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**THE ACT ON THE FINANCING OF SUSTAINABLE FORESTRY AND THE DEVELOPMENT OF  
FOREST CERTIFICATION  
Finnish Case Study on Biodiversity Incentive Measures**

by Arto Naskali

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## FOREWORD

This paper is one of a series of 22 case studies that describe practical experiences in OECD Member countries with the use of incentive measures for the conservation of biodiversity and the sustainable use of its components. These case studies were submitted by OECD Member countries to the OECD Working Group on Economic Aspects of Biodiversity as a contribution to the OECD study of the design and implementation of appropriate incentive measures for biodiversity conservation and sustainable use. In order to ensure maximum comparability between the case studies, all were developed under the common methodology described in “Incentive Measures to Promote the Conservation and the Sustainable Use of Biodiversity: Framework for Case Studies” [OECD/GD(97)125].

The practical experiences described in the 22 case studies were used as the basis for the policy advice developed in the Handbook of Incentive Measures for Biodiversity: Design and Implementation (OECD, 1999). This Handbook combines the lessons learned through the various experiences described in the case studies covering a wide range of ecosystems, economic pressures on biodiversity, and utilising various incentive measures with sound economic theory to develop a practical, step-by-step guide for policy-makers on the design and implementation of successful incentive measures for the conservation and sustainable use of biodiversity.

This paper was provided by the Finnish Government and was written by A. Naskali. It is released as an unclassified document under the responsibility of the Secretary-General of the OECD with the aim of bringing information on this subject to the attention of a wider audience.

This study, and the other 21 case studies submitted by Member countries, are available on the world wide web at <http://www.oecd.org/env>.



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**EXECUTIVE SUMMARY**

This case study discusses the design of a national forest certification scheme in Finland and the effects on sustainable forestry practices there. The Finnish regulatory framework for forestry management has been entirely reformed in recent years, from encouraging intensification (through, for example, subsidies to production and exports) to encouraging environmentally sustainable production. These changes were brought about under the 1994 Environmental Programme for Forestry and the new Forest Act and special Financing of Sustainable Forestry Act in 1997. In addition to removing some of the adverse subsidies, the Financing of Sustainable Forestry Act also provides for the discretionary payment of environmental subsidies to landowners where necessary. A broad-based group formed in 1996 designed a voluntary forest certification scheme (to be operational from 1998) that was compatible with international schemes but reflected the particular circumstances found in Finland.

**Ecosystem studied:** forests

**Incentive measures used:** market creation through certification, removal of adverse incentives, positive subsidies.

**Main lessons learned:** The implementation of forest certification schemes is facilitated by its market-orientation; because of international trade in forest products, national forest certification schemes should be compatible with international ones; and developing a suitable forest certification system and approval system requires wide-ranging stakeholder involvement (including forest owners and NGOs).

## 1. GENERAL DESCRIPTION

Finland's forest ecosystems have undergone considerable changes in a short period of time and their diversity has diminished. The changes in the forest ecosystems have, in many respects, been consequences of the forest sector's own actions. Small-scale forest ownership and family forestry and multiple-use of nature, based on what may be called Everyman's Rights (public right of access) have, on the other hand, retained Finnish forests in a relatively good state.

The intensely practised wood-production use of the forests has led to a trend of forest-dwelling species becoming threatened. Especially the share of the old-growth forests has been reduced and the amount of decaying woody material and numbers of old broadleaves have diminished. In commercial forests especially there is need for improving the preservation of certain invaluable nature items. The fragmentation of contiguous natural environments and of the habitats of organisms with their associated impacts constitute one of the biggest problems facing the conservation of natural biodiversity at the moment.

Finland has hardly any special economic incentives developed to provide for conservation commercial forests. However, these incentives are gradually receiving more attention. Concurrently with the coming into effect of the new Forest Act at the beginning of 1997, a special Financing of Sustainable Forestry Act also came into effect. The latter act includes the possibility of paying out environmental subsidies to landowners. The act also did away with some earlier forms of subsidisation of forestry, which impaired diversity promotion. Separately from the reformation of forest legislation, a forest certification system has been developed in Finland for small-scale forest ownership. The intention is to have this kind of a certification system in operation by the year 1998.

The present report is an examination of the aforementioned economic incentives directed at the forest sector. It should be noted that these incentives are of such recent introduction that experiences of their functionality cannot be really presented yet.



## **2. IDENTIFICATION OF CAUSES AND SOURCES OF PRESSURE**

### **2.1 Identification of sectoral activities and resulting pressures**

The forestry practised in Finland is based mainly on family forestry, which as such ensures the diverse use and treatment of the forests. Thanks to the numerous small farms and the high proportion of non-industrial, private forest ownership, land and forest use in Finland has always been small-scale activities. This has brought about the preconditions for variability in the environment. Due to the landownership situation in Finland, trends inappropriate from the point of view of the sustainable use of ecosystems have not, in general, become widespread. Extensive clear cuttings were carried out in the 1950s and 1960s only in northern Finland on state-owned lands. Intensive forestry ploughing of regeneration sites, too, was applied mainly in northern Finland. Many farmers and other forest owners have, at their own initiative, preserved small areas in their farming and forest environments. This has significantly supported the conservation of biodiversity at the local level.

Nevertheless, forest ecosystems in Finland have undergone considerable changes within a short period of time and their biodiversity has diminished. The forest treatment methods applied have caused significant changes in the biodiversity of forest ecosystems especially for the reason that forests in remote areas, previously non-used old-growth forests, became targets of forest renewal. At the same time, forests resembling natural forests in terms of their structure have diminished. Regeneration felling and the associated planting/seeding of the next tree generation have the effect of making stand structure more even aged. Especially in the case of regeneration of Scots pine the aim has been to carry out a complete removal of undergrowth and shrubs left after felling. When doing so, the removal of decaying wood constitutes a significant drawback. Thinnings thereafter add to the monotony not only by reducing the availability of decaying wood, which is necessary from the point of view of species-related continuity, but by also changing the tree species composition of the forests. Furthermore, stands composed of a single conifer species have been favoured to excess.

Efficient forest fire control in turn has reduced to a fraction the area of forests razed by fire when compared to the situation in the 1800s. The silviculturally based prescribed burning used in the initial stage of plantation forestry has also become less common. The diminishing of forest fires has noticeably affected the populations of species reliant on the occurrence of forest fires. Furthermore, fertilisation of commercial forests has changed the competition relations among species, especially on pine-dominated sites underlain by upland mineral soils.

Drainage for forestry has been carried out on close to 60% of Finland's mire. Finland's original extent of biological mires was about 10.4 million hectares of which close to six million hectares have been drained to improve their wood production capacity. Problems have also been caused by inadequate water-pollution control in connection with drainage and fertilisation of mires.

Mechanised logging and haulage require good roads. In addition to reducing the forested area, roads contribute to the fragmentation of forests and especially of old-growth forests. On the national scale,

the foremost ecosystem impact that the construction of forest roads has is in fragmenting otherwise contiguous natural areas. This is manifested in the reduced total area of original biotopes, in the isolation of biotopes from one another, and in the formation of fringe areas along roads with changed microclimatic conditions. Forest truck road fragment more natural areas than do public roads, especially in northern and eastern Finland.

Fragmentation involves principally two harmful factors: the overall decrease in habitat area and fragmentation of remaining habitats into increasingly smaller isolated islets of varying sizes. The fragmentation of natural environments and of the habitats of organisms and the related effects constitutes one of the biggest challenges for the conservation of natural biodiversity at the moment.

Pollutant impacts on Finnish forests are not significant, i.e. the state of health of Finnish forests is satisfactory in this sense. The effects of the acid deposition on forest ecosystems in Finland continue to be fairly moderate. These forest effects are most evident when examined in the light of the presence of certain lichen species. Thanks to air protection measures, the deposition of sulphur has clearly diminished from the record figures of the 1980s. The deposition of nitrogen, on the other hand, has diminished only slightly in the 1990s. Major long-term threats are associated especially with climate change. Dense populations of reindeer have had a detrimental impact on the biodiversity of northern Finland's Cladonia lichen forest site types and lichen-dominated conservation areas. Lichen site types still in the virgin state have become a rarity in Finland.

Multiple-use forestry is of long standing in Finland. Hunting, fishing and berry picking have traditionally been normal and necessary activities for most rural families. Typical recreational use of nature in Finland is based on the right of public access (the Nordic tradition of Everyman's Rights). These rights refers to citizens' right of access to nature irrespective of ownership. The use of nature within the constraints of these Everyman's Rights does not require the landowner's permission and neither are there any fees involved. Everyman's Rights always include the requirement of the activity being non-damaging, and these rights must not be exercised in a way causing harm or disturbance. Everything not prohibited by law is permitted. Due to Finland's low population density, recreational use based on Everyman's Rights has not resulted in the reduction of biodiversity in forest ecosystems. One can even claim that this kind of right of access to nature has merely made easier the job of forest ecosystem conservation because the conservation of the various forest values is of high personal importance to most Finns. Furthermore, forest owners are also able to enjoy the public rights of access on lands belonging to other landowners. Since the average size of non-industrial, private forest holdings is small in Finland, hardly anyone's personal recreational use of forests is restricted to their own property.

A well-known and characteristic feature of tourism in Finland is that nature is the foremost attraction and it is based on all elements of nature. This has also been revealed by studies focusing foreign tourists in Finland. Tourism already constitutes a quite a significant source of livelihood in Finland, especially in Lapland and in eastern Finland, in addition to the main towns. Tourism does, of course, cause deterioration of the environment. Often the most popular tourist areas exhibit the poorest resistance. However, there is little research data on the effects in Finland of tourism, especially on natural biodiversity and forest ecosystem biodiversity. However, it is necessary to point out that tourism usually promotes nature conservation and protection of the environment. Revenues earned from tourism encourage people to protect nature.

Building development has reduced the forested area to some extent, but even population centres continue to be wooded in Finland. Forests in the vicinity of population centres are of great significance, especially because of their ecological, landscape and recreational values. An especially visible environmental change has been that of transforming wooded shoreline areas into zones of summer cottages.

The changes that have taken place in forest ecosystems in Finland are, in many respects, the consequence of internal measures implemented by the forest sector. On the other hand, small-scale forest ownership and family forestry have retained forests that are relatively diverse. The need for combining multiple-use of nature and the associated uses that forests have has been another central factor enabling the conservation of natural diversity in Finland.

## **2.2 Identification of underlying causes of biodiversity loss**

According to the environmental economics, biodiversity loss is caused by the lack of mechanisms reflecting its real value in various decision-making situations on the markets. Thus, the prevailing institutional environment allows resource users not to heed all the environmental consequences of their operations. Either they do not need to enter into negotiations as to the level of these effects or then they are external to the markets (Perrings 1997). Economists refer to this kind of a situation as a market failure. A situation where the government offers incentives encouraging people to add to environmental costs is referred to as policy failure. Both market and policy failures are underlying causes for biodiversity loss.

A significant proportion of biodiversity benefits have no direct market value, i.e. they are non-market benefits. Therefore, they are readily underestimated or entirely ignored. However, the appreciation of diminished biodiversity as being an environmental damage is a relatively new matter. Indeed, the legitimacy of the existing institutional structure has come into being in a situation where there was no knowledge about biodiversity damages or biodiversity values. When biodiversity loss occurs, however, these damages increase and the number of losers increases. When this happens, environmental policy must be applied also to protect the losers' interests.

However, the economists' knowledge as to the economic values involved in ecological systems and the costs of protecting these systems are still fairly incomplete. The occurrence of discontinuities, irreversibilities, thresholds and various complex interactions mean, all in all, that it is extremely difficult to apply general economic tools and methods to ecosystems. After all, the species important from the viewpoint of the existence of ecosystem functions also have their indirect use value, which can at times be quite considerable.

Also the concept of option value represents a significant justification for conservation as we continue to live in a state of constant uncertainty or ignorance as to what properties of nature will be important in the future. But although option value is often put forward as a reason for conservation value, no quantitative estimates have been proposed without few exceptions as to its magnitude.

However, option values can be involved, not only in the direct benefits of nature, but also to the aforementioned indirect benefits of nature, i.e. ecological functions. The concept of option value can, indeed, be divided into two types - use-oriented and system-oriented option values:

The distinction is made between option value of species and the option value of ecosystem function. In addition to the current use value and the future option value of existing genetic material, biodiversity has option value at the ecosystem level because it provides the option for future benefit from the services of stable and productive ecosystems. (Smith 1996, 193).

Ignoring the option value connected to private and public goods can, in the case of forest ecosystems, be seen as a significant reason leading to biodiversity loss. The development of new methods for valuing the regulatory functions of ecosystems (i.e. indirect benefits of the ecosystem with its option values and its existence values) would be extremely important.

According to Gottfried et al (1996), biodiversity loss in a forest ecosystem can also be caused by what may be called “*landscape-scale market failure*”. This kind of market failure makes questionable the ability of the markets to create optimal landscapes. Indeed, this could be the foremost background reason for biodiversity loss in forest ecosystems or to the breaking up of ecological integrity.

The different kinds of use and management of nature affect the ecological processes and thereby also the potential goods and services, i.e. benefits, offered by a broad landscape area. People do always get a different mix of goods and services from the forests depending on the temporal and spatial scale. Therefore, wood production can also be seen as a process which is supported by the processes of a system wider in scope than an individual wood production area. Indeed, ignoring scales can lead to the “*management failure*” which in turn can lead to a need for modifying nature management, i.e. to the very situation in which we live in at the moment.

When reforming nature management, it has been noticed that forestry, for example, has to be both site-specific and scale-specific at the same time. An aspatial approach is insufficient for the reason that ecological processes and landscape structures are dependent on the spatial dimension. Because ecological constraints and socio-economic values vary in different parts of the landscape area a great deal, variation is also needed in nature-management, for example silvicultural, systems. The ASIO model (aldrig=always, sällan=seldom, ibland=occasionally, ofta=often), developed in the Nordic countries, is a good example of an ecological model for forest planning based on the processes of the natural landscape (Naesset 1997 et al).

Usually a given parcel of land is valued so that the spatial pattern of the surrounding landscape is taken as given. However, the land use and management decisions of all landowners together concerning their properties determine the spatial pattern of all the landscape components. The effect of the spatial pattern on the real output mix of the landscape may be termed “*economies of configuration*”. Due to the economies of configuration, it would also be important in forest planning to operate at the level of entire landscape areas and not only with individual owner (Gottfried 1996 et al). Landscape changes can also influence the values of individual sites. Economies of configuration makes policy intervention difficult.

Even though market failures caused by missing markets or incomplete rights of ownership were to be remedied, market failure with reference to landscape scale could not be remedied. However, achieving sustainable landscapes requires institutions capable of overcoming this landscape-scale market failure. Because one must produce not only site-scale but also landscape-scale goods and services (e.g. maintaining of ecological processes), environmental policies must take every landowner into consideration individually. At the same time, this means that landowners must be offered different levels of incentives so that every landowner would contribute optimally to the landscape. Landscape-level demands extend to the treatment of every individual stand, and thus general treatment directives require parallel special instructions complying with the landscape area. A stand can, for example, belong to an “*ecological corridor*” or it can serve as a “*stepping stone*” for a particular species.

One can demonstrate that the spatial arrangement of habitats has a significant effect on species diversity and ecological processes. However, economists have attached far less attention to spatial dynamics than to temporal dynamics (Bockstael 1996). But in the long run, all depends on how processes supporting and maintaining the integrity of ecological systems on a large scale are protected. After all, ecological systems form the context of all human activity and in this sense they are also the essential element of the value of these activities. This is why the value of the entire landscape area cannot be determined by evaluating individual components in isolation.

It is important to preserve the ecological integrity of an large-scale forest ecosystem when maintaining flexibility in case of changes in ecological conditions and in society’s demands on nature.

Norton and Ulanowicz (1992) speak of "*whole ecosystem management*". In it, in addition to managing components of the system for resource production, the system is also managed as a system. Indeed, biodiversity policy should concentrate especially on the wide scale.

## **2.3 Identification of adverse incentives with negative impacts on biological diversity**

### **2.3.1 Forest Improvement Act**

The period of reconstruction in Finland subsequent to the World War II was based especially on the powerful growth of the country's forest industries. This was accompanied by increased need for wood raw material. The objective of the forest policy of those times was to provide the necessary preconditions for the growth of exports of forest-industry products and to secure the supply of the wood raw material for the forest industries. Public financing support complying with the Forest Improvement Act was aimed at increasing wood production through the promotion of the tending of non-industrial, private forests and lowering of the transportation costs of roundwood. The necessity of the Forest Improvement Act has in the past been justified by pointing out that, as some forest improvement works yield return after such long periods of time and are modest in their profitability, their implementation is not sufficiently attractive from the view point of the landowners' economies. Projects appropriate from the point of view of the national economy could thus be made profitable in terms of private economics.

Characteristic of Finnish forest improvement legislation have been placing of emphasis on social and employment viewpoints and the wide range of work forms subsidised. The forest improvement works covered have been a forest fertilisation, forest drainage, construction of forest truck roads, forest regeneration and tending of young stands, and later on prescribed burning, pruning and remedial forest drainage.

In the 1960s, as it was believed that the sustainability of wood production was threatened, several programmes were formulated with the aim of intensifying wood production. The point of departure in all these programmes was that the forest industries' capacity could be increased only by investing in the development of forestry. Because of this, basic forest improvement works and their financing were further promoted. Starting from the late 1950s onwards, a number of expert parties formulated several improvement and silvicultural programmes with the purpose of developing forest improvement. The Forestry Financing Committee drew up MERA programmes covering the years 1965-1975. The objective of these programmes was to come up with the financing methods necessary to increase the nation's forests' capacity to produce wood. The Forestry Consultative Committee was responsible for formulating 5-year wood-production programmes starting from 1975. Public funding (loans and financial support) and taxation incentives were implemented to promote investment willingness among non-industrial, private forest owners so as to achieve the production objectives set for forestry and the forest industries.

Investments by non-industrial, private forestry in wood production were at their maximum, at FIM 1.0 billion, in 1991. In real terms of the value of money this represented an increase of 50% on the situation in 1980. Between 40-50% of these investments were financed with public money, i.e. FIM 360-490 million per year. This financing was enabled mainly by the Forest Improvement Act. Most of the state subsidies granted in compliance with the Forest Improvement Act were used in forest regeneration, construction of forest truck roads, and forest drainage (Palo 1993).

Forest improvement works have had negative impacts; e.g. further danger to threatened species, decline in the value of forest landscape and recreational use value, reduction in the size of wilderness areas, and pollution of water systems. The situation has been made worse from the point of view of the environment values by the progressive system of subsidies favouring developing areas, which has added to

the pressures acting on the environment in outlying areas. Increases in forest investments have probably transformed income distribution to the advantage of forest owners.

However, the growing stock, its annual growth and sustainable felling possibilities have significantly increased, especially in non-industrial, private woodlots, during the past few decades. Forest improvement works have, in the short term, led to success in job-creation goals, in maintaining the viability of rural areas, and in levelling out differences in regional development among different parts of the country. Mechanisation of forestry work and automation in forest industries have, on the other hand, led to significant losses in employment and regional development benefits lately. And yet the separate effects of forest improvement works on the favourable development of felling possibilities in Finland's forests have not been scientifically evaluated. It was in the 1990s that the Forest Improvement Act it was subjected to a "greening" treatment.

### **2.3.2 *Area-based forest taxation***

The system of area-based forest taxation can also be considered to represent an adverse incentive from the point of view of conservation of biodiversity. In Finland, the main principle followed in forest taxation until the year 1993 was average taxation based on the estimated hectare-specific yield of wood on forest land. As of the beginning of 1993, a new forest taxation law came into effect and according to it, landowners were given the choice to switch to wood-sales taxation in which case the forest tax is paid on the basis of the net stumpage revenues received by the landowner beginning either immediately or 13 years later. Finland is thus in a transition period of gradual switching over to wood-sales taxation from the area-based forest taxation.

The biggest disadvantage from the point of view of environmental values connected to the traditional area-based system of forest taxation has been that tax is paid on calculatory yield - and this, of course, is not produced on areas set aside for protection purposes. The new system of taxing forest ownership has a positive impact on environmental values in that if a landowner chooses to place forest land either fully or partially outside commercial exploitation, there will be no tax burden to be borne on that land. Area-based forest taxation was defended for many years from the viewpoint that it encouraged wood sales and the practising of good forestry in terms of wood production. Although area-based forest taxation has most probably motivated forest owners to take good care of their forests, there have also been other contributing factors. According to Ovaskainen (1992), there is no credible foundation for the direct silviculture-promoting influence of area-based forest taxation. However, the primary purpose of taxation has been to acquire revenues for the state. Due to the tax-exemption instructions applied in area-based forest taxation, there have been some cases where unnecessary and biodiversity-offensive measures have been carried out.

### 3. IMPACTS ON ECOSYSTEMS

Finland belongs mainly to the boreal coniferous forest zone. Finnish forests have undergone thorough changes in the course of the past few centuries. They differ significantly from pristine forests. Finland has an internationally significant role in the maintenance of the biological biodiversity of certain ecosystems belonging to boreal nature. Another matter of central importance is the preservation of populations of species, which have adapted themselves to the climate in Finland. Greater success has been achieved in Finland than in most other forested countries in retaining the forest cover. The country's forested area has increased and following final fellings the forests have been regenerated. The growing stock consists of indigenous tree species. Forest regeneration mainly takes place naturally or using silvicultural methods emulating natural regeneration.

However, the intensive and wide-in-scope wood production use of the forests in Finland has led to a situation in which forest-dwelling species have become threatened. This is particularly so due to the reduction in the area of old-growth forests and the lack of decaying wood in commercial forests. Indeed, retaining old-growth forests untouched is a key issue from the point of view of the protection of threatened and endangered forest organisms. The protection of old-growth forests is being carried out currently on the basis of the Conservation Act.

The effects of forestry actions are clearly visible in the structure of the forest landscape: there are numerous young and middle-aged stands and a lot of edge zones. Old-growth forests are small in area, scattered and the proportion of old broadleaves in them is a small one. Due to forestry, the biodiversity within stands has usually diminished because the amount of decaying wood and of the old broadleaves has diminished.

The number of the organism occurring in Finland is fairly small due to its northern location. It has been estimated that Finland is home to approx. 42 000 species of organisms; of these 378 (3%) are vertebrates, 16 290 (38%) are plants, and 25 500 (59%) invertebrates. Finland has lost 138 species of fauna and flora during the space of a little over 100 years. There are 217 extremely endangered species, 308 threatened species, and 1 029 species to be monitored. The majority (47%) of Finland's endangered species are forest-dwelling. There are hardly any species endemic to Finland.

Probably one quarter of the total number of species of organisms inhabiting Finnish forests, i.e. at least 5 000 species, rely on decaying wood. It is believed that lack of decaying wood in commercial forests and lack of a sufficiently diverse continuum of decaying wood have hampered more organisms than any other forestry-related factor. The inadequate amount of decaying wood has led to the endangerment of nearly one-fifth of the threatened species (more than 300 species) and these are also the primary reasons for the endangerment of over one-tenth of the threatened species, i.e. more than 200 species. As yet, there are no research results as to what is a sufficient amount of decaying wood. There is little decaying wood in commercial forests because sick and fallen trees are removed in connection with increment fellings to prevent the spread of fungal and insect damage. Furthermore, the felling cycles applied in commercial forests have been so short that there has not been time for old, decaying trees to come into being.

Not very much research has been focused on the genetic biodiversity of the indigenous fauna and flora indigenous in Finland. Because the species occurring in Finland are usually at the fringes of their distribution areas, the genetic biodiversity of these populations can be great. The genetic variation of trees also forms the basis for the breeding of forest trees.

The ability of organisms to demonstrate genetic variation has provided them with natural possibilities for evolving, adapting and retain their position in the face of changing environmental conditions. However, there is a limit to their ability to adapt. A fairly large group of organisms has indeed adapted itself to the constant slow development of the forests. They are characterised usually by a fairly poor ability to distribute themselves because unchanged conditions have not necessitated such evolution. However, environment changes in habitats have been so thorough and sudden that highly specialised fauna and flora are unable to adapt to them. From the point of view of ensuring the retention of biodiversity this group of organisms is especially problematic as the precondition for its preservation is the presence of a long continuum of a fairly large habitat. Many species manage in habitats that are part of a fine forest mosaic, but there are also plenty of species, which require vast contiguous forest areas.

According to research results, there are over a million invaluable nature sites in the commercial forests of non-industrial, private forest owners. It is believed that it is possible to retain the majority of the properties of these invaluable nature sites in the course of conventional forestry activities. The foremost improvement targets in non-industrial, private woodlots are felt to be in retaining the special characteristics of especially springs, herb-rich forests and the banks of brooks.

The fragmentation of contiguous natural environments and of the habitats of organisms with its associated effects constitutes one of the biggest problems faced by conservation of natural biodiversity at the moment. Fragmentation involves mainly two harmful factors: a general decrease in the area of habitats and fragmentation of the remaining habitats into even yet smaller and more isolated islets. Especially the construction of forest roads has led to the fragmentation of formerly contiguous nature areas. This is manifested as reduction in the total area of the original biotope, as isolation of biotopes from one another, and as the formation of microclimatically differentiated fringe areas along the modified edges of roads.



#### 4. IMPACTS ON ECONOMY AND WELFARE

Tietenberg's (1991) full-cost principle contains the idea that mankind is entitled to biodiversity. If this principle were to be applied literally, then the implicit subsidies "paid" since the beginning of time to activities resulting in the impoverishing and polluting of nature would end. At the stage when the level of mankind's economic activities was still low, still this kind of subsidy was also small and thus it was not worth even political consideration. Increasing of the scale of economic activities has also increased the subsidies, and this has led to the significant distortions in the use of resources.

Economic incentives are instruments affecting the relationship between individual benefits and costs of the chosen operating alternatives. According to the full-cost principle, polluting parties have to include all the damages resulting from pollution in their production costs, and this would put a complete stop to polluting production. The distribution effects of economic instruments refer to the question of who should bear the burden of the costs of environmental protection and who should benefit from environmental protection and by how much. Economic instruments explicitly point out the bearer of the costs. Environmental protection means additional costs either to the polluting party, the consumer, the taxpayer (when the state bears the burden) or to all of these together. Economic incentives create scarcity where the markets do not see scarcity. It is a question of the price paid for the use of the environment (Larrue 1995).

Forest owners, as the parties who make the concrete decision on the impoverishing of the biodiversity of forest ecosystems, have their own special responsibilities for environmental costs. A new item, a biodiversity fee, will now be included in forest owners' cost functions. However, the fundamental question in this context, according to Lorrain-Smith (1991), is that of whether landowners have a right to all possible profits, which they may get from their woodlots without any limitations being imposed by environmental policy, or does society, as Tietenberg proposes, have the right to all existing biodiversity. In the former case, landowners would be fully entitled to transfer all their environmental costs to others or to society as a whole, and in the latter case they would be fully obligated to include their environmental costs in their own cost functions.

Thus, the most central problems of legislative steering of conservation are connected to compensation issues of the new restrictions (deviating from *status quo*). A special problem in this is, in addition to the clarifying of the magnitude of the compensation unit, where to set the initial level for payment of compensation, which means determining the landowner's conservation responsibility. At the same time, decisions must be taken as to when to apply environmental fees and when to subsidise. Determining the relative shares of the responsibilities is a political issue, not an economic one.

It is difficult for forest owners and wood producers to pass on to the markets the environmental costs internalised by them (paid by them). This is also the central reason for why the polluter-pays principle (which is distinctly less severe than the full-cost principle) is inappropriate for application in forest use (Tobey and Smets 1996). An attempt is made usually to pass environmental fees or environmental taxes forward in the form of higher prices and eventually the bulk of the cost is borne the one who cannot pass it on any further, i.e. usually the end consumer.

According to Calabresi (1991), neither criticism of *status quo* nor its acceptance are neutral in terms of the income distribution. Even if no environmental control were implemented, new losers are nevertheless born constantly and current losers lose more than at present. The losers' group grows all the time as a consequence of the destruction and impoverishing of nature and their losses increase. At the same time, this means that the holders of present rights win too much. Environmental policy means redefining whose interests the state protects and who then should pay for in order to have their interests taken into account or alternatively who must suffer from the harm.

Wood production effects of the regulation of conservation (costs as well as savings) can arise from any of the following reasons:

1. from the reduced area under productive use;
2. from the need for an additional or different kind of work;
3. from the diminishing of the scale of operations;
4. from species changes; and
5. from postponing of felling operations.

The cost level is fundamentally affected by the level to which sustainable management standards are set in relation to forestry. Many estimates have been presented in Finland on how procedures undertaken for the benefit of forest biodiversity affect the net profit obtainable from the forests. According to various estimates, the net profit from a woodlot is reduced between 2-3% and 15%, depending on the intensiveness of the forest ecosystem management. According to some calculations, the effect of measures carried out for the good of care of the environment is such that incomes from timber sales are reduced by 7% per year in the case of the average woodlot. The share of particularly significant habitats as referred to in the new Forest Act in this reduction is 1%. According to Järveläinen et al. (1997), the transition from primarily wood-production-oriented alternative to a forest treatment practice fully compliant with the present-day Finnish forestry recommendations and ensuring the conservation of biodiversity reduces felling outturns by an average of 15% and net incomes by about 10%. However, one should approach the net profit calculation associated with forest biodiversity with some degree of caution.

The economic impacts of a forest politics aimed at securing the biodiversity of forest ecosystems can, indeed, be analysed from several points of view and within economic units as well as at the regional or national level. One practice in examining this issue is to clarify the ways in which the different policy means affect forest owners' investment behaviour and the supply of wood raw material. According to Järveläinen et al. (1997), the possible behavioural changes caused by applied policy means can be classified as follows:

- expectations caused by coming and on-going changes in politics and behaviour reactions resulting from them;
- behavioural changes caused by changes in applied means or new policy means.

When this is done, a clarification is made as to the extent that new restrictions to be imposed on forest treatment, the discarding of incentives aimed at promoting wood production or the creation of incentives aimed at promoting biodiversity serve as transferors of supply and thereby reduce felling volumes, strengthening the short-term supply of wood in connection with felling restrictions through

expectations and influence investment willingness through changes in the profitability of wood production and income expectations.

Indeed, another conclusion drawn by Järveläinen et al. (1997) in their study applies to the supply of wood to forest industry and via this the national-economy impacts of forestry and wood-based industries. According to them, the physical felling possibilities in Finnish forests are 20-30% below total forest growth as a consequence of the conservation of biodiversity and some other limitations. This means a turndown in the growth of the allowable cut in Finland, which in turn may influence forest industries' investment plans.

In most cases, economics have been applied only to present the cost of conservation actions in terms of foregone profits from forestry or other land uses. Few of the benefits of conserving forests have a market value, and therefore the demand for them is difficult to estimate in monetary terms. According to Ovaskainen et al. (1997), assuming that the scale of WTP (Willingness to pay) is the same for Finns as in the reference studies conducted abroad, it is possible to estimate the magnitude of the value of conservation benefits in Finland. The researchers assumed (based on reference studies) that the average annual WTP is within the range of FIM 72-428, with a mean of FIM 200. The total adult population in Finland is 3.9 million, consisting of 2.2 million households. Using these figures, we would have an annual aggregate WTP for households of FIM 158-942 million (mean FIM 440 million), or an annual aggregate WTP for adults of FIM 281-1669 (mean FIM 780 million). According to Kangas and Niemeläinen (1995), a little less than one in two Finns were in favour of establishing of more conservation areas. A suitable percentage of such areas was felt to be 9% of the forest land area. About a third were willing to pay more taxes to maintain forest biodiversity. On average, the respondents were willing to pay FIM 180 per year.

Forest-industry companies see protection of water systems and air protection as both normal investments to achieve a clean environment and as competition factors. Similar development can be expected in conservation of biodiversity in forest ecosystems. About three-quarters of the exports of Finnish forest-industry products are directed at Western Europe. Environmental issues play a very important role in the consumption decisions of West-Europeans. The failure of conservation measures could mean difficulties for forest-industries companies in retaining their share of the markets. At the same time, forest owners' chances of selling their timber for a good price could be reduced. For the present, we have at our disposal little or no analyses as to the potential competitiveness and foreign-trade impacts that forestry-focused environmental policy has had or will have.

Powerful research and development, as well as commercial product development, are taking place in the areas conservation of biodiversity and its sustainable productive use. This kind of development is also to be seen in the environmental sector of forestry. In the matter of utilisation of biodiversity, especially employment opportunities should be looked into more thoroughly than has been done so far. Development of environmentally non-offensive operating modes, products and technology can create significant export openings and thus improve or maintain the employment rate. Maintaining natural biodiversity can serve to strengthen operational preconditions and also create new jobs in tourism.

## **5. IMPLEMENTATION OF INCENTIVE MEASURES AND CONTEXT**

### **5.1 Identification of actual or planned incentive measures**

#### ***5.1.1 Financing of Sustainable Forestry Act as a cost-sharing mechanism***

In 1994, the Ministry of Agriculture and Forestry and the Ministry of the Environment ratified the *Environmental Programme for Forestry*, which is the official forestry strategy of Finland for the near future. According to the strategy, ensuring the preservation of biological diversity of forest ecosystems depends greatly on how Finland's commercial forests are treated because over 90% of the forests in the southern half of the country are being left outside conservation. The main emphasis in the conservation of forest-dwelling species in the Environmental Programme is on retaining biodiversity in commercial forests and especially in key biotopes.

The Environmental Programme proposes that silvicultural methods applied in commercial forests be developed so that the retaining and stimulation of forest biodiversity is included in all forestry measures. Special attention must be paid to the preservation of key biotopes, to the significance of edge zones, and to leaving retention trees on logged sites. Furthermore, the Programme emphasises the importance of creating variable stand structures and mixed stands of broadleaves and conifers, the retention of ancient trees and decaying wood, and that the measures applied should be nature-emulating and of a small scale. The treatment of forests should comply with natural forest development. Buffer zones should be left along shorelines. The use of chemical control, drainage and exotic tree species should be avoided.

Since then, the basic legislation pertaining to forest treatment in Finland has been reformed to comply with the principles of the Environmental Programme. The bills for the Forest Act and the Financing of Sustainable Forestry Act were presented to Parliament in the spring of 1996. Together with the new Nature Conservation Act, prepared concurrently, they came into effect at the beginning of 1997. The purpose of the new Forest Act is the maintaining and promotion of economically, ecologically and socially sustainable forest use and management so that the sustainability of wood production and the biodiversity of these forests are preserved. Therefore, there are regulations contained in the Forest Act to ensure the continuity of wood production and there is also the general obligation to maintain the preconditions for biological biodiversity of the forests in the use and management of the forests by ensuring the preservation of their characteristic habitats. The Act and the associated Decree define some particularly significant habitats (the immediate vicinity of springs, streams and small lakes, eutrophic peatlands, and herb-rich forests), the treatment and management of which need to be executed in a way which retains their characteristics. However, these particularly significant habitats have not been thoroughly inventoried. On the basis of preliminary surveys, it is estimated that they cover about 1% of the area of commercial forests.

According to the exception section of the Forest Act, the preservation of particularly significant habitats will not be a judicial obligation, however, if the decrease in forest yield or some other economic drawback is considered to be greater than minor to the landowner. Thus, the main responsibility for the

conservation of particularly significant habitats remains with the landowner. If limitations result in diminished forest yield for the landowner, and if this economic loss is considered to be greater than minor, the landowner may be granted a permission to carry out forestry use and tending measures so that the said loss is minor.

However, following the lodging of a separate application, a landowner's losses which are deemed to be greater than minor can also be compensated for by means of a discretionary environmental subsidy if the forestry practised takes into consideration biodiversity and other such nature issues to an extent greater than is required in the relevant legislation. The said extending of state financing in addition to the measures ensuring the sustainability of wood production to also cover measures taking care of forest biodiversity and the care of forest ecosystems is the single biggest change built into the Financing of Sustainable Forestry Act.

The Financing of Sustainable Forestry Act (1996) forms the basis for the funding of environmental management measures on non-industrial, private forest lands. The Forest Improvement Act, which was the centrally important financing legislation in non-industrial, private forestry, has been now reformulated, i.e. it takes into account ecological and environmental aspects and promotes the development of forest ecosystems in the direction of maintaining biodiversity. The range of use of these funds has been extended to include individual environmental protection measures. The changes in the kinds of work ensuring sustainable wood production and in the conditions pertaining to their financing are, however, fairly minor on the whole. Indeed, it is expected that the allocation of forest improvement projects will change as new objectives and work forms are adopted.

According to this Act, when the maintenance of biological biodiversity in the forest, nature management or forest use other than wood production are taken into consideration to a greater extent than is required in the Forest Act as being the landowner's obligation, state funds (environmental subsidy) may be used to compensate the landowner in part or in full for the resultant additional costs and economic losses in so far as they exceed costs and losses deemed to be minor. However, the said environmental subsidy may not be granted in cases where the loss in wood production caused by the maintaining of biodiversity or some other economic loss are minor.

It is possible, by way of separate forest ecosystem management projects, to plan and implement undertakings such as the following: management and rehabilitation of particularly significant habitats involving several estates, charting of habitats particularly significant for biodiversity as referred to in the Forest Act, rehabilitation works significant because of landscape values in commercial forests, restoration of forest drainage areas in areas of significant nature values, and other similar regionally significant projects emphasising forest ecosystem management and multiple-use of the forests, landscape, culture and recreational values.

The financing initiative for the aforementioned projects can be made by landowners, public authorities, NGOs, and other such bodies. Projects involving forest nature management are planned and carried out or supervised by regional Forestry Centres. The planning of projects is carried out in co-operation with the landowner and resorting when necessary to the expertise of the regional Forestry Centre. Forestry Centres decide on the use of funds for financing of projects within the constraints of the funds allocated for this purpose and taking into consideration other possible funds.

Environmental subsidies are paid out from a dedicated sub-item in the government's budget - namely, the Promotion of Forest Nature sub-item. The magnitude of this sub-item in 1997 was FIM 15 million (approx. USD 3 million). The follow-up group looking into the implementation of the Environmental Programme for Forestry was of the opinion that the subsidies in accordance with Financing of Sustainable Forestry Act (i.e. environmental subsidy) in 1997 were to be targeted primarily on

compensating landowners for the losses incurred by them when preserving particularly significant habitats as defined in the Forest Act. Furthermore, the follow-up group considered the charting of key biotopes in the initial stage to be an example of the important application of the said funds. Thus it has been proposed that environmental subsidies be used only for compensating landowners for their losses caused by the said special sites.

The magnitude of the impediment to landowners is calculated according to the landowner's choice either with the basis provided by the "pure yield" of forestry as applied in area-based forest taxation or the felling value of the forest. The said "pure yield" method is suitable for sites with a low stand density. The felling-value method is probably used mainly when dealing with densely-stocked sites. The calculation takes into account all the applicant's forest holdings in the same municipality.

The "pure yield" of the site of a particularly significant habitat is determined using the principles applied in area-based forest taxation. The "pure-yield" of a particularly significant habitat is compared to that of the forests belonging to the landowner in the same municipality. That part of the loss in the "pure yield" of a particularly significant nature item which exceeds 4% is compensated. Annual loss in excess of FIM 4 000 is compensated even if the proportionate loss remains below 4%. Along with the loss in forest yield, other losses are also compensated.

When using the felling-value method, the value of the growing stock that can be immediately logged must be determined for the particularly significant nature item as well as for the applicant's other forest holdings in the same municipality. That part of the losses which exceeds 4% of the loss in the logging value is compensated. Loss in logging value exceeding FIM 40 000 is compensated even if the 4% threshold value is not exceeded.

An agreement is drawn up between the regional Forestry Centre and the landowner defining the delimitation of the site in question, the permitted activities, and the amount of the subsidy to be paid. The period of validity of the agreement is 10, 20 or 30 years according to the landowner's choice. The subsidy is paid as a lump sum when the period of validity of the agreement begins. In the case of densely-stocked sites, it is also possible to agree that some of the live trees can be logged as long as felling does not endanger the conservation of the site's special characteristics. The principle of constant application is applied with environmental subsidies. Applications are to be addressed regional Forestry Centres which also provide assistance in the filling of the application. Environmental subsidies are tax-free for the part exceeding the 4% impediment.

### **5.1.2 *Removal of adverse incentives***

First-time drainage is no longer funded through public funds when applying the Financing of Sustainable Forestry Act. Apart from small supplementary drainage operations, first-time drainage for forestry has in practice ended. The said act also includes the principle according to which government subsidies are no granted for the remedial drainage of areas on which tree growth has not clearly recovered following earlier drainage. Subsidies for remedial drainage vary by region between 40% and 65% of the implementation costs.

Of the work types subsidised according to the said act, construction of forest roads receives the least support. The focus will shift to basic improvement of old forest truck roads in the coming years in place of construction of new roads. Appropriate planning of logging will enable winter roads, for example, to be used as a means of reducing the environmental impacts caused by permanent roads.

The act also includes the possibility of providing funding for prescribed burning using public funds. Forestry ploughing carried out using public funds must be confined to targets in which other

soil-preparation methods are not as yet feasible. Furthermore, the Financing of Sustainable Forestry Act includes the possibility to use public moneys to fund restoration projects focusing on forest ecosystems.

### **5.1.3 *Development of forest certification in Finland***

Voluntary certification is an indirect market-based instrument for the worldwide promotion of sustainable forestry. The task of the certification is to supplement other policy instruments such as legislation, economic incentives, taxation, etc. The objective of voluntary certification is to bring into use silvicultural standards, which are more precise than those built into legislation.

The Ministry of Agriculture and Forestry appointed a committee to look into Finland's role and goals in the international development of a certification system for forest products. Where applicable, this clarification work was required to take into account national criteria and indicators for sustainable forest management, as well as international certification and environmental management systems. Furthermore, autumn of 1996 saw the founding of a broad-based (representation of 29 interest groups) forest-certification standardisation team, whose objective was to develop a system of forest certification for Finland and one that would enjoy broad support. The group defined its task to be that of preparing the minimum requirements, i.e. standards based on voluntary participation. On 16.4.1997, the said standardisation team presented its proposal for a Finnish certification system for the sustainable management and use of forests. The certification system proposed is based on voluntary participation and in especially recognises the conditions in which small-scale forestry is practised in Finland. The system can be adapted both at regional level and in individual woodlots.

The goal in Finland has been to achieve national application compatible with presently formulated international certification systems. According to the committee, it would be essential for the criteria employed to be widely accepted and for participation in the system to be voluntary. The system must be suitable for Finnish conditions with their predominant small forest holdings and timber trade customs. The system must also be cost-efficient and relatively easy to implement in practice. Its credibility in the eyes of the consumers is essential. The primary question in the development of a certification scheme in Finland is at what level and how broadly the standards are set in relation to the legislation and forest management recommendations. For the certification system to be beneficial in the economic sense, certified products or production must stand out sufficiently from competing products and production. If the standard of environmental policy in the forest sector is generally extremely high, it may be difficult to achieve the competition threshold and thereby also fall short of achieving a markedly favourable impact on environmental policy.

The following is a summary of the central themes addressed by Certification Committee. The key issues were:

1. Is forest certification needed?
2. What are the alternative systems for forest certification?

According to the committee's clarification work, organisations representing the interest groups view the creation of a certification scheme and the realisation of forest certification as being necessary. Environmental organisations hold the view that forest certification is needed to improve the state of Finnish forestry. Other segments see forest certification as primarily a marketing and communication tool. Increased demand for wood and competitiveness are points which are particularly emphasised by forest-owner organisations. According to forest owners, certification, however, should not endanger the profitability of forestry. Industry representatives point out that the reasons for certification are customers' demands and the actions of competitors in the area of certification. Individual forest-industry companies

feel that the way to influence the quality of the environment is through market influence. There is a consensus on the point that companies would benefit from a credible certification scheme and would use it in their marketing. Consumers hold the view that forest certification would mean reliability, quality and environmental inoffensiveness.

In order to ensure the certification of Finnish forestry, it is essential for certification to take place within the framework of an international system. The Finnish application, therefore, must be capable of being linked with an international system, which accepts it and provides it with credibility. According to the nature of certification, a certification scheme should be international and it should have clear rules of the game. In order to carry out certification, a good deal of local information and expertise, plus knowledge of local conditions, are needed. The most important characteristics of the certification body are competence, impartiality and autonomy. In forest auditing, Finnish industry and trade place their trust in government organisations. The next best alternative is felt to be a certification body with a university and/or research institute background. Forest owners more or less share these same preferences.

Three alternative schemes have been put forward as options for the development of forest certification at this stage:

- the Forest Stewardship Council (FSC);
- the International Organisation for Standardisation (ISO); and
- the EU based system (EMAS).

Forest management certifications based on the FSC scheme has already been carried out in some countries. The FSC has certification readiness developed especially for large tracts of forest. The ISO system comprises general management systems linked to quality and environmental management. There are no forest-certification applications within the ISO framework as yet. Neither is there an EU system for the accomplishment of forest certification. Its development chances have been debated both within the EU and in individual EU member states. The essential components of the certification scheme are the accreditation and certification bodies. The requirements defining the competence and independence of these bodies have been outlined in the framework of the ISO and applicable parts of these requirements are also used in the FSC system.

In the analysis of interest group preferences none of the certification schemes examined has received a clear preference. The ISO system in particular, but also the EU system, had more supporters, in terms of total numbers, than the FSC system. Advocates of the FSC system, however, are more vocal and visible, and they demand certification more ardently than other groups.

The conclusions drawn by the committee were as follows. Voluntary certification is perhaps the most cost-effective means of demonstrating to the markets both general value goals and responsible and high level forest management. Forest certification is needed when marketing to demanding target groups, and for creating and maintaining a positive national and/or company image in regard to environmental issues. The competitions is also pushing the requirement for forest certification. The costs of the certification, however, must not exceed its benefits.

The committee emphasises that ISO and FSC should not be seen as mutually exclusive systems, but rather as complementary systems. In the words of committee, none of the alternatives can be put forward as the leading system. In the end, the markets dictate which system creates additional value.



The committee felt that the following solutions correspond best with Finland's goals and a decision was made to establish Finnish certification readiness applicable to the international environment which means:

- EU-, FSC-, ISO-compatible;
- standards which would suit national conditions;
- be integrateable with the existing organisations, and with forest and environment information systems;
- domestic or foreign certification bodies.

This would:

- be comparable to the unclear situation in the markets;
- ensure that the marketing principle of using the certification system demanded by each customer group can be used;
- correspond with the views of most Finnish interest groups;
- commit Finnish forest sector to genuine development, even if immediate certification is not possible and therefore some customers or customer groups might be lost.

The requirement of product labelling associated with certification is proof of the origin of the wood raw material. This calls for a verification of the chain of custody from forest to transportation, manufacturing and distribution, and right up to the final product. The aim is to be able to separate certified and uncertified production in purchasing decisions made by wood processors, middlemen and consumers. There has been little experience of the chain-of-custody auditing and the practical implementation of certification and the costs thereof.

In the case of Finland, it is important to find forest certification methods suitable for the certification of both small and large forest holding units. The nature of many sustainability criteria is such that there is no possibility of accomplishing them, or of assessing them, in small forest holdings. According to the experiences gained in conjunction with the Pirkanmaa province project, in Finland, a holding can be considered a suitable certification unit if it has an area of at least 1000 hectares. It is only over such an area that the criteria reflecting sustainable forest management can be evaluated in an acceptable manner.

The Committee then proceeded to examine two certification units - a forest-owner-based certification and a regional level certification - and their pros and cons.

A single holding is a suitable certification unit if it forms a large, contiguous area. The following considerations are among those that serve to justify certification of an individual owner's property of this kind:

- Ecological, economical, and social criteria describing sustainable forest management can be assessed in an acceptable way.
- Ecological landscape planning can be accomplished on large forest tracts.

- Decision-making and responsibility for actions focus on one person.
- Economic benefits are earned only by forest owners managing their forests sustainably.
- Certification at holding level does not include what maybe called the “free-rider” problem.

The following factors influence or prevent the awarding of certification to small forest holdings.

- Rotation periods in forestry practised in the coniferous forest zone are long. With change in ownership, the aims of forest use also generally change.
- Ecological landscape planning is impossible on small holdings.
- The real impact of silvicultural procedures on biological diversity may be marginal if corresponding activities do not take place in the neighbouring holding.
- The certification scheme may become bureaucratic and costly if the average size of private forest holdings is below 40 hectares as there are 440 000 such units in Finland.
- The forest owner-based certification scheme would probably form the principal market barrier to small holdings, through no fault of the owner, obtaining certification for the timber produced.

The Committee stated that a forest-owner-based certification is a viable alternative in Finland for large holdings/forest-owner units (Finnish Forest and Park Service, corporate forests, etc.), but not for the small-scale forestry.

According to the Committee, the advantages and benefits of certification at the regional level are fairly obvious:

- The sustainability of forest management in its entirety can be assessed at regional level from the standpoint of all the criteria. Similarly, the necessary changes for achieving sustainability can be defined without much trouble at the regional level.
- Facilitates wood flow separation.
- Makes it possible to establish a certification scheme that is light in regard to its organisation as well as economical.

Disadvantages:

- Providing non-industrial, private forest owners with economic incentives (e.g. higher timber prices) may be difficult.
- An indirect link is established between holding-level decision-making and the regional certification result unless forest-owner-specific commitments are included in the model.

In practice, small forest holdings could be certified regionally through either: (1) the certification of a certain geographic region or (2) certification by an umbrella organisation.

It is also necessary at this point to note that the certification is, first and foremost, an international conservation means which has to be resorted especially because there is no body with international authority in this matter. The basic idea of certification is that consumers (having access to additional information) are able to differentiate between otherwise similar products. The said additional information is a guarantee of the product having been produced in an ecologically and socially acceptable manner. The objective of the certification process is, indeed, to offer consumers the possibility to indicate their preferences and their values on the markets more precisely than before. If consumers are prepared to pay a higher price than otherwise for a certificated wood product than for a non-certificated but otherwise similar wood product, then the producer of certificated wood can also obtain higher unit incomes. In such a situation the wood producer's net income can increase despite the decrease in the amount of wood sold and despite extra costs. However, this kind of willingness to pay on part of consumers is an unknown matter for the present. The willingness of producers to commit themselves to silviculture that is ecologically and socially acceptable depends partly on how they feel that the markets accept certificated products.

The behaviour of the markets is difficult to predict and this applies especially to the market for differentiated timbers and wood products. The socio-economic processes according to which hidden environmental values are transformed into market demands are not very well known as yet (Kiker & Putz 1997). Also unknown are the even wider social processes which bring about the development of values that evolve into willingness to pay. One objective of certification is to try to influence this system of social dynamics, which induces consumers to move over to using products that have been awarded ecological certification. Thus the certification organisations serve also as educators. Furthermore, customers need to have confidence in the certifier.

## **5.2 Process of implementation and distributional effects**

In the following the author concentrates on the execution of forest certification because the application of the Financing of Sustainable Forestry Act has been sufficiently explained in section 5.1.1. The standardisation team in forest certification considers voluntary group certification carried out within the jurisdictions of the various Forestry Centres as the primary procedure, but also presents criteria for group certification at the level of local forest management associations and forest-owner-specific certification. Finland's standardisation group has, indeed, developed the world's first model suitable for certification of small-scale forestry. The solution is the forest-owner- group certification in which a local forest management association or a federation of such association can act as the applicant for the certificate. The primary application level is the jurisdiction of a particular Forestry Centre in which case the applicant is the regional federation of local forest management associations. The second alternative to the regional-level solution is to apply the system over the territory covered by a local forest management association in which case the particular association is the applicant for the certificate. If a forest owner so wishes, he/she can apply for forest-owner-specific, i.e. woodlot-specific certificate.

There are a total of 37 criteria in the certification system for regional level and 23 in the holding-level system. Their purpose is to promote the good care of the forests, maintenance of forest biodiversity, wood production and multiple-use of forests. Furthermore, they take into account things such as the promotion of employment. The standard system now drawn up will be in force for five years after which it will be reviewed. The proposal has been tested in Pirkanmaa, in Pohjois-Karjala and in Finnish Lapland. In these test inspections, some invaluable nature items were found to have been too intensively treated. For example, a third of the criteria were not met in Pirkanmaa. Following the consensus achieved in the standardisation group, however, development work at the national level has made little progress. Environmental organisations have separated themselves from forest industry and forest owners. Before any certificates can be awarded in Finland, those needing a certificate must resolve for themselves the system whose certificate they want to apply for. Furthermore, it remains to be solved how landowners will in

practice commit themselves to the system. If the regional level is decided to be the jurisdiction of a Forestry Centre, then 2/3 of the forest owners residing there need to be involved in the system for the region's forests to be eligible for the certificate.

According to the Certification Committee, the benefits of certification and the costs caused by it must be in a sensible ratio for a system to be functional and for certification to become an economic incentive to forest owners. Certification must be presented to forest owners and the production chain as net benefits. Forest certification results in both direct and indirect costs for forest owners.

Direct costs arise from auditing and follow-up inspections associated with certification, as well as from fees which may be connected with the awarding of certificates. These sums will be paid to the auditor and the certifying body. At present, it is extremely difficult to estimate how high the costs of the technical implementation of forest certification in Finland will be. However, it has been estimated that the technical costs of certification will vary within the range of FIM 10-135 million, depending on the certification model. The costs of the external certification body will obviously be shared by timber buyers and timber sellers. The cost level is fundamentally affected by factors such as the sustainable forest management standards applied in certification and the size of the certification unit. Finnish forestry, with its small-scale ownership structure, is susceptible to a high level of administrative costs which will eventuate unless certification can be carried out concurrently over sufficiently large tracts of forest.

Indirect costs are caused by changes in the management of forests necessitated by the criteria of certification, and the creation and upkeep of the administrative, documentation and document systems needed to establish credibility. Additional expenditures may be caused by decreased yield (e.g. part of an area is not cut, lower yield per hectare), the extra costs of silviculture and harvesting, the additional costs of planning and monitoring, the cost of increased training, and the different of revenue and costs of the division in relation to time. The cost level is fundamentally affected by the level to which sustainable management standards are set in relation to forestry as practised in Finland.

Estimates have been presented in Finland as to how procedures undertaken for the benefit of forest biodiversity affect the net profit obtained from forestry. According to different estimates, the net profit obtainable from a forest holding is reduced between 2% and 15%, depending on the intensiveness of forest ecosystem management, with the average reduction being 5%. However, one should approach net profit calculations associated with forest biodiversity with some degree of caution.

It is difficult to put forward estimates of the benefit-to-cost ratio of certification. At the moment, it appears that consumers are not willing to pay for green-premium-certified products. A price increment may only be realisable in extremely narrow special product market areas. On the other hand, it has been estimated that certification will become a condition of passage to the markets, at least in the environmentally-aware European markets. The buyers of wood can direct their timber purchases to those holdings which are in the certification system.

### **5.3 The role of information and uncertainty in the implementation process**

Retaining the biodiversity of forest ecosystems requires much more biological and ecological basic knowledge than there is available at present about forests in order to succeed. It is only when armed with this knowledge that we can better estimate the effects of the various forest treatment. This is important when we wish to direct forest owners to choose certain treatment methods. However, the fact that every forest has its own role as a part of its landscape area must be remembered. This being the case, there is no one highly schematic treatment recommendation that is suitable for every situation. Indeed, the treatment of the sites has to be based on the demands of not only the site but also of the landscape area.

However, only little of this kind of spatial information is in existence and private holdings lack ecological landscape plans.

Our knowledge of the factors maintaining biodiversity in boreal forest is incomplete on the whole. For the present, there has been little research delving into the ecology, structure and dynamics of pristine forests. The continuity of productional functions depends on the resilience of ecosystems. This resilience is considered to increase with increasing system complexity and an ecosystem's complexity can be measured in terms of its biodiversity. However, the dependence between the biodiversity of an ecosystem and its processes is neither simple nor clear-cut.

The examination of the degree of endangerment of Finland's threatened species flora and fauna is being updated. Finland's threatened species of organisms are estimated to have about 100 000 habitats. About 22 000 of these have been recorded in the register of the threatened fauna and flora (UHEX), which is part of the environmental information system. However, the register is incomplete in terms of its coverage of groups of organisms. Planning work on the register of conservation areas began in the latter half of the 1980s.

The distribution of Finland's species of organisms is still poorly understood. However, the number of species grows smaller in the south-north direction. The species composition variation of the boreal forest in the various stages of succession is very complex and there is not much research data about it. The national follow-up work on the state of ecosystems' biodiversity is still non-systematic. Existing follow-up projects cover the follow-up needs fairly unevenly. The follow-up system for ecosystem biodiversity in commercial forests has been developed in connection with national forest inventories. Follow-up programmes looking into genetic biodiversity are non-existent.

When dealing with the economic effects of the protection of forests, the benefits of protection have usually been ignored because it is difficult to estimate them in monetary terms. However, they can be very significant. Research focusing on the economic evaluation of non-marketable forest benefits has distinctly increased during the past few years. However, evaluating the change in the state of ecosystems requires also that one has enhanced knowledge of the operation of ecosystems and of the ways in which human activity affects them.

The information to be obtained on several forest use forms is still incomplete or totally lacking. Adequate information exists on the value of the collected berry and mushroom crops and game animals and on the significance of reindeer husbandry. Recreational values are known less well. The forests are a recreational environment important to Finns. At the beginning of 1997 an inventory project was launched especially focusing on the recreational use of nature.

#### **5.4 Framework and context of implementation**

Finland's forestry legislation has been reformed completely. The beginning of 1997 was when both the new Forest Act and the Financing of Sustainable Forestry Act came into effect. They were accompanied by the new Nature Conservation Act. The reforms to forestry legislation are the most marked since the approval of the Private Forest Act and Forest Improvement Act in 1928. These reforms apply to forest management and the financing of measures in non-industrial, private forestry, and to the organisation promoting and supervising private forestry.

The main forestry legislation is as follows:

- Forestry Centre and the Forestry Development Centre Act
- Local Forest Management Associations Act
- Forest and Park Service Act
- Forest Act
- Financing of Sustainable Forestry Act
- Forest Insect and Fungi Damage Prevention Act
- Forest Regeneration Material Trade Act
- The environmental legislation related to the forests is as follows:
- Nature Conservation Act
- Environmental Impact Assessment Procedure Act

The Forest Act promotes the sustainable management of forests. Its purpose is for the forests to provide good income to their owners and for ecosystems to retain their biodiversity. In addition, the endeavour is to safeguard the multiple-use of forests, peatlands and waterways. The Act incorporates general provisions for harvesting methods and requirements for safeguarding timber production, as well as for forest regeneration and the conservation of biodiversity. The Forest Act is applied in all commercial forests (also in state-owned forests). The Act does not require a forest owner to fell trees, nor to manage the forest. When tree harvesting and other forest management activities are carried out, the Act must be adhered to.

Financing in the terms of the Financing of Sustainable Forestry Act may be obtained for ensuring the sustainability of wood production, the maintenance of biological diversity, and forest ecosystem management projects. According to this act, landowners are also entitled to environmental subsidies to compensate for extra costs and losses deemed to be greater than minor and resulting from taking into consideration uses other than wood production. This environmental subsidy is not confined merely to particularly significant habitats referred to in the Forest Act, but these are the prioritised applications of the subsidy. Furthermore, it is also possible to finance separate forest management projects under this act.

The Forest Act requires that a Forestry Centre prepares a regional forestry target programme for its jurisdiction in which the general aims of the of sustainable forestry are defined. This programme is drafted in co-operation with the region's forest owners and their organisations, forest contractors and entrepreneurs, forestry employees, forestry clerical staff, the State administration, municipalities, conservation organisations, NGOs, and other parties necessary from the standpoint of the drafting of the programme.

The Forest and Park Service Act requires that the Forest and Park Service manages, uses and protects in a sustainable and profitable manner the (state-owned) natural resources and other property placed in its care. The integration of economic, ecological and social perspectives as required by the Act is accomplished through co-operation between the divisions, particularly the organisation's Forestry, Nature Protection and Recreational Services units. Forest management is controlled by multi-purpose natural resource plans and ecological landscape plans. An ecological landscape plan comprises the ecological overall assessment of a wide forest area and it steers forestry and forest resource use so that the conservation of species natural to the area and their chances of spreading further will be secured in the long run.

The objectives of the Nature Conservation Act are:

1. The maintenance of biological diversity.
2. The safeguarding of natural beauty and landscape values.
3. The strengthening of the sustainable use of natural resources and natural habitats.
4. The promotion of knowledge of nature and general natural history pursuits.
5. The promotion of natural-sciences research.

The European Community's habitat and bird directives are applied through the Nature Conservation Act. The Nature Conservation Act is also applied in nature and landscape protection and management, but not, however, in those areas of forest management which are provided for in the Forest Act. Revisions of the Nature Conservation Act and the provisions of the Forest Act were drafted simultaneously and special attention was paid to making these Acts mutually compatible.

## 6. POLICY-RELEVANT CONCLUSION

### 6.1 Lessons learned

The above is an examination of two economic incentives developed to provide for the conservation of biodiversity in forest ecosystems, i.e. environmental subsidies for forestry and certification of forests. The said subsidies are built into the Financing of Sustainable Forestry Act, which came into effect at the beginning of 1997. The certification system of forests is expected to be in operation by the year 1998. Due to the newness of these incentives, there are no significant experiences to speak of as yet. However, the removal of non-desirable incentives has already put an end to first-time drainage of mires and construction of forest truck roads has brought to a lower level of intensity.

The Financing of Sustainable Forestry Act is, as such, a useful economic instrument for the purpose of distributing the costs of conservation. For the present, however, the funds that have been set aside for implementation of this legislation have been relatively modest, and environmental subsidies for compensating landowners for the losses have been sufficient only to cover the protection of the special items mentioned in the Forest Act. For the usability of environmental subsidies to improve, the regional forest plans required in the Forest Act should evolve more and more in the direction of ecological landscape plans. The need for economic incentives varies from holding to holding and every holding should be provided with an individual incentive-plan. Every holding has its own special role in a regional ecological landscape plan, i.e. as part of the optimal landscape.

Many problems have been encountered in the development of a suitable certification model. So far, the Forest Stewardship Council (FSC) has not been able to develop a certificate suitable for the small-scale forest owner. However, the certification of Finland's small forest premises one at a time will be extremely expensive. In the case of a forest holding of approx. 30 hectares, holding-specific certification would cost perhaps FIM 130 per hectare. Certification on a regional basis involving more holdings at the one time would be a considerably cheaper alternative. Otherwise, too, assessing the realisation of diversity is more sensible over large tracts of land. This being the case, what may be called "group certification" or regional certification is needed. Group certification is a cost-efficient form of certification. Whatever the choice, landowners are worried about the costs of certification.

Another central problem is that of how fine-tuned certification criteria should be. An associated problem is that whether to go for a broad or small-scale certification, i.e. how to immediately certify most of the country's forest area. Fairly full certification appears to be the goal of the forest sector nearly whereas some conservation organisations want to have the criteria so tight that at first only a fraction of the forests could be provided with certification. According to these organisations, this would encourage people to further improve their forestry. But the problem here lies in that the raw material for pulp mills will always be procured from over a wide area. Consequently, for the pulp and paper industry to get its products certificated, corresponding certification would have to be provided for a large area of forestry. According to some estimates, the requirement for certificated paper manufacturing is that about 70% of Finland's forest area would have to be similarly certificated. In any case, the industry must get have its end



products labelled, otherwise it has nothing to gain from certification. In order that one can demonstrate that the wood used in the manufacturing of a product really originates from certificated forests, it is necessary to have complete knowledge of the chain of conveyance. However, it is difficult to determine this chain going back from the finished product to the stump in forestry predominated by family ownership. The more forest holdings there are included in the certification system, the easier it will be to determine these stages.

Yet another central problem is in the lack of research knowledge concerning the markets for certificated products. Indeed, landowners are worried from what will happen if, for example, truly numerous FSC-certificated wood products come to the markets around the world or if the quality of products provided with the same label varies considerably from the point of view of the intended purpose of using the wood. After all, the end user makes choices not only on the basis of the environment inoffensiveness of the way in which the raw material is produced but also on the basis of the product's usability. A lot more information is, indeed, required about the behaviour of the markets. However, it is extremely difficult to make market predictions in this context. For example, it is suspected that the demand for uncertificated wood when compared to the demand for raw materials substituting wood will fall once certificated wood reaches the markets.

Problems also arise from the systemisation of methods and follow-up measures and the question of whether current data acquisition systems yield information that is reliable from the point of view of certification. The testing of certification criteria revealed that, apart from a few exceptions, forestry in Finland is practised very much in the way required by the set of criteria. However, there is much room for improvement in how this is monitored. Of the total of 37 criteria, a rough test showed that the presently available information suffices for the assessment of only 19 criteria.

For the present, little research has been focused on the issue of how certification and the various economic incentives are interconnected. Certification has been developed as if it were the only useful form of providing economic incentives. For the present, the Financing of Sustainable Forestry Act has also been used only to foster the realisation the Forest Act and in so doing to provide compensation to landowners for those losses that exceed their conservation responsibility. However, environmental subsidies should be developed further than is the situation at the present. They could also serve as incentives in the endeavour to meet the certification criteria in situations where there is uncertainty as to whether the costs resulting from certification be regained from the markets. Indeed, it would be necessary to examine in greater depth the compatibility of certification and various economic incentives.

## **6.2 Transferability of experience**

The economic incentives examined here are nation-wide. Providing economic encouragement in the manner of the Financing of Sustainable Forestry Act in the case of Finland is probably feasible in other parts of the world as well. It is suitable especially for the purpose of achieving conservation goals at the regional level with a lot of forest holdings of relatively small size. Subsidies are paid holding-specifically but at least in principle on the basis of regional plans and conservation priorities.

The model of forest certification developed in Finland is suitable for small-scale forestry. In a situation of small-scale forestry holding-specific certification is not possible because of its high costs, and a working model of group certification is needed. The model under development in Finland is suitable for application in countries where small-scale forestry predominates.

It is very difficult at present to estimate the extent to which the certification model developed for the forest sector is suitable for application in other sectors, e.g. in agriculture. After all, the forest sector

differs greatly from the other sectors of the economy. In the case of food production, it is probably considerably easier than in forest industries to distinguish the sources of the raw material.

### **6.3 Possible policy advice for implementation**

Very significant conflicts of interests are connected to use of forests. Conservation of commercial forests always involves also the question of imposing restrictions on landowners' rights (attenuation of property rights). A central problem in the certification of forests lies in the partial transfer of power from traditional forest owners and the forest industries to environmental organisations and consumer organisations. It is very difficult to switch from production-oriented behaviour over to customer-oriented behaviour and from landowners' powers of decision to consumers' powers of decision. When introducing economic incentives, we should take into consideration the slow change in traditional power arrays. It can happen that the incentives most effective from the viewpoint of conservation may never be applied.

The implementation of certification of forests is facilitated by its market-orientedness. In the forest sector there is quite broad unanimity on the point of retaining our market shares depends on obtaining certification. Environmental subsidies can contribute to expanding the forest area suitable for certification.

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