W O R K R E P O R T

Institute for World Forestry

“Ecosystem Approach” versus “Sustainable Forest Management”
-Attempt at a comparison-

by

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The follow-up negotiations to the Convention on Biological Diversity formulated the Ecosystem Approach, inter alia. The principles of this holistic approach are also important for the forestry sector and its management of forest ecosystems. In the light of the national debate and international forest policy negotiations, there is a need for German and European forestry to switch to the perspective of the Ecosystem Approach. This should be based on the regulatory framework on sound and sustainable forestry in Germany prescribed by forest legislation that has been further developed by technical regulations. This is all the more true as the issue "Relationship between Ecosystem Approach and Sustainable Forest Management" had been incorporated into the " Expanded Programme of Work Biological Diversity in Forests"[1], adopted at the 6th Conference of the Parties to the Convention on Biological Diversity, to clarify its content (see next page).

1 . Introduction

Sustainable forest management (SFM) is desired by society and prescribed by law. Highly specific requirements as well, e.g. in the context of *close-to-nature forest management*, must not necessarily constitute a disadvantage in operational terms. In addition, SFM is a key prerequisite for certification. SFM has been striven for and realized over many decades in Germany. The Ministerial Conference on the Protection of Forests in Europe (MCPFE[1]) provides the following definition of sustainable forest management in the Helsinki Resolution H1: *sustainable forest management means the stewardship and use of forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."*

The *Ecosystem Approach* (EA) is a result of the Conferences of the Parties to the Convention on Biological Diversity (CBD) and was conceived as a complex approach to understanding or as a guideline for sustainable handling of all types of biological resources supplemented by twelve *guiding principles* that were formulated at a Workshop in Malawi in 1998 (cf overview 3).

The question arises as to what implications EA might have for SFM in Germany.

Attempts at achieving sustainable forest management have been implemented in Germany at national and sub-national levels (Federal Forest Act, State Forest Acts), at regional level (e.g. MCPFE for Europe, ITTO[2)] for the tropical countries) - according to the parlance of international negotiations - and worldwide (UNCED[3], UNFF[4]). At the levels of forest estates, forestry offices and forest stands, the formulated aims are to be implemented with due regard for the "iron law of the locality".

[1] Expanded Programme of Work on Biological Diversity in Forests. Decisions para 19a, UNEP/CBD/COP/6/L.22
[2] International Tropical Timber Organization
[3] United Nations Conference on Environment and Development
[4] United Nations Forum on Forests

Expanded Programme of Work on Biological Diversity in Forests. Decision para 19 a, UNEP/CBD/COP/6/L.22

The Conference of the Parties…..

Requests the Executive Secretary to initiate the following actions addressing some initial focus areas which are identified as important first steps towards the implementation of regional and international activities of the expanded programme of work, which should facilitate or complement national implementation. The initiation of these actions should not delay implementation of other activities within the expanded work programme at international, regional or national level:

a. *Ecosystem approach*. In collaboration with the Coordinator and Head of Secretariat of the United Nations Forum on Forests to:

i. Carry out a comparative study to clarify the conceptual basis of the ecosystem approach in relation to the concept of sustainable forest management with adequate consideration for regional conditions;

ii. Undertake a synthesis of case-studies on the ecosystem approach provided to the Convention on Biological Diversity by Parties;

iii. Invite the Collaborative Partnership on Forests members to provide a discussion paper, drawing on concrete national or regional experiences and inter-sessional meetings for consideration by the Convention on Biological Diversity.

The study should evaluate the link between the concepts in their application and the differences and similarities with a view to improve the conservation of biological diversity, sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, taking an integrated approach, and in accordance with Article 8(j) and related provisions. The study should be reported to and provide recommendations to the Subsidiary Body on Scientific, Technical and Technological Advice for consideration as part of its work on the ecosystem approach and to the United Nations Forum on Forests at its fourth session for information;

In 1992, the Forest Principles were adopted at the UNCED, inter alia, that are targeted at reducing or preventing, if possible, depletion and destruction/degradation in the world's forests and at achieving sustainable forest utilization. UNCED also adopted the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change and Agenda 21. Germany was greatly involved in shaping these conventions, signed them and ratified them shortly afterwards. Germany also feels co-responsible for Agenda 21 and launched a comprehensive process of implementation a few years ago already. These international agreements are all related to the issue being discussed here. The CBD addresses, inter alia, the conservation and sustainable use of forests worldwide as well as the fair distribution of profits that can be drawn from the use of the genetic component of this biological diversity.

Apart from some plantations, forest trees are usually wild populations that have been hardly genetically modified or not at all. They, therefore, fall directly under the responsibility of CBD that covers the treatment and management of forests in detail. The Conferences of the Parties to the CBD conceived and adopted the *Ecosystem Approach* (EA). The reports by the CBD consultative conference (Subsidiary Body for Scientific, Technical and Technological Advice: SBSTTA/3/5, p. 5 + 6) elaborate in greater detail on EA. Subsections 14 to 16 describe the approach (s. chapter 4). Page 10 pp. of the above document define the "programme elements" (see chapter 4 on this).

2. Sustainable forest management in Germany

Forestry in Germany may consider itself exemplary in many respects in this context compared with other countries around the world: sustainable timber use and increasingly also sustainable forest management have been practiced for around 200 years, in different ways and under different starting conditions admittedly. At first monospecific afforestations with spruce and pine prevailed, notably on degraded sites and on soils that had formerly been used for agricultural purposes to meet the increasing timber requirements that soared due to incipient industrialization and rapid population growth. Windthrow, fire, insect calamities and decreasing vigour of sites for the second and further generations of spruce and pine stands showed the limits to this approach. On the other hand, forests have increasingly been seen as ecosystems, especially in the past three decades, whose nutrient cycles, water balance and energy cascades must not be overtaxed so that future generations will also be able to (i.e. sustainably) benefit from their produce - timber and other goods and services.

Depending on the context of interpretation and in different situations sustainability has been interpreted in widely differing ways, also contradictory in some cases (SCHANZ 1996). Persons engaged in forestry have also interpreted the term in various ways (SCHANZ 1994). Different tree species compositions and varying volumes of growing stock can be handled sustainably, in principle, provided the framework conditions of the respective system are sufficiently known and controllable. A concept to specify the interpretation of sustainability is based on close-to-nature forest management. The closer to nature a system is the less intervention will be required to control the system. Sustainable forest management, therefore, constitutes a basic precondition in close-to-nature silvicultural systems. This aspect is highlighted in the following.

Since the 1950s, the Working Group on Close-to-Nature Forest Management (ANW[5]) has increasingly exerted an influence on this ecological understanding of forests and forest utilization. This is in keeping with the tradition established by former forest scientists such as HARTIG and COTTA as well as GEYER, MOELLER and BIER. In the first decades of its existence it met with skepticism and rejection by many representatives of state forest administrations, but could invoke a remarkable success in proceeds from wood sales and cost savings in management. Thus, their ideas were initially accepted in communal and large private-owned forests (cf overview 1).

In the 1980s, OTTO developed the LÖWE[6] programme for the forest administration of the Land of Lower Saxony, thus helping to get key ideas of ANW accepted. All Land forest administrations in Germany are now implementing similar concepts to a greater or lesser extent. The disastrous impact of several storms especially on coniferous even-aged forests over the past decades boosted this acceptance process to a great extent.

[5] Arbeitsgemeinschaft Naturnaher Waldbau (Working Group on Close-to-Nature Forest Management)

[6] Langfristige Ökologische Waldentwicklung in den Landesforsten (Long-term ecological forest development in the state forests). Programme by the government of the state of Lower Saxony, Hanover, Ministry of Food, Agriculture and Forestry of Lower Saxony, 1991, 49 p..

Overview 1: Silvicultural principles by the Working Group on Close-to-Nature Forest Management (ANW) and the forest administration of Lower Saxony in the context of LÖWE

	Close-to-nature forest management (according to HASENKAMP, von GADOW, inter alia)	**Long-term ecological forest development** (LÖWE programme)
1	Site-adapted tree species, conserving site forces	Site-adapted tree species, soil protection
2	Mixed forest - permanent stocking	Deciduous/mixed forest propagation
3	Biological equilibrium	Ecological conduciveness
4	Natural regeneration	Natural regeneration
5	Continuity, supporting structure	Forest structure
6	Girth limit felling	Girth limit felling
7	Conservation of nesting trees and trees for cave-nesting animals	Conservation of old trees, rare flora and fauna
8		Network of protected forest areas
9		Special forest functions
10	Multi-storied supporting structure	Forest edge maintenance
11	Dispensing with all types of toxins	Ecological forest conservation
12	Game density adapted to ecosystem conditions	Ecological game management
13	Site-compatible forest engineering adapted to ecosystem conditions	Ecological forest engineering

The aim is still a type of forest management geared to forest aspects that ensures that more valuable timber grows per time and area unit than would have been the case by nature, if possible. Rigorous close-to-nature forest management that is more strongly guided by dynamic natural design processes than envisaged by ANW and leaves those largely unaffected, if possible, is still the exception to date, e.g. in the municipal forests of the cities of Lübeck and Göttingen.

Federal and State forest acts, but also the requirements set by the MCPFE, require sustainable forest management to preserve the permanent functional and productive capacities of the natural balance at least. The nature conservation acts, that also consider substance and energy flows alongside diversity, peculiarity and beauty, also call for the conservation or improvement of the functional and productive capacities of (forest) nature, whilst giving preference to the most nature-compatible of all possible methods in the utilization of forests. Public-owned forests (communal, municipal, state and federal forests) are to act as an exemplary model in the context of both bodies of laws.

Forest management in Germany has been sustainably implemented for many decades now under these framework conditions and on sites that are mostly favourable in climatic and edaphic terms for forests according to global standards. The forest area increases by over 30 ha every day, the standing timber volume rises by over 2 m³ per hectare per year. German forests number among the European forests that are richest in growing stock today (almost 300 m³/ha) and have become

richer in growing stock by 200 m³/ha in order of magnitude in the past century even though there have been continuous fellings, more than increments would have allowed at times.

Annual timber use in Germany could be sustainable increased by 50% at least without impairing growing stock and productivity since the annual increments average approx. 6 m³/ha of which only approx. 4 m³/ha are being used. The fact that not more wood is being felled is partly due to a change in owner's objectives, but is also attributable to economic restrictions: wood harvesting is expensive in Germany and the market does not absorb accruing industrial roundwood at cost-covering prices. Therefore, favourable preconditions exist for *Sustainable forest management* and for the *Ecosystem Approach*.

The debate on the level of timber growing stock and the degree of its exploitation must take into account that the natural vegetation in Germany, in terms of full area coverage, consisted of forests chiefly that had been pushed back to less than one third of the area in the early Middle Ages already by settlement by farmers. Without exploitation in the flowing equilibrium between biomass formation and biomass degradation, it would carry approx. 600 to 700 m³ of live timber (solid timber volume) per hectare (estimated on the basis of the few primeval forest reserves in eastern and south-eastern Central Europe especially). Standing and lying deadwood in volumes of approx. 100 to over 300 m³ per hectare would be found additionally.

The farming settlement in Central Europe initially cleared comparatively fertile land that was easy to till. The remaining forests, therefore, grow mostly on edaphic and adverse sites in terms of the climate. Yet, in spite of their frequently relatively adverse sites compared with farmed agricultural soils, approx. half of the growing stock of their natural potential is particularly productive since the increment in biological systems (per area and time unit) takes a sigmoid course roughly until a flowing equilibrium between biomass formation and degradation has been achieved, with timber stock reaching maximum growth rates of around half of the equilibrium level. Even those forests, that have been actively re-afforested following agricultural use and more or less intensive degradation of these sites, are today in a relatively productive and mostly rich in growing stock. This is due to the fact that neither woodland grazing nor forest litter utilization had been carried out for many decades. Nutrient immissions have probably made a significant contribution to this in virtually all Central European forests over the past few decades.

In terms of growth potential, therefore, a further increase in growing stock can be expected. This is a situation that in view of the expected strains on forests within the framework of the climate change debate (e.g. increasingly occurring storms), would probably involve less risks given close-to-nature forest structures than e.g. in the optimum phase of even-age forests that are relatively rich in growing stock, for instance. Close-to-nature forests are assumed to be particularly resistant to various types of stress factors. Yet, planning and initiating an ecologically adapted tree species composition in a binding manner is not yet possible as the repercussions of the emerging global climate change for forests in Central Europe (and elsewhere) cannot be forecast yet in a scientifically substantiated way.

In view of this uncertainty it would make sense to manage forests in a close-to-nature manner, if possible, and to allow or promote as much diversity as possible. As appropriate, additional biomass/timber can be produced with farming methods, if required, on intensively managed fast-growing species plantations in relatively short rotations.

3. Sustainable forest management in Europe

The public debate on sustainable forest management is a political process that had already been triggered in Germany in the 1980s in connection with deforestation and the boycott of tropical timber. Verifying sustainable forest management (*SFM*), controlling its dimensions (monitoring) and furnishing proof of it towards third parties (reporting or also certification) is harder, however, than first thought. Various parties defined criteria and indicators to assess the extent to which sustainability has been achieved or is to be achieved in future, with specific requirements and standards being observed.

The MCPFE adopted in June 1994 six criteria and 27 indicators to assess the sustainable development and use of forests in European countries in the light of its definition of *SFM*. To supplement the six criteria and 27 indicators, the Third Ministerial Conference on the Protection of Forests in Europe adopted in Lisbon in June 1998 the pan-European operational guidelines for sustainable forest management, subdivided into guidelines for the planning of forest management or forest management operations, in the context of Lisbon Resolution L2.

The problem with indicators lies not only in the accuracy of statements on conditions and processes, but is a cost issue notably. The effort required to establish the (quantifiable) data should be as minor as possible. Already existing data that do not have to be newly collected at great expense are primarily used, therefore. They can or should be combined and interpreted from a suitable perspective in a targeted manner.

On the keyword "biological diversity" MCPFE required, for instance, data on four different area qualities that can be mainly gathered from existing statistics. Furthermore, the percentage of endangered forest species is assessed (on the basis of red lists) by the total number of existing forest species in a long-term trend. ELLENBERG (1998) showed a few years ago the minor extent to which this latter indicator, that seems convincingly plausible at first sight, has been defined in many respects, how clumsily it "indicates" and how error-prone it is basically. The indicators, especially the criterion "biological diversity" has now been revised, updated and specified by MCPFE (Expert Level Meeting of MCPFE in Vienna, October 2002). The revised version has been adopted at the Fourth Ministerial Conference in April 2003.

The *Forest Stewardship Council* (FSC) was founded in the 1990s with the aim of certifying sustainability of forest management, not only in the Tropics. For this purpose, a number of guidelines were formulated. They are primarily applied to forest estates, ranging from individual forest estates via forest offices to state forest administrations in Germany. The (economic) success of certification efforts is completely dependent on the acceptance of the outcome, i.e. on the degree of familiarity of the quality label and its credibility with respect to the evaluated facts. FSC is represented at international level. In Germany, Naturland[7] sets slightly higher requirements than FSC and is also endorsed by large environmental conservation groups (guidelines: see overview 2). Naturland has now certified thousands of hectares of forest, but substantially less than FSC or even PEFC[8] (see below).

Naturland differs from FSC in some key respects: criteria for the dimensions of reference areas (FSC: 5 %, Naturland: 10 % of the certified area), for the tree species composition (FSC: the natural tree species composition may not be dominated by that motivated by forestry, this allows e.g."40 % Douglas fir"; Naturland: merely tree species of natural forest communities are allowed) and for the spacing of strip roads (FSC: no specific statement on the spacing of strip

[7] Association for Environmentally-adapted Farming
[8] Pan European Forest Certificate

roads; Naturland: not narrower than 40 m to compact soils as little as possible). Some facts are not convincingly handled by Naturland/FSC either, e.g. taking biological diversity into account or the problems cloven-hoofed game pose for forests. These issues are addressed in-depth in the following digression.

Digression*: Biological diversity can only be assessed with great effort within the framework of forest management, but also in general. There are key shortcomings in this respect in other certification/assessment systems as well. Surrogates for biological diversity such as the quantity of dead wood or the forest structure that might be easier to assess than diversity itself must still be quantified in their relation to diversity and replace only a selected part of diversity anyway.*

The impact of ruminating hoofed game on forest vegetation, especially on the regeneration of trees, has been subject to some controversy in Germany for many decades now. Most people accept that this influence can be great. Sufficiently intensive hunting to lower browsing pressure is highly time- and cost-intensive though and frequently unwanted, for perfectly comprehensible reasons in some individual cases. The problem posed by hoofed game for forests is a major problem for sustainable forest management in Central Europe, however, since the selectivity and intensity of browsing exerts a key influence on the future tree species composition.

Own investigations performed in forests in southern Schleswig-Holstein over the past twelve years demonstrated that a diverse woody plant regeneration (25 to 27 tree species) in large quantities (20,000 individuals per hectare and more) has occurred virtually everywhere and is recordable in growth heights of up to 20 cm. Given the presence of roe deer and red deer and conventional hunting, only three tree species have survived out of this diversity in the forests examined and this only in a number and quality that rarely satisfies in forest terms and with a minute contribution of individual specimen of one to three other species. After eight years of intensified hunting in some of these forest areas, the number of individual trees that outgrew browsing had tripled and the number of species more than doubled. Especially with a view to future trends (sustainability, global change) this diversity is a key prerequisite for adaptations and chances of survival. In the case of forests, the composition of regenerated trees that outgrew browsing should be pointed out in the first place. Therefore, considerably more attention should be paid to biological diversity and hoofed game browsing in the context of the monitoring of sustainable forest development, also in the certification systems.

Overview 2: Ecological forest utilization: binding principles and rules as a basis for annual certification notifications. (NATURLAND - guidelines on ecological forest utilization: 5th version, Nov. 1998, slightly abridged)

1. Site-indigenous stocking - continuous approximation of forests to potential natural biocoenosis. Aim: natural regeneration of existing site-indigenous trees. Planting and seed: the exception. Genetic engineering operations are banned.

2. Afforestations - must be coordinated with Naturland.

3. Soil cultivation - none, if possible. Traffic should not cover entire area. No forest soil drainage. Topsoil loosening only in consultation with Naturland.

4. Forest utilization and forest protection - single stem cutting, group cutting or grove cutting. Clear felling and whole tree use are banned. Diameter of the logging area not larger than neighbouring tree heights (to conserve stand climate). Type, frequency and intensity of logging operations are coordinated with Naturland based on planning documents. Logging debris remains on the spot to preserve soil. Natural species diversity must be conserved and/or promoted.

5. Hunting - planning of hunting on the basis of the condition of forest vegetation. It should be possible to regenerate all tree species of the natural regional forest community without any specific protective measures. Few justified exceptions. Sika, fallow deer and moufflon must not be newly naturalized or fostered.

6. Opening up, wood harvesting, storage - forest road planning must be coordinated with Naturland. Fixed and permanent strip road system is required, not more than 10% of the forest soil should be exposed to traffic. Timber haulage from the strip roads under suitable weather conditions. Pre-skidding with horses. Biodegradable chainsaw oil. Logging (stem timber) only during winter dormancy, if possible. Drying fuel wood only in a natural way.

7. Fertilization and use of synthetically produced chemicals - application of substances alien to forests is always forbidden - except for protective agents against browsing, rubbing and bark-peeling damage without any synthetic-chemical additives. Compensation fertilization of partial areas with exemption being granted by Naturland.

8. Natural dynamics - natural dynamics must be allowed on all areas. - To be noted: conservation of rare tree species, conservation of special biotopes - going beyond statutory protection as well. Raising the share of biotope timber (trees for cave-nesting animals, nesting trees, deadwood etc.). Long-term aim: share of standing and lying biotope timber = 10 % of growing stock. Conservation of tree monuments, striking individual trees, historical sites in forests.

9. Reference areas - For comparison with managed areas, unmanaged reference areas are to be designated according to the key types of stands to acquire local, site-specific information on natural forest development and thus for ecological forest utilization. Public-owned forests: at least 10 % of reference area! - Private forests do not have to designate any reference areas themselves, but also gear themselves to comparable reference areas in public-owned forests.

FSC and Naturland certificates only met with limited approval in the German forest sector, often encountered scepticism or rejection especially on the part of professional forest associations, many private forest owners and some state forest administrations. The guidelines and criteria of Naturland/FSC were deemed too far-reaching and restrictive. Thus, it did not come as much of a surprise that some critics, when the FSC certificate began to gain a promising foothold, developed their own certificate to counter disadvantages on the market, the so-called PEFC. It is geared to the criteria set by the MCPFE. FSC and PEFC rejected each other for years. Recently, a kind of mutual recognition has emerged which is probably chiefly motivated by economic reasons because competing certification systems for timber from sustainable forest management do not get along on the market.

The aim of silvicultural management in previous decades was to manage forests so as to produce there high-value timber faster than until now. The silvicultural systems only focused on few types of timber suitable for uniform processing (at operational level) and use (on the market) of which more quantities can be produced than the original stand would have yielded. This approach is

gleaned from farming, in principle. Yet, forests that are shaped in this way require permanent input of attention, work and energy for preparatory soil cultivation, planting, fertilization, care, thinning, salvage logging etc.. The theory that forests are "multivariable fortuitous succession mosaic" (STURM 1992), however, was hard to accept.

In view of the sustained cost problems in the German forest sector, natural forest regeneration should be more seriously examined than before as a forest management concept on a larger area as well. This ties in with the development of the past decades: towards more close-to-nature and thus less expensive forests that meet their ecological and social tasks in all likelihood just as well as the even-age forests of the past that were mainly marked by coniferous trees. These forests might also yield economic benefits in the longer term.

4. The *Ecosystem Approach* (EA)

The *Ecosystem Approach* was developed as part of the follow-up negotiations to the *Convention on Biological Diversity* (*CBD*). It is not only geared to forests. The *Conference of the Parties* (*COP*) to the *CBD* already decided at its fourth meeting (*COP* 4) that an *EA* should provide key guidance for activities to implement decisions within the *CBD* framework. The *EA* is seen as a holistic approach in this context, in deliberate contrast to many approaches pursued in other international negotiations that were more sectorally-oriented. The *CBD* defines an *ecosystem* as "*a dynamic complex of plant, animal and micro-organism communities and their non -living environment interacting as a functional unit*", i.e. as a biological system. The scientific advisory body of CBD, the *Subsidiary Body for Scientific, Technical and Technological Advice* (SBSTTA), already addressed *EA* in-depth at its third meeting (SBSTTA III/5, page 5 + 6; quotation):

14. *Parties to the Convention have agreed that the EA should be the primary framework of action to be taken under the Convention (decision II/8, Paragraph 1) and that sustainable forest management should take an ecosystem approach and aim at securing forest quality (decision II/9, Annex, paragraph 12).*
15. *An EA emphasises the complexity and interdependencies of biological communities and their dependencies on the abiotic site-specific (edaphic) factors. Furthermore, the concept introduces the importance of natural disturbance regimes and regeneration mechanisms as factors involved in the maintenance of biological diversity over large landscapes. Finally, an ecological perspective notes the spatial organisation of communities and ecosystems as life-zones, formations, ecoregions, biogeographic zones or realms, and biomes.*
16. *The importance of applying the EA in the SFM at the national, regional and global levels is further emphasized by the fact that it is through the sustainable management of all types of forest, natural, semi-natural, and plantations, particularly those outside reserves, that most in-situ conservation of forest biological diversity will be realised. One important aspect of this, as identified by the SBSTTA, will be the advancement of scientific and technical approaches to rehabilitating degraded and deforested ecosystems and to enriching biodiversity in forest plantations.*

In view of the apparent different understanding of the meaning of *EA* in practice, also in the *COP*, a workshop was held in 1998 in Malawi. This workshop drafted *guiding principles*. On the occasion of *COP* 4 (Bratislava, May 1998), these guiding principles were acknowledged and *SBSTTA* was commissioned to develop them further. Thus, *EA* was described and an explicit definition of 12 *guiding principles* to apply *EA* as well as five points on *operational guidance* were drafted. These 12 *principles* and 5 points (see overview 3a and b) were formally endorsed

by the *COP* 5 (Nairobi, May 2000, decision V/6, Ecosystem Approach), with their application and implementation being recommended as the current state of play in the common understanding of *EA.*

Overview 3: The twelve *guiding principles* and five *points for operational guidance* for the *Ecosystem Approach* ("Malawi Principles", as of 2000, COP 5) abridged text

a) Guiding principles

1.) The objectives of management of land, water and living resources are a matter of societal choice. … Ecosystem should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

2.) Management should be decentralized to the lowest appropriate level. … Management should involve all stakeholders and balance local interests with the wider public interests. …

3.) Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. … This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.

4.) Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

a) reduce those market distortions that adversely affect biological diversity;

b) align incentives to promote biodiversity conservation and sustainable use;

c) internalize costs and benefits in the given ecosystem to the extent feasible.

5.) Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the EA. … The conservation and … restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

6.) Ecosystems must be managed within the limits of their functioning. … management should be appropriately cautious.

7.) The EA should be taken at the appropriate temporal and spatial scales. … The EA is based on the hierarchical structure of biological diversity characterized by the interaction and integration of genes, species and ecosystems.

8.) Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term. … This inherently conflicts with the tendency of humans to favor short- term gains and immediate benefits over future ones.

9.) Management must recognize that change is inevitable. … Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. … consider mitigating actions to cope with long-term changes such as climate change.

10.) The EA should seek the appropriate balance between, and integration of, conservation and use of biological diversity. … There has been a tendency in the past to manage components of biological diversity as either protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in a context …

11.) The EA should consider all forms of relevant information, including scientific, and indigenous and local knowledge, innovations and practices. … Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

12.) The EA should involve all relevant sectors of the society and scientific disciplines.

b) Points for operational guidance:

1.) - Focus on the functional relationships and processes within the ecosystem

2.) - Enhance benefit sharing.

3.) - Use adaptive management practices.

4.) - Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to the lowest level, as appropriate.

5.) - Ensure intersectoral co-operation.

The follow-up negotiations showed early on that these principles must still be revised to make them more effective, easier to understand, more coherent and less redundant. A relevant study by HÄUSLER and SCHERER-LORENZEN (2001) pointed this out, inter alia. The *COP* 5 also recommended a further conceptual elaboration of the *EA* and a practical trial of the *EA*. To this end, the signatory states of *CBD* were called upon to present their own case studies that should then be compiled and assessed with the objective of further specifying the *EA*. It took relatively long to draft the case studies. The study from Germany drafted by HÄUSLER and SCHERER-LORENZEN (2001) was one of the first and most concrete, using forest management as an example.

A great number of these studies with highly varying intensity and from various regions of the world are now available. Many of them were discussed, analyzed and compiled in a report[9] at an international workshop held by the International Nature Conservation Academy of the Federal Agency for Nature Conservation on the island of Vilm (Rügen) in October 2002.

The Vilm workshop tied in with the *decision V/6 EA* of the *COP* 5 (*CBD*) that is designed to encourage the contracting states of *CBD* to elaborate the *EA* further in conceptual terms and test it under practical conditions. *COP* 6 commissioned the secretariat of *CBD* in April 2002 with its *decision VI/12* to develop proposals for the *"refinement of the principles and operational guidance of the EA on the basis of case studies and lessons learnt"*.

These formulations highlight a certain uncertainty in the handling of the EA concept itself. The "Vilm – Report" is to compile the key points of the discussions and make recommendations "*to help individuals and delegations in their preparation of the revision of the EA at the ninth meeting of the SBSTTA and COP 7"*. The streamlining of principles to only ten principles and their more logical compilation (see overview 4) seems to be a crucial element in this report:

Overview 4: Summary of the revised Principles of the EA (proposal from the Vilm-Workshop, October 2002)

Number Vilm-Workshop	Former Number Malawi-Principles	Principle: Text
1	1 12	The objectives of management of land, water and living resources are a matter of societal choice involving all relevant sectors of society.
2	10	The EA should seek the appropriate balance between, and integration of, conservation and sustainable use of biological diversity as well as the fair and equitable sharing with benefits.
3	6	Ecosystem management must ensure the sustainable provision of ecosystem goods and services.
4	5	In order to maintain the provision of ecosystem goods and services, the conservation of ecosystem structure and functioning is a priority target.
5	2	Ecosystem management should be decentralised to the lowest appropriate level, taking into account the linkages with other levels.
6	11 12	Management decisions should be based on all forms of relevant information, including that from scientific disciplines as well as indigenous and local knowledge, innovations and practices.

[9] second draft, can be obtained via Dr. Horst Korn, INA Vilm, Bundesamt für Naturschutz (Federal Agency for Nature Conservation)

Overview 4: Summary of the revised Principles of the EA (proposal from the Vilm-Workshop, October 2002)

Number Vilm-Workshop	Former Number Malawi-Principles	Principle: Text
7	4	Ecosystem management must consider the relevant economic values, impediments and opportunities including: the reduction of those market distortions that adversely affect biological diversity; the alignment of incentives to promote biodiversity conservation and sustainable use; the internalisation of costs and benefits to the extent feasible.
8	7 3	Ecosystem management should be undertaken at spatial and temporal scales appropriate to the objectives taking into consideration effects on adjacent and other ecosystems.
9	8	Ecosystem management should set objectives for the long term recognising the varying temporal scales and lag effects that characterise ecosystem processes.
10	9	Ecosystem management should adopt adaptive management strategies recognising the inherent dynamics of change and uncertainties in ecosystems.

Another key outcome of the Vilm Workshop is the clear emphasis on persistent problems and issues revolving around the EA that are briefly listed in the following:

- *Some of the Principles of the EA were not agreed by all Parties.*
- *The overall concept and explanation frame of the EA needs clarification.*
- *Must the Principles of the EA be seen as a package, or might a stepwise implementation be feasible?*
- *The relationship of the EA to other approaches needs clarification.*
- *There is a lack of guidelines for the application of the EA in the field.*
- *There is a need for capacity building.*
- *There is a need for public awareness.*
- *There is a need for economic incentives.*
- *What is the role of adaptive management?*
- *How can we promote active participation?*
- *Scale-related issues need to be clarified.*
- *Monitoring-related issues need to be clarified.*

The Vilm workshop was devoted to the EA as an overall concept, i.e. its application to all types of ecosystems that are to be sustainably managed, not only forests.

5. Comparison between the Ecosystem Approach and Sustainable Forest Management

A comparison or distinction between the *Ecosystem Approach* (EA), on the one hand, and *Sustainable Forest Management* (SFM), on the other hand, must take two different levels into account, i.e. the specific specification level of both approaches (depth of specification), on the one hand, and the contents involved in these two approaches (content-wise specification), on the other hand.

a) Depth of specification

With regard to the depth of specification, it must be noted that the *EA* is not a precise concept for management that provides clear instructions for action for certain forest estates or forest sites (see also HÄUSLER and SCHERER-LORENZEN 2001). The *SFM* concept, in contrast, was continuously developed during its far longer history (e.g. drafting of the sustainability indicators for operational medium-term planning) as well as by negotiations at international and regional levels over the past few years (separation of levels of consideration, national or at enterprise level) and technical scientific findings (keywords, inter alia: close-to-nature concept; biological automation; silviculture on an ecological basis, including mapping of biotopes).

All the same, the above-mentioned management concepts of environmentally-adapted/close-to-nature forest management (NW[10], LÖWE, inter alia) and, in a similar way, also traditional sustainable forestry in Germany (TND[11]; cf also the reference to the "iron law of the locality" ascribed to PFEIL in the context of German sustainability forestry) as well as the certification systems PEFC, FSC and Naturland do not constitute precise management concepts either, in principle, but framework concepts for the time being.

All of these concepts, however, use a kind of institutional embedding that can provide the required site specification, notably through the legal advisory and inspection system and specifically with the aid of the instruments of forest management planning and forest supervision. In the case of PEFC/FSC, operational management concepts on the basis of enterprise inspections also ensure site specification.

If the above instruments for site specification are viewed as an integral part of TND, NW, LÖWE and PEFC/FSC, it must be noted that the specification of these concepts goes deeper than in the case of the *EA*. Even if this does not provide any information about the specified contents in each case, the silvicultural options to take concrete ecosystemic processes into account go further in these concepts than in the *EA*.

b) Content-wise specification

SFM and EA can be compared in terms of content in three ways: on the basis of *definitions*, on the basis of *meanings of words* and on the basis of the respective *contexts of interpretation*.

A comparison of definitions at operational level is hardly possible as the respective definitions in EA, SFM as well as NW, TND, LÖWE, inter alia, can be used against different backgrounds.

A comparison of *meanings of words* can help to clarify positions in view of the respective euphemization potential. In terms of word meanings, *SFM* stresses the management aspect

[10] Close-to-nature forest management (according to ANW)
[11] Traditional sustainable forestry in Germany

compared with *EA* and is restricted to forest management; *EA* stresses the integration into ecosystems and encompasses more than just the forest aspect, i.e. also the ecological integration of the examined forest ecosystem into neighbouring ecosystems. This aspect is, however, also highlighted in the last line of the MCPFE Definition of SFM. This gives the impression that the *EA* represents a more holistic claim than *SFM*; at the same time *EA* avoids a reference to management (with its possibly negative connotations) by the choice of words. In addition, *SFM* mentions specific targets of action (i.e. "sustainability" as well as "management"). *EA*, in contrast, does not contain the target, but the starting-point of action (i.e. the ecosystem). *EA*, thus, avoids any associations with potential conflicting aims in terms of words and suggests that management instructions can be objectively derived from a scientific observation of the ecosystem.

A viable comparison of the concepts must essentially be based on the respective *contexts of interpretation*. *SFM* as well as the *EA* are being used in international negotiation processes (*SFM: MCPFE; EA: CBD*). Two typical features of international negotiation processes must always be heeded in a comparison: on the one hand, a number of varying factual starting conditions in the individual countries must be taken into account in international negotiations. This holds true for *CBD* even more than for *MCPFE*. The MCPFE framework comprises countries with a long-standing forest tradition and functioning forest administration. The CBD framework also involves developing countries without these prerequisites in some cases. In addition, *CBD* transcends the forest sector in its scope of application. It must also be noted that international agreements are often linguistically watered in the reaching of a consensus to conceal dissent content-wise.

CBD itself is also ambiguous about the implementation of EA. The fact that *CBD-COP* 6 initially recommends in the revised programme of work on forest biological diversity to clarify the conceptual basis of the *EA* with respect to *SFM* can only be explained that way (UNEP/CBD/COP/6/L.27, *Annex 1*, programme element 1, *Goal 1*, *Objective 1*, *Activity [a]* and *activity [b]: Develop guidance for applying the ecosystem approach in forest ecosystems*).

In view of this initial situation, the following comparison is confined to the question to what extent the *EA* for all types of ecosystems that are laid down in the twelve *Malawi principles* of CBD might conflict with the customary practice of sustainable forestry in Germany. As HÄUSLER and SCHERER-LORENZEN (2001) had already made this comparison, it is assumed that their results are known here. Therefore, the following observations are restricted to additions and also rectifications of those results, as appropriate.

A "wish list" (HÄUSLER and SCHERER-LORENZEN 2001), geared to the *Malawi principles* and adapted to forestry, generally harbours the danger of disregarding the intersectoral aspect: the ecological optimization of forest management as a type of terrestrial land use in Germany that is today already closest to nature could result in further distortions of competition at the expense of forestry if other types of land use are not ecologically optimized at the same time. If "undisturbed nature" were to be the reference system, a lot more could at first be effected in the transport sector, in farming etc. under political and ecological aspects. Even if HÄUSLER and SCHERER-LORENZEN (2001) cannot see any major differences, all in all, their "wish list" set out in the examples based on the *Malawi principles* goes far beyond the regulatory requirements for *SFM* in Germany (e.g. criticism of "spruce forestry", reference areas pp.).

A key difference between *EA* and TND, also *SFM*, is the explicit recourse to participatory mechanisms in the *EA* (Malawi principle 1). TND, NW, LÖWE and *SFM* do not provide for these mechanisms; HÄUSLER and SCHERER-LORENZEN (2001) point out, however, that the

National Forest Programme, inter alia, remedies this shortcoming. It must also be pointed out that participation is not restricted to discussion processes with stakeholders, but market coordination can also be deemed a form of participation, for example. Furthermore, there are co-decision options in Germany for state and communal forests via the respective parliaments.

Moreover, participation can take place at several levels, e.g. with respect to precise site-specific management rules (local level) as well as in the political fixing of framework conditions (land and federal levels).

Conflicts could arise between the procedural rule contained in the participation idea and the content-wise targets (nature conservation, for example) that could emerge in the course of participation (such a conflict could arise, for example, if the population would opt against nature conservation measures in a participatory procedure).
HÄUSLER and SCHERER-LORENZEN (2001) conclude in their study that the ownership target "nature conservation" is of secondary importance in private forests and can only be realized by public-owned forests really. Yet, we can cast doubt on this conclusion for several reasons:

a) On the one hand, this conclusion is based on a mix-up of theoretical economic behavioural incentives (*Malawi principle 10*) with practical conduct itself. It is true HÄUSLER and SCHERER-LORENZEN (2001) suggest that private forest owners, in particular, maximize profits *(„while in the past there has been a distinct focus on the commercial function of forests ... ... aiming at the maximization of ecosystem goods production"*) and they argue: since 90 % of revenue comes from timber sales, forest owners invest too little in protective functions, if at all. However, there is empirical proof to the contrary (e.g. the study by DAHM et al. (1999) on strains on forestry resulting from the protective and recreational functions of forests that proves significant voluntary investments into unremunerated protective functions).

b) On the other hand, the long-term nature of owners' targets, that can potentially conflict with the short-term nature of policy aims, can be used to draw a contrary conclusion. The existence of ANW constitutes a counterexample on the part of private forest owners. It has to be recalled as far as the state is concerned that the silvicultural programmes of most state forest administrations did not contain close-to-nature forest management ten years ago still.

The option to dismantle market distortions and perverse incentives (*Malawi principle* 4) as well as negative externalities that impair forestry lies largely outside the sphere of influence of the forest sector. As far as support schemes are concerned, it can be noted, however, that the Joint Task for the Improvement of Agricultural Structures and Coastal Protection, for example, promotes measures that are rather targeted at an improvement of conditions for the use of timber in the narrower sense (e.g. soil cultivation, road construction). A rigorous conversion of the support system to the support of environmental services instead of substantial support of timber production seems imperative. Yet, Germany does not require the *EA* to provide impetus for this.

6. Conclusions

The question whether new requirements for forestry in Germany will arise from the discussion on the *EA* cannot be answered at present. The *Malawi principles* are not yet operational for one thing and, therefore, still being developed. Secondly, they are not specifically related to forests, even though *COP-CBD* sees a need for specification in terms of forests. The still to be drafted forest criteria within the framework of the *EA* are likely not more operational than the previous ones in the contexts set out above. Nature conservation activists might want to harness this rather general specification of the *EA* to tighten requirements for forestry under the keyword of "sustainable forest management".

A tightening of criteria is not mandatory, however, and it does not by any means ensue from the elements of *EA* formulated by CBD. If nature conservation activists were to try to exploit the *CBD* for a tightening of demands on forestry, therefore, this would be based on a certain interpretation of the *EA* and not on what was laid down there in writing. The vague formulations in the *EA*, that are hardly operational as yet, leave wide scope for interpretation at present at least. Yet, the EA contains some ideas and aspects that could surely be taken into account in the *SFM* framework, as it is currently understood and operated, without doing any harm. A rigorous further development of sustainable forest management (*SFM*), as it has evolved in Germany, is recommended here. It has proved to be target-oriented by international standards as well.

The following comments briefly take up the new compilation of ten principles of the *Ecosystem Approach* as they had been grouped together at the Vilm Workshop in late October 2002 (see overview 4) and outline the current situation of forest management in Germany from the author's perspective.

- The National Forest Programme as a process already translates key demands of the EA into practice. Regional and local activities should continue to be supported and initiated, as appropriate.
- *SFM* has striven for a long time to strike a balance between the conservation and use of forests and their biological diversity and has stepped up its efforts in this regard.
- The fact that sustainable forest management (*SFM*) shall generate sustainable production of the goods and services provided by the ecosystem is self-evident.
- The transition to a type of forest management that is closer to nature has increasingly made clear that the protection of structures and functions of forests is a prerequisite for their productivity.
- The existing and further updated planning documents have already ensured that the decisions on concrete forest management are taken on the spot on most sites, if possible. The stepped-up involvement of knowledgeable persons and groups at local level can further deepen and possibly also institutionalize the knowledge of local characteristics.
- The active debate on political framework conditions that result in market distortions and exert an adverse effect on biological diversity can and should be intensified.
- The temporal and spatial framework for decisions on sustainable forest management can also be extended to surrounding non-forest areas that have an ecological exchange with the forested areas. This synopsis has formed an integral part of planning at several levels and in many respects for a long time now.
- Sustainable forest management has increasingly focused on long-term ecosystemic processes in conceptual terms.
- Sustainable forest management takes the options of a type of forest utilization geared to ecosystemic processes into account.

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