Chains

In the case of agri-environmental contractual subsidies, the State is the funding agency, and uses either special aid funds, proceeds of environmental levies, or the general agricultural, forestry and environmental budget as a source of funds. The complexity often proceeds from the fact that there may be several levels of State intervention, for example in European Agri-environmental measures there is a combination of National Institutions, Local decision-making and Community (European) Institutions which intervene in drafting the measures.

In the case of certification systems, the consumers are supposed to be the ones who, *in fine*, contribute to bearing the costs of adjusting to more environmentally-friendly agricultural and forestry practices. Many studies have been conducted recently to evaluate the actual willingness of consumers to pay for goods having a higher environmental and social "added value". The results indicate that a majority of consumers (60 to 90%, depending on the cases and sources) are in theory ready to give the preference for such goods.

However, their readiness to actually pay a higher price for eco-labelled goods is very limited; between 5 to 10% depending on the cases, in average about 6% for certified forest products in Europe, for example (Keogh, 2000). Unfortunately, such a price difference is unlikely to be able to sustain the costs of shifting to agriculture and forestry practices that result in higher environmental services. However, there is a lot of variation between countries, income classes, etc. In Europe, Northern Europe countries which are heavily industrialized are where the highest preference is given to eco-labeled products. Fortunately for the producers, educated and wealthy socio-professional categories are also the ones with the preference for these products.

However, measuring the readiness of consumers to pay for eco-labelled products through direct surveying may not be the right approach to the topic. More than enabling to sell products to the same consumer at a high price, which will seldom take place in practice, being certified enables to shift from one category of consumer – with low budget – to wealthier, more profitable market segments. Unfortunately it is very difficult to estimate the price differential gained in the process, especially because of the secrecy kept by most companies about their supply and selling prices.

The reality of consumer markets, however, is less straightforward than a linear willingness to pay. Consumers place several types of values in certified products, and these values are not passed on directly to the farmers and foresters, they go through processors, marketers and retailers who try to integrate them in their marketing strategy.

The first value placed by consumers on "eco-labeled" products is an expected higher usage value, through the expectation that the certified product will be of higher quality and result in better health. This is especially true of all products that are organic, in which consumers expect to gain health benefits from reduced exposure to chemicals or GMOs. This is also true of all products that carry a "regional" label or that are guaranteed to be produced with special traditional processes that are likely to result in better taste, nutritional value or other characteristics. However, in general, it is important to state that the superior health or nutritious value of organic food is very controversial – some medical doctors say that the natural toxins found in organic products are far more dangerous than pesticide residues. As for taste and other organo-leptic qualities, they vary a lot depending on personal preferences and types of

products. Indeed, consumer education is a very important point there. In many industrial countries, consumers have been used to consume products which cannot be produced under organic farming methods, such as huge fruits, regularly shaped and sized, and bearing absolutely no single spot or insect attack mark.

In fact, there is a very irrational part in the superior usage value that consumers place on eco-labeled products. At this stage one has to remember that for humanity, the process of ingesting food is never a purely biological one, it is heavily loaded with symbolic value, as taboos and other food-related magic or spiritual beliefs indicate. In fact, consumers of eco-labeled products often have the – not necessarily conscious - impression that by consuming these goods, they integrate the qualities which they associate with a better environment, such as purity, durability, spiritual values, community life, etc. These highly symbolic perceptions of the superior value of eco-labeled products are good targets for marketing campaigns, which typically aim at the irrational.

After usage values – real or perceived, material or symbolic – some consumers place a pure option or existence value on the ecosystems, human rights and cultures that eco-labeled schemes are supposed to protect.

What makes things complex is the fact that people do not buy their certified food or chairs from farmers and foresters, but more likely in two types of outlets:

- ❑ small specialized outlets devoted to "green" products were for a long time the only and then the main source of organic food and fair-trade products. Some of them are run by individuals or small companies specializing in such markets, some of them by specialized brands or franchises which have become international, like the Body Shop. Some of them are run by NGOs (such as Artisans du Monde, a French fair-trade association operating its own shops);
- ❑ large retailers and distribution chains, however, have recently started to notice the fact that buying "green and good" is starting to get out of a small niche to become an increasing choice of mass consumers. Large food chain companies are now offering a larger range of organic products and fair-trade goods. In the furniture sector, large retailers like Home Depot and Ikea are now the primary agents of certification development for sustainable forest management schemes.

Indeed, many large chains like Ikea (for furniture) or Monoprix (for food, in France) are putting environmental and social values or the so-called sustainable development agenda at the core of their identities and marketing strategies. This seldom materializes in higher prices offered to producers – large distribution chains are not known for the generosity of their purchasing strategies. It rather results in very straightforward "get certified or lose our clientele" threats. For example, large companies like Loewe, Home Depot or Ikea are making it clear to their Indonesian furniture suppliers that they have until 2003 to get certified, without offering any particular price incentives. Again, like in the case of consumers, the main reward for certified producers is being able to retain a market which pays relatively well than other segments. Furniture suppliers who cannot get certified can always sell to China or Korea, but they are likely to get even lower prices.

Since there is no simple, straight-forward additional price tag attached to certified products in all sectors, it is very difficult for a producer to identify whether getting certified will actually result in higher or lower benefits. It is more like a bet on moving towards better quality, higher-end market segments, like any quality-based certification scheme. By doing so, the producer hopes to improve its production process and get better rewards for its products – without any guarantee of financial rewards.

The Regulators: Rule-Makers and Controllers

All contractual reward schemes include at some stage some institution which drafts the conditions for the rewards. These tend to be more and more multi-stakeholder based. For example in France, Territorial Exploitation Contracts are defined by regional governments in consultation with local producers associations. The only credible certification scheme for forest products, the FSC, is managed by representants of the industry and NGOs. This multiple representation enables the schemes to be more realistic (implementers are consulted) and more credible (external stakeholders who care for the environmental results are represented).

Contractual schemes also need a controlling body. In the case of public aid, it is relatively straightforward with usually the State being the controller. In the case of certification schemes, the only ones which have some credibility use independent third-party audits, conducted by

bodies (consulting or audit companies, NGOs...) accredited by the rule-makers, who are also the ones who rule on the use of the certification logos and labels.

Credibility of the control process is a key problem in all eco-labeling schemes. Recently, 7 out of 9 certifying agencies for the French Organic Farming label had their accreditation revoked after an independent evaluation indicated that they failed in meeting their mandates. The competence and independence of FSC accredited certifiers is often questioned. This is especially a problem since in the end, like in any certification scheme, the certified party is the client of the certifier. The problem is particularly acute in countries with a high level of corruption practices, in which there is a general cynical view that "everyone can be bought" which means that all audit procedures are viewed with suspicion.

The Helpers: advisors, consultants and funding agencies

Because of the complexity of most contractual approaches, many farmers and foresters find it impossible to go through the process without assistance. Success in implementing these strategies request institutions – private or public – able to provide technical assistance to the implementers.

For example, in the case of the contractual agri-environmental measures implemented in Europe, a recent brochure by the Regional government of French Southern Alpes area read: *"Of course, the procedure is not as simple as we wished [N.B: a euphemism given its actual mind-numbing complexity], and thus we are proposing the services of our technicians [N.B.: extension officers from the local agricultural services] to help you in establishing the contract, and then in respecting your commitments in an optimal way"*.

In the case of certification, a number of NGOs or private consultants offer services to farmers and foresters to help them go through the process.

Because of the high cost of the whole thing, certification has often been criticized as discriminating against poor farmers or small forest-owners. Indeed, a contractual approach targeted at the poor or at communities must include a way to finance the cost of the whole process, either through more public aids (for example in agri-environmental measures, the cost of making the contract can be added to the funding request) or through NGO programs.

Case Studies

Agri-Environmental Measures in Europe and North America

The French CTE: who benefits from complex processes?

The CTE (*Contrat Territorial d'Exploitation*, or Territorial Farming Contract) measures has been specifically designed in France to provide subsidies to farmers, in exchange of the implementation of specific changes in their practices resulting in environmental benefits, but also socio-economic benefits such as job creation, diversification, quality improvement, etc. They are presented as part of the "agri-environmental" measures of the New European Common Agricultural Policy.

The CTEs are targeted mainly towards upland "environmentally-sensitive" areas, where there is a problem of poverty and desertification, as farmers who cannot compete with producers from mechanized lowland areas abandon farming. As such, the CTE can be considered, at least in principle, as a model of RUPES mechanism.

The CTE are integrated within other European policy frameworks for environmental conservation, such as the Natura 2000 network of protected areas. Farmers who implement a CTE in a Natura 2000 area receive a 20% complementary aid from European funds. The complexity which was and is still involved at all stages of the CTE program, however, illustrates very well the difficulties met when trying to implement RUPES mechanisms.

The first stage in drafting the policy was to define the type of changes which would be eligible for financing. This was done in a participatory way through multi-stakeholder consultations, involving the local government units, consumers associations, environmental NGOs, and farmers associations. The result is an official list of different types of changes, in which farmers can choose a combination of specific actions to implement on their farm. For example, in the 7,000 sq. km upland district of *Alpes de Haute-Provence* in Southern French Alps, farmers can choose between nearly a 100 different types of actions, such as shifting to organic farming converting cultivated areas to extensive grazing, or enriching leguminous covers to make them a better habitat for specific birds. The proposed changes are described in detail in a 73-pages documents (see Box 3 for an example).

Box 3. Promoting hedgerows through agri-environmental measures

The example below shows the degree of details which accompany the specifications of environmental services eligible for subsidies under the French version of European agri-environmental measures. One of the services proposed for financing to the French upland farmers in Alpes de Haute Provence is the rehabilitation and maintenance of hedgerows. Farmers who opt for it are eligible to aid worth US\$0,8 per meter of hedge row for rehabilitation, and US\$0,4 per meter per year for maintenance - limited to 200 meters per ha and for a duration of four years).

The instruction manual specifies that a local "technical committee" will first review the candidate hedgerow for rehabilitation, and decide which trees can be planted depending on the characteristics of the area. The farmers is eligible if there was between 20 to 50% of missing trees to start with. Eligible hedgerows must be at least 15 meters long, 1,5 m wide on the ground, and be less than 3 meters high in non windy areas - in windy areas, hedgerows can be as high as one wants but must be pruned to limit thickness. Detailed instructions are given as to the types of techniques that must be used to maintain the hedgerow. For example, all interventions are forbidden during birds nesting periods, and farmers have to reduce the height and thickness of the hedgerow at least three times in five years, using non-damaging tools, except in windy areas where height reduction is not conducted. Instructions are also given about cleaning, rodent control, etc. In case there is a grass strip around the hedge, the grass has to be grinded twice a year, and it cannot be financed by other specific CTE measures meant to finance grass strip development and maintenance at the extremity of fields.

Each action is categorized depending on whether it is "environmental" or "socio-economic", and whether it is "mandatory", "1st priority" or "2nd priority" in given areas. Besides, some of the proposed actions apply only to some of the 12 subdivisions of the district, or only to particular crops or productions.

Under the project, each farmer is eligible to aids varying from US\$100 to a few hundred US\$ per ha, depending on the type of action financed. The maximum is US\$15,000 over a period of five years, disbursed in yearly installments conditional to the respect of the contract by the farmers.

It can be much higher in other areas (the national average is US\$25,000 per farmer). The aid normally covers 30% of the cost of the changes required, or 40% in "disadvantaged" areas, plus 10% in case of job creation or 15% if it is implemented by a young farmer. So far, about US\$500,000 have been disbursed.

In order to obtain a CTE, the farmers must fill a first application form provided by an authorized institution (local agriculture Chamber, producers association, agricultural government services...), which forwards it to the other organisms intervening in the process. Then the applicant has to submit a 20 pages document entitled "self-diagnostic and farming project", which is similar to the type of questionnaires used by socio-economic researchers in rural areas, with complex tables documenting the social, economic and environmental aspects of the farm and the proposed changes. The farmer is encouraged to use the services of the local agricultural services or associations to design his or her proposal.

The proposal, to be eligible, must combine the right type of changes amongst the 100 ones in the official list. The farmer must combine "environmental" and "socio-economic" measures. In each section, the farmer has to choose the mandatory measures for his/her sub-region and sector (if any), and at least one "1st priority" type of measure. The request is then examined by three different local authorities in charge of the process. If each of them gives a positive feed-back, then an 8-pages contract is signed between the farmer and the local government, which specifies the 5-years commitments of the farmers towards the chosen practices, and the type of aids he or she will receive in compensation.

Needless to say, the control of such a procedure involves regular visits by inspectors, who usually become very unpopular with farmers, ever tempted to make use of the complexity of the thing to increase the flow of aids in their direction. The whole system costs a lot in administration, advisory and control services. Farmers can include in their subsidy request 3 days of their work (at US\$200 per day) for the time spent in the administrative process, and can get aid to finance US\$1000 worth of advisory services (also at US\$200/day) from the local Agricultural Chamber.

Although it is easy to criticize the bureaucratic weight of such a process, it is difficult to imagine, in fact, how the objectives of agri-environmental measures could be reached with a simpler process.

Designing a lower number of eligible actions would restrict their adaptability to local conditions. Failing to earmark each action for a different sub-region or sector and to describe them in detail would reduce their environmental efficiency. Reducing the number of bureaucratic controls would mean opening the door to corrupt practices and collusion; in rural areas where the head of the local agricultural service is likely to be a relative of the farmer, it is better to have several controls than one. Indeed, two years after the start of the program, the Minister declared that there was no plan to simplify the procedure (Dupont, 2001).

But the complexity needed to reach all these objectives leads to perverse outcomes. In practice, it discriminates against those farmers who are not able or willing to spend hours visiting bureaucracies and filling complex forms. It promotes those farmers who have a good understanding of the process, who are usually the ones whose relatives work in the local producers associations or agricultural services. In practice, it means that a minority of farmers get the help, and that they may not be the poorest ones, quite the contrary. It also promotes competition for land, with farmers trying to increase the size of their farms to get a higher volume of aid (which is always delivered on a per ha basis). It means that farming and natural resources management are becoming technocratic professions, in which the winners are not necessarily the best farmers, but the more apt at tapping subsidies, as well as the whole profession of administrators, advisors, and inspectors who are needed to sustain the system (Ehrwein, pers.comm.).

The sustainability of the process is also questionable. What will happen to the farms after the five-year contracts expire? Will the contractual changes remain profitable enough so that farmers will maintain them, or will it be necessary to renew the aids for ever? We can bet that the farmers who received the subsidies will claim that they need more to sustain environmental services. The problem is that, based on the sheer competitiveness of their farms in terms of food production, these farmers cannot compete with (also heavily subsidized!) large mechanized farms in the lowlands. In fact, a country like France could be fed entirely, for its staple needs, with the products of a few limited lowland areas in the North, North-West and South-West. The social function of upland farmers is changing towards natural resources management, landscape maintenance, and the provision of recreational services and high quality regional food products. If these functions

have to be funded by subsidies, their sustainability will depend on the readiness of taxpayers to finance the new State-managed profession of "natural resources managers" in the upland areas - of which farmers will be only a component, along with technicians and administrators.

As of November, 2001, 2 years after the law drafting the CT was adopted, 19,000 contracts were signed, representing 1 million ha and 5% of French farms (the total objective over 5 years is 100,000 farms). After strong critics and a slow start, farmers are now eager to get the aids. The main focus of the process is on watershed services, with improvements in water quality (reduction of discharges) being the focus of 55% of the aids, although the process met little success in the most polluted, intensive pig-farming areas in Northern France. The process mostly benefits young farmers and, as can be expected, is biased against "small, isolated farmers" – farmers working in groups benefit more of the aids (Dupont, 2001).

Competitive Contract Allocation in the UK

France does not have the monopoly of State-managed agri-environmental measures, who are found in most European countries. An example can be found in the UK in Northern Ireland, another area with problems of poverty in agriculture. The Environmentally Sensitive Areas Scheme, launched in 1985, can be applied on 20% of Northern Ireland agricultural lands, and has attracted since over 4,500 participants on 65 per cent of the eligible land. Due to its success, it was then complemented by the Countryside Management Scheme (CMS), launched in 2000 for other areas. Both are an integral part of the agri-environment programme included within the Rural Development Plan submitted in respect of Northern Ireland. The CMS scheme is operated with EU finance, under the constraints of European Commission regulations for such schemes. One of these constraints states that payments are based on income foregone and costs incurred (Nugent, 1999).

These schemes are aimed essentially at encouraging farmers to adopt or continue with environmentally sensitive farming practices, mostly aimed towards watershed services (better nutrient management to promote water quality) and biodiversity (enhancement of habitat, as well as landscape and heritage conservation). Like in the French CTE, the schemes are actively promoted in relation to farmland in NATURA 2000 conservation areas.

The main difference between the UK's CMS program and other similar European agri-

environmental measures is that the CMS is operated on a competitive basis, seeking to target those farms that can deliver the greatest environmental benefit. Farmers seeking to participate submit applications are ranked in terms of environmental benefit against the agreed criteria in terms of priority habitats. The Scheme should be oversubscribed in terms of applications and, in accordance with the funding available, only those applications that can provide the greatest environmental benefit consistent with value for money will be accepted. The Northern Ireland authorities consider that this competitive element has many advantages. Funding for agri-environment measures in other Member States also restrict the number of subsidies delivered based on finance budgets, albeit using different mechanisms such as temporarily closing schemes for applications, delaying the processing of applications etc. The method being adopted in Northern Ireland removes such uncertainty by making clear at an early stage whether an applicant will be unable to enter the CMS in that year or not. In addition the competitive element is seen as a very positive factor in that, with the determining criteria being based on environmental factors, the scheme will achieve desirable status in the eyes of farmers and carry with it a premium status.

Apart from the competitive element, the scheme bears many similarities with the French CTE, and requires as many bureaucratic and technical controls. The scheme involves 10-year management agreements between the Department of Agriculture and Rural Development and participating farmers, with provision for either to withdraw after five years. It involves assessment of applications using a ranking system to establish the environmental benefits and value for money of individual applications and a pre-entry Environmental Audit of the whole farm, including soil sampling. Besides, participating farmers are asked to undertake a training course training to "promote their understanding, knowledge and acquisition of skills to deliver environmentally farming practices to meet agri-environment scheme requirements". A monitoring and evaluation program is planned, involving ecological, landscape, archaeological and socio-economic monitoring (DARD, 1999).

However, because there is no pre-established list of officially agreed changes, the procedure is simpler. The official requirements are more targeted towards specific habitats types, some of them having to be included for improved managements in the proposals. However, there detailed principles

and prescriptions that must be followed, and like in the case of France, the farmers are invited to seek advice from the local agricultural services, especially for sensitive points such as landscape preservation.

Unlike the French CTE, the scheme has no direct socio-economic targets, but is expected to have a positive socio-economic effect in the countryside, in the form of better landscape and employment.

Because the scheme is only concerned with Northern Ireland (14,000 sq.km) and with non Environmentally-sensitive areas, its targets are smaller than the French CTE, with a planned 4,125 farmers or 150,000 Ha. Yearly funding should be about US\$2 million per year, or less than US\$3,000 per farmer per year (Nugent, 1999) – which is a bit lower than the average French CTE (US\$5,000 per year).

From Watershed Conservation to Carbon Sequestration in the US

Despite their stated commitment to liberalization in international scenes, the US also have implemented a number of measures aimed at subsidizing farmers for environmental services, especially for watershed services (pollution control) and habitat preservation. The subsidies can take different forms such as grants, loans, and tax benefits that are offered in exchange for improved conservation practices. Like in Europe, multi-year contracts pay landowners to either take land out of cultivation or to manage it in a certain way. In addition, benefits that support farm programs have, since 1985, been linked to environmental performance in a program called "Conservation Compliance." In the Fiscal Year of 1998 alone, the US Department of Agriculture managed US\$5.9 billion in various conservation subsidy programs (EPA, 2000).

The largest single program (35% of total spending) is the Conservation Reserve Program (CRP), which was initiated by Congress in 1985 and is a continuation of the Soil Bank Program started in the 1950s (Uri and Bloodworth, 2000). It is a contractual approach, in which farmers agree to take land out of production and place it under conservation uses for 10 to 15 years. Applications to participate in this

program must include conservation plans, which usually require the establishment of a grass or tree cover. Participating farmers receive annual payments of as much as \$50,000 per person, which take the form of an annual per hectare rent of \$125 in average, and half of the cost of establishing the

permanent cover. The total aid per farmer. This program, unlike other agri-environmental measures mentioned above, is relatively simple to implement and control, but has the obvious disadvantage of totally excluding land from production.

Like in the UK case mentioned above, since landowners have offered more acres than the CRP can afford, they have to bid for enrolment. The 1990 and 1996 Farm Bills shifted the emphasis of the CRP to protecting lands that were not only highly erodible but also important to water quality and wildlife habitat. The bidding system, as a result, has been changed several times since 1991. An Environmental Benefits Index (EBI) is used to evaluate bids. The EBI includes numerous factors relating to soil erosion, water quality, and the value of the land for wildlife habitat. Lands located in special Conservation Priority Areas are given additional preference, particularly if structural or land management practices proposed for the lands maximize environmental benefits per dollar expended. The EBI is compared with the bid amount to determine whether the parcel should be enrolled in the CRP.

The area under CRP is about 12,5 million ha, or nearly 10% of the total U.S. cropland. The USDA estimated the net social benefits of CRP at US\$4.2 billion to US\$9.0 billion over the life of the program, as detailed in **Box 4**.

Box 4. Social Benefits and Costs of the US Conservation Reserve Program

SOCIAL BENEFITS RANGE OF VALUES (US\$billion)	
Increases in net farm income	1 - 6.3
Value of future timber	3.3
Preservation of soil productivity	0.6 - 1.7
Improved surface water quality	1.3 - 4.2
Lower damages caused by windblown dust	0.3 - 0.9
Wildlife enhancements	1.9 - 3.1
TOTAL BENEFITS	9.5 - 19.5
SOCIAL COSTS	
Higher food costs for consumers	2.9 - 7.8
Existence of vegetative cover on CRP land	2.4
USDA technical assistance	0.1
TOTAL COSTS	5.4 - 10.3
NET BENEFIT	4.1 - 9.2

Source: USDA. 1994, in EPA (2000)

Because of the relative simplicity of the measures – take land out of production and establish a permanent cover – the cost of technical assistance is limited, and certainly much lower than in the case of European agri-environmental measures. To make the program more effective, special incentives are planned now to gear it towards areas with a higher environmental value, such as river stream banks. Unlike in European programs, no particular social provisions is included and no particular incentives is planned to gear the program towards poor areas or farmers.

Besides the CRP, the United States operate a number of other conservation reserves programs in which farmers receive payments or tax exemptions for land taken out of production. They also have a number of more complex programs in which farmers, like in the European agri-environmental measures, are paid to implement farming practices in an environmental friendly way.

This is mostly done through provisions of the 1985 Farm Bill which state that to ensure farmers' eligibility for receiving support such as price support, credit or tax exemptions, farmers are required to develop and implement approved conservation plans for designated "highly erodible" land. The plans typically entail adjustments in farming practices and rotations and could include measures such as the maintenance of crop residues on fields in winter, contour plowing, minimum tillage, and shelterbelts. These rules appears to have a strong incentive effect. Implementation costs for the conservation compliance provisions are estimated at \$17 to 25 per ha, whereas a loss in farm support benefits would cost farmers between \$90 and \$150 per ha (EPA, 2000).

Another contractual subsidies program implemented in the United States is the EQIP (Environmental Quality Incentive Program), which assists farmers and livestock producers with making environmental and conservation improvements. Participating landowners agree to establish conservation plans and implement them for periods of 5 to 10 years.

In doing so, they receive cost-share or incentive payments for as much as 75% of their costs for adopting these conservation practices. Payments are limited to \$10,000 per person per year or a total of \$50,000 for any multi-year agreement, with a total yearly funding of US\$170 million. As can be seen, this is significantly higher than similar European schemes.

Although they appear less bureaucratic than some European Schemes, these programs also require a lot of administrative and technical support to ensure that selected projects maximize the environmental benefits per dollar spent, to choose priority areas, and to develop plans that identify both the main problems being addressed and the practices capable of solving these problems with available resources. These provisions effectively make watershed planning a major activity for the Natural Resource Conservation Service (EPA, 2000).

The interesting aspect in these programs that the evolutions in its goals reflect changes in environmental policy priorities. The primary goal of conservation programs as stated in the 1980s were to reduce soil erosion on highly fragile cropland. Secondary objectives included reduced sedimentation, improved water quality, and fostering wildlife habitat (Uri and Bloodworth, 2000). The economic objectives were the reduction of surplus, the preservation of the long-term productive capacity of US agriculture, and income support to farmers. Hence, like all policies designed in the 1980s and 1990s, the CRP was mostly geared towards watershed services and biodiversity conservation.

Recently, studies have been conducted to evaluate whether these programs could be considered for their carbon sequestration services. Since most of the hectareage under CRP is planted in grass, the amount of soil organic carbon contained in the soil ranges between 0.3 and 0.7 Mt/ha, or a total sequestration of 3.8 to 8.8 million Mt for the whole CRP area.

This is equivalent to 1.2% of the US carbon emissions from burning fossil fuels (Uri and Bloodworth, *op.cit.*). Besides, the carbon sequestration in the 1.24 million Ha conservation buffer strips promoted under other USDA programs, also under grasslands, is equivalent to 0.4 to 0.9 million Mt. Meanwhile, no tillage practices, adopted as conservation practices on 19.3 million ha of farmland in 1998, resulted in a net carbon storage of 0,05 to 0,5 Mt/ha, or 0,09 to 9,6 Mt for the whole area (1% of US emissions from fossil fuels). All together, using midpoints, the organic carbon in the soil in 1998 in the US was estimated at 12.2 million Mt, with a potential increase by 25% (or about 3 Million Mt) by 2008, based on the targeted agri-environmental programs.

Certification Schemes

There are an impressive number of certification schemes that may result in rewarding farmers for environmental services. Some of them are implemented only in given countries, some of them are international. Actually, this sheer diversity is a strength and weakness of certification: it is a strength because it widens the possibility of a given farmer to find a scheme that may be applicable to his or her conditions. It is, however a great weakness because it confuses consumers and undermines the credibility and visibility of eco-labels. It also means reduced economies of scale in the certification processes, which are fragmented between an incredible number of schemes and organisms.

What is important in eco-certification is that it is mostly based on PPMs (Process and Production Methods) rather than on particular properties of the product. It is also almost always voluntary – although pressure from buyers may make it not that voluntary. The examples below are given to illustrate some of the current debates and difficulties in certification, and how they may affect the use of certification as a market-based, consumer-based RUPES.

The pressure on food Labels in France and Europe

In France, where gastronomy is at the core of culture, "quality" food products represent about one third of the total food consumption, or a market of US\$19 billion per year. This is, however, a relatively recent and growing trend. In the two or three decades after the Second World War, the priority of French agriculture was to feed its baby-boomers, and to catch up with other European countries in the race towards mechanization and input-intensive "productive" farming. Industrialization was the motto, and quality became associated to it. Upland farming, where mechanization and transport is difficult, slowly started to lag behind.

A major shock to French upland farmers came when industrial farms in French Brittany started to sell "Emmenthal" cheese, notwithstanding the fact that Emmenthal is in the Alps, more than 700 kms away. Their farms, close to international harbors, had access to cheap imported feeds, and they could imitate the Emmenthal cheese at a fraction of the production costs in the Alps. Soon, industrial Emmenthal flooded supermarkets and is now a basic item in the consumption of low- and middle-income households. However, it is no match for

the refined taste and texture of the traditional version. But because farmers in the Emmenthal region had never done anything to protect their region name as a brand, there was nothing they could do against it use. Meanwhile, consumers started to become quality-conscious and developed a longing for "country" food, symbolically associated with health and quality of life. They started to look for ways to differentiate "traditional" products from "industrial" ones.

This taught a lesson to producers in other regions, who started to register their regional names, and to revive traditional processes in a search for renewed quality. In the 1980s, it became increasingly apparent that quality production, respectful of the local environment, was the only way for upland farmers to compete against lowland mechanized farms with good road access. The problem was how to make sure that the consumer willing to pay a premium for these products could differentiate them in supermarket shelves. This led to an increasing use of labeling and certification.

The oldest of such scheme is the regionally defined names (*Appellation d'origine contrôlée* or *AOC*) which exists since 1935. These schemes specify the geographical origin of a product, but also a number of PPMs that must be respected, to ensure that quality and traditions are maintained. These processes are usually more environmentally-friendly than industrial ones. They rely more on local ingredients and feeds, hence require less energy to import inputs. They rely more on extensive, low-input natural grazing and pastures than on intensively produced grains. They are based on the use of local varieties and indigenous knowledge, and hence promote biodiversity. However, for consumers, it is more the taste and texture quality of these products which is the motivation, rather than environmental conservation.

Another label, which is mostly based on quality aspects but also results in environmental benefits, is the "Red label", which is not based on regional origin, but on the use of PPMs leading to better food quality. The criteria to obtain a Red Label, however, also include concerns for animal welfare and the environment (Dupont, 2001), especially reduced pollution.

In fact, the only label which popularity is clearly based on environmental criteria is the AB logo (*Agriculture Biologique* or Organic farming). The farms that receive it are supposed to follow a number of rules in their PPM, including the absence

of chemical pesticides and fertilizers, which in turn result in a number of environmental benefits such as soil conservation, watershed services and biodiversity conservation. Given the highest organic soil matter content in organic farming, it could even be considered that organic farming contributes to carbon sequestration.

The AB logo, which is the most significant one in terms of environmental services, belongs to the government (French Department of Agriculture). It can be used after certification by a public or private institution accredited by the Minister. One certifier, Ecocert, controls 80% of the market, and 7 other ones share the 20% other certifications. The use of the AB label is regulated and controlled by a government institution, the National Center for Certification and Labels (NCCL), which gives accreditations to and controls the certifying organisms. Similar schemes are applied in other European countries, with varying degrees of government and private sector institutions. Besides government-sponsored labels, like the French AB logo, there are also labels which are purely controlled by private organizations or NGOs. They control their logo like a brand name and have all interests in making sure that it is associated with quality and vigilance in the eyes of consumers. For example, the *Nature & Progrès* logo, belonging to a private organization which markets products under this brand name, can be used only after a certification process which is more costly and has stricter criteria than the government AB logo.

The main problem encountered by all these labels is... their growing success with consumers. The demand for all certified products far exceeds the productive capacity of the industry: for organic food, it is estimated that less than 50% of the French demand is covered by production – and the demand is growing fast (Dupont, 2001). The same problem of excess demand is found all over Europe. Most of the consumption takes place in 5 European countries which are amongst the most industrialized and have therefore a stronger longing for "things green"; i.e. UK, Germany, the Netherlands, France and Denmark (Reynaud, 1996). In all these countries, although organic farm products makes less than 3% of total food production, the growth rate of the sectors' turn-over is as much as 30% per year.

Besides, price differentials are significant: the price of organic AB products in supermarkets is 20% higher than similar, non-organic brand products sold in the same outlets, while a consumer survey

in Belgium indicated that price differentials should not be above 30% for organic products to remain attractive (Brouyaux, 2000). This is mostly due to the health and taste qualities associated with organic farm products. As indicated above, consumers in Europe are not ready to pay a much higher price for environmentally beneficial products, but they are ready to pay – a lot - for better food and better health. Although the health effect of organic product is sometimes questioned, most recent European studies indicate that organic products are in general less toxic because of the absence of chemical residues (despite occasional contamination by natural toxics), and usually have a higher mineral and vitamin content.

Price differentials enable to compensate for the lower productivity (in purely financial terms, at market prices) in organic farms. A recent survey in Switzerland indicated that the net income per ha or per animal in organic farms was 5 to 35% higher than in conventional farms, despite yields which tended to be 11% lower per animal and 20 to 25% lower per ha (Hostettler, 2000). Lower input costs contributed to raising farmers incomes, but this alone was not sufficient to offset lower yields, and the higher income per ha of organic farms was due mostly to much higher prices paid for the products (10% to 60% more per unit of product). If the prices applied to conventional farm products had been applied to organic farms, their net income would have been 7% lower per animal and 20% lower per ha than in conventional farms. Besides, organic farms tend to use much more family labor than conventional farms (Hostettler, *op.cit.*) so the actual income per unit of labor is not necessarily higher.

There are three reasons which explain the difficulties of the organic sector to cope with demand all over Europe:

- ❑ the main problem is the cost of adjustment to a new way of producing, which requires significant structural changes. This is especially true, of course, in intensive farming areas, especially where an intensive use of mechanization and pesticides has been the rule for the last 30 years or more. Not all farms can be magically changed into organic farms overnight.
- ❑ the second one is the whole organization of the marketing and distribution chain, which has been borne at a time when organic farm products were a niche product, and is not adapted to meeting large-scale consumer

demand. Hence, there have been cases where buyers could not find products in a region, while some farmers could have supplied them (Brouyaux, 2000).

The cost of certification, by comparison, seems like a small and marginal constraint. This is due to the fact that certification has been organized for a long time, with significant learning and economies of scale. However, certification itself cannot cope with the fast shift to large-scale consumer markets. They cannot form certifiers overnight and their capacity cannot cope with increases in volume and the increased complexity of the sector. Moreover, the change in scale and the shift from "niche, dedicated" sector to "large-scale, profit-oriented" means that there is more pressure towards cheating. The early proponents of organic farming – including farmers and distributors – were idealistic militants, promoting a lifestyle and production style in which they believed. Frauds were limited, and certification was there mostly to help dedicated volunteers in their progress towards environmental quality. With increased demand and profit opportunities, organic farming attracts a larger range of producers and distributors, which is necessary if it has to get out of its boutique niche. But these new entrants are not all as idealistic as the first generation, hence frauds are much more common (Le Noallec, 1999).

And indeed in 2000, after a number of reported frauds, the NCCL controlled the accredited certifier institutions in France, and found them wanting on a number of points such as their response to alleged fraud cases, the level of training of their certifiers, and their use of product analyses (Minagri, 2000). Of the 8 certifying organisms, 1 decided to get out of the sector, 2 had their accreditation revoked, and 5 received corrective action requests. This sent a shockwave to the sector, raising attention to the loss in reliability in the AB logo, and hence the risk for loss of consumers' value. The crisis is not limited to organic farming, however. The other eco- and quality labels face similar problems of growth (Dupont, 2001).

Two types of answers to this crisis are found. The first one is a growing request to make the certification criteria less strict and more accessible to a larger number of producers; this would enable organic products to be produced on a larger scale, like is the case in the United States. Certified producers fear that this would result in an erosion of the value and image of their products. The second answer is to ask for a tightening of the controls, to make sure that labels retain their

purity. The opponents to that view point to the fact that it will just deepen the supply crisis, raise prices, and make it impossible for quality and organic farming to get out of their elitist ghetto and become mass consumer products.

This latter debate reflects the real challenge for organic farm production, and generally speaking for all kinds of eco-labeled products which make it possible for consumers to buy environmental values, as well as higher quality and health values. The underlying question is whether we can meet the needs of all the planet's consumers with sustainable processes, and if yes, how much time and money will it take to make the necessary changes, and who will support their cost? Until a satisfactory answer can be found, eco-labeling may well remain a niche sector, satisfying the ethical and quality needs of the urban rich, while helping a few upland farmers to provide environmental services on a limited scale.

The case is even worse if developing countries try to access these markets: most of the eco-labeling schemes used in Europe are defined based on criteria adapted to the European PPMs. Hence the accusation of third-world countries that these schemes are just a new form of market protection. However, a number of institutions of developed countries have started cooperating with developing ones to see how adapted certification schemes could help them meet poverty alleviation, growth and environmental goals.

The certification of Coffee: a label for everyone?

Coffee has many characteristics which make it a prime candidate for environmental labeling in developing countries. It is produced solely in developing countries, with no competition or substitutes from developed countries' agriculture, and it is sold in rich countries consumer markets. In developing nations, it has become the second-most traded commodity, next to petroleum, with a total world market estimated at US\$11-14 billion annually (TerraChoice, 2000). Coffee is consumed for pleasure and stimulation. Hence, symbolic values are an important aspect of the marketing strategies of large coffee brands, whose advertising campaigns try to persuade consumers that with a cup of Nescafé™ or Jacques Vabre™, they absorb the exotic charm, warmth, friendliness, and beauty of Latin America's uplands.

But since nearly all major brands are competing with the same symbols to catch the imagination of

consumers, more is needed to achieve products differentiation. Hence coffee marketing has seen the development of a number of branding and labeling efforts, aimed at advertising particular qualities. Since coffee is grown a lot in poor upland areas with relatively little use of inputs, the idea to give value to the environmentally-friendly practices of poor coffee growers seemed a good way to ensure that they too, would benefit from the symbolic magic of coffee markets.

As a number of private firms and NGOs started implementing those ideas, first in Latin America, then increasingly in Africa and Asia, the world of coffee labels and brands has become a labyrinth. The complexity comes from the fact that there is a confusion between brand names and certified labels.

A certified label bears with it the guarantee that the product comes from a given region, and/or has been produced under particular conditions methods. Its use is regulated by a number of conditions, which normally include third-party independent verification. A brand name is any statement put on a label by a producer or distributor. It can be used to imply that the product has particular qualities or come from a particular region, without any commitments about the reality of these statements. For example, in the absence of a certification of origin, a distributor based in Bali could easily import coffee from Costa-Rica and export it to Europe with a label reading "Kopi Bali". For that matter, because there is no registration or protection of the "Kopi Bali" trademark, even a distributor based in Sumatra or Kenya could do the same.

However, the names of certain Coffee origins have come to be associated with quality in the names of consumers, and coffee is increasingly sold based on advertisement of its origin (De Taffin, pers. comm.). This is particularly true of upland arabica coffee, such as Toraja coffee in Indonesia, which has a worldwide reputation. In many cases, these coffees are produced with processes which are relatively good for the environment, for example, because they are produced by poor isolated farmers, they may use less chemicals than competing products from other areas. Designing a certification of origin scheme, like what exists for French Cheese, could enable to make sure that coffee bearing a particular name only comes from a particular region and is produced with traditional or semi-traditional methods guaranteeing quality and environmental services.

In practice, however, it is difficult to imagine how such a label could be protected without generating perverse effects, which in some case might discriminate against the rural poor and even against environmental services. For example, a certification scheme stating that Toraja coffee can only be produced in certain areas with certain processes would be nearly impossible to enforce in a country like Indonesia, where property rights are loosely defended, corruption prevails and production and marketing is scattered between thousands of small agents in remote areas. If it was enforced, it would be even worse: some farmers being unable to access the certification scheme might be excluded from it, and this would discriminate against them.

Because certifying and protecting names of origins in developing countries is such a delicate issue, certification of coffee to generate RUPES must be based on environmental processes that can be used by the rural upland poor. There are already a number of such schemes in the world, which have been created as an answer to the development of large scale coffee plantations in lowland areas, which use reduced shade and are hence obliged to use large quantities of chemical fertilizers and other inputs, generating negative social and environmental externalities. These costs have stimulated interest in a return to more traditional, sustainable methods of producing this cash crop (Terrachoice, 2000). These alternative approaches have taken on various forms, including:

- Organic;
- Sustainable;
- Bird / biodiversity-friendly;
- Fair Trade; and
- Shade-grown.

In 1996, organic coffee was reported to account for less than 2% of the \$5 billion world market for specialty coffees, but was quickly increasing that meager share to 5% in 1999 (Terrachoice, *op.cit.*). This means a US\$250 million market for organic coffee only.

Organic coffee growing is mostly promoted, certified and labeled by members of the International Federation of Organic Agriculture Movements (IFOAM). Since the requirements for organic coffee growing are sometimes considered as too strict, other labels, usually owned by marketers or non-profit organizations, define various standards for "sustainable" coffee production. Another label is the "Bird-friendly" coffee, which must be produced in conditions that

enable the preservation of migratory birds habitat. "Shade-grown" is an all encompassing label which has the advantage of federating many environmental benefits, since shade-grown coffee requires less pesticides and fertilizers and provides better conditions for watershed and biodiversity conservation.

Although none of these labels are geared exclusively towards the rural upland poor, most of them provide market recognition for coffees which are grown in the conditions of the poor. After all, compared to wealthy lowland landowners, there is a larger percentage of poor upland farmers who grow coffee under shade without pesticides, simply because they cannot afford the mechanization and inputs required for intensive coffee growing.

So these schemes are indeed working as a form of RUPES – as long as they guarantee a higher price to the farmer. This is not guaranteed to happen if the product is marketed along the usual marketing chains of developing countries, especially in Asia, which allow for little premium for quality at producers' level. However, in most cases, certified coffee production is developed under the assistance of a certifying organization which often also provides marketing assistance. This is absolutely necessary of certification has to generate additional revenues for the farmers. Many of these "certification plus marketing" schemes are managed by NGOs.

A good example of "certification plus marketing assistance" scheme, which also has the advantage of being geared towards enhancing the income and welfare of small farmers, is the Max Havelaar Fair Trade Scheme. Unlike the above labels, it is not specifically geared towards environmental benefits, and is rather aimed at providing better working and living conditions and better terms of trade for poor farmers. However, in reality, it is often associated with organic farming labeling, since consumers and distributors often require both. Besides, the kind of coffee produced by small farmers certified by Max Havelaar is more likely to be of the shade-grown, environmentally friendly type than of the full sun, intensive type (Terrachoice 2000).

In conclusion, the variety of labels existing for environmentally and socially responsible coffee opens a wide range of opportunities for developing RUPES mechanisms. To be efficient, these mechanisms should have an environmental assessment component (to identify which environmental services can be promoted in a particular area) and a social assessment component

(to ensure that poor farmers are given priority). It should be assisted by organizations able to provide both certification and marketing assistance, and to secure financing for the initial investment phase, especially the cost of certification.

Does forest certification help the poor?

Another sector which shows considerable potential to develop market-based, consumer-based RUPES mechanisms is forestry. In the 1990s, tropical forest products sold in Europe and Northern America, especially furniture, started to be increasingly attacked on the grounds that they were based on the ransacking of rainforests and the alienation of indigenous people. The distributors of these products started to worry about the possible consumers impact of NGO campaigns supporting these views. There is a whole website, for example, which is entirely dedicated to alerting consumers about the environmental wrongdoings of The Home Depot™, one of the main American mass retailers in furniture. This site (www.Homedepotsucks.com) is sometimes better referenced by some search engines than the actual website of the Home Depot, which indicates that it may receive more hints and links from other websites.

At the same time, environmentalists and foresters were looking for market-based instruments to support sustainable forest management, i.e. basically a type of forest management practices that would be economically viable, could sustain production levels over the long term, while protecting watersheds and biodiversity, and respecting the rights of indigenous people and workers.

Today, the most widely internationally recognized scheme designed to meet these objectives is the one managed by the Forest Stewardship Council (FSC). The FSC is a multi-stakeholder body based in Mexico, which gathers members of the industry and NGOs, in 3 chambers (economic, social and environmental). It defines a number of principles and criteria (P&Cs) of sustainable forest management (SFM), which are then supposed to be translated into national standards by local FSC multi-stakeholders committees. In certain countries like Indonesia, the FSC works jointly with national eco-labelling schemes like the LEI (Lembaga Ekolabel Indonesia). It certifies natural forests as well as plantations, and can be applied to large forest concessions as well as smallholdings, group forestry or community forests.

The FSC authorizes a number of certifier organisms, the first one being the Smartwood program of an American NGO called the Rainforest Alliance, while other ones are private consulting companies or ISO-certifiers like SGS. These organisms perform third-party audits at the demand of producers who want to get certified, and these audits must involve multiple stakeholder consultations to ensure transparency. The cost of certification is normally supported by the certified party. It can range from US\$3,000 to 15,000 depending on the size of the unit and the complexity of the problems. Certification is awarded on the basis of a five year contract, which usually specifies the conditions that the company has to respect to remain certified. The company is audited every year during the contract, with audits costing between US\$3,000 to 6,000. Companies which fail to meet their conditions can be de-certified, as has been the case of Perum Perhutani in Indonesia in 2001.

The FSC scheme has been recently attacked from a number of fronts, which reveal the limits of certification. On one hand, it has been threatened by the expansion of competing schemes set up in developed countries. While the FSC was designed for the protection of tropical forests, it soon appeared that producers in those countries had difficulties in meeting certification criteria and supporting the whole certification process. On the other hand, a growing number of forest management units (FMUs) from developed countries got certified to benefit from the consumers demand from certified forest products. Very soon, forest industry in developed countries started to become uneasy about a scheme managed from abroad with rather high standards, and started to develop their own nationwide schemes, in most cases without third – party independent audits (WWF, 2000). This development of multiple logos with lower standards than the FSC's started to generate consumers confusion and to undermine the whole certification idea for forestry. The NGOs which supported certification, like WWF, reacted strongly by stating that their support went only to the FSC, which is the only certification schemes meeting a number of standards like independent third party audits.

Like all eco-labelling schemes, the FSC is often attacked as being a new form of protectionism, and certainly the fact that more forests got certified in the North than in the South did not help. It is also attacked by NGOs for being biased in the favor of large scale companies, which can more easily afford the costs of certification. In fact, the only way small

producers can get certified is through special programs aimed at supporting group certification and community forest certification, with financial supports from NGOs.

When applied to small producers, forest certification can be a very effective RUPES. A good example is the case of PT XYP, a company in Indonesia which makes pencil slats for the German market, using *Alstonia* wood purchased from rubber agroforests managed by small farmers. One of the conditions for certification was that the company had to ensure that farmers did maintain and protect the *Alstonia* trees in their agroforests. The company decided to do this by making farmers sign a commitment to maintain *Alstonia*. This was done and seems to be well accepted, understood and implemented by farmers. To maintain sustainability, the company also embarked on a program of helping small farmers to plant trees on *Imperata* grasslands. In that case, the environmental services provided by small farmers are biodiversity conservation (in the rubber agroforests) and watershed services (through reafforestation), and they get a premium from the company for signing agreements to maintain *Alstonia* populations in their plantations. As a result, *Alstonia* trees are now grown even under mono-specific clonal rubber plantations. Not many examples of such a direct link between an environmental service (biodiversity conservation) and a financial reward can be found in Indonesia. In fact, this might be the only case where the biodiversity in "jungle rubber" agroforests is rewarded in such a straightforward manner.

There are other cases where certification has been accused of working against the rural poor by being biased towards large concession holders. However, certification stipulates that concession holders can be certified only if they respect the rights and resource bases of indigenous people – which explains why certification is so difficult in countries with a poor record of indigenous peoples rights protection like Indonesia. It would be interesting to look for ways to make sure that this provision can be used as a RUPES mechanism, for example by promoting cooperative arrangements between concession holders and local people, in which the benefits of sustainable forest management and certification could be shared more equitably. This, however, is next to impossible to achieve without a clarification of the tenurial rights of concessions and local people. This reminds us that stable, safe and long-term land access is the first basis of RUPES mechanism.

Limits to Contractual Approaches in Developing Countries

The main limitation of contractual approaches in developing countries is the degree **of institutional development** needed for their design and implementation, and the **costs** involved in the process. By definition, complex contracts can be respected only in a country or region which has a good culture of abiding to contracts and to law in general.

This does not mean that these approaches cannot be applied in developing countries, but there are a number of conditions.

The first condition is that there must be **some institutions able to design contracts** adapted to local conditions. This can be done at the international level, as in the case of the FSC or Max Havelaar. However, additional standards usually need to be developed locally, and this requires the intervention of NGOs and government, though a process which is usually rather long and difficult.

The second condition is that **funds must be available to finance the process** if it has to benefit the rural upland poor, who cannot be in a position to pay for requested changes or even for the certification of existing beneficial environmental practices. There are several ways to source and channel these funds. The government can be willing to finance certification schemes to increase the international competitiveness of its products. This is the case in Costa-Rica, which government does a lot to promote eco-labeling. This can be done through international aid, as in the case of GTZ supporting the development of FSC certification in Indonesia, or NGOs supporting FSC certification for community forestry. This can also be done by private companies, which want to trade in the certified products. For example in Indonesia, the cost of FSC certification of *Alstonia* wood

production and its development by small farmers is entirely supported by PT Xylo Indah Pratama, a national company which can then sell its certified wood products (pencil slats) to German buyers.

The last condition is the **credibility and accountability of the institutions** managing the process. This pretty much rules out the possibility of implementing targeted contractual subsidies through a government-led process. A scheme like the French CTE, which relies a lot on the independence of government administrators and controllers, would lead to tremendous occasions of corrupt practices in many poor countries. This is why certification by private parties, under the supervision of international institutions managing eco-labels, is often advocated as an alternative. However, to retain its credibility, the certifier organisms must ensure that they remain independent from their audited clients. The only way in the long term to maintain the credibility of the process is to make it **open, transparent and participatory**, as in the case of FSC certification in Indonesia, which is opened to consultation and even scrutiny by local and international NGOs.

All these conditions mean that contractual approaches, despite the huge hopes that they create – especially in the case of certification – remain difficult to implement on a large scale in developing countries, especially if the upland poor are the target beneficiaries. This is why in many cases they actually benefit rich countries producers more than developing countries. FSC certification was created to promote sustainable forest management in poor tropical countries, but the difficulties met by tropical forest managers in meeting FSC standards and going through certification means that more developed countries forests are being certified than forests in poor countries. For this reason, eco-labelling schemes are often criticized as being a new form of trade barrier imposed on developing countries (Verbruggen *et al.*, 1995).

ECO-TOURISM: DOES ENJOYING NATURE BENEFIT THE POOR?

Tourism: the Largest Industry in the World

Long considered as a marginal niche market, eco-tourism is gaining worldwide recognition as a viable and growing industry - and one of the few that has the potential to provide a sustainable, market-based reconciliation of the objectives of economic growth, poverty alleviation and environmental conservation.

The travel and tourism industry is the largest single industry in the world - accounting for 12% of the world economy and providing employment to 280 million workers, or one in ten workers worldwide. Tourism receipts account for 3% to 4% of the GDP of most Asian countries; accounting for some 12% of the export earnings of countries like Indonesia and the Philippines, and as much as 35% of export earnings of resource-poor countries like Nepal (Cater, 1997). While rich countries have historically received the bulk of tourist arrivals, developing countries are catching up fast: it is projected that in 2020 there will be more visitors to China than to the USA, which is the most-visited destination at present (Chauveau, pers.comm.).

A survey conducted in 1994 indicated that 40 to 60% of all international tourists were nature tourists, contributing an international direct economic impact of US\$166-US\$250 billion per year (Lash, 1997). Using a narrower definition of eco-tourism as indicated below, it is usually estimated that eco-tourism makes up 10% of international tourism (Pleumarom, 1994 in Cater, 1997), which amounts to about US\$40 billion per year. In comparison, the Global Environmental Fund, the single largest non-market based mechanism for environmental transfers, received US\$1.3 billion for its first period, 1990-1993, and 2,2 billion dollars for 1993-1997, i.e. about 0,5 billion dollars per year (Tubiana, 2000). This means that the gross yearly product of nature-based tourism is 400 times the size of the GEF trust fund, and the contribution of *stricto sensu* eco-tourism is 80 times that of GEF. In other words, even if only 1% of ecotourism benefits reward the poor for environmental services, this is still nearly as much as the whole GEF contribution.

The recent burst of terrorist activities is putting a fatal blow on tourism right now, at least on international, long-distance tourism relying on

airline travel. It is hence difficult to predict what will be the actual development of eco-tourism during the next decade. After September 2001, the World Tourism Organization had to revise its predictions for tourism growth in 2001, from 3% to 1,5% - yet it maintains its long-term growth predictions. After all, even if tourism is a volatile industry which is very sensitive to political conditions, travel for pleasure is increasingly seen as a primary need in rich countries (Chauveau, pers.comm.). Until September 2001, eco-tourism was growing at the rate of 10 to 15% a year (Cater, 1997, Pleumarom, 1997) - again one of the fastest rates of growth for any large economy sector worldwide, and certainly one of the few, if not the only, one which was sustained for such a long period. Hence despite uncertainties, it still holds a large potential.

Recognizing the unmatched potential of eco-tourism to meet the objectives of Agenda 21, the United Nations has declared 2002 the "International Year of Ecotourism." The declaration come as a result of the United Nations Commission on Sustainable Development (CSD)-related meeting of the Ad-Hoc (Inter-Agency) Working Group on Tourism, convened at Heredia, Costa Rica in 1999. During this meeting, the United Nations Environmental Program (UNEP) and the World Tourism Organization (WTO) were mandated to work together toward a World Ecotourism Summit, which is scheduled to take place in Quebec, Canada from May 19-22, 2002. One of the tasks of the summit will undoubtedly be to clarify the definitions of eco-tourism.

A War of Definitions

From ecologically-based to ecologically-sound tourism

Since the term eco-tourism was coined in 1987, many definitions have been used and the very task of defining eco-tourism can be problematic (Lash, 1997, Pleumarom, 1997). In its broadest sense, eco-tourism is sometimes considered as encompassing any kind of *ecologically-based* tourism activities, i.e. any kind of tourism which brings visitors close to natural landscapes and traditional cultures and give them an opportunity to enjoy recreational activities based on nature and local traditions.

Such a broad definition of eco-tourism does not provide a framework conducive to environmental conservation. In fact, without any additional caveats, nature-based tourism can be the most environmentally-disturbing forms of tourism, bringing masses of visitors in forest tracks and

faraway villages, where they may frighten the fauna, destroy the flora, generate waste, raise prices of essential goods, and bring social tension.

Hence the operational concept proposed here is "sustainable eco-tourism" (Cater, 1997), which can be defined as *ecologically and socially-sound tourism*. Indeed, dedicated eco-tourism associations consider that this is the only valid definition of eco-tourism, as set in the simple, elegant definition given by the International Ecotourism Society: *"Ecotourism is responsible travel to natural areas which conserves the environment and improves the welfare of local people"* (Wallace, 2000).

Eco-tourism is more than Sustainable Tourism

Even if sustainability is at the heart of the concept, a distinction should be made between the concepts of ecotourism and sustainable tourism. The principles of sustainable tourism were defined by WTO as early as 1988; sustainable tourism is *"envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems"*.

While the sustainability principles should indeed apply to all types of tourism activities, including the ones which are not based on nature, the term ecotourism itself refers to a segment within the tourism sector.

Needless to say, there are countless other definitions of eco-tourism in the literature. All of them, however, point more or less to the same mix of bringing tourists in contact with nature and traditional cultures, while making sure that the operations have positive impacts on the local environment and people.

The WTO and the UNEP, within the preparations for the International Year of Ecotourism in 2002, propose the following characteristics of Eco-tourism (World Tourism Organization, 2001):

1. All nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas
2. It contains educational and interpretation features.

3. It is generally, but not exclusively organised for small groups by specialised and small, locally owned businesses. Foreign operators of varying sizes also organise, operate and/or market ecotourism tours, generally for small groups.
4. It minimises negative impacts upon the natural and socio-cultural environment
5. It supports the protection of natural areas by:
 - ❖ generating economic benefits for host communities, organizations and authorities managing natural areas with conservation purposes,
 - ❖ providing alternative employment and income opportunities for local communities
 - ❖ increasing awareness towards the conservation of natural and cultural assets, both among locals and tourists.

A New Concept: Pro-Poor Tourism

Sustainable eco-tourism has a strong social component, it is supposed to provide benefits for local communities in an equitable way, therefore it is supposed to contribute to poverty alleviation. However, as will be seen below, it may be difficult to ensure that the poorest members of a community reap the benefits of tourism: it is likely that educated members and entrepreneurs are in a better position to cater to the needs of tourists.

Hence specific actions may need to be targeted to reach the poorest of the community. This approach is defined as "Pro-poor tourism": *"Pro-poor tourism (PPT) interventions aim to increase the net benefits for the poor from tourism, and ensure that tourism growth contributes to poverty reduction. PPT is not a specific product or sector of tourism, but an approach. PPT strategies aim to unlock opportunities for the poor – whether for economic gain, other livelihood benefits, or participation in decision-making. Pro-poor tourism overlaps with, but is different from, the 'sustainable tourism' agenda. PPT focuses more on countries of the South, not on mainstream destinations in the North. Poverty is the core focus, rather than one element of (mainly environmental) sustainability."* (Ashley et al., 2001).

While Pro-Poor Tourism and eco-tourism are different concepts, they share the same concern for the welfare of local communities. Hence ecotourism projects would gain by integrating the Pro-Poor approach in their agenda.

A Dream Come True ?

At this stage, it seems that eco-tourism has it all, being a large, fast growing industry generating economic growth, foreign exchange, environmental conservation and awareness, and welfare for rural communities. By providing a mean to attract wealthy visitors ready to pay for preserved ecosystems, it is a potentially perfect market-based mechanism for RUPES. Unfortunately, for all these results to be achieved, it takes a combination of conditions which are not always met. The next section will seek to identify the potential contributions of eco-tourism towards meeting the RUPES agenda, and the conditions needed.

Tourism operations that are dedicated to the principles of Ecotourism as indicated above put at the core of their mission the welfare of the local people, and hope to establish a direct relation between the welfare of the local people and the conservation of the features of their environment. This means that any ecotourism project should include some mechanism to reward local communities for the supply of environmental services. In most cases, the environmental services that are expected to be provided by the communities are the conservation of land-use patterns that provide the following services:

- ❑ conservation of forest covers providing watershed services such as soil conservation, prevention of erosion and regulation of water flow;
- ❑ conservation of biodiversity including flora, fauna, landscapes (either natural landscapes or man-made landscapes resulting from the historical interaction of traditional cultures with their environment), and cultural diversity (traditional customs and technologies, knowledge and belief systems, etc.).

The Stakeholders: Catering to King Tourist

It is very important to remember that tourism is a consumer industry, and as such, can be sustainable only as much as it detects what tourists wants, influences it – as much as marketing and promotion can influence consumers' preferences, which is another debate – and, more importantly, caters to their wants. Tourist first: this is how we will present the stakeholder analysis.

From the Amazon to Copacabana, a Diverse Tourists' World

Eco-tourists, as it happens, are not a species radically different from the rest of travelers. Indeed, all authors agree that there is a continuum between "hard-core ecotourists", "dedicated nature tourists", "mainstream nature tourists" and "casual nature tourists" (Cater 1997). The most hardcore look for untouched natural and cultural conditions and are willing to forego modern comfort and amenities. They are often willing to contribute as much as possible to the local economy, and will give the preference to tours that explicitly advertise the fact that a part of their benefits are used to fund local community development and conservation initiatives led by NGOs or community groups. Some of them are even willing to contribute time to research or community projects.

The more casual nature tourists stay in modern facilities and enjoy occasional trips to nature and local culture, during which they may not be too fussy about "authenticity", and are unlikely to question too much whether a local ritual retains its spiritual and cultural meaning or is just a stage-show.

Because of this continuum, nature-tourism sites tend to go through an "evolutionary curve" which, unless carefully anticipated, can threaten the sustainability of eco-tourism.

As stated by Dearden (1997), an eco-tourism site is likely to evolve from a "discovery stage" where only hard-core tourists are coming, to a "nature tourism" stage when the area becomes well-known and perhaps fashionable, facilities improve and cater to the needs of more conservative tourists, and the flow of visitors increase. This is the fragile phase, because at this stage, two things may happen:

- ❑ with careful planning, the environmental and social impact of visitors (waste, disturbances, water consumption, social tensions) may be mitigated and the area will retain its capacity to attract a steady flow of mildly environmental-conscious tourists and a sustainable income for the local people. In the best case, planning will enable to propose different kinds of experience to different kinds of tourists, sending hard-core bird-watchers in remote areas while smoothing things for comfort-and-nature lovers in more accessible places.

- ❑ without careful planning, the environment may be destroyed (an example is the destruction of coral reefs in Eastern Bali to build hotels, which has resulted in the wiping out of the beach of the Candi Dasa tourist haven by waves), the social atmosphere may change with more immigrations, criminality and commercial aggressivity. These changes are likely to push tourists away, especially the ones looking for some degree of authenticity.

At this stage, the area may turn itself into a mass tourist enclave, maintaining a few traits such as cheap labor and sunshine, which will be sufficient to attract mass tourists. Or, if environmental and cultural changes are too drastic, it may totally lose its appeal to tourists and disappear from tourist destination maps altogether. While in the first case, some revenues will still flow in to enclave hotels and discotheques, in both cases no more funds will be directly available for environmental conservation and rural communities. The only solution, which may be found attractive by many governments, is then to levy a tax on tourists activities to fund conservation and community-based development projects elsewhere – a tourism sector equivalent to the "segregation" choice in the "segregate or integrate" debate in respect of conservation and development.

Catering to Domestic Tourists

In the above discussion, we have mostly assumed that eco-tourists in developing countries come from developed countries. However, with urbanization and a growing environmentally-conscious middle class in developing countries, they have a growing eco-tourism inner market. This market is often less appreciated because it may be perceived – often wrongly – as less wealthy, and does not bring in foreign exchanges.

However, developing a domestic market for eco-tourism should be a priority for host countries, for the following reasons:

- ❑ contrarily to the common view, domestic tourists may spend just as much as foreign tourists. They may stay less long, but will be willing to transform their holiday in a special experience and will be willing to spend more per day on food, accommodation and take-home gifts;
- ❑ a domestic tourist may not bring in foreign exchange, but if he/she replaces a holiday abroad by a holiday home, the net amount of foreign currency gained is the same

- ❑ domestic tourism is a diversification from foreign tourism. It may be subject to fluctuations in the local economy, but will not be subject to fluctuations in international tourism, political perceptions, terrorist activities, etc. Hence complementing international arrivals with domestic ones will help to stabilize earnings.

- ❑ domestic tourism raises the awareness of the local middle-class – often decision-makers or influential – to the needs to conserve the national environmental heritage and to defend the rural poor. This is extremely important because developing countries elites tend to become completely alienated from the realities of their own countries as long as they live in well guarded golden enclaves. It is a crucial part of a national conservation and development policy to bring them closer to rural life and give them a reason to want to conserve its beauty and help its people.

Taman Negara in Malaysia has successfully managed to increase its flow of domestic tourists, with a more or less 10% increase per year since 1980, so that domestic tourists make now 50% of the visitors.

The Travel Agents and Tour Operators

Like the clients they work for, travel agents are found along a continuum from mass tour operators to boutique adventure and nature specialists. Travel agents can be divided between source country agents and local travel agents. They often work together when catering to foreign tourists.

The main characteristic of the eco-tourism field is that a number of the travel agents are non-profit organizations. The distinction, however, is getting blurred. Non-profit agents operate increasingly in a very professional way, and make sure that their activities generate at least enough benefit to be sustainable. If they want to attract qualified, dedicated employees, they have to pay similar salaries as for-profit organizations. For-profit agents operating in eco-tourism, in another hand, have often been created by idealistic individuals who follow strict ethical codes of behavior. Hence the difference does not appear to be so important.

The only difference is that non-profit organizations are likely to combine eco-tourism earnings with other sources of funds, especially when working on conservation and development projects. In that

case, eco-tourism may not be a profitable activity *per se*, but a way to secure additional funds by renting the projects' assets such as lodges, workforce, etc. On the other hand, travel agents in eco-tourism are often donating all their profits to conservation and community development projects run by NGOs. Some of them may even have their own foundation with whom they work closely.

The main difference, hence is not whether the operator is a for-profit or not-for-profit operation on paper. The grid for financial analysis should be as such:

- ❑ what is the actual profitability of the eco-tourism operation (is it profitable *per se* or only as a spin-off of a conservation and development project?)
- ❑ what is the flow of resources between the eco-tourism operation and the conservation and development activities it supports?

Another issue is to be able to make the eco-tourism get out of its niche by making "standard" travel agents interested in marketing eco-tourism products, or integrating pro-environment and pro-poor concerns in their strategy. The difficulty is that tourism is very competitive, and rare is the agent who has had time to investigate tour operators to find which presents thoughtful policies sensitive to ecological and cultural resources. Besides, until supporters of ecotourism can demonstrate immediate benefits, travel agents, and industry training or development programs will give little attention to the concept. Ecotourism projects will need to provide marketing assistance, easy to read literature which can be shared with clients, and competitive commissions. Interesting seminars can offer trips at reduced rates to agents to introduce them to the products and encourage them to share their experiences with other agents (Malek-Zadeh, 1988).

The Local People: Beneficiaries or Exploited?

The kind of rewards provided to local people, the conditions thereof and the kind of problems which may arise in providing these rewards are summarized in the table below.

The main benefit of eco-tourism for the local people is the creation of employment and economic activities in hotels, restaurants, guided tours, and nature conservation activities. However, this comes with conditions. The first is that the

local people have to be given preference over newcomers in providing these services. This may not be easy because the local people may not have the skills needed to provide these services, a problem which can only be partially solved by training programs. The local people may also not be available all year round or during peak tourism periods, depending on their other activities. Employment in tourism may hence compete for labor with other activities, like agriculture, and threaten their sustainability.

However, the main problem is usually the conflicts created by the fact that not all the local people will be able to grab the opportunities of employment in eco-tourism, which can lead to severe conflicts (Lash, 19997). This is especially true since no eco-tourism operation can operate purely on the basis of local skills – external outputs are needed to provide the vision and competence needed to fulfill visitors' expectations. Hence any eco-tourism operation will rely on a given percentage of external skills, usually found in the more rewarding upper management, training or consulting positions.

All these problems – unequal opportunities, competition with other less rewarding activities, conflicts – can be considered as the inevitable outcome of any creation of new economic activities and, indeed, as the outcome of any social change. They can, however, threaten the sustainability of an eco-tourism project. This means that such problems must be anticipated and, as much as possible, mitigated for by conducting appropriate socio-economic appraisals and setting up participatory conflict solving mechanisms with and within the local people as much as possible.

One of the most sustainable ways to generate economic opportunities linked with eco-tourism is to encourage the local people to set up their own economic enterprises based on the markets created by the arrival of visitors, in the fields of accommodation, restauration, guidance, recreation, handicraft, etc. Again without proper training this can lead to two kinds of failures: either the failure to meet the tourists demands and standards, or the failure to maintain the environmental services associated with eco-tourism. For example, local people may set up hotels discharging wastes in rivers or develop recreation activities that threaten local values and culture (such as modern discotheques, prostitution, etc.).

A very good example of what may happen if local people are not sufficiently trained and aware of the

demands of eco-tourism is presented by Lash (1997). He tells the story of a family who received regular visits of tourists, brought by visitors to watch them make traditional cakes and bread using local handmade tools and labor-intensive methods. The tourists rewarded the family with money, and at the end of the season, both the local guide and the family were enthusiastic about the prospects of the following season. Yet when the next visitors arrived, they found that the family had logically used the revenues of the preceding year to purchase modern bread-making equipment to improve their lives and income.

This examples raises a few questions. From a financial perspective, the issue is simple. Suppose that a family makes 15 cakes a day manually, each of them worth one dollar. With the modern equipment, they can make 50 cakes, and we will suppose that their price is 0,5 US\$ each – homemade cakes are usually better and more expensive, and the surge in production probably drives prices down anyway. Hence the income of the family has raised from 15 US\$ to 25 US\$ a day, and we can assume that this takes place 250 days a year, hence the marginal income is 2,500 US\$ a year. The only way to preserve the local technology is to make sure that tourists paying to watch traditional cake-making are willing to pay 2,500 US\$

- for example, with 500 tourists paying 5 US\$ each to the family (not including the guide).

Unfortunately, even in that case, it is unlikely that things will happen that way. The local people will probably want to reap the benefits of both modern technology and tourism. Hence they will probably make cakes the modern way, and perform demonstrations of manual cake-making for the sakes of tourists alone. At this point, the more culturally-conscious of ecotourists will leave the area, because they will not want to watch a meaningless performance staged for them only. It will become known that that area "is not what it used to be" and "has lost its authenticity".

The above discussion indicates that the involvement of local people in eco-tourism activities can vary a great deal, from being mere providers of great landscapes, labor force and locally-made products such as food or handicrafts, to being active entrepreneurs running accommodations or other services and facilities, to being the designers and managers of the whole operations.

The extreme case of local peoples participation is what Sproule (2000) defines as "community-based ecotourism", i.e. "ecotourism enterprises that are owned and managed by the community".

Table III.1. Benefits of Eco-Tourism to the Rural Poor

Potential Benefits to the Rural Poor	Potential Problems and Constraints	Mitigation Options
Employment in hotels, lodges, guided tours and other facilities or services related to the eco-tourism operation	Lack of local people having the needed skills	- give priority to local people in employment
Generation of economic opportunities for local micro-entrepreneurs: accommodation, restauration, guiding, handicrafts...	Lack of finance to develop independent eco-tourism economic activities	- establish special training programs to enhance the employability of local people in the eco-tourism operation
Markets for local products (purchase of food, handicrafts, etc. by hotels, restaurants and tourists)	Competition for labor with other activities (e.g. agriculture) threatening the sustainability of local economy	- establish a program to support the development of SMEs related to eco-tourism, including training, marketing services and financial support
Better consideration for the local people by the national authorities	Generation of inequalities, jealousy and conflicts in the local population	- conduct socio-economic appraisals to anticipate and monitor possible negative impacts
Better self-perception of the local people about their own environment and culture	Lack of supply of adequate products and services	- establish participatory consultation and conflict mitigation mechanisms
Improvement of infrastructures (road, water access) by the government or private investors	Price increases disturb local economy and hurt the poor	- if necessary, implement activities to help people who do not beneficiate from the eco-tourism project, or to compensate for possible negative effects on certain people or activities
Fundings for community-development projects from taxes, international public aid or donations by NGOs and enterprises		

Case Studies in Eco-Tourism

Sustainable eco-tourism ventures with a real care for the environment and local people can be found nearly on all continents. In all cases, they involve some kind of transfer from a developed country's economy to a developing one, or within a developed country towards rural people and farmers who contribute to the conservation of ecosystems. This is because most eco-tourist activities are primarily geared towards tourists from developed countries, who are more likely to be attracted by natural landscapes and to be environmentally aware.

Taking the Lead: the diversity of Eco-tourism in Latin America

Amongst developing countries, Latin America is probably the continent where eco-tourism is the most developed. It hosts beautiful natural environments which are prime destinations for tourists, including mountains, rainforests, coasts and interesting local cultures. It also has a relatively higher degree of environmental and social awareness within its educated local people, so that it is easier to find people having the skills necessary to develop eco-tourism ventures. Probably the country that has gone the furthest into marketing its rainforest environment and biodiversity with an effort towards sustainability and conservation in Costa-Rica. Other countries with strong eco-tourism sectors are Ecuador and Belize. Africa has a number of eco-tourism ventures which take advantage of the rich African mega-fauna. Asian cultures took more time to adapt to eco-tourism but it is a growing sector in Malaysian Borneo, Laos, Thailand, the Philippines and Indonesia.

Below are a few examples of Latin-American Eco-tourism ventures, reproduced from the websites of the organizations.

1. Maquipucuna Foundation's strategy to fund the management of the Maquipucuna Reserve located in Ecuador's Amazon relies heavily on ecotourism. The reserve is home to one of the highest levels of biodiversity on the earth. Over the past 10 years, the Foundation has established a Scientific Research Station and Ecotourism Lodge to accommodate scientists, volunteers and ecotourists. The Foundation also works closely with local communities to develop ecotourism products.
2. Programme for Belize (PFB) is a non-profit organization, established in 1988, to promote the conservation of the natural heritage of Belize, and to promote wise use of its natural resources. The Rio Bravo Conservation Management Area (RBCMA) is its flagship project, where PFB's two ecotourism sites, the RBCMA-Hill Bank Field Station and La Milpa Field Station, offer an exceptional forest experience that combine visitation with environmental education. The quality of PFB's forest experience is enhanced by its team of highly trained and dedicated naturalists, educators and staff members. activities at these sites include archaeology, birding, hiking, night-spotting, canoeing, and even an introduction to local culture through visits to neighboring communities. Visitors leave with a deeper understanding of the real issues surrounding the conservation of the world's tropical forest.
3. TIDE (Toledo Institute for Development and Environment). TIDE is a conservation NGO located in the town of Punta Gorda that is dedicated to "protecting Toledo's resources through sustainable development." Ecotourism has been a principle focus of their work as it meets many important goals - it is sustainable, it is environmentally sound and culturally sensitive, and it keeps the money within local communities. TIDE has helped to develop local fly fishing, sea kayaking, birding and natural history tours and businesses, and now offers a central reservations service for local businesses.
4. Tropic Ecological Adventures started in Quito, Ecuador, in 1993 as a pioneer ecotourism company, offering superb nature-based trips with a genuine environmental and social commitment in Ecuador, one of the world's richest natural destinations. Tropic strives to be a "bridge between the local communities and the international market, so that tourism is now becoming a positive influence, providing much needed income to remote communities while encouraging the sustainable use of their natural resources and respect for their cultures." At least 10% of our profits is donated to environmental protection programmes in Ecuador, through our related nonprofit Acción Amazonia and including The Cuyabeno Defense Committee, the Amazon Defense Front, the Amazon Environmental Monitoring Network, the Huaorani Peoples' Organization (ONHAE), the Huaorani Community of Quehueri'ono, the Galápagos Guides Club and others.

Research through Ecotourism and Paying Volunteers

The Coastal Ecosystems Research Foundation is a non-profit organisation whose aim is to fund ecological research through eco-tourism. Research is presently focused on the whales and dolphins of British Columbia's Central Coast. The general public is invited to participate in the research directly as 'paying volunteers'. The program funds the research completely, allowing the foundation to remain independent, and it also helps to get the research results out to the public directly, in a form that they can understand, having participated in field operations.

The Foundation offers week-long expeditions to study gray and humpback whales on their breeding and feeding grounds. Participants are incorporated into the research team for the duration of the expedition, and learn field techniques first-hand from research biologists. People participate in running the vessel (no experience required), recording whale observations, collecting data, etc., either on the boats or on the coasts and in the local forests.

The eco-tourists pay about 1000 US\$ per week, including seven day expedition, all meals, hotel accommodation and local transport. This is relatively expensive compared to mass tourism, but still way within the range of what middle-class people would pay for a relatively exotic or original holiday. The organizations' figures indicate that 52% of their ecotourists are students, researchers or academics, 14% were professionals, the (33%) rest being office workers, manual workers, retired or at home. Obviously this means that the market for "paying volunteer tourism" is still restricted to a niche of people from a predominantly educated and research background – but has the potential to attract other crowds.

The potential for such projects is shown in the growth of the CERF activities. The Society has grown from a \$20,000 a year / one boat operation in 1994, to a \$250,000 / four boat operation by 2001. Its primary source of funding has been the eco-tourism programme, with donations and government funding filling in the gaps. The CERF employs a crew of 11 during the summer and 4 during the winter months.

Paying volunteers can also be used for funding occasional research loads. In 1995, the Caribbean Conservation Corporation (CCC), a not-for-profit organization proposed paying volunteers to contribute to Research and monitoring activities consisting of daily beach surveys, tagging, collection of biometric data and determination of egg clutch survival in Costa-Rical for its 40th annual green turtle tagging project. One and two week openings were available, costing \$1,570 and \$1,890 respectively. The fee covered round-trip airfare from Miami, food, accommodations and the cost of the research project. With the CCC being a non-profit organization, much of the fee was tax-deductible, which is certainly a bonus for tourists and means that in fact the public budget, not the tourists are paying for the environmental services.

Indeed, the concept of paying volunteers on holidays is becoming so popular that a new organisation, Ecovolunteers, has been created to link paying volunteers with a large number of wildlife conservation related projects. The fee paid by ecovolunteer tourists is distributed as such:

- ❑ A minimum of 77% of the recommended retail prices of the working holiday is transferred to the conservation organisations that operate the ecovolunteer projects, covering the tourists' participation and contributing to the project's organisation and programs.
- ❑ Additionally 3% is used to keep up the Ecovolunteer websites and the webmarketing, and up to 10% of the price is used for the development, management and maintenance of the Ecovolunteer Program organization.
- ❑ Additionally 10% of the recommended retail price is added for the national ecovolunteer agencies that operate national marketing and bookings.

The projects are found in Europe, Asia and Latin America, with prices ranging from 400 to 600 US\$ a week excluding international transport, food and contingencies.

The growing concept of eco-volunteering is an interesting way to raise funds for research and conservation projects. However, it is limited in nature and can only be seen as a complementary sources of funds. It also has the advantage of raising interest and sympathy for a given cause or project.

The Issues at Stake: Sustainability and Distribution of Benefits

For Profit or not for Profit? Issues in Financial Viability

Sources of funds: Tourists or Aid?

From the case studies we reviewed, there are very different situations in the economic nature of eco-tourism ventures. Clearly, they operate within a continuum which goes from the extreme case of totally self-supporting entities which operate with no subsidies at all, deriving all their income from visitors spending, to foundations supported by private donations or public development and conservation funds, which include eco-tourism as one of their activities. In that case, the eco-tourism component may not be a self-supporting business which would generate a profit in the absence of donations. It may just be a way to generate complementary funding while attempting to create economic activities in a region.

Even when subsidies are used to launch an eco-tourism operation, however, it can be argued that the sustainability of the venture supposes that economic viability and profitability should be the ultimate goal. This point is not much addressed in the literature. The main problem that may arise is that making an eco-tourism venture fully profitable may conflict with the other missions assigned to the operation, such as environmental support or community development.

A clear illustration can be seen by reading the questionnaire for the evaluation of eco-tourism activities in Costa-Rica. A lot of the criteria, when met, suppose additional spending which may threaten the viability of an operation. Of course like in any effort aimed at making a business environmentally friendly, it can be argued that environmental care will lead to a more efficient use of resources that in the long run will generate savings and higher profits. How this takes place in practice in eco-tourism businesses remains to be analyzed on a case-by-case basis.

While conflicts between environmental care and economic profitability may be solved in the long run through gains from more efficient use of resources, conflicts between caring for the poor and being profitable may be more complex to deal with. Giving the priority to the poorest members of a community in tourism employment and enterprise creation may result in a lesser ability to meet the

demands of visitors or impose high costs for training and supervision – all of which may threaten the long-term viability and competitiveness of a venture.

Risky ventures

Another issue in financial viability is linked with the very ephemeral nature of the tourism industry, which is typically a seasonal and boom-and-burst activity. Jobs in tourism are often very seasonal in nature, depending on local climate patterns (tropical rainy seasons are rarely popular with trekking tourists or bird watchers) or holiday seasons in the origin countries of the tourists. More worrying is the extreme vulnerability of the tourism industry to the political uncertainties characteristics of poor countries. Indonesia and the Philippines provide very good examples of the over-reaction of tourists and tour-operators to political turmoils. A combination of local riots, kidnappings and fear of islam-western antagonism have led to huge drops of tourists arrivals since 1998, with tours being cancels up to 2003 after the September 11, 2001 attack on the World Trade Center. Even in the absence of political turmoil, the tourism industry is a marketing-based consumption industry, in which image and fashions are very important, which may lead to sudden shifts in the popularity of a destination which are hard to predict.

Such market twists may be extremely damaging if tourism is relied upon to provide for the basic income needs of a poor community in exchange of environmental conservation. This is even more so if the local people have abandoned other forms of income or invested heavily in infrastructures. This points to the fact that in all cases, tourism in a conservation and development program should always be seen as one component only, to be developed as a complement to other more resilient forms of income such as food production, sustainable timber or NTFP extraction, etc.

It would be interesting to analyze whether eco-tourism is more resilient than other forms of tourism. Two points can be made:

- on one hand, eco-tourists are more likely to be seasoned travelers, more informed and more willing to take risks to go to destinations that have a bad reputation. They are more likely to make direct reservations or book their tour through boutique agencies, rather than travel with large tour operators. These tour operators are the ones responsible for mass

cancellations as soon as the slightest apparent or real threat to tourists' security occurs. For example, the Thai tourism industry is currently very happy to welcome back-packers who, without being eco-tourists, are typically more likely to stay in nature areas and travel in direct contact with local people. This kind of tourist is the only one who are still visiting Thailand since WTC attack – standard tourists and tour operators have deserted the country.

- ❑ on the other hand, eco-tourists are often geared for remote areas where risks may be perceived as higher than in protected mass tourist enclaves. The political turmoil in Indonesia has not so much affected the 5-star enclave of Nusa Dua in Bali, where tourists have very little interaction with the local environment, as it has affected nature and culture lovers visiting the Toraja country in Sulawesi.

This highlights the importance of a distinction between nature-based tourism and sustainable eco-tourism. Mass tourism based on nature activities will be over-sensitive to fashions and political shifts. Sustainable eco-tourism geared at an educated public taps a less ephemeral market. But unfortunately, it is a niche market, which leads to the third limitation in the economic potential of eco-tourism, i.e. its elitist nature.

The need for guidelines and assessments

A number of organizations propose principles and criteria against which the sustainability of a given eco-tourism operation – especially from the environmental and social point of view – can be evaluated. In most guidelines, there is no particular effort made to assess the economic or financial viability of the venture.

It seems that it is assumed that the eco-tourism operation is either a non-profit venture, which does not have to be 100% self-sustaining financially, or is a profit-making operation, in which case the fact that it remains in operation indicates that its owners expect it to be or become profitable and self-sustaining.

An impressive number of principles, criteria and guidelines for eco-tourism have been edicted by the International Ecotourism Society, the UNEP, the World Wildlife Fund, etc. Like in the case of eco-labelling of agricultural and forest products analyzed in part II, these schemes can only work if they are based on contractual arrangements with third party independent audits.

Conclusion: getting the right institutional framework

Eco-tourism, by the sheer **volume of its market** and the relative simplicity of its implementation, has the potential to be a good RUPES base in certain areas. Like in all other RUPES instruments, eco-tourism, to be sustainable and to succeed in actually reaching the poor, must be based on a proper institutional framework. These institutions are needed to ensure the following functions:

- ❑ assess the conditions under which eco-tourism can protect the environment and not harm it
- ❑ assess the conditions by which the local population can benefit from it, the constraints, and the need for capacity building
- ❑ provide capacity building to local players, in the form of training, marketing support, and seed financing when needed.
- ❑ ensure that there is a dialogue between the stakeholders to avoid harmful conflicts, and set up a participatory monitoring and evaluation system managed by the stakeholders.

SHARING THE BENEFITS FROM GENETIC RESOURCES

The use of genetic resources, one of the major by-products of biological diversity, cover several types of applications, mainly agriculture, pharmacy and miscellaneous biotechnology applications. Since major biodiversity sources are in developing countries, while the capacity to develop and market commercial varieties based on this genetic material tends to be in rich countries, the sharing of benefits of the use of genetic information can be a major market-based mechanism to reward poor countries for biodiversity conservation.

Indeed, the development of the use of genetic resources, the sharing of its benefits with the rural poor of developing countries and the logically following reinvestment of the income gains in biodiversity conservation has the potential to achieve the "win-win-win" dream of any development textbook, i.e. economic growth, poverty alleviation and environmental conservation. However, the materialization of that dream supposes a number of institutional conditions, which are far from being the norm of developing countries.

Below is a review of the international framework against which benefit-sharing of genetic resources is evolving, followed by a presentation of the main stakeholders involved and their interests. A review of the theoretical bases and the main existing mechanisms for benefit-sharing is then proposed, with examples in developed and developing countries – all of them involving some financial transfer from a developed country party to a provider or biodiversity conservation service.

Regulating the Market for Genetic Resources

The benefits of the use of the genetic resources of plants and animals have been shared by mankind for a long time on a give-and-take basis. Farming communities developed new varieties and shared the benefits – better crops, higher yields – among themselves and with other people as they encountered them. The discovery of new pharmaceutical, technological or agricultural uses for existing species was shared throughout humanity.

Recent changes in biotechnologies and the institutional setting in which they are operated have

been changing this radically. Plant breeding, pharmaceutical research and other biotechnologies are increasingly relying on sophisticated knowledge, equipment. The average cost of bringing a new drug to the market, for example, is US\$300 to 500 million (Wildman, 1998, Gruver, 1999). The capital needed to supply these resources is increasingly supplied and controlled by private operators, who are expecting a return on their investment. Private sector investment in agricultural technology was estimated at US\$7 billion in 1996 (ISAAA, 1996 in Lesser et al., 2000). In a market-based global economy, securing a return on this investment meant obtaining property rights on the products – through the patenting of chemical and genetic information, a long process which has been accelerating during the last two decades.

Meanwhile, it appeared that one of the bases of biotechnology – the supply of genetic information from natural or man-made ecosystems – was shrinking fast due to the disappearance of natural ecosystems and the increasing reliance of agricultural systems on a few varieties or genotypes. The need to protect biological diversity in its broadest sense started to get supported by economic motivations. Another growing concern was the uneven share of the benefits derived from the use of genetic information. While developing countries seemed to supply a lot of the raw genetic information used by pharmaceutical research and plant or animal breeders, they were not getting any reward from it. Moreover, they were increasingly asked to pay royalties for the use of selected plant varieties, some of them derived from their own landraces, or to pay a high price for cancer-curing molecules initially discovered in their own forest.

The first global recognition of the need to share the economic value of genetic resources appeared in the International Undertaking on Plant Genetic Resources for Food and Agriculture, adopted at an FAO Conference in 1983, which states that "farmers, their communities and countries in all regions should participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources." Resolution 4/89 recognized that Plant Breeder's Rights, as provided for by the International Union for the Protection of New Varieties of Plants (UPOV), were not inconsistent with the Undertaking, and simultaneously recognized Farmers' Rights defined in Resolution 5/89. The sovereign rights of nations over their genetic resources were recognized in Resolution 3/91, and it was agreed that Farmers' Rights would be

implemented through an international fund for plant genetic resources.

The Convention on Biodiversity Conservation (CBD), which was adopted during the Rio de Janeiro Earth Summit in 1992, went further down this line and established a breakthrough in the history of biodiversity conservation mechanisms:

- ❑ while all previous treaties involving biodiversity conservation were using either a sectoral or spatial approach, the CBD is the first which approaches biodiversity in a holistic way, from molecular genetic resources to species and whole ecosystems (Tubiana, 2000);
- ❑ it emphasizes the value derived from biodiversity, and establishes a framework for the sharing of this value, which, in a market-based economy, means establishing property rights over biodiversity as a resource.

Following the conference, a multi-year program on biodiversity was established to harmonize the provisions of the CBD and the 1983 undertaking with the aims of :

- ❑ promoting the positive effects and mitigating the negative impacts of agriculture on biological diversity
- ❑ promoting the conservation and sustainable use of genetic resources of actual and potential value for food and agriculture
- ❑ promoting the fair and equitable sharing of benefits arising out of the utilization of genetic resources (Convention of Parties, in Cooper, 2001).

Indeed, many promoters of the CBD, especially developing countries representatives, insist that developed countries are the ones which benefit more from the use of genetic resources extracted in developing countries. This is so because the property rights for "raw" genetic information have been insufficiently developed and enforced. For a long time, there has been no clear mechanism to force a stakeholder to pay for the collection of raw genetic material in a developing country. On the other hand, there is a well-developed and well-enforced system of patent for the varieties derived from this information, which enables the developers of the varieties to sell them at a high cost to the very countries where the original material came from. This means that the only service valued was the transformation of the genetic material into a commercial variety, while the service provided by poor rural communities who have preserved the needed biodiversity was considered as valueless.

Based on this term, the potential for market-based or non-market-based RUPES mechanism there seems relatively straightforward. We have some well identified stakeholders who derive a direct benefit from an environmental service – the private companies or public laboratories creating and marketing varieties based on preserved biodiversity. We have a direct, relatively well established relation between given land use patterns and this environmental service – any eco-botanist can assess the level of biodiversity in a given land use.

As of now, with no consensus on valuing biodiversity and sharing its benefits, all we can do is provide an update of the current debates and analysis on the position of each stakeholder, and a review of a few examples of agreements which have been tried in practice

The Stakeholders: Use and Supply of Genetic Information

Are the Final Users the main Beneficiaries?

Farmers and the Imperfect Market for Improved Varieties

Farmers are supposed to get a share of the benefits of the use of genetic resources in the form of greater revenues due to the use of superior varieties. In a "perfect" market environment, this share of the benefit would be the one which maximizes total net output. Unfortunately, the markets of improved varieties is far from being perfect ; it suffers from a lack of information and is clearly oligopolistic. This is reflected in the very high price that farmers may have to pay for improved varieties, and from choices of breeding methods that favor the dependency of farmers towards suppliers of seeds, such as the choice of hybrids vs. open pollination, or the attempt to introduce "killer genes" (the so-called terminator technology) to make sure that nobody else than the original supplier of seeds can supply new ones.

Consumers: Putting a Growing Value on Biodiversity

Downstream processors, users and consumers of food products or molecules produced using genetic information are supposed to be the ultimate beneficiaries, through cheaper and better food or medicine. Again how much this is true depends on market structures.

A point which has not been considered enough in the scientific literature – but is an increasing component of the marketing strategy of agri-food companies - is the willingness of consumers to pay an additional price for food which has a "biodiversity" added value. This willingness is part of the growing trend and desire for more "authentic" products and for more diversity in food products. Supermarket chains are realizing that their offering of 3 to 5 varieties in each fruit or vegetable species (in the best case) is harming their capacity to tap the elite, wealthier segment of their consumers, who may be willing to pay a high price for anything different and appearing as authentic. This can be translated in the rehabilitation of several biodiversity components:

- ❑ the revival of old varieties of common fruits and vegetables, considered as more tasty, more nutritious or simply different and more authentic (in that latter case the added value is purely symbolic, as is often the case in any quest for "authentic" or "countryside" products). An example is the reintroduction of old potato varieties by supermarket chains in Europe.
- ❑ the search for exotic food types, considered as offering a new exotic food experience, sometimes a superior nutrient intake, and the consumer's satisfaction of contributing to the preservation of endangered landscapes and the support of poor communities. A good example is the marketing of Quinoa grain from the Andes by Artisans du Monde, a fair-trade association active in Europe.
- ❑ the promotion of regional know-hows and technologies through region-based labels for fruits, vegetables, meats, fish or processed foods such as cheese. In that case, a whole landscape and production structure is given value. In the case of regional-label cheeses for example, the conditions to obtain the label may include the preservation of semi-natural meadows using the local flora, the use of animal landraces, and traditional methods of milk processing.

The value given by consumers to the superior taste, nutritional value and symbolic attributes of food coming from biodiversity rich landscapes is certainly one of the most promising market-based mechanism for biodiversity conservation. More discussion on the topic is found in the section on eco-labeling.

For the present section, the point is to remember that consumer's demand is one of the new driving

forces for agro-food industries to preserve biodiversity.

On the same level, pharmaceutical companies are more and more catering to the growing demand of consumers for phyto-pharmacy. Only 25 percent of the prescription medicines marketed in the United States contain active ingredients derived from plants (Simpson, 1997). However, there is a growing market for plant-based medicines, which are sold over the counter as para-pharmacy consumer products, and often fetch a much higher price than their synthetic counterparts. Extracts of plants like Kava and Saint John's Worts, which have relaxant and anti-depressant effects, are increasingly considered as an alternative to benzodiazepins or serotonin recapture inhibitors, without the harmful side effects. Moreover, because the sales of natural plant medicine is much less regulated than the sales of prescription drugs, it has potentially higher margins, being a consumer "comfort" product with nearly unlimited growth potential. This trend provides an incentive to pharmaceutical companies to look into natural or domesticated genetic resources.

The Industrial Intermediaries: Commercial Users of Genetic Information

The Privatization of Commercial Breeding for Agricultural Uses:

For plant and animal breeders, genetic resources are inputs needed to produce varieties who have a better use and market value due to their superior behavior, such as higher production, faster development, resistance to pests and diseases, easier processing and conservation, or better taste. This use value is a function of the breeding technology and the income that can be derived from the productive use of the new cultivars.

Recent progresses in breeding technologies have increased the breeders' demand for germplasm, and hence raised its value and potential market price. However, whatever the potential for benefit sharing of the use of plant genetic resources collected in poor countries, it is important to bear in mind that it represents only a small fraction of commercial breeding activities. Most modern varieties are developed from germplasm which has already been improved through years of selection, or from publicly accessible collections such as genebanks. Field-level collection comes as the last resources, since its potential for yielding desirable genes is very low.

The kind of genetic resources that plant or animal breeders are looking can be found in natural ecosystems, for example when breeders are looking for wild relatives of domesticated species. In most cases, however, field-level collection of genetic information is conducted in landraces, i.e. in traditional agro-ecosystems where a high degree of intra-species variety has been conserved by farmers. Hence commercial breeders are more likely to be interested in the conservation of traditional agricultures rather than purely natural ecosystems.

In Western Europe, and particularly in the USA, private companies tend to be more and more involved in the final production of breeding varieties, while public institutions tend to concentrate more on fundamental research with long-term objectives, including pre-breeding activities – i.e. germplasm enhancement by the transfer of a few genes from unadapted sources into better usable material (Cooper 2001). On the contrary, plant breeding (including the final stages) in the developing world is more often conducted by public laboratories. However, public laboratories in both worlds usually attempt to derive commercial income from the varieties they develop, and hence tend to behave more like private institutions, with profit seeking becoming a growing priority.

This privatization of breeding activities and the growing part of it which is conducted for profit explains why there is a growing call for sharing of the benefits of plant breeding. As long as breeding was conducted by public laboratories deriving little profit from it and willing to share the results of their work with other institutions for the public good, there was little need to design profit-sharing mechanism. Sooner or later, the same countries who supplied raw genetic information would benefit from the use of the varieties derived from these genes, without having to pay expensive royalties to the breeders. With agro-technical companies making higher and higher profit margins, new devices are needed to ensure that developing countries get a share of the benefit.

Pharmaceutical Research: the Emergence of Bioprospecting

Unlike plant and animal breeders, who are mostly interested in domesticated genetic resources, pharmaceutical research is more likely to be looking for wild plant species – and increasingly for micro-organisms and marine macro-organisms (Wildman, 1998). These species are more likely to be found in natural ecosystems, or in agro-

ecosystems that allow for a high degree of conservation of natural species, such as the agroforests of Indonesia. Hence pharmaceutical research companies are more likely than agro-industry firms to be interested in the conservation of natural ecosystems, or any agro-ecosystems with a low degree of transformation by man.

The exploration of ecosystems to discover commercially valuable biological resources is called "bioprospecting" (USAID). Molecules derived from natural products have an excellent record of providing novel chemical structures for development as new pharmaceuticals. Many of the world's most valuable and successful medicines have been derived from nature - 10 of the world's 25 top-selling pharmaceuticals were derived from natural products and accounted for global sales of almost US\$14 billion in 1995. (Wildman, 1998). Despite much interest in rational drug design in the 1970's and 80's, and the long odds against finding lead compounds that may be developed as new drugs from natural sources, there remains a keen interest in bioprospecting for new molecules.

While bioprospecting is mostly used for pharmaceutical uses, it is important to remember that it can also occasionally be used for agricultural uses. This may include the (very rare) identification of new foods and fibers, the search for pathogens, predator insects, and botanical pesticides to control agricultural pests (we are then closer to pharmaceutical usages), or occasionally, the use of native parents of cultivated species, that through cross-breeding can introduce desirable properties such as resistance to pests or tolerance for harsh growing conditions.

The Innocent Keepers of Biodiversity

Rather than using the term "supplier" of genetic information, which is often found in the literature on intellectual property rights, we prefer to start with the term "keeper". After all, the main service that people in biodiversity-rich areas have rendered to mankind – and to commercial users of genes – is the preservation of gene pools in natural or man-made ecosystems. This service, moreover, has been rendered unknowingly in most cases.

In all cases, it is important to try to analyze why a bio-diversity rich landscape has been preserved. The following reasons can be found, from the strongest ones to the most vulnerable to economic changes:

- ❑ spiritual or cultural reasons. Traditional cultures often have a spiritual component calling for the respect and preservation of life forms. The last remnants of virgin forests found in many areas of Borneo, for example, are in areas which are considered as sacred by the local people. In fact, these traditional conservation methods are often more effective than their modern counterparts (Ryan, 1992). However, for similar reasons, a government may decide to preserve a natural area as part of the cultural heritage and identity of a Nation.
- ❑ watershed services. A community or a government may decide to preserve an area of forest in an upper watershed to sustain agricultural activities downstream. In that case, biodiversity is not the primary environmental service sought by conservation activities, but it is maintained within the protected forest cover ;
- ❑ economic value. A forest ecosystem or an agro-ecosystem which has a high level of biodiversity may be preserved because the species in it provides sources of income, or enhance the profitability or sustainability of the system. As stated by Wilken (1992): *"Diversity is a strategy of traditional agriculture, not a characteristic. A diverse array of crops and cultivation practices give agricultural households a balanced diet, it allows farmers to exploit a range of environments, and it reduces the risk of catastrophic losses"*. For example, native people may want to preserve a natural forest which supplies a large number of NTFPs. Some rubber farmers in Sumatra prefer the species-rich "jungle rubber" plantations, despite their lower level of latex production per hectare, because they consider the growth of mono-specific rubber plantations as too risky and less profitable in the long run.
- ❑ lack of capacity to finance alternative land uses. While the cases above can be found in reality, a realistic outlook at biodiversity conservation yields the hypothesis that in most cases, biodiversity is preserved for lack of capacity of destroying it. At present, the only large remaining tracks of primary forests in Borneo are the ones which are so remote that commercial logging would not be profitable. Yet if the local government found the resources needed to build roads, these forests would be gone as well. Most smallholders exploiting biologically diverse rubber agroforestry systems would be glad to replace them with high-yielding, mono-specific rubber or oil palm if they had the funds to do so.

Farmers who use multiple traditional varieties of rice would be glad to switch to intensive rice farming based on varieties from outside if they could afford the irrigation systems and inputs needed to express the yield potential of those modern varieties.

The "unknowing, unwilling" nature of biodiversity maintenance in developing countries is one of the reasons why some parties argue that there is no legal or moral basis to pay for this service. This is why information is so important: only when the keepers of biodiversity will be aware of the potential value of it will we have a better basis to organize for them to conserve it on a fully-aware and voluntary basis, and to reward them for it. Once the conservation of biodiversity niches becomes a voluntary service for a market, then the providers of this service will start having a base to negotiate its value.

A New Service for a New Market: Access to Genetic Information

As argued above, the keepers of biodiversity will have a hard time securing an income for a service which is not rendered knowingly and willingly. Even when they do so, there are many pitfalls in the valuation of this service, and the willingness of the "clients" to pay for it is unlikely to offset its cost (see below). Hence stakeholders in biodiversity-rich ecosystems have an interest to go beyond conservation to easing the access of prospective clients to valuable genetic information.

Potential suppliers of such services include :

- ❑ indigenous people providing information on the distribution, diversity and traditional uses of particular species;
- ❑ research institutions who have gathered and sometimes published such information
- ❑ non-governmental organizations who have documented local species and their uses.

While the barriers to acquiring the technology and industrial capacity to develop modern breeding industries, pharmaceutical industries or biotechnologies are enormous, it is feasible and in the best interest of poor countries to develop their capacity to perform some of the upstream tasks involved in the genetic resources use chain.

Basically, the functions in the chain leading to the commercial use of a genetic resources are as such:

- ❑ conservation of the raw resources in the form of natural or diverse man-made ecosystems;
- ❑ identification and classification of the species and varieties
- ❑ documentation of their distribution, variety, behavior and properties
- ❑ extraction of chemicals from these living organisms
- ❑ testing of some of the chemicals
- ❑ characterization of their genotypes for breeding potential
- ❑ design of industrial methods to exploit these genotypes or chemicals
- ❑ patenting and licensing of the genotype and associated industrial processes
- ❑ design of a marketing strategy including market identification, product design, branding, packaging, pricing, promotion and point of sales strategy
- ❑ implementation of industrial-scale production, marketing and distribution.

The final, downstream phases are the more capital-intensive and where most of the marketable added-value is. However, there is also some value in the upper stages, and this value can be captured more easily by institutions or individuals from developing countries. It can easily be argued that they indeed have a comparative advantage when it comes to identifying local species, and foreign companies may be more than willing to let them exploit this advantage (Simpson and Sedjo, 1992). Again, however, the potential benefits of using pure local knowledge again are limited. In addition, due to the nature of disease targets and modern high throughput screening methods, many pharmaceutical companies utilise random screening approaches in their search for natural products rather than using ethno-medical knowledge to guide them (Wildman, 1998). Hence again this means that developing countries will have to invest as much as possible in technologies compatible with modern uses of genetic resources if they want to share a bigger part of the pie.

The Missing Institutional Framework

Biodiversity hotspots: a hot responsibility for governments

It is important to realize that the CBD establishes that countries – not communities or individual firms – hold the sovereignty and eminent property rights

over the genetic resources found on their territory (Simpson and Sedjo, 1992). Any strategy to derive value from these rights will then be based on governments policies and institutions.

This nationalization of what was previously considered as an asset belonging to humanity as a whole is a reaction of developing countries which were afraid that if biodiversity remained an international public good, their interests would not be well protected. Their fear was that the negotiations taking place within the World Trade Organization would lead to a reinforcement of Intellectual Property Rights on genetic material derived by rich countries and multi-national firms from their own genetic resources. The only exception to this rule are all the collections established before 1994, which remain the property of whoever collected them, without any obligation to compensate the countries from which the genetic information originates. This point, however, is still a source of conflict between suppliers and users of genetic resources (Tubiana, 2000).

For example, a fungus, *Tolyptocladium inflatum* was collected in Norway in 1969 within an open access regime, implying that there is no benefit sharing with the source country from Novartis' present sales of the derived cyclosporin-based medicines. Researchers have tried to estimate the source country's loss of benefits in comparison with present norms and expectations concerning bioprospecting. Two percent annual royalties would have been a reasonable claim in this case, and in 1997 this would have amounted to US\$24.3 million (Svarstad *et al.*, 2000). Such benefits could, for instance, have been targeted to conservation, scientific capacity building and health care. This example provides an indication of possible gains for source countries - countries with developed as well as developing economies - in a case of the finding of a blockbuster drug. It shows how important the role of the government and other institutions is in regulating access to such resources.

If governments are the eminent owners of genetic resources, rather than local communities or the international community, then they have to regulate access to that resource and benefit-sharing. This means that they must have the following capacities:

- ❑ identifying genetic resources within their own countries;
- ❑ establishing policies aimed at protecting them;
- ❑ enforcing such policies despite contradictory short-term interests;

- ❑ establishing a framework of regulations and institutions for dealing with prospective purchasers / users of these genetic resources;
- ❑ negotiating with the purchasers / users in a way that guarantees the maximum return for the country;
- ❑ ensuring a fair distribution of this return within the country's stakeholders.

This lists calls to mind the main problem which arises with the Government sovereignty over genetic resources, i.e. the lack of capacity of many developing countries government to perform these functions. Depending on the countries, this lack of capacity may be a lack of technical capacity, a problem of law enforcement and corruption, a problem of lack of representation of certain groups by the government, or, very likely, all of the above. The resulting pitfalls can be devastating, resulting in the appropriation of under-valued royalties by some parties without reinvestment in conservation and without any share with the local poor. The latter may then become disgruntled and feel no reason to respect conservation objectives set by government institutions, such as park boundaries or limits on collection of forest products. In that case, none of the supposed windfalls of IPR-benefit sharing (environmental conservation, economic growth and poverty alleviation) will be obtained: it is clearly a lose-lose-lose situation.

Indeed, as stated by the Government of Costa Rica: "Countries that are able to establish the most efficient regulations for the conservation of their biodiversity will be in better conditions to negotiate the acquisition of more benefits. In this sense, the capacity to produce resources based on biodiversity is directly related with the capacity of each country to create development policies for the conservation of wild areas that concentrate its biodiversity."

Research Institutions: a Key Role in Coordinating Functions

Research institutions – public or private – hold the key to one of the above functions and capacity, i.e. the technical capacity to identify genetic resources, to locate prospective users, and to propose adequate institutional and regulatory frameworks. Again their lack of capacity is often obvious, especially when it comes to dealing with prospective "clients" for genetic resources, who are likely to be top scientists backed up by top legal advisers.

Hence, reinforcing the capacity of National Agricultural and Biological Research Systems can be

considered as the first, urgently needed step in developing the adequate conditions for a sustainable use of genetic resources. Costa-Rica INBio (see below) provides an obvious example of the efficiency that a research agency can provide as a one-stop access agency for potential users of genetic resources, a coordinator for documentation and access, and a guide for conservation and development policies. The lack of references to other such cases from developing countries in the literature seems to indicate that this example has yet to be emulated.

Rural People and Communities

As usual, rural people hold the ultimate key to the implementation of environmental conservation strategies. Involving them in a strategy for conserving sources of genetic information requires first an understanding of why they have been conserving such resources so far, and why they are or may be destroying them (see above). Such a diagnosis should be indeed the first step of any genetic resource policy drafting, like for any conservation and development strategy. Another key aspect of the diagnosis is the identification of the elusive "communities", i.e. the ability to identify working institutions and representation mechanism enabling external stakeholders (biotechnology firms, research institution, governments) to negotiate with rural people.

In the frequent case where conservation of genetic resources is likely to have a cost in the form of foregone income – from other alternative land uses – then a strategy should in theory be devised to compensate for this cost, using the proceeds of the benefits obtained from the use of genetic resources. Any evidence so far of the value that can be obtained from such use indicates that it is very unlikely that it could match economic income foregone from lower biodiversity land uses – especially after government, research institutions, etc. have taken their share. This means that income from benefit-sharing of the use of genetic resource can be one contributor to the funding of a conservation and development policy – along with other mechanisms that remained to be identified.

As indicated above, apart from mere "conservation" services, local people can provide access services. While a lot of the added value of these services will be captured by research institutions and other "information brokers", indigenous people often detain unique information enabling to identify valuable resources. In most cases, however, they will not be able of the value of that knowledge and will not be in a position to obtain the highest

reward for it. Hence the importance of developing specific programs, either through governments or more efficiently through non-governmental organizations defending indigenous peoples' rights, to make sure that indigenous knowledge is adequately rewarded.

Hence a viable strategy for rewarding rural poor in a biodiversity rich area may be to develop upstream services which go beyond the mere conservation of biodiversity and go as far downstream as possible in the chain of genetic information added-value creation. This strategy is a good way to make use of information detained by indigenous people regarding the properties of local ecosystems and species.

Non-Governmental Organizations

As mentioned above, NGOs are likely to be needed and to be in a good position to provide valuable services in the institutional framework of benefit-sharing of the use of genetic resources. Local environmental and indigenous-rights organizations are often good at communicating with indigenous communities and are often already conducting work on identification of local flora and fauna based on local knowledge. When the government lacks capacity to take into full account the interests of indigenous people or to enforce environmental regulations in a fair way, NGOs may be needed to perform some services such as watching and intermediation.

International Regulatory Bodies

The international market of bioprospecting and commercial breeding is the seat of intense competition with high economic interests at stake. It is dominated by a few powerful companies, with increasing concentration and, as indicated above, frequent monopolistic features. People and institutions from developing countries are likely to find themselves in a weak position when negotiating with such players who have a higher financial and technical capacity, and who may themselves be backed by strong governments from their own countries – especially in the case of American and European companies, which dominate both markets. Expecting an optimal output from market forces is not realistic in such a context of unequal access to information and limited competition between a few players. With the additional burden of having to clarify the contours of nascent property rights on the resources at stake – raw genetic information – it is unlikely that we will be soon in an optimal free-market situation there.

While non-government organizations can provide some services in solving some of the above market imperfections, like reducing the asymmetry of information access and fighting monopolistic behaviors, they lack both the power and the legitimacy to do so. Since International institutions have been responsible for drafting international treaties defining the very concept of benefit-sharing of the use of genetic resources, they may well have to take the lead in enforcing the provisions of these conventions. No clear alternative option exists as of now.

Mechanisms for Sharing Benefits of Genetic Resources with the Rural Poor

The framework laid in the CBD establishes mutual obligations for suppliers and users of genetic information:

- ❑ suppliers are responsible to maintain natural genetic diversity, either by conserving natural ecosystems or by maintaining or promoting agricultural practices compatible with biodiversity conservation;
- ❑ the additional cost of such practices has to be compensated for by the users of genetic diversity
- ❑ the benefits from the use of the genetic information has to be equitably shared.

The next thing we need – which is a bit more complicated – would be to establish how much income is foregone by the rural poor in the conservation of biodiversity. The conservation of biodiversity can be done in two ways. Firstly, when natural ecosystems are set aside and protected from extractive exploitation or from agricultural conversion. Secondly, when agricultural ecosystems with a relatively high biodiversity (for example, rubber agroforests in Sumatra or multi-species meadows) are not transformed into more profitable specialized systems (like monospecies, monoclonal rubber plantations or monocrop forage fields).

Evaluating the value of such services is complicated for several reasons:

- ❑ it is difficult to define exactly who is renouncing an income by not exploiting a natural ecosystem, by not converting it or by maintaining highly diverse agro-ecosystems;
- ❑ it is difficult to compute the income difference in the long run, especially since the productivity

gains of shifting to specialized agro-ecosystems tend to be overestimated.

The next difficulty is the lack of a clear framework for assessing the value of raw genetic resources and their contribution to the creation of value through the marketing and use of genetic material for agriculture or biotechnologies. When a new drug is developed based on the root of a tree collected in the Amazon basin, exactly how much percent of the ensuing patent and royalties should go back to the Amazon?

Even if we could figure out the answer to that question, who exactly is supposed to collect the benefits? The Amazonian states which regulate the use of forest land? The international research centers who have been documenting the forest ecosystems? The tribes who live in them? Or the ranching companies who have been banned from expanding their pastures into the forest?

The lack of a clear basis for establishing a fair, sustainable sharing of the benefits of genetic diversity use explains why the FAO Commission for Genetic Resources for Food and Agriculture (CGRFA) is at an impasse on the issue of the distribution of benefits derived from the commercial and other uses of plant genetic resources (Cooper, 2001). The neo-classic solution would be to let the market sort out what the remuneration of farmers should be, with the hypothesis that we would then reach an optimum enabling to maximize the profits of both the rural farmers and the laboratories. The market would then work out how much farmers need to be compensated for renouncing to destroy biodiversity rich landscapes. Obvious market failures such as lack of information make this doubtful, however.

A Gambler's Game: Valuing Genetic Resources

Cashing in Use Benefits

Rewarding poor rural communities, governments and research institutes for their role in keeping genetic resources and documenting them can be based on several value components.

The most obvious one is the use value, i.e. the value derived from the use of genetic information by plant breeders, farmers, food processors and consumers. The transfer is based on a very simple transaction. A first party (in that case, a country, which is holding the initial right) transfers the right

to use a particular genetic resource to a second party (the user). The user can pay for this right in several ways:

- ❑ advanced payments
- ❑ a percentage of the benefits obtained from the use of the resource (royalty earnings)
- ❑ a combination of both.

The whole dilemma there is based on the uncertainties of the profits, which makes the proceeds from the use of genetic resources some kind of a gambling game – not the best basis on which to fund a national strategy for conservation and poverty alleviation. Bioprospecting to find a miracle heart-disease drug can yield nothing, or yield the next wonder-drug. Less than 0,1% of samples of living species collected in the wild enter the drug development process (Evans-Illidge & Murphy, 2001). According to Wildman (1998), fewer than a third of new chemical entities entering the marketplace actually make a profit. The same holds true of looking for useful genes to improve corn in wild related populations. Time is also a constraint, since it takes a pharmaceutical company 10 years to transform a natural product into a marketable drug (Gruver, 1999).

The whole issue of negotiating the percentage that will be given to the host country is very hot, as will be seen in the examples below. In most cases, the deals are kept confidential. The issue is complicated by the fact that royalty terms in contracts are generally negotiated as a range, depending upon the relative contribution of the partners to the invention and other aspects of the drug discovery process. For example, a commercialised product that is a direct isolate or very similar to the original extract provided by source country partners may pay a higher royalty than one that is synthesised by the pharmaceutical company but based upon a lead encountered in the original extract. Ethno-medical knowledge from source country participants can also be explicitly rewarded in the royalty structure of agreements as intellectual contributions to an invention (Rosenthal, 2000).

For these reasons, advanced payments are much more secure for the country supplying the genetic resources, but because of the uncertainties in the profits, they are likely to be small. Rosenthal (2000) noted that some companies are reluctant to provide significant monetary payments until a partnership is showing productivity, and will prefer to provide used equipment needed for a project. Lump-sum payments, however, are often viewed by companies as good public relations and a bargaining

tool to drive down royalty fees. Many companies prefer to make per-sample payments.

Other benefits may be transfer of technologies and research benefits (see box below).

Box 5. Types of Benefits to Source Country Partners from Bioprospecting Agreements

Royalties - A percentage of earnings from commercial sales by the licensing partner may be agreed upon in the initial agreement, or the agreement can specify a range and require the parties to negotiate the final rate on a case by case basis. Some issues to consider in royalty structures include: a) relative contribution of partners to invention and development; b) information provided with samples; c) novelty or rarity of sample organisms.

Advance payments - Access fees may take the form of lump-sum or milestone payments, per sample fees, payment for re-supply of samples, or in-kind contributions of equipment, training, medicines, etc.. Advance payments are valuable for establishing trust funds that can provide immediate benefits to stakeholders.

Equipment, training and infrastructure - Commercial partners or non-profit funding organisations may provide resources to help build the capacity of source country partners to execute current or future needs for bioprospecting research, medical care, biodiversity management, etc..

Priority research areas - Agreements can require that locally important, but understudied, diseases and indigenous therapies will be investigated by commercial and other scientific partners. Additionally, they can focus specimen collections and identification on geographical areas or biological groups that are high priorities for conservation needs.

Source: Rosenthal, 2000.

Option Value: Paying to Conserve the Unknown

The option value, which is the value stakeholders are willing to pay to avoid risking the irreversible loss of genetic information which has not even been identified. This includes preserving habitat of species that have not yet been classified, in order to avoid their irreversible disparition. Besides species preservation, the conservation of ecosystems is also justified by the value of the diversity of behavior of the same species. According to Wildman (1998), a compelling argument for the pharmaceutical industry's involvement in conserving biodiversity is that there are variations in secondary metabolite production between different samples of

the same species from different habitats. This is even more true for plant breeders, who are likely to look for different behaviors of similar species in different conditions.

As stated by Cooper (2001), it is unlikely that any single stakeholder or group of stakeholders may have a private option value which is high enough to be willing to pay for conservation of unidentified genetic resources. The likelihood that a particular company, for example, would derive enough profit from the conservation of unknown native varieties of rice is too low to justify that they would embark on their own on a conservation program.

Indeed, an estimation conducted in 1996 by the Resources for the Future (RFF) indicates that pharmaceutical researchers may not be willing to pay much to preserve natural habitats, even in biodiversity hotspots that are highly imperiled (Simpson, 1997). RFF researchers used a formula often employed by biologists to predict how habitat loss leads to species extinction, and from there deducted the value of the "marginal hectare", i.e. its contribution to supporting endangered species of potential market value. This contribution was then multiplied by the RFF's estimate of the market value of the protected species. Based on this calculation, the value of habitat conservation to pharmaceutical companies ranged from 0,02 US\$ per ha (for a reserve in California) to a maximum of 2,29 US\$ per ha (for a biodiversity hotspot in Western Ecuador). For fifteen out of eighteen hotspots proposed in the survey, the value was below 0,8 US\$ per ha. More recent studies indicated that in the case of competing situations between users, the option value may be higher and may be equivalent to the value of the average hectare and not the marginal one.

In all cases, the option value and the willingness of individual biotechnology companies to pay to preserve unidentified genetic resources remains low, and well below the costs of conservation of these areas in most cases. Hence the option value of unidentified genetic resources such as the ones found in tropical rainforests or traditional agro-ecosystems is more likely to be a public one, meaning that any conservation program aiming at preserving this value should be funded by international public sources. This is where international institutions intervene.

A third value, which is also a public value, is the intrinsic existence value of species and native varieties – i.e. the value some individuals or groups

may put on the very existence of these genotypes, for pure moral, cultural or spiritual reasons, in the absence of any present or potential economic use. This would include the value of biodiversity for satisfying the needs of humanity for "beauty, excitement and to explain the world" (Government of Sweden, 1993).

In practice, two main types of mechanisms can take place:

- ❑ bilateral contractual arrangements between a supplier (i.e. a country, which may delegate its authority to a public or even a private institution) and a user (which can be a private or a public research and development institution). The contract will typically include some form of compensation and/or benefit sharing.
- ❑ bilateral or multilateral arrangements taking the form of traditional public for the conservation and exploitation of genetic resources in developing countries.

Some public-private partnership projects combine the two types of mechanisms, as will be seen in the examples below. This is often the only practical way to fund a project. Private advanced payments being often too limited to supply the resources needed for a prospection and research project – not to mention conservation and community development activities – they may be supplied by some public funds, while the private partners commit to pay royalties in the case of a successful finding.

Another compensation mechanism which is requested by developing countries is to ease their access to the technologies that might ultimately enable them to exploit themselves their own genetic resources.

These three points: contractual arrangements, public aid and transfer of technology are discussed below. It was impossible, in the scope of this review, to provide an exhaustive inventory and analysis of the numerous cases of existing or currently discussed benefit-sharing arrangements. We provide below a few cases which seem particularly revealing of the practical issues at stake. For each case, we reviewed official documentation (for example, the case studies presented on the CBD website at <http://www.biodiv.org/programmes/socio-eco/benefit/case-studies.asp>) as well as documents supplied by parties criticizing the projects, such as press releases from NGOs.

Contractual arrangements

The rationale behind contractual benefit-sharing arrangements is the recognition that as of now, Intellectual property rights alone do not serve well this purpose. As stated by Rosenthal (2000): "*Patent law is the legal instrument most commonly used to protect the right to benefit financially from scientific innovations. However, as practised in most countries, it is an inadequate tool to provide for sharing of the benefits from Bioprospecting. Patentable inventions and discoveries must be novel, non-obvious and useful. As a result of these requirements and others patent law is generally unable to recognise stewardship of biodiversity or maintenance of traditional knowledge of the uses of biodiversity.*"

A simple mechanism to establish market-driven rewards for the supply of genetic resources is the establishment of contractual arrangements. These contracts require no new intellectual property rights. Rather, they utilize the existing legal instrument of the contract to, in effect, trade the right to collection and use of some genetic resources in return for a guarantee of some portions of the revenues generated by the commercial use of this resource (Sedjo, 1992).

On the user / collector side, these contracts usually involve private firms. However, they can also involve public institutions of technologically-advanced countries. For example, the National Cancer Institutes in the United States has negotiated contracts with tropical countries like Zimbabwe, Madagascar, Tanzania and the Philippines, that have provisions for revenue sharing or compensation (Sedjo, 1992).

On the supplier side, the party involved in such contract is usually a public institution, usually a research or academic institution which is able to provide documentation and ease access to genetic information.

In certain cases, there is even the intervention of intermediaries. Biotics Inc. is a British firm that matches sellers of genetic resources with buyers and provides some extraction and processing services. It has negotiated contracts with suppliers in Ghana, Malaysia, and even New Zealand.

As indicated above, the so-called "Bioprospecting contracts" usually include a combination of advance payments, royalties and transfer of technology. Their negotiation and implementation, which is a relatively new phenomenon even in developing countries, often steer controversies which highlight

the needs of a clear policy framework and a transparent setting – components which are often missing.

From Yellowstone to Mexico: the Controversy around Diversa Corporation Bioprospecting Activities

The controversies surrounding the exploitation of genetic resources in Yellowstone are interesting because they reveal the disparity of power that can exist between public conservation institutions – even in the USA – and private companies, as well as the contradiction between public interest and the secrecy needed by the industry.

The issue started when a hot-water loving bacterium, *Thermos aquaticus* was found in Yellowstone's cauldrons in 1996. One enzyme derived from the bacterium, Taq polymerase, provided a key to the decoding of DNA. The discovery generated a Nobel Prize and the patent was sold for \$300 million. It generates an estimated \$100 to 200 million per year for its new owners, Swiss drug giant Hoffman-LaRoche, with earnings projected to increase to \$1 billion a year by 2005 (Edmonds Institute).

Other than the federal tax dollars paid by the companies in the U.S. who license this technology, which may arguably contribute to the Park's US\$20 million annual operating budget from the US treasury, Yellowstone - which is in a funding crisis - has not received a direct share of the financial benefits arising from the discovery (Ken Tate *et al.*, 1998). This is due to the fact that the initial arrangements for sampling collecting, drawn in the 1960s, did not plan any benefit sharing. Historically, park research permits issued by Yellowstone and other US Parks have not included provisions requiring permit holders to share with national parks the full range of benefits resulting from their research on collected material. And since the USA is not a signatory country to the CBD, its provisions do not automatically apply in the absence of other texts.

This bitter experience prompted the Park to use the Cooperative Research and Development Agreement (CRADA) mechanism in future agreements. The CRADA is based on The Federal Technology Transfer Act of 1986, enacted by the US Congress with the intention of encouraging cooperative research and technology transfer between the federal government and the private sector. A CRADA is a contract specifically

authorised by this statute, under which a private company contributes money and expertise to a "federal laboratory facility" in order to augment its own research and in exchange for rights in any resulting useful or valuable discovery arising from the research. An implementing executive order requires the heads of the various Federal agencies to delegate the authority to enter into CRADAs to designated "federal laboratories."

In 1997 the Park reached a (CRADA) with Diversa, a Nasdaq listed San-Diego, Ca. biotechnology company. Under the agreement, Diversa provides the Park with :

- ❑ an up-front payment of US\$100,000, payable in 5 yearly instalments of US\$20,000
- ❑ Undisclosed royalties of up to 10% upon commercialisation of a product derived from
- ❑ genetic resources sourced from the Park. Royalty rates are based on a sliding scale, depending on
- ❑ the end-use of the research results and the magnitude of sales
- ❑ The company also transferred equipment such as DNA extraction kits and DNA 'primers' and has trained Park staff in some recent molecular biology techniques. The value of the equipment and training is estimated at 75,000 US\$ per year in the contract.

In return, the company benefits from non-exclusive access to the genetic resources in the Park, and from being permitted to use specimens collected earlier under Research (Ken Tate *et al.*, 1998).

The small amount of that upfront payment illustrates well what was indicated above, i.e. the fact that given the uncertainties in the profit from bioprospecting, advanced payments are likely to be small. This, despite the fact that at the same time, as many as 18 other entities were discussing similar agreements with the park agency: hot water-loving bacteria, cousins of *T. aquaticus* and others in Yellowstone, have been used for everything from medicine to high fructose corn syrup and stonewashed blue jeans. Indeed, in 1998, the Park authority estimated that there could be as many as six similar CRADAs signed in the next six months and ten to twenty within ten years (ICTA, 1998).

The problem there for public interest was the total secrecy surrounding these deals – which is perfectly understandable from the point of view of companies operating in a highly-competitive

market, but contradicts the transparency which many stakeholders view as a condition for fair environmental resource management. The Edmonds Institute, a small nonprofit based in Edmonds and ICTA (International Center for Technology Assessment, another NGO), led several NGOs and individual plaintiffs, in a 1998 lawsuit arguing that a full discussion of the impacts of such commercial use was required under the National Environmental Policy Act (NEPA).

A U.S. Federal Judge ruled that questions surrounding the exploration should be aired publicly, with rules established to govern bioprospecting on federal lands, and requested the park service to complete an environmental assessment before implementing the agreement with Diversa. The Judge noted that "essentially, the future of bioprospecting on federal lands in the United States appears to be a work in progress, but the government as of yet has not engaged in any public debate on the issue nor made any definitive policy statement through regulations or less formal means". However, the Diversa-Yellowstone CRADA agreement got further support from the National Parks and Conservation Association (NPCA), and was authorized in a later Court Ruling in April 2000. Negotiation of the Yellowstone-Diversa agreement was actively supported by the National Park Service and U.S. Department of Justice. Facilitation services were provided by WFED (World Foundation for Environment and Development), an independent non-governmental organisation based in Washington DC established to undertake creative problem-solving initiatives in environment and development (Ken Tate *et al.*, 1998). These services alone cost 28,000 US\$ to the Park.

As of now, the Yellowstone-Diversa agreement is considered as a milestone in the establishment of partnerships between conservation bodies and private biotechnological companies. As stated by Ken Tate *et al.* (*op.cit*) in their comprehensive review of this case, "*one lesson that can be learned by public bodies from this case is the need to establish clear procedures for public comment prior to embarking on a new kind of partnership that may result in the development of commercial products from research on publicly owned genetic resources. Such a consultation should involve not only the academics, companies and NGOs who are likely to be directly involved in bioprospecting activities themselves, but those who represent environmental, biosafety and local community and users' groups*".

In fact, the Yellowstone-Diversa case illustrates all the traps in which developing countries may fall when trying to reap the benefits of genetic resource uses through contractual arrangements:

- ❑ the disproportion between the potential benefits and the actual payments that a company is ready to make at the early stage of genetic resources development;
- ❑ the difficulty in obtaining transparency
- ❑ the need for a clear policy framework and the fact that in most Countries, even very advanced one from a legal point of view like the USA, are far from being ready in that respect.

In the light of the Convention on Biological Diversity, many countries are reviewing their legal, policy and administrative measures on access to genetic resources. This exercise often reveals that existing law relevant to access to genetic resources is unclear, incomplete or does not facilitate partnerships. Law relating to the collection of, and research upon, specimens is often demarcated along sectoral lines (for example, forests, agriculture, fisheries), leaving gaps in the scope of law and policy related to access. A further problem is that existing laws relevant to access to genetic resources were often introduced many years ago, and their objectives may relate more to the conservation of biodiversity than to ensuring prior informed consent for access and the fair and equitable sharing of benefits (Ken Tate *et al.*, *op.cit.*).

The experience of Diversa in other countries illustrates very well what can happen when developing countries with an unclear policy framework and a weak, technical, institutional and financial capacity enter agreements with powerful private interests.

In October 2001, Diversa corporation announced the signing of biodiversity access and research collaboration agreements with The Department of Biochemistry at the University of Ghana and The Kenya Wildlife Service, in partnership with the International Centre for Insect Physiology and Ecology (ICIPE) in Kenya. They give Diversa the rights to discover genes and commercialize products from small environmental samples, in exchange for scientific training, annual research support, and royalties on Diversa's revenues from products developed under the agreements. Diversa has entered into similar legal agreements to obtain samples from Alaska, Antarctica, Bermuda, Costa

Rica, Ghana, Iceland, Indonesia, Kenya, Mexico, the Meadowlands Superfund site, Russia, and South Africa. No information could be found on the amount of these agreements.

Like in the United States, these agreements steer controversy. In Mexico, Diversa was accused by a Mexican academic and lawyer, A. Nadal, supported by the Edmonds Institute, to have entered in a bio-prospecting agreement with the country's National Autonomous University (UNAM), in violation of Mexican law, and was accused to pay one-twentieth of what it had agreed to pay in the Yellowstone National Park CRADA.

According to Nadal, the 3-year bioprospecting deal allows Diversa access to Mexico's rich genetic resources in exchange for equipment valued at \$5,000, technical training in collection and categorization of samples, \$50 per sample collected and royalties on net sales of products derived from the material collected - from 0.5% in the case of pharmaceuticals and 0.3% on other products. The royalty payments in Mexico are to be deposited in the special fund for bio-diversity of Mexico's Commission for Biodiversity.

Like in the Yellowstone case, the issue was public policy and consent. Nadal estimated that the Mexican law requiring prior informed consent and fair share of benefits with owners, who in this case are the people of Mexico (and not UNAM). Moreover, Nadal pointed out to contradictions between the UNAM-Diversa agreement with Mexico's Federal environmental legislation, in which access to genetic resources can take place only through prior informed consent of the owners of the land on which the resources are located, and specifies that the owners have a right to a fair share of the benefits and profits derived from the commercial exploitation of resources collected from their land. Furthermore, under the agreement, Diversa and UNAM each will own the rights to all components, including genes and DNA/RNA of the organisms which they identify. These clauses may run contrary to Mexico's Industrial Property Law, in which living organisms are excluded from patents, as well as biological and genetic materials found in nature (Raghavan, 1999).

Public funding for Bio-Prospecting

Contractual arrangements with commercial users are not the only way to make sure that developing

countries and local communities benefit from the use of genetic resources. Indeed, many projects of research on genetic resources are funded through conventional project funding, using bilateral or multilateral sources. However, since these projects are likely to involve and benefit private companies in the end, they are often steering the same controversies as direct public-private contractual deals.

The case study below, the International Cooperative Biodiversity Groups (ICBG), is an illustration of such potential conflicts. The information is based on presentations of the project made to the CBD, and attacks on the project from NGOs reprinted from the web site of ETC (Erosion, Technology and Concentration Action Group, a Canadian NGO formally called RAFI or Rural Advancement Foundation International).

The ICBG program was established in 1992 by three U.S. Government agencies (National Institutes of Health, National Science Foundation, United States Agency for International Development) to integrate "improvement of human health through drug discovery, incentives for conservation of biodiversity, and new models of sustainable economic activity that focus on the environment, health, population and democracy". The program funds 5 ICBG groups consisting of diverse public and private institutions including universities, environmental organizations and pharmaceutical companies (See table below). Groups are linked by a series of research and benefit-sharing agreements. Each group is run by an academic principal investigator, who directs his or her own research programme in natural products chemistry, drug development or ethnobotany, and co-ordinates the activities of several associate programmes. The associate programmes generally include other academic research institutions, local and international NGOs that are working in the host countries, and in most cases, a commercial pharmaceutical partner. The awards are in the form of co-operative agreements, rather than grants. The US Government has continued involvement in the projects through the services of the NIH, which manages the programme. (Rosenthal, 2000).

According to ECT/RAFI, the total funds awarded by the project amount 18,5 million US\$. One project in Mexico (see below) received 2,5 million US\$.

This is much more than the amount of advanced upfront payments that most private agro-food or pharmaceutical companies are ready to provide for such projects, and this highlights the importance of public aid.

Below is a table presenting the 5 main projects which were selected amongst 34 competing ones: In each case, the main issues was how to design the proper institutional arrangements between foreign and local research institutions,

Table IV.1. The 5 main projects which were selected amongst 34 competing ones

Country/ Project Leader	Other partners	Industry Partners	Local Partners	Study Topic
Suriname Dr. David Kingston of Virginia Polytechnic Institute and State University (VPISU)	The Missouri Botanical Garden Bedrijf Geneesmiddelen Voorziening Suriname	Bristol-Myers Squibb Pharmaceutical Research Institute.	The Forest People of Suriname Conservation International – Suriname the National Herbarium of Suriname, , and	Rainforest plants
Costa Rica Dr. Jerrold Meinwald of Cornell University		Bristol-Myers Squibb Pharmaceutical Research Institute.	National Biodiversity Institute (INBio) of Costa Rica The University of Costa Rica	Insects and related organisms from the dry tropical forests of the Guanacaste Conservation Area
Argentina, Chile, Mexico Dr. Barbara Timmermann of the University of Arizona	Purdue University G. W. L. Hansen's Disease Centre	Medical and Agricultural Divisions of Wyeth-Ayerst/American Cyanamid Co.	Instituto de Recursos Biologicos, Argentina Universidad Nacional de la Patagonia Pontifica Universidad Catolica de Chile Universidad Nacional Autonoma de Mexico	Arid land plants
Peru Dr. Walter Lewis of Washington University		Monsanto-Searle Co.	Organisations of Aguaruna Peoples the Universidad San Marcos Universidad Peruana Cayetano-Heredia	Plants used medicinally in Andean tropical rainforests
Cameroon, Nigeria Dr. Brian G. Schuster, Walter Reed Army Institute of Research	The Smithsonian Institution Biodiversity Support Programme	Shaman Pharmaceuticals	University of Yaounde in Cameroon Bioresources Development and Conservation Programme	Cures for parasitic diseases from rainforest plants

NGOs, communities, and private partners. The project leading advisory institution, the NIH, went very far in recognizing these issues and devised complex case-by-case arrangements. Consultations with local communities were conducted as much as possible, despite numerous logistical and institutional pitfalls (Rosenthal, 2000). Legal advisory services were provided to local partners, which is a very important step given the lack of local capacity in this respect, compared to foreign private companies. In most cases, the project established multi-partners trust funds to manage the project resources – an initiative which steered controversy.

Below is a table indicating the profit sharing in the Suriname Project:

program has outraged some indigenous peoples' organizations in Chiapas who claim that their indigenous knowledge and resources are being stolen. Again the issue here is transparency. Local activists emphasize the fact that the research cannot be ethically conducted without the local communities prior and informed consent, and that these communities have not received enough information on the scope and potential benefits of the project to give it.

The Project has also been criticized by local existing NGOs for its institutional approach. They criticized the project's approach of setting a new non-profit organization to manage the projects' trust fund, called PROMAYA (Protection of Mayan Intellectual Property Rights), which will act as their civil society

Table IV.2. Suriname portion of advance payments and royalty earnings (from Rosenthal, 2000)

In %	Royalties		
	Advance Payments	Ethno-medicinal collection	Random collection
Forest Peoples Trust Fund (established by the Project)	100	50	30
Bedrijf Geneesmiddelen Voorziening Suriname		10	10
Conservation International-Suriname		10	10
University of Suriname Herbarium		10	10
Stichting Natuurbehoud Suriname		5	10
Suriname Forest Service		5	10
Future collaborating institutions		10	20
Total	100	100	100

All these efforts did not prevent the project from attracting criticism. Given the issues at stake, it seems difficult to imagine how any such project could proceed in a developing country without steering such controversy – which has the advantage of forcing the parties to greater openness and to addressing the real, deep ethical, legal, financial and institutional issues behind all these cases.

In Mexico, for example, a 2,5 million US\$ ICBG project was severely criticized by some international and local NGOs. The bioprospecting

counterpart. PROMAYA will set up a trust fund for Mayan communities, and it will decide how to disburse any royalties that accrue from the sale of drugs that result from ICBG research in Chiapas.

The Canadian NGO, RAFI/ETC, also claims that the use of public money to finance such projects is an unfair form of subsidy to large multi-national companies who are gaining most of the profits from bioprospecting and contributing only a tiny portion to local communities.

National Public Strategies: the Example of Costa-Rica INBio

Costa Rica provides a good example of a country which has managed to harness assistance from developed countries to support a national strategy aimed at providing rewards for biodiversity conservation and exploitation.

Its National Institute for Biological Diversity (INBio) is a pioneer in this sector. Scientists within INBio are documenting Costa Rica's flora and fauna and are attempting to develop innovative ways of using Biodiversity in a sustainable manner (Gov. of Sweden, 1993). The activities receive support from a number of bilateral and multilateral cooperation agencies. Pharmaceutical companies or plant breeders wishing to exploit Costa Rica's biodiversity are requested to do so through INBio and to contribute to the funding of its programs (see below).

In this case, the only stakeholder who receives a direct reward for conservation efforts is a public research institution. Part of its resources is then used to fund community development efforts that are supposed to benefit the rural communities, especially its poorest constituents, who have been the keepers of the biodiversity hotspots.

Since its opening in 1989, INBio has signed around 11 benefit-sharing agreements of this nature. All INBio agreements contain 7 basic aspects:

1. Direct payments in cash or knowledge exchanges (equipment, training, technological know how).
2. Payment of a significant percentage of the initial budget of the project (10%) and the returns of the commercialization of the products (50%).
3. Cooperation clauses that stipulate the gradual translation of the investigation processes to the supplier country, in order to create new jobs and the achievement of industrial development.
4. Minimum exclusivity.
5. Agreement on the samples property and patents property
6. The use of chemistry synthesis, semi-synthesis and domestication of the living sources, in order to avoid the continuous extraction of the biotic material.
7. Legal Mechanisms that will provide protection to both parties.

The best-known benefit sharing agreement signed by INBio is the INBio-Merck Agreement, which was signed in 1991, even before the Convention on Biological Diversity was established. This agreement was the first attempt to use biodiversity in order to achieve the commercialization of genetic and biochemical resources. The parties involved in this agreement were INBio and Merck Sharp & Dome. The parties conceived the agreement as a contract to collaborate in the investigation of the existent biodiversity in Costa Rica's tropical forests in order to establish its potential applications to human health and animals.

Under the agreement with Merck, the pharmaceutical firm agreed to provide 1 million US\$ over the next two years to help the institute build its plant collection operations, as well as some equipment. In return, INBio would supply an unspecified number of samples to be screened by Merck. Samples from the same sources could be supplied to other parties, but only after Merck had completed their screening. Merck also committed to the payment of royalties, undisclosed for confidentiality reasons, but stated in the contract as being "is within the range of usually used percentages for this type of agreements".

International Genebanks: the Example of Southern Africa

Five Nordic countries, including Sweden, are supporting a 20-year-old project in order to build up a regional genebank for a number of countries of Southern Africa (Angola, Botswana, Malawi, Lesotho, Mozambique, Namibia, Swaziland, Tanzania, Zambia and Zimbabwe). The Nordic Genetic Bank is the institution responsible for the implementation of this project and is a model used for similar regional cooperation. (Gov. of Sweden, 1993).

Transfer of Technologies and Industrial Development Capacity

Beyond equipment and know-how

One of the value transfers which is the most requested by developing countries is technology transfer. After all, the most sustainable way for developing countries to reap the benefits of modern variety creation, pharmaceutical R&D and other biotechnological innovations would be to process themselves their own genetic resources. However, plant breeding and biotechnology are becoming an increasingly sophisticated fiend, and

the gap between the capacity of rich and poor countries is actually widening.

Besides, there are other issues than pure technical capacity in the commercial exploitation of genetic resources. For example, the Research Institute for Fiber Crops in Malang, Indonesia, claims to have developed cotton varieties which, in terms of resistance to drought and adaptation to the climatic conditions of Southeast Sulawesi, are superior to imported varieties commercialized by local subsidiaries of multi-national firms. However, because Indonesia lacks the industrial capacity to develop and market these varieties, their use remains marginal despite their much lower price and possibly better performances (Ide-Force and PT EKA, 2000). Other examples abound of developing countries' laboratories having identified pharmaceutical molecules but being unable to produce and market them on a large scale.

Transfer of technology and industrial capacity of this kind should be supported under the CBD's financial mechanisms. However, unless strong regulatory pressures are put on multi-national firms, it is unlikely that they will be willing to be sharing their capacity with developing countries. This means that it is up to the countries themselves to request them to do so. For example, developing countries could request agro-industrial firms or pharmaceutical companies to establish joint-ventures with local partners to exploit locally extracted genetic resources, and provide incentives for them to do so in the form of tax breaks or other duty exemptions.

NGOs and Communities

An important issue is to involve NGOs and local communities in technology transfer and capacity-building programmes. For example, the African ICBG, led by Dr. Brian Schuster of Walter Reed Army Institute of Research (WRAIR), is helping to strengthen an African non-governmental alliance, Bioresources Development and Conservation Programme (BDCP), that includes university biomedical and biodiversity researchers, government officials, traditional healers, community leaders and herbal medicine producers. In the first year of ICBG associated work this alliance has helped renovate a community health clinic, held an international congress on utilisation of medicinal plants, begun training parataxonomists from at least five African countries and purchased equipment and supplies for several university laboratories (Rosenthal, 2001).

Research on Local Priority Health and Agricultural Issues

Bioprospecting partnerships may be used to focus outside research expertise and resources on understudied diseases or biodiversity concerns of the source country. Some of the diseases that most affect developing countries do not offer sufficiently profitable markets to attract research by large US and multi-national drug companies. Locally (and globally) important health concerns such as malaria and leishmaniasis are consequently understudied and effective therapeutic treatments are few.

Bioprospecting agreements can be utilised to ensure research efforts in diseases of local importance by state of the art commercial laboratories and researchers, and/or to achieve transfer of equipment and training to carry out more work in the source country. The research of each of the ICBGs contains work on such diseases, and for several they are the thrust of the groups' work. Such efforts may promote conservation goals in at least two ways. Whether or not a financial incentive develops from the research, finding local treatments to locally important diseases may have a significant impact on the valuation of those areas and species by all concerned. Second, traditional disease eradication programmes that focus on vector control for diseases such as malaria have often directly resulted in habitat destruction (e.g., draining wetlands and broad insecticide applications) and have created an unfriendly view of tropical forests and wetlands among public health officials in many countries. Alternative treatments may reduce the need for mosquito eradication programmes and the impression that wildlands are a threat to human health.

Similarly, geographically or biologically defined regions of a country that are a priority due to high diversity or imminent threat can be investigated in conjunction with bioprospecting arrangements. Such arrangements offer the opportunity to bring experts on particular biological groups or techniques in to identify local flora and help design management strategies (Rosenthal, 2000).

The same reasoning can be applied to agriculture. Agro-food companies that conduct research on improvement of varieties using local land race gene stocks can be harnessed to contribute to enhancing the capacity of local R&D institutions to improve varieties and other technologies for local agricultural development.

Genetic Resources, a gold mine or a mine field?

Benefit-Sharing of genetic resources holds big promises for transferring resources from developed to developing countries while linking this transfer to environmental conservation. They hold the potential to provide a partially market-based mechanisms enabling the poor people of biodiversity rich areas, who have conserved these areas, to reap in some of the benefits of the use of this biodiversity.

However, there are a number of issues to be considered:

Financial Issues

The rewards from the use of genetic resources are potentially enormous. Earnings from each wonder chemicals for private companies are in the range of US\$100 million to US\$1000 million per year. If the initial raw genetic information supplier country receives 1 to 10% of these, this can be this means earnings of US\$1 million to 100 million per year for each wonder drug. But these earnings are uncertain and take at least 10 years to materialize, they cannot form the basis of the funding of a conservation and poverty alleviation policy.

This means that conservation and development projects aimed at protecting biodiversity hotspots or biodiverse agro-ecosystems while rewarding the poor will still need classical international project funding, at least in the beginning. The recipe for success seems to combine both forms of fundings: public funds to start a project, and royalties from private companies as a "bonus". The involvement of public institutions, especially international ones, can also help to ensure that the host country receives assistance in its negotiations with the foreign private partners, and that there is some transparency in benefit sharing within the country.

Equity issues and transfer of technology

Because the largest part of the added-value in the creation of a new crop variety or drug is made in high-tech developed countries laboratories, the share of the benefit going to the suppliers of the raw genetic information will always remain small – unless they can access that technology.

Hence, technology transfer and capacity building should be key components of any genetic resources benefit sharing project. This should include:

- ❑ building the R&D capacity of local public and private institutions
- ❑ building the local institutional and policy framework for genetic resource management
- ❑ building industrial capacity in the host country to participate in the production and marketing of chemicals and varieties
- ❑ building the capacity of communities and NGOs.

Political issues in benefit-sharing within the country

Most projects reviewed have relatively clear mechanism explaining how the benefits of a project (including public grants, advanced payments and royalties) will be shared between developed countries public sources, private companies, and public institutions of host countries (mostly research).

How exactly the civil society and local communities are supposed to benefit in the end is far less clear, and this usually results in controversies, with accusations made to the project to concentrate all the benefits on some public institutions, government people and a restricted number of NGOs whose selection criteria are not often clear.

Mechanisms for rewarding poor rural people are even more fraud with complications because in most cases, direct individual monetary payments are not an option. Hence a few individuals benefit from the project through services rendered (such as informants for example), and communities end up benefiting from such projects in indirect ways through community development projects, which again may not benefit everyone in the same way. There we arrive exactly at the same range of issues that the one which is found in any ICDP, or any Community Development Project in an area with environmental conservation stakes. The problem, however, is made potentially more acute because local actors perceive biotechnology projects as carrying the potential for huge financial benefits and have resentment over private foreign or multi-national companies for having a strongest capacity to cash in those benefits. In short, the biggest the money (real or imagined), the biggest the potential conflicts.

Policy, legal and institutional conflicts

In a brave new world, these issues should be resolved through the use of appropriate policy and regulatory instruments and through adequate institutions. The problem there is that the commercial use of natural or landrace-based genetic resources is a relatively new thing, while benefit-sharing has been internationally defined only since the 1983 International Undertaking for Agriculture, and since the 1992 CBD for other usages. Hence no country – not even the USA, as the Yellowstone case indicates - can safely declare that it is ready with the right laws, institutions and mechanisms.

In fact, the most common case is a situation of inadequate laws created for other purposes in another context, which are usually both conflicting with each other while leaving areas of legal vacuum and uncertainties. These loopholes are gladly exploited by many parties for various agendas, be it private companies wanting to increase their share of the benefits, or local NGOs and political groups wanting to denunciate what they feel are unfair situations.

The position of environmental NGOs are often to ask for moratoria on all Bioprospecting activities and projects unless the policy and institutional issues are clarified. This position however would prevent countries from benefiting from private and

public funding for research, development and conservation activities that are badly needed.

An alternative position is to proceed with projects, ensuring the maximum transparency and using the project as a mechanism to identify problem policy issues and to work on them. The problem is that this combination of uncertainty and openness, which is characteristic of process-based interventions, is rarely compatible with both the confidentiality and the legal certainty needed by private companies which, at the end of the year or the quarter, are still responding to stockholders and not only to stakeholders.

This is probably where international public, semi-public institutions or non-governmental institutions can play an important mediating role and advisory role, providing expertise and reassurance to all parties. This can include UN institutions, international research institutions such as the CGIAR ones, or reputable NGOs such as IUCN or WWF.

If such parties could contribute to easing the relations between private interests and the public, while pressuring for a more fair and more sustainable use of genetic resources, then the Bioprospecting win-win-win dream may hold true in some areas. But in the end, this will depend a lot on the degree of openness, fairness, competence and public accountability of local authorities.

TRADABLE EMISSIONS: FROM WATERSHED SERVICES TO CARBON TRADE

Managing Waste And Water Use

Tradeable emissions of polluting gases such as SO₂ have been used widely in the USA to reduce atmospheric pollution, with a good level of success. They have been also used, under different forms, to reduce pollutions in river basins, by proposing waste emissions trade. Other similar systems have been used in river basin management to ensure that users of water (including polluters) pay for the resource a price that internalize their externalities. Such schemes are now found in most developed countries, and are starting to appear in developing countries like Thailand, at least for urban areas and industrialized use.

These systems, however, present very limited application for developing RUPES mechanisms in developing countries. They are applicable in developed countries when it is possible to actually monitor the quantity of water used by a particular user, or the quantity of waste and pollutants discharged by another entity. Such evaluations and monitoring would be impossible to use in rural areas with poor farmers.

However, rather than pure trade in water use rights and waste emissions rights, a number of mechanisms can be used to reward the poor for watershed services, based on the principle "the polluter pays" or "the user pays". This can be done through taxes or penalties on water use and discharges by large industrial units, in which monitoring is easier – although corruption remains a real issue. The funds generated can then be used for funding watershed conservation activities led by the poor, using community development projects or other forms of rewards as mentioned in the previous chapters. This means that this system is more a system to generate funds than an innovative system to reward the poor.

In some cases, such systems have been financed directly by water users, taking the initiative to finance community forestry projects to enhance waterbasin conservation. This is the case of the AQUA company in Indonesia.

Carbon Trade and the Clean Development Mechanism

All the RUPES mechanisms mentioned above were designed first with watershed services and biodiversity protection in mind. Some of them, like ICDPs, or contractual mechanisms to ensure soil conservation, can actually result in higher carbon sequestration, but it is not easy to determine how much, and to decide whether this carbon sequestration, which is resulting from existing conservation practices, should be deducted from emissions quotas of the implementing countries. Allowing for such deductions would be weakening the already extremely feeble provisions of the Kyoto protocol. In the rest of the document, we will look for other instruments aimed at specially addressing carbon sequestration goals, while assessing if they can be used to promote other environmental services within a RUPES framework. Much more than in the previous chapters, this will be based a lot on speculations since the implementation of the Kyoto protocol is just starting.

A New Set of International Mechanisms

The Kyoto and Bonn protocol have created mechanisms for the tradability of carbon emission permits and carbon offsets, which enables new forms of financing for carbon sequestration (Sedjo, 1999). The Kyoto protocol commits 39 developed countries (listed in Annex 1 of the Protocol and therefore called "Annex 1" countries) to reducing their overall emissions of greenhouse gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012. Additionally, the parties agreed – after much controversy, especially from the United States who always opposed that provision - that developing states would assume no formal greenhouse gas reduction obligations.

Articles 3 and 17 of the Kyoto Protocol allow countries with binding targets to lower the cost of meeting their targets by participating in international emissions and offsets trading. The Protocol calls for development and use of three specific market based emissions reductions tools: Emissions Trading, Joint Implementation, and the Clean Development Mechanism.

In emissions trading, one country transfers part of its assigned amount to another. According to the "Council of Economic Advisers" of the White House, the marginal cost of emissions reductions without transactions in permits would be US\$125 per ton in the US, and will fall to 30 to 50 dollars if Central and Eastern European countries participate in emissions trading. If such trading is extended to developing countries, the marginal cost would fall to 14 to 20 dollars/ton. (Tubiana, 2000). Hence tradable permits are supposed to be a more efficient market-based instrument for carbon sequestration than non tradable ones. Trade of emission permits is only allowed, however, within Annex I countries, and this is one of the reasons why the USA refused to sign the last version of the treaty.

The JI, for its part, was mostly designed with the States of the former Soviet bloc in mind. These states are expected to far exceed their Kyoto emissions reductions goals, thus having many emissions reductions credits to sell to the United States and Western Europe, or any other state that may wish to pursue that emissions reduction strategy. The JI, in its various phases, followed this type of investment pattern throughout the 1990s. According to the World Bank, in February 1997, prior to the signing of the Kyoto Protocol, 15 JI projects had been registered, and the post-Kyoto era boasts some 65 additional proposals from Poland's secretariat for Joint Implementation, 31 spread throughout Central and Eastern Europe and close to 200 proposals from various other sources.

The concept of CDM is relatively new to the climate change negotiation lexicon and was negotiated as a last minute Kyoto Protocol emissions reduction tool, to provide a possibility for Annex II countries to join the Protocol as active participants. Annex II states participating in CDM projects begin earning emissions reductions credits applicable to their projected emissions targets should they voluntarily opt to transfer to the Annex I category. At this stage, they may then start trading their credits. In between, they are supposed to benefit from the funds invested in the project, while Annex I parties gain certified emissions reductions (CER) credits once the emission reductions achieved by a CDM project have been documented. The implementers of the project (Annex I Countries) may use these Certified Emission Reductions to help achieve their GHG emissions reduction commitment. The goal is to promote a transfer of finances and resources to developing countries to green investment and practices (Haites and Yamin, 2000).

Parties of the Kyoto Protocol agreed that predictable and adequate levels of funding should be made available to developing countries and recognise the need for funding that is new and additional to existing financial resources.

Three new funds will be established, two under the UN FCCC:

- ❑ A special climate change fund to finance activities in the following areas: adaptation to climate change; technology transfer; energy, transport, industry, agriculture, forestry and waste management; and activities to assist fossil-fuel dependent developing countries to diversify their economies.
- ❑ A least developed countries fund to support a work programme for these countries. Both of these funds will be operated by the Global Environment Facility (GEF). In addition, the activities of the GEF Trust Fund will be broadened, particularly to build the capacity in developing countries to respond to the challenges of climate change.

Given the low commitment of developed countries towards transfers to developing countries, these funds are unlikely, however, to receive enough funds to meet their alleged targets

- ❑ The third fund, the Kyoto Protocol adaptation fund, will be established under the Protocol to finance concrete adaptation projects and programmes in developing countries that ratify the Protocol.

The funding provisions of the agreement have been complemented by a political declaration by the EU and several other developed countries Canada, New Zealand, Switzerland and Iceland - reaffirming a strong political commitment to increase climate change funding for developing nations and to pay their fair share. This share is considered to be EUR 450 million per year by 2005 and is to be revised in 2008. At the same time, reporting and review of financial support will be strengthened and made more transparent.

On another hand, Indian experts have estimated that if the USA used the CDM to meet their obligations of emissions reductions – to which they have not subscribed – they would need to invest about US\$1,5 billion per year in developing countries. This shows that the potential for environmental transfers to developed countries based on the Kyoto protocol remain rather limited.

Revenues from 2% of the credits generated by clean development mechanism projects will be paid into the Kyoto Protocol adaptation fund, designed to help developing countries that are particularly vulnerable to the adverse effects of climate change to meet their costs of adaptation. This is extremely small again, given the above amounts and the cost of the needed adjustments in developing countries. All these figures reflect the fact that the Kyoto protocol is still a world apart from addressing the needs for carbon emissions reductions and environmental transfers generated by the prospects of global warming.

Carbon "sinks" (land-use, land-use change and forestry)

The main mechanism by which the CDM can be used as a RUPES mechanisms is Carbon Sinks, i.e. promoting land-use, land-use changes and forestry in ways that will result in a higher sequestration of carbon (for a review of these mechanism, see CIFOR, 2001).

With such an objective, virtually all the RUPES mechanisms reviewed above have the potential to be used for meeting carbon sequestration objectives, and could hence be funded by the CDM. And indeed, as mentioned above in the example about agri-environmental measures in the US, many developed countries are now frantically evaluating how they could use their existing environmental policies to gain carbon emissions reductions. But again, it should remain clear that the CDM will be useful if it generates new funding for environmental and poverty alleviation projects, not if just takes over existing ones.

Industrialised countries can use carbon absorption from forestry management activities up to a set limit in order to meet their emissions targets. Also, under the clean development mechanism, only sinks projects involving afforestation and reforestation can be counted, up to a fixed limit. The EU is disappointed that no limit has been set on sinks from agricultural activities.

Not counting the US, which has said it will not ratify the Protocol, the total amount of carbon that can be absorbed through overall sinks activities, including agriculture, is estimated at around 96 million tonnes/year, equivalent to about 70% of the emissions reduction commitment of industrialised countries (excluding the US) under the Protocol.

Unfortunately, it is much too early to evaluate what could be the potential for implementing the CDM, since mechanisms for its operation and maintenance are not even totally defined (Haïtes and Yamin, 2000). As of now, a number of private parties and governments have started implementing pilot projects to test the possibility of using carbon sinks to meet a number of goals. The most popular type of projects is tree plantations, which are usually planted with several objectives such as timber production, reforestation and carbon sequestration. When timber production is planned, it remains to see what is the global impact on carbon sequestration over the lifecycle of the plantation and these projects are highly controversial.

A privately-funded Carbon Sink in Brazil

An example of the kinds of trials that have been made on a purely voluntarily bases by Annex I private parties in anticipation of the implementation of the Kyoto protocol is found in Brazil. Peugeot/PSA, a major European car-maker group, has funded a project in Cooperation with the NGO ProNatura, in order to plant one million trees on ha. The main stated objective of the project is to offset the carbon emissions linked with the car production activities of the group. The proponents of the project indicate that the trees should absorb 180.000 tons of Carbon over 40 years, and this despite the numerous uncertainties that surround carbon sequestration by forest growth as of now (Utopies, 2001). Besides, what type of emissions this is supposed to offset is not clear. The emissions of the diesel engines produced yearly by the group are actually 62 times higher than the 180,000 tons of Carbon allegedly stored by the project.

Such activities are often criticized by NGOs (Frederic Castell, FOE, pers.comm.) for a number of reasons. Because they rest on artificial tree plantations, they have the potential to harm biodiversity (and this despite the fact that PSA claims to have planted 30 local species, which remains questionable due to the difficulty in growing native forest tree species in the tropics). They have a high chance of burning before reaching maturity, rejecting all their carbon into the air. They may also generate land conflicts with local communities. Their real capacity to absorb carbon over the long run is questionable.

Given the way that the project is presented by Marc Boquet, President of PSA group, it is clear that it is first a marketing and image tool. The

choice of the presentation ("we plant one million trees") is clearly designed to provide an image of a large-scale reforestation to reassure the consumer: they can buy cars, PSA is planting trees. How 1 million trees could ever offset the emissions of the 2,8 million cars sold yearly by the group (at 4 tons of CO₂ over car per year) remains totally eluded.

One could argue that even if they are limited, these experiences can be positive since they allow to drag much needed funds towards RUPES mechanisms. This will be true only if the projects are clearly designed in a way that maximizes benefits to the environment and to the rural poor, and not only the image of a company.

Have your trees and eat them: the Strategy of Costa-Rica

As seen in other examples above, Costa-Rica is definitely the country which has the most active and aggressive strategy to bank on the developing environmental transfer mechanisms from developed countries. From eco-tourism to bio-prospecting, nearly all market-based instruments have been developed in an exemplary way by Costa-Rica. It is not surprising that they are taking the lead in seeking remuneration for carbon sinks. Rather than planting trees, they are mostly targeting their strategy at being paid for keeping them, a goal which has much better environmental benefits in terms of biodiversity and watershed conservation.

In 1998, the Government of Costa Rica and SGS Société Générale de Surveillance Holding S.A. (SGS) announced the certification of a carbon offset programme aiming at preserving 530,000 ha of forests in the National Parks and Biological Reserves throughout Costa Rica. The majority of this land is owned by non-governmental organisations or private landowners, exposing the existing forest vegetation [approximately 85% of the area] to the risk of deforestation. The deforestation rate will be reduced by transferring ownership to the state and placing the lands under the protection of SINAC, the National System for Conservation Areas. The land acquisition is supposed to be funded by the sale of the carbon offset credits.

As such, such a program is nothing else than the creation of a Forest Reserve, to be funded by carbon emissions and offsets trade. It is then subject to the same uncertainties and risks than the creation of any such reserve. The first difficulty is to make sure that local landowners have been adequately compensated, and that they have

alternative livelihood so that they will not be tempted to take the money and cut the forest anyway. This also means adequate enforcement and surveillance. The capacity of such project to become a RUPES is only real if it contains a strong community development project, like in any ICDP – with all the difficulties linked with such projects.

The SGS certification, the first ever under terms of the Kyoto agreement on climate change, claims to verify that the planned set aside of Costa Rican forests as a "carbon sink" will remove more than 1 million metric tons of carbon equivalent from the atmosphere. Over the life of the project, Costa Rica hopes its total forest lands will pull more than 15.6 million tons of carbon equivalent from the atmosphere. Sale of Certified Tradeable Offsets (CTOs) could earn Costa Rica more than \$300 million over the project life. The offsets are supposed to be sold to companies in Annex I countries. How this will be achieved and whether this value will be reached, while the US has not signed the treaty and the compliance mechanisms of the protocol are extremely weak, remains unclear. What is clear, however, when reading the press releases, is that the operation is a very good image for the Costa-Rican President and for SGS company. More recently, the President has tried to obtain a US\$54 million rebate of Costa-Rica's debt to the US (out of 200 million) in a "debt-for-carbon" swap.

Conclusion: a New Source of Funds for old Projects?

A recent study by the WRI (2001) examined a number of projects funded by international NGOs and bilateral and multilateral cooperation agencies as well as private sponsors such as AES a leading global power company. These projects are very similar to traditional ICDP activities, with a mix of conservation activities and community development. One of them funds Reduced Impact Logging development. In all cases, these projects have clear carbon sequestration goals as a basis for finance. (see table on the next page).

Whether these projects will manage to create a significant, stable additional source of funds for conservation, development and poverty alleviation will depend a lot on the actual development of trade in carbon emissions and offsets. For the moment, the involved parties are testing the ground, investing in such projects to protect their image and anticipate changes in the international markets and domestic regulations about carbon

emissions. A few brokers are already offering to sell carbon credits from projects similar to those described above.

The market, however, seems rather experimental and based on the goodwill and image strategy of companies, and their anticipation of the market. If this market fails to materialize and if countries and private companies can continue emitting carbon without any clear sanction or benefits in case of emission offset, they might lose interest in this

type of projects. Another worrying element is the number of projects and countries that are offering carbon credits or planning to develop some. When compared to the actual low requirements of carbon emissions reductions, this means that supply could become so abundant that prices will fall.

This means that the future of such projects will depend a lot on the success of international organizations to make international treaties stronger and binding.

Table V . A review of Carbon Sink Projects

CARE/Guatemala			\$14 million Total
<i>Allied Energy Services Corp. (AES), CARE</i>	Guatemala	15.5-58 million tons	\$2 million from AES
Agroforestry, reforestation, protection			
RIL Logging			
<i>New England Electric (NEES), Innoprise, Rainforest Alliance, COPEC</i>	Malaysia	300,000-600,000 tons	\$450,000
Reduced-impact logging			
Paraguay Forest Protection			
<i>AES, The Nature Conservancy, FMB Foundation, U.S. Agency for International Development</i>	Paraguay	14.6 million tons	\$3.4-4.5 million (AES provided \$3 million)
Preservation, sustainable agroforestry			
Amazon Basin Forest Protection			
<i>AES Corp., OXFAM</i>	Peru, Ecuador, and Bolivia	70 million tons	\$2 million
Land tenure			
CARFIX			\$2.73 per ton
<i>FUNDECOR, MERINEM, Wachovia</i>	Costa Rica	2 million tons	Partially funded
<i>Timberland Investment Management</i>			
Sustainable forestry			
ECOLAND			
<i>Tenaska Washington Partners, Trexler and Associates, National Fish and Wildlife Foundation, COMBOS, MIRENEM, Council of the OSA Conservation Area, and Rainforests of the Austrians</i>	Costa Rica	1 million tons	\$900,000
Forest preservation			
Noel Kempff M. Climate Action Forestry Project			
American Electric Power System (AEP), The Nature Conservancy, and Fundación Amigos de la Naturaleza (FAN)	Bolivia	6,794,000 tons	\$1.25 per ton (estimated)
Halophyte Cultivation Project in Sonora			
<i>Salt River Project, Halophyte Enterprises Inc., Econergy International Corporation and Mexican partner: Genesis, S.A. de C.V.</i>	Mexico	1,650 tons	confidential
Cultivation of salt-tolerant species			

CONCLUSION: BUILDING A MULTIPLE TOOLBOX

The review above has enabled to present a number of mechanisms initiated by developed countries to reward rural people – especially the poor – for environmental services.

While the initial mechanisms were devised for watershed protection, the latest decade (1990-2000) has seen the development of new tools aimed at protecting biodiversity. The "third wave" which is only beginning, consists of tools aimed at promoting carbon sequestration.

All of these tools include market-based and non market-based mechanisms. Market-based mechanisms are possible when there are consumers or users of an environmental service who are ready to pay directly for the preservation of this service. Non-market based mechanisms are needed when the cost of environmental conservation is higher than what consumers and users are ready to pay within present market conditions.

From the comparison of market-based and non-market based mechanisms, a few conclusions can be made:

1. Market-based mechanisms offer a financial potential which is far higher than most of the existing public aid budgets for environmental and poverty alleviation programs. For example, the gross average yearly product of the eco-tourism sector alone is 80 times higher than the annual GEF budget. Royalties paid to developing countries from the proceeds of each new pharmaceutical drug derived from their genetic resources are in the magnitude of 1 to 100 million US\$ a year, depending of the benefits of the drug and the agreements made.
2. Market-based mechanisms, however, provide uncertain benefits which may not always be adequate for the funding of an environmental conservation and poverty alleviation strategy. They also request a certain level of capacity building in the implementing sector before they can be successfully used. They may not be the best solution to provide rewards to the poorest of the poor, since it is usually the most skilled members of a community and those with capital who are the most likely to be able to benefit from them. Their sustainability depends on the level of uncertainties and

fluctuations of the markets on which they are based – which can be very high in the case of genetic resources or tourism, and lower for agriculture or forest-based products.

3. Non-market based mechanisms enable a degree of control by the public over policies for environmental conservation and benefits allocations. They are in theory more appropriate towards meeting social goals and poverty alleviation objectives – although the mixed record of ICDPs and community forestry projects in effectively reaching the poorest of the poor indicates that it may not necessarily be the case in practice. Like market-based mechanisms, non-market ones need adequate policy and institutional framework to meet their objectives in a sustainable way. They are not necessarily more sustainable, since they are subject to changes in national and international funding priorities.

However, perhaps the biggest lesson of this review is the difficulty of separating market-based from non-market based mechanisms in practice.

Each of the strategies aiming at rewarding rural populations for environmental services can be based either on market-based transfers, or on public aid, or, more likely, on a combination of both:

- the promotion of integrated conservation and development areas is usually based on public aid, aimed at providing alternative sources of income to people living near or in conservation areas and giving them incentives to participate in conservation activities. However, ICDPs often integrate market-based mechanisms such as eco-tourism or the development of the production of organic farming products or certified forest products. More recently, a new trend has appeared with the development of private funds to acquire conservation areas which may mean that a market for ICDPs may emerge. Even if it is likely to remain a marginal trend, it reminds us that the "willingness to pay" for conserving natural ecosystems may not only be an economic concept, but a reality leading to market-based applications.
- the promotion of environmentally and socially sound agriculture, forestry or tourism practices can be developed based on market-based mechanisms – banking on the willingness of consumers to pay for environmentally friendly products and services, preferably if they are certified as such. However, the willingness to pay *more* for environmentally

friendly products is usually not sufficient to cover all the additional costs of environmentally sound practices. Hence these strategies are sometimes partly or totally funded by public subsidies or NGO aid.

- ❑ benefit-sharing of the use of genetic resources is supposedly the most market-based mechanism for rewarding developing countries and their rural populations for biodiversity conservation. Yet the market rewards for the use of genetic information collected in natural biota or landrace reservoirs are so erratic that genetic resources collection, preservation and development can hardly be based on purely market-based revenues. Successful "bio-prospecting" projects that have a chance to have a sustainable contribution to environmental conservation and development usually combine contractual payments from users of genetic resources (including royalties) with public aid to launch and sustain research, conservation and development strategies.
- ❑ as for carbon sinks and other CDM instruments, it is still too early to evaluate their impacts. Again, however, it is very unlikely that they will be able to provide a market-alone basis for sustainable environmental conservation and poverty alleviation strategies.

Successful examples of environmental conservation strategies including a remuneration for rural populations, especially its poorest members, are usually based on a combination of market-based and non-market-based mechanisms. Such examples include Costa-Rica's INBio, which has established a one-stop agency collecting private and public funds for conservation activities and community development. The Agri-environmental Strategies of the European Union are another good example of integration of market-based tools (organic farming promotion, eco-tourism) with non-market based tools (direct subsidies to compensate for the costs of environmentally sound practices).

One of the main lessons of this review is that there are three things needed to ensure a sustainable development of RUPES mechanisms: laws, policies and institutions. Failures to implement both market and non-market based mechanisms are due to an inadequate policy and institutional framework, be it in the field of tenurial rights on natural resources, inappropriate intellectual property rights, lack of institutional framework for local peoples consultation and participation in decisions that affect them, or a general lack of law enforcement on a background of corruption. Quite predictably,

lasting success stories come from countries which have managed to build up an appropriate framework of laws, regulations, policies and institutions which are consistent with participatory conservation and poverty alleviation goals.

Another lesson is that the funds available to develop RUPES mechanisms are very limited when compared to the needs, and that many of these mechanisms have particular constraints which make it impossible to apply them in many areas. Eco-tourism, which has the largest financial potential for RUPES, can be used only in a number of areas with good infrastructure and a concentration of touristic sites. Eco-labeling presents so many constraints that it does not manage to get beyond a tiny share of agricultural production in developing countries, and often end up serving better the needs of RUPES within developed countries. The readiness of biotech companies to pay upfront for bio-prospecting remains very limited, and the royalties revenues, while potentially high, remain too much of a gambling issue to be counted on. As for private and public funds for ICDPs, community forestry or carbon sequestration, they are not even nearing the order of magnitude of what would be needed to meet their stated goals.

With strong constraints to their implementation and limited funds, it is clear that the contribution of straightforward RUPES instruments to meeting the needs of poverty alleviation and environmental conservation will remain marginal, at least in the next decade. Whatever is available can be used for testing pilot approaches and lobby to get more funds for their wider implementation, when possible. This should be strongly geared towards the most effective instruments, i.e. the ones that are the most "market-based" like eco-tourism, eco-labeling and bio-prospecting.

However, there is an immediate field of action for effective RUPES mechanisms which, instead of working hard to try to promote rewards, would first identify policies that work against the rural poor and against the environmental services they may provide. Such policies include land rights allocation, subsidies for environmentally damaging practices, subsidies for large-scale, input-intensive lowland farming, and levies against the products of environmentally-friendly agricultural systems of the poor. Assessing the impact of these policies and removing the more harmful seems, in the short term, like the most effective way of promoting poverty alleviation and environmental conservation.

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The Certification in Sustainable Tourism Program (CST) in Costa-Rica
<http://www.turismo-sostenible.co.cr/EN/home.shtml>

Promotion of Ecotourism in East Africa
<http://www.eco-resorts.com/>

Asia Pacific Ecotourism Conference 2002 (APECO)
<http://www.mattasabah.com/apeco/>

IMPACT project (UNESCO): publications on the effect of tourism on cultures and the environment in Asia and the Pacific

<http://www.unescobkk.org/culture/impact/index.shtml>

Worldwide selection of eco-travelling destinations

<http://www.responsibletravel.com/Home.htm>

Center for Responsible Tourism, Univ. of Greenwich
<http://www.cftrt.org.uk/>

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APPENDIX 1. LINKS TO MAIN RELEVANT INTERNATIONAL TREATIES

Based on lists compiled by Tufts University, <http://www.fletcher.tufts.edu>

Environment and Biodiversity

Convention between the United States, Great Britain, Russia and Japan for the Preservation and Protection of Fur Seals (7 July 1911) (no longer in force)

Convention Relative to the Preservation of Fauna and Flora in their Natural State (8 Nov 1933)

Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (12 Oct 1940)

International Plant Protection Convention (6 December 1951) and the Plant Protection Agreement for the South East Asia and Pacific Region (27 February 1956)

International Convention for the Regulation of Whaling (2 Dec 1946); Protocol of Amendment (1956)

International Convention for the Protection of Birds (18 Oct 1950)

International Convention for the Protection of New Varieties of Plants (2 Dec. 1961). Revised version (23 Oct 1978)

Fisheries Convention (9 Mar 1964)

African Convention for the Conservation of Nature and Natural Resources (15 Sept 1968)

European Convention for the Protection of Animals During International Transport (13 December 1968)

BENELUX Convention Concerning Hunting and the Protection of Birds (10 June 1970)

Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR) (2 Feb 1971). Ramsar Convention Bureau. Commonly called the Ramsar Convention. With this Convention for the first time the international community recognized the need for "conservation and wise use" of wetlands, which were recognized as valuable natural resources and habitat of endangered species.

United Nations Conference on the Human Environment (Stockholm, 1972): Declaration; Action Plan

Convention for the Protection of the World Cultural and Natural Heritage (16 Nov 1972). text Version. World Heritage List. List of the World Heritage in Danger. Operational Guidelines. Ratifiers of the Convention. Convention Secretariat (World Heritage Centre, UNESCO)

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (3 Mar 1973); as amended 1979, 1983; 1995 with Appendices I, II and III. For the latest texts, consult the CITES Secretariat. List of Parties. The CITES seeks to protect wildlife and plant populations from over-exploitation caused by increased international commercial trade. The treaty provides for the monitoring and regulation of trade in designated species in its 135 country members.

Convention on the Protection of the Rhine Against Chemical Pollution (3 Dec. 1976).

Convention on the Conservation of Migratory Species of Wild Animals (CMS, 23 Jun 1979), Further agreements under the CMS

Convention on the Conservation of European Wildlife and Natural Habitats (19 Sept 1979)

World Charter for Nature (1982)

International Tropical Timber Agreement (18 Nov 1983)

International Undertaking on Plant Genetic Resources for Food and Agriculture (1983, FAO)

Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (25 Nov. 1986).

Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (and Protocols) (24 Nov 1989)

Convention on Environmental Impact Assessment in a Transboundary Context (25 Feb 1991)

Convention on the Protection and Use of Transboundary Watercourses and International Lakes (17 Mar 1992)

The Rio Declaration on Environment and Development (14 Jun 1992)

United Nations Conference on Environment and Development: Agenda 21 and Other UNCED Agreements (14 Jun 1992)

Convention on Biological Diversity (5 Jun 1992). Biodiversity Secretariat. States Parties. (CBD): signed by 157 countries at the Rio de Janeiro Earth Summit, in recognition of the continued threat to global and local biological resources. The stated objectives of the CBD are the "conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" (Article 1). Convention signatories recognized not only the ecological, genetic, social, economic, scientific, educational, cultural, and recreational values of biological diversity, but also its intrinsic value and its importance for maintaining life sustaining system of the biosphere.

Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests [The Forest Principles] (13 Jun 1992)

FAO Resolution requesting member countries to negotiate the revision of the 1983 International Undertaking, in line with the CBD principles (1993). The negotiations have to take place through the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA).

United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (17 Jun 1994); via UNDP with ratification information.

1994 Draft Declaration of Principles on Human Rights and the Environment

European Energy Conference. European Energy Charter. Annexes and Protocol (17 Dec 1994)

The Pan-European Biological and Landscape Diversity Strategy (PEBLDS), adopted by the Ministers of Environment at the Sofia Environment for Europe Ministerial Conference (1995).

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (24 Nov 1996)

Framework Agreement for the Conservation of the Living Marine Resources of the High Seas of the South Pacific ("Galapagos Agreement") (14 August 2000)

Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (5 Sept 2000)

Agreement on the International Dolphin Conservation Program (amended 30 October 2000) from the Inter-American Tropical Tuna Commission. Ratification status.

Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (20 April 2001)

Human Rights

Universal Declaration of Human Rights (1948). WWW version via The United Nations via HRWEB
European Convention on Human Rights (4 Nov 1950) and all Protocols, via Council of Europe (ETS 005).
The Indigenous and Tribal Populations Convention and Recommendation, 1957
International Covenant on Economic, Social and Cultural Rights (16 Dec 1966). WWW version via HRWEB.
International Covenant on Civil and Political Rights (16 Dec 1966) (www version via HRWEB and Optional Protocol
American Convention on Human Rights (22 Nov 1969); Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights "Protocol of San Salvador" (17 Nov 1988); Protocol to the American Convention on Human Rights to Abolish the Death Penalty (7 June 1990).
ILO Convention Concerning Indigenous and Tribal Peoples in Independent Countries. (27 June 1989)
Draft Declaration on the Rights of Indigenous Peoples (1992) via University of Saskatchewan.
United Nations World Conference on Human Rights: Vienna Declaration and Action Programme (25 Jun 1993)
1994 Draft Declaration of Principles on Human Rights and the Environment
European Framework Convention for the Protection of National Minorities (Strasbourg 1 Feb 1995) (19 Oct 1996)
Council of Europe: Convention on Human Rights and Biomedicine (4 April 1997)

Trade and Intellectual Property

General Agreement on Tariffs and Trade (1947) (as amended through 1966). Final Act of the Uruguay Round via The World Trade Organization.
Paris Convention for the Protection of Industrial Property (rev. 14 Jul 1967)
Patent Cooperation Treaty; with Regulations (19 Jul 1970). Contracting States. WIPO. U.S. Patent and Trademark Office
Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (14 Nov 1970)
Universal Copyright Convention as revised at Paris on 24 July 1971; and Protocols (24 Jul 1971); and WIPO Copyright Treaty (December 20, 1996)
United Nations Convention on Contracts for the International Sale of Goods (11 Apr 1980)
Convention on the Law Applicable to Contract Obligations (19 Jun 1980)
Unidroit Convention on Agency in the International Sale of Goods (17 Feb 1983)
World Intellectual Property Organization-World Trade Organization: Agreement Between WIPO and WTO(Geneva, 22 December 1995)
World Intellectual Property Organization: Copyright Treaty (20 Dec 1996)
World Intellectual Property Organization: Performances and Phonograms Treaty (20 Dec 1996)
Draft version of the OECD's Multilateral Agreement on Investment (MAI). From Multinational Monitor (versions of January and May 1997)

List of Main Abbreviations

ASB	Alternatives to Slash-and-Burn
CAP	Common Agricultural Policy
CBD	Convention on Bio-Diversity
CBFM	Community-Based Forest Management
CDM	Clean development mechanism
CER	Certified Emission Reduction
CGIAR	Consultative Group for International Agricultural Research
CGRFA	Commission on Genetic Resources for Food and Agriculture
CIFOR	International Center for Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CH4	methane
CO2	carbon dioxide
COP	Conference of Parties
CREED	Collaborative Research in the Economics of Environment and Development
CST	Certification in Sustainable Tourism
EAGGF	European Agricultural Guidance and Guarantee Fund
EEA	European Environment Agency
EMEP	European Monitoring and Evaluation Programme
ESB	European soil bureau
EU	European Union
FCCC	UN Framework Convention on Climate Change
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization
FSC	Forest Stewardship Council
GDP	Gross domestic product
GAEPS	General Agri-Environment Protection Scheme
GCEA	German Council of Environmental Advisors
ESA	Programme Environmentally Sensitive Areas Programme
GHG	Green House Gases
GMO	Genetically modified organisms
GNP	Gross national product
GVA	Gross value added
GWP	Global Warming Potential
Ha	hectare
HFC	hydrofluorocarbon
ICDP	Integrated Conservation and Development Project

IIED	International Institute for Environment and Development
IEA	International energy agency
IP	Integrated production
IPCC	Intergovernmental panel on Climate Change
LEI	Lembaga Ekolabel Indonesia
NGO	Non-Governmental Organization
NTFP	Non Timber Forest Product
ODI	Overseas Development Institute
OECD	Organisation for Economic Cooperation and Development
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
PPM	Processes and Production Methods
RECOFTC	Regional Community Forestry Training Center
RFF	Resources for the Future
SME	Small and medium-sized enterprise
TEN	Trans-European Network
TIES	The International Ecotourism Society
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environmental Program
UAA	Utilised agricultural area
WTO	World Trade Organization ; or World Tourism Organization
WCMC	World Conservation Monitoring Centre
WWF	World Wildlife Fund