Evy Thies

Incentive Measures Appropriate to Enhance the Conservatioin and Sustainable Use of Agrobiodiversity

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TABLE OF CONTENTS

Boxes

Tables

ABBREVIATIONS

CBD	Convention on Biological Diversity
COP	Conference of the Parties
EU	European Union
FAO	Food and Agriculture Organization
GATT	General Agreement on Tariffs and Trade
GEF	Global Environment Facility
GPA	Global Plan of Action
GTZ	Gesellschaft für Technische Zusammenarbeit
IPR	Intellectual Property Rights
ISO	International Standards Organization
IUCN	World Conservation Union
LISTRA	Livelihood Systems and Tropical Forest Areas
m ATS	Million Austrian Schillings
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PES	Payments for Environmental Services
PGRFA	Plant Genetic Resources for Food and Agriculture
PPP	Public-private-partnership,
RMSH	***Ressourcenmanagement über Selbsthilfeansätze***
SADC	South African Development Community
SSSP	Sustainable Seed Supply Program
SWOT	Strengths and Weaknesses, Opportunities and Threats
TRIPs	Trade Related Aspects of Intellectual Property Rights
UAA	Utilizable Agricultural Area
UNDP	United Nations Development Program
UPOV	International Convention for the Protection of New Varieties of Plants
WIPO	World Intellectual Property Organization
WTO	World Trade Organization
WWF	World Wide Fund for Nature

1 SUMMARY

The present study analyzes whether incentive measures designed for the promotion of conservation and sustainable use of natural resources are transferable to agrobiodiversity and if so, which ones. For this purpose, existing activities that apply incentive measures in development cooperation have been evaluated with regard to their design, implementation and impact.

Since incentive measures are political instruments aiming to encourage politically desirable ways of acting and to discourage undesirable ones, key problems and adverse incentives have to be identified before entering the process of design. They are linked to the **valuation of natural resources, in particular biodiversity**, which is a complex subject, characterized by numerous interdependencies, ignorance of details, and uncertainty about probable management impacts. Valuation therefore is difficult, due to the lack of scientific knowledge and objective valuation criteria. In addition, private short-term economic interests quite often determine the valuation, leaving little space for the manifestation of public values and long-term sustainability considerations. Market prices do not reflect the real value of biological resources and their services because of a failure to internalize external costs. Genetic resources represent above all option and quasi-option values, and specific incentive measures for their realization are not common. One possibility in this context is to apply the precautionary principle in general policy-making. **The challenge is to allocate values to both, the private and the public functions of biodiversity.** These values have to be transparent and easily understandable and must be translated into incentive measures and action. Several types of incentive measures exist, and the most appropriate are often a mix.

With the exception of wild relatives, **agrobiodiversity is not an "open access common,"** such as are many forests or wildlife. It is managed privately or in communities, either for subsistence or commercial purposes. The more it is managed for commercial purposes, the more high-yielding crops and breeds are used, and the less important is the traditional minimization of risks through the use of a high diversity of varieties, typical of subsistence farming. Agrobiodiversity is threatened because most commercial production focuses on a few major crops and breeds, often already introduced during colonial time and sometimes still propagated by national policy and development projects. A multitude of traditional breeds and crops are considered low-performing and are ousted by a limited number of high performing varieties. This however leads to the irreversible loss of genetic diversity essential for genetic improvement, which is decisive for current and future food security.

Consequently, **agrobiodiversity is threatened because it is not used** and not because it is overused, as is the case with many wildlife or tree species. Sustainable use of agrobiodiversity therefore often means "increased use" instead of restriction. Consequently, ***in-situ*** management of agrobiodiversity is a very active process, as is ***ex-situ*** conservation. Since traditional, neglected and under-utilized breeds and crops have their present characteristics only because they have been actively selected, conserving them means more than just shielding them.

Particular "agrobiodiversity criteria" for the transferability of incentive measures follow from the aforementioned considerations. However, it is the **framework conditions** in particular which the author judges to be **decisive for the success**

of incentives. These may be multilateral or bilateral agreements, good governance, the legislative framework and law enforcement, national and regional economy, research activities, traditional knowledge or the uniqueness of certain agrobiological resources. **Agriculture is often an intensively subsidized economic sector.** Thereforemost prices are distorted and do not reflect the real cost of production. In addition, food-for-work programs or long-term free food supply may strongly influence local and national markets. The combination of these factors may result in an **adverse incentive** with regard to the sustainability of agriculture and the conservation and sustainable use of plant and animal genetic resources. The removal of these adverse incentives may already have a considerable impact.

In most OECD countries, the government's steering function is much stronger than in developing countries. In developing countries, it is therefore often the donor community which assumes the role of the government in designing and implementing incentives.

As such, a development project can be regarded as a series of incentives. Therefore, project-initiated incentives have to take into account the framework conditions to increase the probability of success, i.e. a sustainable change in valuation and resulting management priorities. On the other hand, framework conditions, such as the ratification of the Convention for Biological Diversity or a national strategy to implement the Global Plan of Action for plant genetic resources, can facilitate decision-making and design, implementation and monitoring of incentives.

Besides the general activities dedicated to capacity-building and information exchange, the following types of incentive measures seem to be the most promising. Relevant activities to be undertaken by the GTZ sector project "Managing Agrobiodiversity in Rural Areas" are proposed in chapter 5:

- Removal of adverse subsidies
- Environmental funds and public financing
- Benefit-sharing agreements
- Intellectual Property Rights
- Market creation and support for commercialization
- Access to and use of information about available genetic resources

As two relevant projects are already working in the SADC region, this region could function as a starting point for a workshop on incentive measures, for example.

Pilot projects should be encouraged to conduct particular studies on the impact of incentive measures.

Manyexperiences concerning incentives for the conservation and sustainable use of agrobiodiversity are related to plant genetic resources. Therefore, approaches should be analyzed to determine whether any of them are transferable to animal genetic resources and if so, which ones.

2 BACKGROUND OF THE STUDY

The present study was prepared for the GTZ sector project "Managing Agrobiodiversity in Rural Areas." The purpose was to analyze whether incentive measures designed for the promotion of conservation and sustainable use of biodiversity and natural resources in general are transferable to agrobiodiversity and, if so, which ones.

Existing concepts for and experience with the application of incentive measures in development cooperation have been evaluated with regard to their design, implementation and impact. A part of the bibliographic and Internet research has been undertaken with emphasis on information from German development cooperation and documents from FAO and CGIAR as well as related institutes. Several studies on particular project experience were cited as practical data. Specialist publications have been consulted for specific issues, such as intellectual property rights. Communication with experts completed the information and has been very helpful during the study. A workshop on incentive measures (see Annex I) has been scheduled by the steering committee of the GTZ sector project for 2001.

The study starts with the presentation of the categories of values of biological diversity, followed by types of incentives measures and their implementation. Appropriate incentive measures for agricultural biodiversity are elaborated, including elements for their design, implementation and monitoring. Key questions and important elements are noted that should be considered when designing, implementing and monitoring the impact of incentive measures. This chapter is enriched with some examples. Recommendations are formulated to the GTZ sector project how to further develop the issue of incentive measures for agrobiodiversity.

The author has tried to present the results of the study in a form that partners in developing countries and projects might use as a checklist for incentive measures they themselves design. The author would be happy to receive comments on contents and usefulness.

3 INCENTIVE MEASURES FOR BIOLOGICAL DIVERSITY

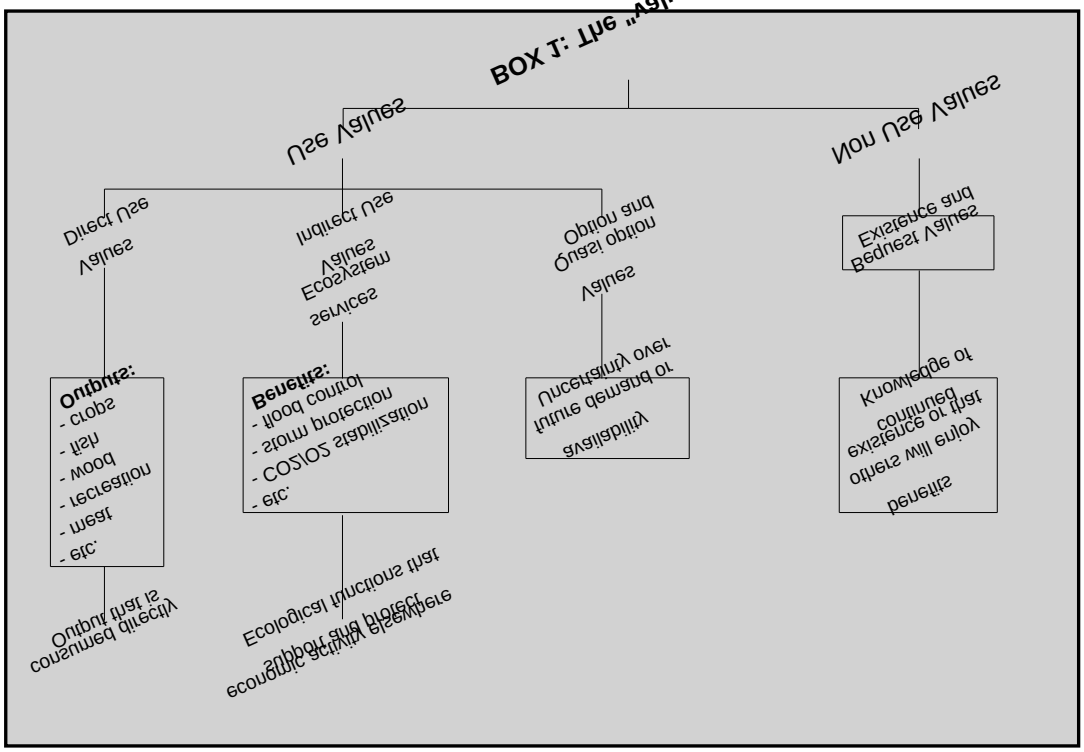
Article 11 of the Convention on Biological Diversity (CBD) stipulates: “Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.” Subsequently the issue of incentive measures has been discussed in several workshops, such as the Global Biodiversity Fora in 1996 and 1997. Decision IV/10 of the fourth Conference of the Parties to the Convention (COP) requested the Executive Secretary: “To prepare in collaboration with the Organization for Economic Development and Cooperation (OECD), the World Conservation Union (IUCN) and other relevant organizations, a background paper containing further analysis of the design and implementation of incentive measures for the conservation and sustainable use of biodiversity, as it is related to the incentive measures in the thematic focus of the fifth meeting of the Conference of the Parties, with the aim of developing guidance to Parties.” OECD did substantial work on incentive measures and the recently published OECD “Handbook of Incentive Measures for Biodiversity” is used, among others, as a basis for the presentation of the current discussion process.

3.1 Valuation of biodiversity

When analyzing the underlying causes of biodiversity loss, one will ascertain that failure to allocate appropriate economic values to biodiversity is one of the most important factors. This leads to the following hypothesis, formulated by Plän (1999). “If market prices reflected the actual value of biological resources (including resources systems) and their services (especially ecological ones), i.e. if external costs were internalized and the costs of the respective resources thus corresponded to all the values attributable to them, and if not only the private value but also their social (and ecological) value became apparent on the market to a sufficient degree, this notion should support conservation and sustainable use of biological diversity.”

However, valuation of biodiversity is as complex as biodiversity itself. Biological diversity is dynamically evolving, and there are various horizontal and vertical interdependencies between the genetic, species and ecosystem levels. Many of them will always be ignored or not understood. Therefore biodiversity will never be completely known and the precautionary principle and safe minimum standards should be part of valuation and play a role in incentive systems.

According to Barbier (1989 and 1997), cited in OECD (1999), there are several categories of values of different elements and functions of biodiversity:



Source: Adapted from OECD (1999)

Direct use values are concerned with those elements of biodiversity which can be directly consumed, traded or used as an input of commercial activities. They can be privately owned.

Indirect use values or ecosystem services, on the contrary, are functions that provide direct value to the well-being of humans at local, regional or global level. They have a social or public dimension and are not privately appropriable.

"**Option and quasi-option values** represent the value which is contained in having the ability to make choices in an uncertain future" (OECD, 1999). Option values represent choices people would like to take in the future: for example, the possibility of using any given ecosystem for recreation purposes. "Quasi-option values concern maintaining the ability to react to future information independently of one's own preferences and knowledge" (OECD, 1999). Particularly genetic resources that may have a value for food and agriculture or for pharmaceutical or cosmetic purposes represent option and quasi-option values. The precautionary principle can be understood in this context as a sort of answer to a "negative quasi-option value", i.e. a probable negative and certainly irreversible impact.

"**Existence values** refer to the fact that humans value ecosystems and biological diversity for their pure existence, and **bequest values** for the possibility of maintaining them for future generations" (OECD, 1999). These values are closely linked to social and cultural, or even religious values, and may increase with income levels.

In fact, limits between these values are fuzzy. It depends on the element of biodiversity and on the person/society who defines them. People in the North may give a donation to an NGO such as WWF to protect elephants in the Central African rainforest. From that point of view, the elephants have an existence and bequest value. Others initiate projects to protect the elephants, because they

have important ecosystem functions; this is an indirect use value. The Cameroonian Ministry sets out quota for trophy-hunting for elephants and grants concessions, in this case the elephants have a direct use value.

The challenge is to allocatevalues to the private and public functions of biodiversity, that are transparent, easily understandable, and translatable into incentive measures and action. Several types of incentive measures exist and the most appropriate are often a mix.

3.2 Types and implementation of incentive measures

The following classification of incentive measures is a summary of those mentioned in OECD (1999), other references and concrete examples. The list is surely not exhaustive, and several incentives could probably be otherwise classified or represent a combination of incentives: of economic incentives and regulation, for example, such as an exclusive use right.

BOX 2: Incentive measures to encourage the sustainable use and conservation of biodiversity:

- **Economic incentives**
  - Granting of labels and certification
  - Market creation
  - Improvement of access to markets, support to commercialization
  - Assignment of well-defined property rights, to intellectual property as well as to resources
  - Covering of incremental cost for sustainable long-term use instead of for maximum short-term use

- **Environmental funds and public financing**
  - Fees, charges and environmental taxes to internalize external cost
  - Fiscal incentives for conservation activities
  - Payments for environmental services
  - Compensation

- **Social and cultural incentives**
  - Citation of traditional knowledge
  - Granting of community intellectual property rights
  - Exclusive use rights for particular ecosystems
  - Management responsibility for particular ecosystems

- **Framework incentives**
  - Information provision, scientific and technical capacity-building
  - Standards, regulations and access restrictions
  - Reform or removal of adverse incentives
  - Technology transfer
  - Support for benefit-sharing agreements
  - Economic valuation
  - Institution building and stakeholder involvement

Source: author

The decision as to which incentive or which mix is the most appropriate depends on the target group and on the political and economic framework in the particular country. Incentives for sustainable agriculture in Europe will differ from those appropriate for, e.g., the South African Development Community (SADC) countries.

It is obvious that most of the incentives are not new and some of them are even basic preconditions for sustainable management of natural resources, such as the assignment of well-defined property, use and access rights. What is new is the approach: to treat biodiversity as a multi-dimensional complex whose well-being can be influenced by a multitude of steering instruments, from simply pricing a single product adequately to changing the whole system of subsidies in agriculture.

Box 3 presents the implementation of incentive measures in a cyclic process with four main phases:

BOX 3: Implementation of incentive measures

1. Identification of the problem
Main activities are collection and dissemination of as much information as possible about pressures on biodiversity, the political and economic framework, existing adverse and positive incentives, and the determination of "losers and winners" in the current situation.

2. Design of the incentive measures
Young and Cunningham (1997, in OECD 1999) have identified a series of desirable features of incentive measures relating to: predictability of impact, conformity to the precautionary principle, equity, political acceptability, economic efficiency, adaptability and administrative feasibility. Political acceptability may be very different from one country to another. In some countries, mutual consultation will be necessary, while in others setting out a clear and legally binding policy may be more effective. This phase also comprises awareness-raising, building of coalitions for the assignment of responsibilities, a first rough cost estimate and a feasibility study.

3. Building support and providing capacity for the implementation
Capacity-building and involvement of local residents and stakeholders are decisive elements, independent of the incentive measure itself.

4. Managing, monitoring and enforcing the incentive measures
Sufficient funds have to be put aside in advance, but a reasonable balance has to be developed between the incentive measure's benefit, and monitoring and enforcement cost.

Source: author

Translated into project cycle management, this corresponds to (1) problem analysis, (2) project planning, (3) project implementation and (4) monitoring and evaluation. In fact, development projects, in the context of natural resources management, can be understood as a series of incentives intended to encourage a change in management priorities.

Evaluation of 22 case studies from OECD countries has underlined that three elements are crucial for successful implementation: information provision, capacity-building, and the involvement of indigenous and local communities and stakeholders (OECD, 1999).

3.2.1 Incentive measures as instruments for project implementation

Two GTZ publications deal with the issue of incentive measures in the context of natural resources management. With regard to "participatory and self-help approaches in natural resources management" (RMSH) Balzer and Engel (RMSH, 1995) distinguish between two types of incentives: subvention and compensation. As subsidies, they mention the provision, gratis or at reduced prices, of means of production such as seedlings, or the undertaking of particular activities such as transport (transport by the project lorry of stones for the establishment of contour lines, Burkina Faso). As compensation, they classify the following measures: direct compensation payments, exchange of traditional use right against formal land titles or use rights, development of alternative sources of income, participation in future benefits of alternative resource use such as tourism or hunting. Quantity and nature of subsidies/compensation have to be negotiated among all relevant stakeholders. The authors cite as an example a project in Sri Lanka that promotes private nurseries at village level. The seedlings are sold to local farmers for anti-erosion measures. The price of the seedlings is negotiated every year among the farmers, the private nurseries and the project.

LISTRA (1997) understand compensations not as an incentive to encourage a change in behavior, but as a payment or measure that is granted for the renunciation of particular uses. They define incentives as measures intended to encourage the willingness of the population to cooperate and finally to change behavior.

LISTRA (1997), as well as Balzer and Engel (1995), deal with incentives as instruments in project implementation, but not as political steering instruments determining framework conditions. However, the author of the present study considers it necessary to embed the design of incentives for an individual project in the national policy framework, particularly in the provisions for national action plans or biodiversity strategies. This may facilitate decision-making and action at project level, on the one hand, and promote implementation of national plans and strategies on the other.

3.2.2 Incentive measures focusing on access to and sustainable resource management

Wildlife and hunting: Bush-meat

According to Nuding (1996), communal wildlife management may serve as an incentive for the protection of biodiversity in communal and adjacent protected areas. Besides the ecological sustainability of wildlife management, several conditions are necessary in order to assure the success of corresponding projects:

- The ownership rights to wildlife and the right and decision-making power to utilize the resources have to be with the communities in the communal areas.
- Informal and formal structures have to be established which secure the participation of those who actually manage the wildlife.

- Distribution mechanisms that guarantee a just distribution of the profits of the communities have to be functional.
- Project design has to follow a "private sector approach" in order to be economically sustainable.

The Zimbabwean CAMPFIRE program (Communal Areas Management Program For Indigenous Resources) succeeded because the following basic hypotheses proved correct (Child, 1996):

- "The unit of benefit, the unit of management, and the unit of authority should be the same – that is, the community that 'produces the wildlife.'"
- Scale is critical. The unit should be small (fewer than 200 households) and able "to meet under a tree."
- "The unit of regulation should be separated from benefit, management and authority."

Ownership of the animal resources and exclusive access seem to be crucial conditions for the sustainability of wildlife management, as demonstrated by the studies of Caspary et al. (1998) and Hofmann et al. (1999), as well as experiences from the southeast of Cameroon where commercial hunters from outside the area destroy the sustainability of local management.

Logging and mining activities, as well as better access to markets, increase demand and create new commercialization potential that may function as an incentive to overexploitation of wildlife. Therefore market creation has to correspond to the potential for sustainable use, and alternatives such as stock farming or game ranching have to be taken into account to meet the demand for animal protein.

Non-Timber Forest Products:
According to Bonnéhin (1997), the economic value of non-timber forest products (NTFP) in Côte d'Ivoire is largely overestimated, and almost all commercialization takes place in the informal sector. However, there is growing interest in NTFPs as, through their utilization, local populations can participate in long-term development projects for forest resources. The reinforcement of traditional rights to forest resources and domestication initiatives has therefore become a key element in conservation policies at the level of both government projects and peasant initiatives.

Development by traditional populations in "Extractive Reserves – ER" in Brazil is based on sustainable use of NTFPs and contributes to the conservation of biodiversity. Once a contract for the management of the ER is completed with the Brazilian Institute of Environment, the inhabitants of the ER receive, gratis, legal rights to the use of their traditional land. This guarantees the permanence of the communities and avoids conflicts with outsiders. Several technical and social programs support community development. Evaluation indicates that annual income for each family is higher than minimum salaries in the city (von Behr, 1997).

The decisive element in the above-mentioned approaches is the change of status from an "open access common" to a resource that is privately owned or to which a defined user group has exclusive access. As agrobiodiversity is generally not an open access common, this kind of incentive approach is only appropriate to a limited extent.

3.2.3 Forest certification

According to Kruedener and Burger (1998), “forest certification was developed as an instrument to give due recognition to and to provide an incentive for sustainable forest management.”

“A system of forest certification has five elements. It involves ***an inspection and evaluation (i.e. certification) of the forest management*** according to ***specified standards***. The assessment is carried out by an independent certification organization. The certificate can be awarded to an individual forest or to a group of several forest holdings. Likewise the ***chain-of-custody***, i.e. the track the timber takes from the forest to the end-user, has to be verified by an independent body before a product can be ***labeled*** as coming from the certified forest. To ensure that certifiers work competently, independently and to a common standard, they are ***accredited*** by a third-party organization” (Kruedener et al., 1998).

Forest certification does not focus primarily on the product itself – timber from a certified forest does not differ from timber that has been harvested in an unsustainable manner. It is the whole process, the technical performance and the management as well as the chain of custody, which is certified. Translated into agrobiodiversity, this concept would mean focusing above all on all elements except the genetic resource itself – e.g., fertilizers, pesticides and organic farming, which may considerably change the quality of the product – as well as commercialization and transport, gender issues, working conditions, partnerships, benefit-sharing, and intellectual property, to name but a few.

All these issues are very important in the context of sustainable management of agrobiodiversity. Certificates exist for particular elements: for example, organic or biological farming or fair trade. But the main problem related to agrobiodiversity is the loss of genetic resources that is related to species and varieties and to the under-use of them. Important targets of certificates should therefore be the products themselves: genetically diverse cereals, for example. The potential to establish an overall system such as the one for forest certification has to be further analyzed with the CGRFA, the International Standards Organization (ISO) and other relevant stakeholders.

4 APPROPRIATE INCENTIVE MEASURES FOR AGRICULTURAL BIODIVERSITY

As has been mentioned already in Chapter 1, agrobiodiversity is not an "open access common" threatened by overuse. Not only is it managed privately or by communities, but the management aim is high yield. The more a variety of crops or animal breeds is used, the less it is endangered, and vice-versa. This is the opposite to most impacts of the use of wild species. For biodiversity in general, "sustainable use" often means restriction; for agrobiodiversity, "sustainable use" in most cases means promotion of use. The second important basic consideration is that agriculture is often one of the most subsidized sectors. How people deal with agrobiodiversity is therefore above all a matter of policy, which influences market prices and the choice of species and varieties.

4.1 Problem analysis and design of incentive measures

Box 4 shows possible underlying causes for the loss of agricultural biodiversity. Their analysis is part of the problem analysis. It has to be done at the appropriate level(s) while taking into account the points of view of all relevant stakeholders: e.g. individual farmers, local communities, research institutes, and decision-makers at the national or regional level.

BOX 4: Underlying causes for the loss of agricultural biodiversity related to:

General framework
- Adverse incentives, such as subsidies for exotic breeds
- Macroeconomic and export constraints
- Lack of financing for the implementation of national agrobiodiversity strategies
- Lack of financing to reduce transaction cost in agrobiodiversity-promoting farming systems
- Lack of adequate legislative framework
- Lack of adequate institutional framework
- Lack of adequate conservation strategies
- Lack of integration of the national AnGR and PGR management plans or strategies into the overall environmental strategy
- Disastrous situations, political crises, civil wars, etc.

Farming systems level
- Abandonment of breeds and crops for microeconomic reasons
- Abandonment of breeds and crops due to market failure
- Loss of resources, such as pasture
- Loss of knowledge about such matters as traditional practices and local varieties

Consumer demand
- Change in nutrition habits
- Lack of consumer awareness

BOX 4 continued:

Natural disturbances
- Alien and invasive weeds, introduced with exotic seeds
- Changes in the diversity and density of biocontrol agents, pollinators, and soil microorganisms

Research and information sharing
- Lack of farmer-driven participatory research
- Lack of coordination and information-sharing between research and development programs
- Lack of adequate breeding strategies
- lack of understanding special qualities and adaptation complex
- Lack of knowledge about the genetic resources of the country/region
- Lack of access to appropriate genetic resources and training for on-farm management and improvement
- Lack of awareness of importance of adapted GRs to increase productivity

Source: author

This list is surely not exhaustive, but gives an idea about the manifoldness of reasons for the loss of plant and animal genetic resources. In most cases, loss will be due to a combination of weaknesses and threats. However, only an in-depth analysis will allow designing effective incentive measures which will not be accompanied by undesirable side effects, such as an "over-aided mentality" or a change in social structure of a local community. However, incentives serve to promote a desired activity, and it is quite probable that there will be not only winners but also losers. The promotion of transhumance will restrict agriculture and vice-versa. Therefore, it is essential to undertake already the problem analysis with as many stakeholders as possible.

For incentive measures to become sustainable, not a sort of sustained subsidy, it is reasonable to take into account the country's (region's, institute's, community's) strengths and the opportunities offered by the political and jurisdictional framework, the facilities and the country's strengths. Importance should be placed on the social and cultural dimension, focusing especially on indigenous peoples and traditional management practices and knowledge. This may counteract the marginalization of these populations, contributing to increasing their standing in the society and their participation in national decision-making, which may be more important to them than pure economics. Box 5 presents elements for the design of incentive measures.

BOX 5: Strengths and opportunities
Elements for the design of incentive measures for agrobiodiversity

The incentive measure has to take advantage of the policy framework, i.e.
- Ratified agreements such as the Convention on Biological Diversity
- National Biodiversity Strategies
- Benefit-sharing guidelines and agreements
- Legal framework, UPOV, Farmers' Rights, ***sui generis*** systems

- National strategy for the implementation of the Global Plan of Action on plant genetic resources
- National strategy for the implementation of the Global Strategy for animal genetic resources
- Participation in regional economic communities, such as SADC

The incentive has to take advantage of country's specific facilities, i.e.
- National and international research facilities
- Gene banks and ***ex-situ*** collections
- Public-private research partnerships
- Networks for the exchange of information
- Local seed supply or commercialization networks, extension services, etc.
- Commercialization infrastructure such as roads, harbors, airports or railways
- Special market opportunities such as tourism and agro-ecotourism

The incentive has to take advantage of the country's richness, i.e.
- Particular agrobiodiversity
- Vavilov and secondary diversity centers
- Traditional knowledge and practices
- Stakeholder interests
- NGOs
- Human and financial resources

Source: author

Young and Cunningham (1997, in OECD 1999: see Box 3) note a series of desirable features of incentive measures that should be taken into account during the design phase. Large stakeholder participation is also recommended.

4.2 Implementation

Some incentive measures merit further discussion, because they seem to be the most promising in the context of agrobiodiversity. The most important are adverse incentive removal, environmental funds and public financing, benefit-sharing, legislation and intellectual property rights, market creation, and certificates and labels, as well as use of and access to information about available genetic resources.

4.2.1 Removal of adverse incentives

"The reform or removal of support for activities that exert pressures on biodiversity is one of the most promising incentive measures for the conservation and the sustainable use of biodiversity. […] A large number of adverse subsidies examined were the result of government support programs to agriculture, which is probably the most common form of support in OECD member countries" (OECD, 1999). However, in this context OECD deals not only with threats to agrobiodiversity but also with subsidies encouraging forest clearing for agriculture, wetland drainage or other activities that threaten biodiversity. Agriculture in developing countries often changes the local water balance through large irrigation projects or is encouraged to undertake forest clearing for cash crop production. Nevertheless, for the purpose of the present study, incentives are analyzed with regard to their transferability for the conservation and sustainable use of agrobiodiversity itself and not for biodiversity in general.

OECD (1999) has compiled some facts about the removal of adverse subsidies:

BOX 6: Facts about the reform or removal of adverse subsidies

Description	Subsidies can encourage activities that have negative impacts on the environment and biodiversity conservation
Advantages	Reforming or removing these incentives can lead to an easing of pressures on the environment, improved economic efficiency and reduced fiscal expenditures
Disadvantages	Adverse subsidies can often be difficult to identify (lack of transparency); and may be politically difficult to reform because of strong opposition by the recipients
Applicability	Where clear benefits in terms of budgetary, economic efficiency and/or environmental goals can be identified, and potential compensation measures exist to facilitate the support of the removal process

Source: OECD, 1999

In developing countries, subsidies are often granted through development projects. Since the projects are implemented by different executing agencies and financed by different donors, project philosophies, approaches and objectives may differ largely one from the other. As projects follow the interests not only of the government but also of the donor, coordination and harmonization are not evident. In addition, structural adjustment programs may determine frame conditions such as the removal of duties on imported agricultural products. The following box shows some activities that may facilitate the removal of adverse subsidies:

BOX 7: Activities to facilitate the removal of adverse subsidies

- Increase transparency of subsidy system
- Identify winners and losers in case of a change of the subsidy system
- Assist in building strong national programs for plant and animal genetic resources
- Assist in national decision-making through information and exchange of experience
- Increase project and donor coordination
- Raise awareness at decision-makers' level
- Develop monitoring and early warning systems as well as comprehensive information systems
- Prioritize support measures for removal according to their economic and environmental inefficiencies (OECD, 1999)
- Design compensation programs to alleviate any potential hardships caused by support removal (OECD, 1999)
- Where possible, cooperate with other countries to achieve multilateral support reduction, but also examine unilateral support removal where net benefits will be realized as a result (OECD, 1999)

Source: author

4.2.2 Environmental funds and public financing

The corresponding opposites of adverse subsidies are environmental funds and public financing for positive incentives. The reform of agricultural subsidies in Austria, for instance, led to a greater emphasis on agro-ecological aspects of funding and an integration of environment-related direct payments into the funding system (Hoppichler et al., 1998).

It is very probable that the on-farm conservation of option value and quasi-option value plant or animal genetic resources will not become micro-economically efficient, even while financing the reduction of transaction cost in agrobiodiversity-promoting farming systems[1]. Nevertheless, it may be macro-economically efficient or even represent a global benefit. Opportunity and other costs will lead to a profitability gap for the farmer that has to be closed by sustained funding. This funding could be undertaken either by environmental funds or by public financing.

The case study from Hoppichler et al. (1998) describes the "**Austrian program on an environmentally sound and sustainable agriculture, based on EU Regulation 2078/92**." "The program is broadly and regionally conceived to meet the agro-political aims of promoting a nation-wide environmentally sound agriculture as well as the maintaining of small-scale family farming" (Hoppichler et al., 1998). It comprises a whole set of measures in which funding is generally granted on a regionally specific basis:

- Extensive forms of management
- Extensive use of individual areas of arable farmland
- Extensive use of individual areas of grassland
- Special forms of management beneficial to the landscape and securing genetic diversity, e.g. keeping and rearing endangered domestic animal species and growing rare agricultural crop plants
- Re-establishment and preservation of landscape elements
- Educational measures

Austrian agriculture is, in comparison with that of other EU member countries, characterized by a wide diversity of small farms. The average farm size in Austria is 13.7 ha Utilizable Agricultural Area (UAA), 50% of them have a UAA of less than 10 ha. An average cattle farmer has approx. 20 head of cattle and an average dairy farmer has approx. 7.5 dairy cows. Forty-nine per cent of all farms are in mountainous regions; approx. 67% of all farms are chiefly characterized by subsidiary income activities (Hoppichler et al., 1998).

As in many developing countries, many Austrian farmers face massive management problems (e.g., mountainous regions) and are obliged to maintain a highly diversified farming system. Moreover, environmental protection and nature conservation are important elements in Austrian land use planning due, among other things, to the demands of the tourism sector.

Blümel et al. (1996, cited in Hoppichler et al., 1998) have done an evaluation of the impacts of the Austrian program on biodiversity. They see strong effects on the insurance and enhancement of species diversity, mainly through measures for "support of farms using organic cultivation methods," "non-application of specific high-yielding agents on arable and grassland (total farm)" and in

[1] References for respective cost-benefit analyses could not be found.

"upkeeping of ecologically valuable areas." Out of 25 different measures, these three got acceptances, as shown in Table 4.1. The figures for the measures "keeping of rare endangered breeds" and "growing of rare agricultural crops" have been added to show the direct impact of the program on the promotion of the animal and plant genetic resources program. There were many more contractors for the keeping of rare and endangered breeds than for the growing of rare agricultural crops.

Table 4.1: Acceptance of the different measures of the Austrian program in 1997

Measure	Contracted area	Contractors	Premiums	
	Ha UAA	number	m ATS	%
Organic farming	256,980	18,362	869.9	12.1
Non-application	291,335	33,363	559.3	7.8
Upkeeping	37,075	43,124	156.0	2.2
Keeping rare endangered breeds	-	3,476	21.9	0.3
Growing of rare agricultural crops	3	30	0.01	0.0
Total of all 25 measures	2,600,000	166,429	7,166.4	100

Source: adapted from Hoppichler et al., 1998

In 1996, the Austrian program covered 76% of Austria's total agricultural area (area reduction alpine pastures, the "contracted area" of alpine pasture is estimated according to the assumption: 1 ha alpine pasture = 1 livestock unit; the actual area is much bigger). The total number of applicants amounted to approx. 64% of all Austrian agricultural and forestry holdings (1995 census). The average premium per farm came to 49,000 ATS. One of the most successful elements of the program is organic farming, which has become a guiding principle of Austrian agro-environmental policy.

Concerning the transferability of the experience, Hoppichler et al. (1998) mention the following two aspects as important with reference to the preservation of biodiversity:

- "By including the majority of the useful agricultural area in the program, it is possible to create a broad basis for conservation and the preservation of biodiversity which can include both extensive and intensive locations.

- The nation-wide approach includes almost all farmers; it therefore increases their sensitivity to environmental and conservation issues."

Austria already possessed relatively well-developed agro-environmental measures before entering the EU. The agricultural program was developed with a very broad stakeholder implication as a component of the Austrian environmental program. Compilation of all agro-environmental subsidies and economic analyses

of the effects of environmental schemes on farm were key elements in drawing up the draft program in cooperation of the Chamber of Agriculture and the Austrian Farmers Union. Long-term social discussion and appropriate public relations work were essential for the long-term success of the program.

In view of the aforementioned characteristics of Austrian agriculture (many small farms, difficult management due to site conditions etc.), experience in Austria may contribute to the establishment of concepts for developing countries, and the Austrian program should be further analyzed.

Environmental funds may be from public or private sources. They are earmarked for particular purposes, allowing high transparency. A key question is whether they function as an incentive or a payment for a service. The following case study may highlight the implication related to this distinction.

"**Payments for environmental services**" (PES) is a new term in Costa Rican Forest Law and is used as a substitute for "incentives." The objective is the same: to encourage reforestation or the maintenance of forest cover on private land. However, the economic implications make "payments for environmental services" rather different from "incentives." Both are paid in advance, but cash-flow and cost-benefit relation are different. If PES is paid for services, "the full amount of PES has to be considered as a benefit, and the additional costs involved to guarantee the service, like management plans, controls, etc., are consequently to be considered as real costs of production. In the case of incentives, these additional costs are normally omitted from the microeconomic calculation, because in this case they cannot be considered real costs of production but costs related to the distribution of the incentives. As such they are costs of the donor, not the farmer" (von Platen, 1999).

This also has implications for the economics of corresponding projects: "in the economic evaluation of projects, incentives and subsidies are considered as direct transfer payments and thus omitted in the calculation. PES, however, is the payment for a real service and has to be included in the calculation as a tangible benefit"…"This can boost the internal rate of return considerably, giving projects with a PES component a higher rank when competing for the allocation of scarce resources" (von Platen, 1999).

Two key issues are related to the payment of environmental services: What is the monetary value of an environmental service and how can it be calculated? The second issue is of a social and economic dimension: if the provision of environmental services results in tangible benefits, formerly free goods become subject to economic valuation and will no longer be omitted in the calculation of Gross National Product.

Virchow (1999) stipulates, as the main incentive for selected individual farmers to maintain agrobiodiversity, a **monetary compensation** "for continuously cultivating a specific variety or maintaining a specific level of agrobiodiversity in his or her field." According to Bücken (cited in Virchow 1999), as a rule, "a traditional variety may be maintained ***in situ*** on an area less than 100m_ for crops with orthodox seed and less than 250 m^2 for vegetatively propagated crops. For other crop species, e.g. with recalcitrant seed, perennial species, and species with long life cycles, less than 2.500 m_ are necessary."

"Because of the difficulties in measuring the value of farmers' contributions to the conservation of agrobiodiversity, the amount of compensation could be determined by the opportunity costs of forgoing production system conversion to a system with modern varieties." Virchow (1999) proposes a system of "**Controlled *in-situ* conservation**" which "enables the maintenance of an endangered variety on a required area minimum safety standard and at the same time guarantees a conservation system with the highest possible flexibility based on a self-correcting price as an incentive mechanism."

The amount of compensation is composed of the difference in gross margins of the improved and the endangered variety and a risk premium to take into account the farmers' anticipated risk of flexible prices and benefits. The risk premium is the key element of this approach. If the area cultivated with the endangered variety falls below the required minimum, the premium can be increased to encourage more farmers to cultivate this variety. If the premium is too high, the area cultivated will greatly exceed the safe minimum and social opportunity costs, i.e. social costs will increase for increased food production forgone by not utilizing the improved variety.

To be feasible, this approach requires adequate knowledge of the particular farming systems with regard to both micro-economy and cultivated varieties, improved as well as endangered. Moreover, the monetary compensation of farmers for the maintenance of endangered varieties results in national and international benefits, and it has to be negotiated who will cover what percentage of the costs.

Almekinders (2000) raises the question "**What genetic diversity should or can be conserved *in situ?***" and mentions two points of view: (1) maintain the traditional farming system and thereby the traditional cultivation practices and varieties; (2) maintain the evolutionary and dynamic character of the community's farming systems. The first approach may run counter to the interest of the farmer and therefore needs compensatory measures such as those proposed by Virchow (1999), which will only function as long as funds for compensation are available. Almekinders (2000) judges this type of incentive justified in the case of particularly valuable genetic diversity and because of the current lack of viable alternatives. In the second case, genetic diversity is maintained through supporting use through community development, and loss, introduction and change of particular genes or varieties are seen as inherent characteristics of a sustainable and dynamic agricultural system.

Important international funding comes from the **Global Environment Facility** (GEF). The funds may be allocated for all values but direct use values, be they ecosystem functions, option and quasi-option values or even existence and bequest values, as long as they represent a global benefit.

4.2.3 Benefit-sharing

The fair and equitable sharing of the benefits arising out of the utilization of genetic resources is the third objective of the Convention on Biological Diversity (CBD). The most important article in this regard is Article 15, CBD, which deals with access to genetic resources and therefore with bioprospecting. Bioprospecting regulations mainly concern the relationship between the pharmaceutical industry in developed countries and institutions in developing countries. But the access and benefit regulations developed in this context are certainly the most elaborate and their implementation should therefore be closely

monitored. Henne (1999) mentions a list of non-monetary benefits for bioprospecting agreements, some of which could be adapted to the context of agricultural biodiversity.

The following benefits should be considered in designing incentive measures for the conservation and sustainable use of plant and animal genetic resources:

BOX 8: Options for Non-Monetary Benefit-Sharing

- Sharing of research results
- Set of voucher specimens left in national institutions
- Support for research in the conservation and sustainable use of agricultural biodiversity
- Research focusing especially on the promotion of neglected and under-utilized animal breeds and crops
- Strengthening capacity for technology transfer
- Strengthening capacity of indigenous peoples and local communities
- Free access to technology and products resulting from the agreement
- Information exchange
- Protection of existing local uses and intellectual property rights

Source: author

It has to be tested if these approaches could be valuable for collaboration between national institutions, local communities or other stakeholders in the providing country, on the one hand, and, on the other, the private sector – for instance, agro-industrial companies, seed, breeding or food companies – or the international public sector, such as international agricultural research centers or collections.

A new report from UNDP, for example, proposes to put aside part of patenting fees charged by the World Intellectual Property Organization (WIPO) and to invest in research neglected due to limited marketing interest (Kaul et al. 1999 in Ouéau, 2000).

4.2.4 Intellectual property rights

At present, the r**ecognition of Intellectual Property Rights (IPR) to indigenous and traditional knowledge** is rather difficult. Existing laws are not able to protect the use of traditional knowledge. Traditional knowledge is ***per se*** "generally known" and cannot, therefore, be protected under the existing national and international patent law. In the same way, traditional innovations or practices are unlikely to constitute commercially valuable inventions. In general, only the results of research and development obtained on the basis of traditional knowledge are commercially valuable. A first step towards recognizing the knowledge of indigenous and local communities consists in requiring access-seekers to obtain communities' informed consent, based on full knowledge and information supplied to them (Glowka, 1995). Another possibility of recognizing them is to cite each application or traditional knowledge in publications or patents. The respect for the indigenous and local populations which results from such a procedure is mentioned in Article 8 (j) of the CBD (Thies, 1999).

A law dealing with **Community Intellectual Property Rights** would redefine IPRs to encompass the collective, incremental innovations, practices, and knowledge of local communities, and vest those communities with enforceable

IPRs in those innovations. Such a system could probably meet the criteria for a ***sui generis*** system of IPRs, which is the only option other than adoption of dominant IPR systems available under the 1994 GATT agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) (Uruguay round, WTO) (Mugabe et al., 1996).

Traditional Resource Rights are described as "an integrated concept that recognizes the inextricable link between cultural and biological diversity" (Posey and Dutfield, 1996 in Glowka, 1998). They are viewed as more holistic than IPRs and set out the range of considerations which may need to be taken into account in developing benefit-sharing systems for genetic resources and associated knowledge.

Community registers and the translation of traditional knowledge into **trade secrets** are a concern of the "Cartel" project in Ecuador.

BOX 9: From traditional knowledge to trade secrets – the Cartel project in Ecuador

The pilot phase of a project entitled "The Transformation of Traditional Knowledge into Trade Secrets" is underway in Ecuador. The project starts from the premise that biological diversity shares a similar cost structure to that of an information good: extremely high opportunity cost in the maintenance of habitats but extremely low costs of assessing components of those habitats. It is argued that, in a parallel to patents, copyrights and trademarks, which are accepted as instruments to enable the emergence of a market for information goods, oligopoly rights over genetic resources should be allowed to enable the emergence of a market for habitats. Thus the project attempts to achieve a cartelization of traditional knowledge in Ecuador. It is a collaborative effort by the Inter-American Development Bank and several NGOs. The project sets out to catalogue traditional knowledge and maintains the database at regional centers, which is safeguarded through a hierarchy of access restrictions. After filtering, the knowledge, which is not yet public, will be negotiated as a trade secret in a Material Transfer Agreement (MTA). The benefits from the MTA are to be split between the government and all communities that deposited the same knowledge in the database (UNEP/CBD/COP/4Inf.7). Quite similar approaches to handle indigenous and local knowledge have been chosen in India, for example.

Source: Thies, 1999

The question of **Farmers' Rights** in particular is of enormous importance with regard to ***in-situ*** conservation and sustainable use of plant genetic resources:

BOX 10: Farmers' Rights

Farmers' Rights are defined as: "rights arising from the past, present and future contribution of farmers in conserving, improving and making available plant genetic resources, particularly those in centers of origin/diversity. These rights are vested in the International Community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of their contributions" (Annex II, Resolution 5/89).

"The Farmers' Rights are not only a question of fairness, but also of the economic efficiency of incentives for widely distributed innovations to agricultural growth in complex habitat conditions. They have to be seen as a supplement for national and international research endeavors in sustainable agricultural development" (Braun et al., 1996).

Resolution 5/89 of the International Undertaking on Plant Genetic Resources stipulates that Farmers' Rights were vested in the international community in order to:

- Ensure that the need for conservation is globally recognized and that sufficient funds for these purposes will be available;
- Assist farmers and farming communities, in all regions of the world, but especially in the areas of origin/diversity of plant genetic resources, in the protection and conservation of their plant genetic resources, and of the natural biosphere;
- Allow farmers, their communities and countries in all regions, to participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources, through plant breeding and other scientific methods (Glowka, 1998).

Currently the International Undertaking, and its Article 12, "Farmers' Rights," is under revision. Countries should be assisted in the **establishment of *sui generis* systems** appropriate to implement Farmers' Rights.

Plant Breeders' Rights are recognized internationally through the 1961 International Convention for the Protection of New Varieties of Plants (UPOV Convention) as amended in 1978 and 1991. Member states are expected to grant and protect breeders' rights at the national level for plant varieties, which are new, distinct, uniform and stable (Art. 6(1)) (Glowka, 1998). Until the beginning of 2000, states could choose to become members of UPOV 1978 or of UPOV 1991. Now UPOV 1978 will now longer accept new members.

The revision of the UPOV Convention in 1991 resulted in substantial changes. The scope of protection is now extended to include harvested material and, if applicable, the products derived from it. Furthermore, so-called **essentially derived varieties** are now also within the scope of variety protection (Rutz, 1996).

The "**farmers' privilege**," as it could be interpreted in the UPOV Convention of 1978, allowed a farmer who buys the protected variety's seed to save the seeds

from the resulting crop for subsequent use the following year without paying additional royalties to the plant breeder. The revision of 1991 replaces this with specific rules for farmers' privilege. The member states of the Union are given the choice of allowing the re-use of farm-saved seeds without breeders' authorization, but against the payment of a remuneration to the breeder (Rutz, 1996).

UPOV deals with plant varieties which are new, distinct, uniform and stable. However, most local varieties important in developing countries do not show these characteristics, but play an essential role in conserving plant genetic resources. In order to allow benefits to flow to small farmers, Gauchan from Nepal (1999) recommends the following approach, which should be considered when designing incentives with regard to intellectual property:

- to conduct labeling of heterogeneous plant varieties
- to establish an intellectual property system which can accommodate plants with heterogeneous, changeable genes
- to conduct bioregistration of plants at community level
- to strengthen farmers' traditional seed supply and exchange systems.

Argumedo from Peru (1999) sees a necessity to establish a community protocol for plant genetic resources protection, based on local customary laws and practice, that would regulate the exchange and use of plant genetic resources.

4.2.5 Market creation and commercialization

The predominant concern of less-commercialized farmers in developing countries is household food security. However, surpluses are needed to respond to the growing cash demand. To generate income, traditional farming systems – in the SADC region, for example – have adopted crops and/or varieties with a commercial appeal, even if they are used for food, to meet both demands (Neuendorf, 2000). Hence, the choice of crops and/or varieties is guided by the principle of the "maximum secure yield." Therefore, the less-commercialized farming systems use a higher number of less selectively bred varieties than highly commercialized farming systems aiming to generate the "maximum possible yield." Farmers will maintain their production system and consequently a specific level of PGRFA diversity, as long as their private marginal benefit is higher than their private marginal costs because of forgoing higher yields or other benefits determined by a change of the production system (Virchow, 1999).

Nevertheless, the choice of varieties and breeds will also always depend on demand and market opportunities, such as proximity to the market, type of commodity, communication infrastructure, marketing channels, and transparency of prices. Therefore, local and regional markets have to be promoted and market information systems have to be established. Consumers' awareness has to be raised to overcome prejudices, created through past commercial marketing practices, that traditional crops would be nutritionally inferior to exotic crops (Neuendorf, 2000, observation from SADC-region).

The Global Plan of Action on Plant Genetic Resources (GPA) dedicates two of its 20 priority activities to the issue of market creation and commercialization:

- Activity 12: Promoting development and commercialization of under-utilized crops and species

- Activity 14: Developing new markets for local varieties and “diversity-rich” products

Both activities are also valid for animal genetic resources. Besides more general activities such as capacity-building, the GPA underlines the importance of developing post-harvest processing and appropriate niche variety registration systems.

Quality and **quality standards** are decisive for marketing of food as well as of seed. Therefore, the characteristics, such as the range of time of maturity, of non-certified seeds and especially those of heterogeneous plant varieties have to be documented and made available.

International market creation in the context of conservation and sustainable use of agrobiodiversity focuses especially on the commercialization of “diversity-rich food” products from organic farming or traditional products, such as cheese from the endangered Aubrac cattle breed in France (FAO/CBD, 1999). Marketing can be facilitated by labels and certificates, thus ensuring the consumer that the money spent promotes conservation and sustainable use of agrobiodiversity.

It is evident that **consumer interest** in biodiverse food has to be raised through provision of information and sensitization. However, quality, market access, regular availability and pricing play an important role, when consumers are to switch from “normal food” to “biodiverse food.” In addition, commercialization infrastructure has to be appropriate. Milk from a “bio-farm” on the Isle of Rügen, for example, cannot be adequately processed, due to the lack of a specialized dairy in the region. Therefore it has to be processed normally and cannot be sold as a bio-product. Consequently, an analysis is needed to show which is the real bottleneck: consumer habit or commercialization infrastructure.

Several people and organizations may be part of the **commercialization and marketing chain**: individual farmers, producers’ organizations, national and international NGOs, labeling organizations, and organizations controlling health standards, particular import requirements such as uniformity of products, customs of importing countries, intermediaries and retailers. When designing the incentives, the possibility of joining already functional initiatives such as Protrade and TransFair or of cooperating with gepa® should be evaluated.

Protrade, a program formerly run by GTZ, has now been transformed into a program encouraging public-private-partnership (PPP). Specializing in trade and business promotion. It supports companies from developing and transition countries working together closely with the German/European business community. The services cover sector-related marketing, product and production consulting in more than 90 countries, promotion in Germany and the EU, trade fair assistance and a comprehensive information service. Protrade included a organic products sector in 1993 in reaction to the growing demand for biological cultivation of products and the strong interest of many third world countries in organic agriculture and farming.

The main emphasis of the work in the organic products sector is on developing new trade contacts, consulting in the areas of organic farming, certification, product development, management and quality assurance, as well as offering support for participation and international specialist trade fairs. Fifteen countries are currently in the consulting program: the Dominican Republic, Ecuador, Haiti,

Honduras, Kenya, Madagascar, Mexico, Nicaragua, Peru, Russia, Senegal, Zimbabwe, Uruguay and Tanzania.

TransFair is a seal offered by the labeling initiative "Transfair International" to traders who buy from registered cooperatives in developing countries and abide by fair trade criteria. Products covered by the TransFair seal include coffee, honey, cocoa, sugar and tea. Several other Initiatives like TransFair are all grouped in the Fair Trade Federation. They can be found on the website fairtradefederation.com.

Other important actors in the field of labeling, particularly of organic products, can be found in the "**Green Trade Net**": green-tradenet.de.

The **EU regulations** 392R2081, for "protection of geographical indications and designations of origin of agricultural products and foodstuffs", and 392R2082, for "certificates of specific character for agricultural products and foodstuffs," focus on the diversification of agriculture and offer potential for the marketing of products from remote and particular areas. Provision shall be made for "allowing trade with third countries offering equivalent guarantees for the issue and inspection of geographical indications or designations of origin, granted on their territory" (392R2081) and "certificates of specific character in their territory" (392R2082).

These regulations may offer an important opportunity for the commercialization of products from special plant or animal genetic resources. The potential of the two regulations should be further analyzed with regard to their transferability to developing countries.

4.2.6 Use of and access to information about available genetic resources

Access to appropriate genetic resources for improvement of traditional varieties and breeds is a basic condition for successful on-farm management. No matter if the genetic resources are found in gene banks or in local seed supply networks. A sound crop and variety database, which can be utilized by farmers, contributes considerably to the use of the available genetic resources, as has been proved by the Small-Scale Seed Supply Program (SSSP) in the SADC region.

According to the Crucible Group (1994), "for farmers, extinction can already take place when seed leaves the field. That it is stored in a gene bank is not necessarily a guarantee that farmers will ever see it, or its progeny, again. Conservation programs and gene banks must establish a new relationship with rural communities to guarantee farmers access to the germ plasm they are prepared to share. At the same time, a conservation strategy must engage the private sector as well as public-sector institutions. Industry can make a constructive contribution."

Activity 9 of the Global Plan of Action on plant genetic resources partly addresses the aforementioned issue. Activity 9 stresses the need for "expanding the characterization, evaluation and number of core collections to facilitate use of plant genetic resources." Typically, most gene bank accessions have not been well characterized and evaluated. This leads to under-use of collections and failure to realize their full value, resulting in high conservation cost in relation to derived benefits. An important incentive in this context is therefore to document local and regional plant genetic resources, their adaptations, respective

traditional knowledge and practices, and their use, in order to disseminate the information and support on-farm conservation initiatives, as well as the management of ***ex-situ*** collections.

Participatory crop improvement is "an alternative breeding approach for developing countries in response to the recognition that conventional and often centralized breeding programs had brought little benefit to the farmers in agro-ecologically and socio-economically marginal and variable environments" (Almekinders et al., 1999). Such an approach can contribute considerably to the conservation and sustainable use of plant genetic resources.

The challenge is to determine which type of genetic diversity the farmers need, and how this diversity can be introduced into the local seed supply systems. In addition, costs, benefits and risks from the farmers' perspective have to be determined. The links between breeders, researchers, ***ex-situ*** collections and farmers joining participatory crop improvement activities have to be structured according to the respective legal framework. Besides positive impacts on agrobiodiversity and household economy, such an approach increases social recognition of local and marginalized populations.

5 CONCLUSION AND RECOMMENDATIONS TO THE GTZ SECTOR PROJECT

There are only a very few concrete examples of the use of incentive measures for conservation and sustainable use of agricultural biodiversity. Most of them pertain to the forestry sector and to the management of protected areas and buffer zones.

Many incentive measures used for biodiversity target the sustainable management of formerly "open access commons" through the attribution of property rights, exclusive use rights, tradable hunting/exploitation permits, tradable development rights, individual transferable quotas for fishing, and licenses, to name but the most important. This and the creation of markets are based on the premise that rational holders of these rights will maximize the value of their resources over time.

However, most elements of agrobiodiversity are not "open access commons," but privately or communally owned and managed. In addition, most of the threats to agrobiodiversity, i.e. the irreversible loss of plant and animal genetic resources, are due to non-use and not to overuse.

Moreover, agriculture is in many countries one of the most subsidized sectors, and is therefore heavily influenced by international and national policies.

Consequently, these factors have to be taken into account in designing incentive measures appropriate for agriculture. Besides the general activities dedicated to capacity-building and information exchange, the GTZ sector project should concentrate on the **promotion of "incentive measure issues" within GTZ** project planning and on the evaluation of future GTZ projects concerned with positive and adverse incentives. In addition, the GTZ sector project should contribute to **policy development for incentive measures** within the German Federal Ministry for Economic Cooperation and Development.

The types of incentive measures listed below seem to be the most promising. It is proposed that the GTZ sector project **look for partners** (NGOs, GTZ projects, institutes, etc.) already undertaking relevant activities. In cooperation with these partners, the GTZ sector project should do a follow-up of relevant case studies and evaluate their transferability:

- **Removal of adverse subsidies**: assist countries in identifying adverse subsidies and winners and losers – at present and in case of changes in the subsidy system – and assist them in the development of a concept for positive incentives.
- **Environmental funds and public financing**: study further the Austrian example and the potential for application of the "controlled ***in-situ*** conservation approach" of Virchow (1999).
- **Benefit-sharing agreements**. In the agricultural sector no viable mechanism for benefit-sharing has been worked out so far, although this is one of the three aims of CBD: contribute to the creation of a model for benefit-sharing in agriculture in the SADC region in cooperation with relevant projects, CGRFA, and with national and international NGOs.

- **Intellectual Property Rights**: closely follow the process of the revision of the International Undertaking, inform partners in projects and support the implementation of Farmers' Rights.
- **Market creation and support to commercialization**: get in contact with PPP, TransFair, the GTZ forest certification project, CGRFA and other relevant actors to evaluate the impact of certificates and labeling of diversity-rich food, as well as to develop appropriate concepts for agrobiodiversity products.
- Analyze the potential of the EU regulations 392R2081, for "protection of geographical indications and designations of origin of agricultural products and foodstuffs", and 392R2082, for "certificates of specific character for agricultural products and foodstuffs" for the commercialization of products from special plant or animal genetic resources and their transferability to developing countries.
- **Use of and access to information about available genetic resources**: support community breeding programs and participatory crop improvement by encouraging exchange of relevant experience. Encourage the use of international crop and breed databanks such as the Domestic Animal Diversity Information System (DAD-IS)

To further develop the issue of incentive measures for agrobiodiversity, the present study should be used as a basis for discussion and exchange of experience with projects dealing with agrobiodiversity issues. As two relevant projects are already working in the SADC region, this region could function as a starting point for a **workshop on incentive measures**, for example.

Pilot projects should be encouraged to conduct particular **studies on the impact of incentive measures**.

Much experience concerning incentives for the conservation and sustainable use of agrobiodiversity is related to plant genetic resources. Therefore, it should be **analyzed whether some approaches are transferable to animal genetic resources and if so, which ones**. In this context, the issue of traditional knowledge concerning "veterinary" practices may be the subject of benefit-sharing agreements similar to those for traditional knowledge about pharmacopoeia.

REFERENCES

Cited references

Almekinders, C., Elings, A., 1999. Collaboration between breeders and farmers in different stages of the crop development process. Discussion paper presented at the SfAA meeting - PB session, April 22, 1999, Tucson, Arizona.

Almekinders, C., 2000. Management of crop genetic diversity at community level. January 2000, draft.

Argumedo, 1999. Contribution to the workshop on the Legal and Policy Needs of Developing Countries in Relation to Plant Genetic Resources. IPGRI / GTZ, 10 – 11 November 1999, Rome.

Balzer, G., & Engel, A., 1995. ***Die Rolle von Anreizen bei der Anwendung von RMSH als Vorgehensweise***. GTZ

von Braun, J., & Virchow, D., 1996. Economic valuation of instruments for conservation and use of genetic resources as a part of biological diversity. In: ***Zugang zu Pflanzengenetischen Ressourcen für die Ernährung und Landwirtschaft,*** ed. Frank Begemann. ***Schriften zu genetischen Ressourcen.*** Vol. 3, IGR, ZADI. ISSN: 0948-8332.

Von Behr, M., 1997. Extractive reserves in Brazil: Searching for sustainable development with social justice. In: Crafter, S.A., Awimbo, J., Broekhoven, A.J., 1997. Non-Timber Forest Products; value, use and management issues in Africa, including examples from Latin America. IUCN, ISBN 2-8317-0317-4.

Bonnéhin, L., 1997. Economic value and role of Non-Timber Forest Products in the long-term management of forest resources in the Côte d'Ivoire. In Crafter, S.A., Awimbo, J., Broekhoven, A.J., 1997. Non-timber Forest Products; value, use and management issues in Africa, including examples from Latin America. IUCN, ISBN 2-8317-0317-4.

Caspary, H.U., Mertens, A.D., Niagaté, B., 1998. ***Possibilités d'une exploitation durable des ressources fauniques dans la Réserve de Faune du Bafing***, Mali. TÖB/GTZ, ISBN 3-933984-01-7

Child, B., in Prescott-Allen, R. & C., 1996. Assessing the Sustainability of Uses of Wild Species; case studies and initial assessment procedures. IUCN, ISBN 2-8317-0287-9.

Convention on Biological Diversity, 1992.

Resolution 3, Nairobi Final Act, 1992.

4th Global Biodiversity Forum, 1996. IUCN, ISBN 2-8317-0416-2.

8th Global Biodiversity Forum, 1997. IUCN, ISBN 2-8317-0424-3.

FAO International Undertaking on Plant Genetic Resources, 1983

FAO, 1996. Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture.

FAO/CBD, 1999. Sustaining Agricultural Biodiversity and Agro-ecosystem Functions. Technical Workshop, 2 – 4 December, Rome, Italy.

FAO, IDAD, 1999. The Global Strategy for the Management of Farm Animal Resources, Executive Brief. ISBN 92-5-104267-5.

Gauchan, D, 1999. Contribution to the workshop on the Legal and Policy Needs of Developing Countries in Relation to Plant Genetic Resources. IPGRI / GTZ, 10 – 11 November 1999, Rome.

Glowka, L., 1995. Determining Access to Genetic Resources and Ensuring Benefit-Sharing: Legal and Institutional Considerations for States Providing Genetic Resources. IUCN Environmental Law Center.

Glowka, L., 1998. A guide to designing legal frameworks to determine access to genetic resources. Environmental Policy and Law Paper No. 34. IUCN. ISBN: 2-8317-0428-6.

Henne, 1999. Biodiversity and Development: Exchanging Experiences – Building Visions. International Symposium and Conference. Sector Project "Implementing the Convention on Biological Diversity." GTZ.

Hofmann, T., Ellenberg, H., Roth, H.H., 1999. Bushmeat: A natural resource of the moist forest regions of West Africa. TÖB/GTZ, ISBN 3-933984-29-7.

Hoppichler, J., & Groier, M., 1998. The Austrian Program on Environmentally Sound and Sustainable Agriculture: Experiences and Consequences of Sustainable Use of Biodiversity in Austrian Agriculture. OECD Environment Directorate.

Horn, L., Niemann, F., Kaut, C., & Kemmler, A., 1994. SWOT analysis and strategic planning. GFA.

IDRC, 1994. The Crucible Group. People, Plants and Patents. The impact of intellectual property on trade, plant biodiversity, and rural society. IDRC, ISBN 0-88963-725-6.

Kaul, I., Grunberg, I., & Stern, M.A., 1999. Global Public Goods: International Cooperation in the 21st Century, UNDP-Oxford University Press. In: Ouéau, ***geistiges Eigentum und Gemeinwohl - Wem gehört das Wissen?*** Le Monde Diplomatique, February 2000.

Von Kruedener, B., & Burger, D., 1998. Forest Certification: a consumer-driven market instrument with potential to promote sustainable development.

LISTRA, 1997. ***Kompensation von Nutzungsverzichten, Konzeptelement 3, Entwurf zur Diskussion***, GTZ, January 1997.

Mugabe, J., Barber, C.V., Henne, G., Glowka, L., La Vina, A., 1996. Managing Access to Genetic Resources. Towards Strategies for Benefit-Sharing. Biopolicy International. African Centre for Technology Studies (ACTS), Kenya, World Resources Institute, Washington, DC, USA.

Neuendorf, 2000. Personal communication.

Nuding, M., 1996. The potential of wildlife management for development co-operation. TÖB/GTZ.

OECD, 1999. Handbook of Incentive Measures for Biodiversity. Design and implementation.

Plän, T., 1999. The economic valuation of Biological Diversity. TÖB/GTZ, ISBN 3-933984-24-6.

von Platen, H., 1999. "Payments for Environmental Services: A New Slogan for Old Incentives or a New Economic Concept?" In: Natural Resources Management between Economic Development and Nature Conservation. Experiences from development projects in Asia, Latin America and Africa. GFA. ISBN: 3-8175-0311-3.

Rutz, H.W., 1996. ***Internationale und europäische Entwicklungen im Sortenschutz und Saatgutverkehr***. In: ***Zugang zu Pflanzengenetischen Ressourcen für die Ernährung und Landwirtschaft***, ed. Frank Begemann. ***Schriften zu genetischen Ressourcen***, Vol. 3, IGR, ZADI. ISSN: 0948-8332.

Thies, E., 1999. Sharing benefits from Bioprospecting for Sustainable Development and Biodiversity Conservation. In: Natural Resources Management between Economic Development and Nature Conservation. Experiences from development projects in Asia, Latin America and Africa. GFA. ISBN: 3-8175-0311-3.

UNEP/CBD/COP/4Inf.7, 4 May 1998: Synthesis of case-studies on benefit-sharing. Note by the executive secretary.

Virchow, D., 1999. Conservation of Genetic Resources. Costs and Implications for a sustainable utilization of plant genetic resources for food and agriculture. Springer. ISBN: 3-540-65343-0.

Other references

Ackermann, K., Aicher, C., Pretzsch, J., Richter, J., 1999. ***Rahmenbedingungen von Waldschutz und Waldbewirtschaftung in den Tropen: Einflüsse und Rückkopplungen anderer Politikfelder***. TÖB/GTZ

Blümlein, G., & Maier, S., 1995. ***Von der Vielfalt zur Einfalt – das Schicksal der genetischen Diversität der Kulturpflanzen***. In: Wolters, J., (ed.), 1995. ***Leben und leben lassen. Biodiversität - Ökonomie, Natur- und Kulturschutz im Widerstreit. focus: ökozid*** 10. Focus Verlag Gießen, ISBN 3-88349-409-7.

Commission on Genetic Resources for Food and Agriculture. Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture. First session, 8 – 10 September 1998, Rome, Italy.

CPRO-DLO, Wageningen, 1999. Summary Proceedings, workshop on Breeding for low-input conditions, and consequences for participatory plant breeding, 26 – 27 January 1999.

FAO, 1988. ***Lignes directrices principales pour le développement de plans de gestion des ressources génétiques animales au niveau national***. UNEP, FAO, IDAD, ISBN 92-5-204164-8.

FAO, 1988. ***Lignes directrices secondaires pour le développement de plans de gestion des ressources génétiques animales au niveau national. Gestion des petites populations à risqué.*** UNEP, FAO, IDAD, ISBN 92-5-204165-6.

FAO, 1999. Commission on genetic resources for food and agriculture. Eighth regular session, Rome, Italy, 19-23 April 1999.

FAO, 1999. The global strategy for the management of farm animal genetic resources. Executive Brief. FAO, IDAD, ISBN 92-5-104267-5.

Fischer, J., Claus, C., Herrera, A, Rahmann, G., 1999. ***Bedeutung der Haarschafhaltung für eine nachhaltige Nutzung der Regenwaldrandgebiete Südamerikas***. TÖB/GTZ, ISBN 3-933984-27-0.

Frisvold, G.B., Condon, P.T., 1998. The Convention on Biological Diversity and Agriculture: Implications and Unresolved Debates. World Development, Vol. 26, No. 4, pp 551-570.

Hartmann, J., 1997. ***Potentiale des Kleingewerbes zur Bewirtschaftung tropischer Regenwälder. Fallstudien aus Dominica und Guatemala***. TÖB/GTZ, ISBN 3-933984-03-3.

Havener, R., (ed.), 1998. Biodiversity - maintaining the balance. IRRI 1997 - 1998. ISBN 971-22-0105-8.

IPGRI, 1999. Implementation of the global plan of action in Europe - Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, Proceedings of the European Symposium , 30 June -3 July 1998, Braunschweig, Germany. T. Gass, L. Freese, F. Begemann and E. Lipman, compilers.

McNeely, J., 1988. Economics and biological diversity: developing and using economic incentives to conserve biological resources. IUCN, ISBN 2-88032-964-7.

Valdebenito, S., Nader, W., (eds.), 1997. ***Conservación a traves de la utilización de la biodiversidad en el marco de la convención sobre la biodiversidad - desafío para la cooperación al desarollo.*** GTZ.

Wollny, C., 1998. Conserving the Biodiversity of Southern African Livestock Resources, Technical Paper.

W e b s i t e s

Fao.org
Biodiv.org
Biodiv-chm.de
Unep.org
Undp.org
Worldbank.org
rafi.org
wri.org
idrc.ca
cgiar.org
oecd.org
gtz.de
Green-tradenet.de
Protrade.gtz.de/protrade
Fairtradefederation.com
Europa.eu.int/eur-lex/de/lif/dat/1992/de-392R2081.html
Europa.eu.int/eur-lex/de/lif/dat/1992/de-392R2082.html

ANNEX I: TERMS OF REFERENCE

Project: “Managing Agrobiodiversity in Rural Areas”

Study on incentive measures

1. Establishment of a bibliography of relevant literature

2. Evaluation of existing experiences in the context of development cooperation (GTZ projects: “Resources Management and Self-Help Approaches,” “Tropical Ecology Support Program,” Buffer Zone Management,” “Livelihood Systems in Tropical Forest Areas,” etc.) and assessment of the transferability of incentive measures for the management of agrobiodiversity in rural areas

3. Identification of different “incentive measure” options with potential relevance for the management of agrobiodiversity in rural areas

4. Preparation of a workshop on incentive measures (reported by the steering committee of the GTZ Sector-Project to the second half of 2000)

5. Documentation of the workshop (reported by the steering committee of the GTZ Sector-Project to the second half of 2000)