

Fischer, Richard

Research Report

Feasibility study for future contributions in the field of forest biodiversity assessments

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WORKREPORT

Institute for World Forestry

Feasibility Study for Future Contributions in the Field of Forest Biodiversity Assessments

by

Richard Fischer



**Federal Research Centre
for Forestry and Forest Products**

and the

Chairs of World Forestry,
Wood Biology and Wood Technology

of the

University of Hamburg

Bundesforschungsanstalt für Forst- und Holzwirtschaft Hamburg
(Federal Research Centre for Forestry and Forest Products)
Address: Leuschnerstr. 91, D-21031 Hamburg, Germany
Postal address: P.O. Box: 80 02 09, D-21002 Hamburg, Germany

Phone: +40 / 73962-101
Fax: +40 / 73962-480
E-mail: weltforst@holz.uni-hamburg.de
Internet: <http://www.bfafh.de/>

Institute for World Forestry

**Feasibility Study for
Future Contributions in the Field of Forest Biodiversity Assessments -**

by

Richard Fischer

**CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION
INTERNATIONAL CO-OPERATIVE PROGRAMME ON ASSESSMENT AND MONITORING
OF AIR POLLUTION EFFECTS ON FORESTS**

United Nations
Economic Commission
for Europe

Richard FISCHER

**Feasibility Study for
Future Contributions in the Field of Forest Biodiversity
Assessments**



October 2002

**Federal Research Centre
for Forestry and Forest Products (BFH)**



Mr Richard Fischer,
Programme Co-ordinating Centre of ICP Forests,
Leuschnerstrasse 91, Hamburg/Germany,
fischer@holz.uni-hamburg.de

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I Overview on national biodiversity monitoring activities within some ICP Forests countries

Abstract

As a basis of the ICP Forests feasibility study this overview describes national activities in the field of forest biodiversity monitoring. It takes into account 15 participating countries of ICP Forests, including those that already in 2002 were interested in a participation in an ICP Forests biodiversity test-phase and those that had already submitted relevant reports to the to the Convention on Biological Diversity (CBD). Results show that the importance of forest biodiversity and related monitoring has been recognized in most countries. The evaluated countries differ widely in the extent of implemented national biodiversity monitoring programmes. A first evaluation of National Forest Inventory methodologies shows that stand structural information should be available from most inventories – although not in an harmonized format, whereas information on compositional aspects of forest biodiversity, e.g. in the form of ground vegetation species lists, is hardly available from existing national forest inventories.

I.1 Introduction

At its 18th Meeting held in Lisbon in May 2002, the ICP Forests Task Force invited the countries to compile national experiences or if possible to carry out national desk studies in the field of forest biodiversity assessment. The Task Force also decided to carry out a biodiversity feasibility study through its Programme Coordination Centre (PCC) in cooperation with the Forest Intensive Monitoring Coordinating Institute (FIMCI) in 2002. As a part of this feasibility study an overview on the national activities in the field of biodiversity monitoring was required. Such an overview seems inevitable in order to (i) estimate the need of additional transnational biodiversity monitoring activities and (ii) to avoid double work in the countries.

This chapter presents a first overview as prepared by the Programme Coordinating Centre of ICP Forests. It is based on literature and internet information. A draft of the overview has been circulated among the National Focal Centres of the programme and the comments and amendments of national experts were incorporated.

I.2 Methods

I.2.1 Available information

The national reports submitted to the Convention on Biological Diversity (CBD) provided a starting point in the search for national activities. These reports are available under <http://www.biodiv.org/world/reports.asp?t=all>. An additional internet search provided more details. Concerning biodiversity related assessments in the frame of National Forest

Inventories (NFI), use was made of an EFICS study compiled by the European Forest Institute on behalf of the European Commission.¹

I.2.2 Selection Criteria

From the wealth of information a selection was made focusing on the specific interests and possibilities of ICP Forests.

I.2.2.1 National biodiversity monitoring programmes

The compilation only includes national monitoring systems, in particular those concerned with forests, and more particular those including aspects of vascular plants, mosses or lichens. “Monitoring” is meant as a repeated (or at least planned to be repeated), comprehensive as regards the area, systematic, site-based activity.

The following aspects were excluded from the review:

- monitoring solely focussed on red list/threatened species
- monitoring focussing on genetic aspects
- compilation of research activities
- species inventories
- guidelines for sustainable forest management

I.2.2.2 National Forest Inventories

Through the EFICS project, financed by the European Commission, an overview on methods of existing National Forest Inventories was available (see also Annex II).

I.2.3 Countries included

The work in this study has been carried out for (i) those countries that in 2002 already offered their participation in a test phase 2003-2005 (Austria, Belgium-Flanders, Denmark, Czech Republic, Finland, Germany, Spain, Switzerland, and the United Kingdom) and in addition (ii) for those countries for which a “Second National Report on Biodiversity” and a “Thematic Report on Forest Ecosystems” was available on the CBD webpage (Estonia, Ireland, The Netherlands, Norway, Poland, Sweden) (Table 1).

¹ European Commission. 1997. Study on European Forestry Information and Communication System. Report on forestry inventory and survey systems. Vol.1, 2. European Communities, 1997. 1328 p.

Table 1: Countries¹ evaluated and availability of national reports to the CBD²

	Biodiversity Strategy	1st National Report	2nd NR Biodiv ³	TR ForEco ⁴
Austria	x	x	x	x
Belgium		x	x	
Czech Republic	x	x		
Denmark	x	x	x	x
<i>Estonia</i>	x	x	x	x
Finland	x	x	x	x
Germany		x	x	x
<i>Ireland</i>	x	x	x	x
<i>The Netherlands</i>		x	x	x
<i>Norway</i>		x	x	x
<i>Poland</i>		x	x	x
Spain	in span	in span	in span	
<i>Sweden</i>		x	x	x
Switzerland	in prep	x	in prep	x
United Kingdom	x	x	x	x

¹ standard fonts: countries that already offered their participation in a test phase

italics: additional countries for which a “Second National Report on Biodiversity” and a “Thematic Report on Forest Ecosystems” was available on the CBD webpage.

² available at <http://www.biodiv.org/world/reports.asp?t=all>

³ Second National Reports on Biodiversity (mostly 2001)

⁴ Thematic Report on Forest Ecosystems (mostly 2001)

I.3 Results

I.3.1 Biodiversity and monitoring in general

In the CBD - “Second National Reports on Biodiversity” countries answered questions generally related to biodiversity. The following tables only concentrate on questions related to possible future activities of the ICP Forests.

They show that for most countries forest biodiversity and monitoring are of high or medium priority (Table 2, Table 3). The monitoring of species is mostly focussed on species groups (Table 4). The monitoring of ecosystems takes into account major ecosystems or those of particular interest only (Table 5). Comprehensive ranges of species and ecosystems are monitored in one out of 15 countries respectively. The assessment of potential indicators is underway in most countries whereas only a minority of countries has already identified relevant indicators (Table 6).

Table 2: Priority of forest biodiversity

What is the relative priority for implementation of the work programme on forest biological diversity in your country?				
	High	Medium	Low	Not relevant
Austria	x			
Belgium (Flanders)		x		
Czech Republic		x		
Denmark			x	
Estonia	x			
Finland	x			
Germany	x			
Ireland	x			
The Netherlands		x		
Norway		x		
Poland	x			
Spain	x			
Sweden		x		
Switzerland		x		
U.K.		x		
all	7	6	1	

Table 3: Priority of Identification and Monitoring

What is the relative priority afforded to implementation Article 7 (on Identification and Monitoring) and the associated decisions by your country?			
	High	Medium	Low
Austria			x
Belgium (Flanders)		x	
Czech Republic		x	
Denmark		x	
Estonia		x	
Finland	x		
Germany		x	
Ireland		x	
The Netherlands	x		
Norway	x		
Poland		x	
Spain	x		
Sweden	x		
Switzerland	x		
U.K.	x		
all	7	6	1

Table 4: Monitoring programmes at species level

Does your country have ongoing monitoring programmes at species level				
	minimal activity	for key groups	for a range of major groups	comprehensive range of species
Austria		x		
Belgium (Flanders)		x		
Czech Republic		x		
Denmark		x		
Estonia		x		
Finland				x
Germany		x		
Ireland		x		
The Netherlands			x	
Norway		x		
Poland		x		
Spain			x	
Sweden		x		
Switzerland			x	
U.K.			x	
all	0	9	4	1

Table 5: Monitoring programmes at ecosystem level

Does your country have ongoing monitoring programmes at ecosystem level?				
	minimal activity	ecosystems of particular interest only	for major ecosystems	comprehensive range of ecosystems
Austria		x		
Belgium (Flanders)			x	
Czech Republic		x		
Denmark		x		
Estonia		x		
Finland		x		
Germany			x	
Ireland			x	
The Netherlands		x		
Norway			x	
Poland			x	
Spain				x
Sweden			x	
Switzerland				
U.K.			x	
all	0	5	8	1

Table 6: Identification of national indicators of biodiversity

Has your country identified national indicators of biodiversity?			
	no	assessment of potential indicators underway	indicators identified
Austria		x	
Belgium (Flanders)			x
Czech Republic		x	
Denmark		x	
Estonia		x	
Finland			x
Germany	x		
Ireland			x (some)
The Netherlands			
Norway		x	
Poland		x	
Spain		x	
Sweden			
Switzerland			x
U.K.			x
all	1	6	4

I.3.2 Forest biodiversity

In the “Thematic Reports on Forests” under the CBD a large number forest specific questions are answered by the countries. For this study only questions related to possible future activities of the ICP Forests were evaluated.

They show that most countries have experiences with indicators for forest biological diversity (Table 7) and that the assessment of forest biodiversity is mostly underway (Table 8).

Table 7: Experiences with indicators for forest biological diversity

Has your country assessed experiences gained in national and regional processes, identifying common elements and gaps in existing initiatives and improving indicators for forest biological diversity?				
	minimal activity	limited assessment	significant assessment	not relevant
Austria		x		
Belgium				
Czech Republic		x		
Denmark			x	
Estonia		x		
Finland			x	
Germany		x		
Ireland		x		
The Netherlands		x	x	
Norway			x	
Poland		x		
Spain				
Sweden		x		
Switzerland			x	
U.K.		x		
all	1	8	5	

Table 8: Forest Biodiversity assessed?

Has your country assessed the status and trends of its forest biological diversity and identified options for its conservation and sustainable use?				
	no	assessm. underway	assessm. completed	not relevant
Austria		x		
Belgium				
Czech Republic		x		
Denmark		x		
Estonia			x	
Finland		x		
Germany		x		
Ireland		x		
The Netherlands			x	
Norway		x		
Poland		x		
Spain				
Sweden			x	
Switzerland		x		
U.K.		x		
all		9	3	

I.3.3 Specific programmes (excluding National Forest Inventories)

The standardized answers in the previous chapter do not allow identifying ongoing programmes. Thus the written comments of the CBD reports were evaluated and an additional internet search was conducted in order to provide more details. In the following tables the programmes are classified and a short description is provided.

The results show that in six out of 15 countries country wide biodiversity monitoring programmes are planned. In Switzerland and the United Kingdom programmes have been implemented which were classified as comprehensive, country wide biodiversity monitoring programmes (Table 9). Related to forests, the search revealed four countries with monitoring activities in selected areas, not being National Forest Inventories. The hemerobie study in Austria covers the whole national forest area (Table 10).

Table 9: Country wide biodiversity monitoring programmes

Are there country wide biodiversity monitoring programmes (not only focussing on protected areas, not only focussing on forests)?		I	II	III	IV
Source/name					
Austria	http://fbva.forvie.ac.at/700/700.html : „Für die nächste Inventurperiode 1999/2003 ist ein Beitrag zu einem österreichweiten Monitoring der Biodiversität unter Einbeziehung der Ergebnisse des Hemerobieprojektes im Gespräch“		X		
Belgium		X			
CZ		X			
Denmark	1st national Report (1998) to the CBD: "Ministry of Environment and Energy has adopted a comprehensive nation-wide monitoring programme. The programme will enter into force from 1998" <u>Danish Nature - status, trends and recommendations for future biodiversity policies, Wilhelm Committee 2001:</u> Includes recommendations for further measures and the proposal to set up a comprehensive monitoring programme in 2004 "..... The objective of forest monitoring should be to offer some contribution to total monitoring of nature."		X		
Estonia	<u>Establishment of "GIS based Biodiversity Monitoring System for Estonia" (PHARE, 1998):</u> "The main efforts were put into the monitoring of habitats, but also landscape and species level components were monitored.....however, a comprehensive country-wide assessment of the status and trends of its forest biological diversity are so far missing in Estonia."	X			
Finland	<u>National Action Plan</u> (http://www.vyh.fi/eng/environ/bdclearh/actionpl.htm#RMAI): "89. A network will be established for monitoring the status of biological diversity in Finland." <u>CBD Reports:</u> The research, monitoring and information systems working group will publish a report on the current state of biodiversity monitoring in Finland during the summer 2001.		X		
Germany	http://www.umweltbundesamt.de : Model project "Ökosystemare Umweltbeobachtung" in Biosphere reserve Rhön will combine all available data accross state (Länder-) borders and different programs." In the meantime the model project has been stopped due to lacking funds.	X			
Ireland		X			
The Netherlands		X			
Norway	<u>Draft Plan for Environmental Monitoring worked out in 1998:</u> National programme on monitoring of biological diversity is being worked out in collaboration with relevant Ministries		X		
Poland		X			
Spain	"National Inventory of Habitats and Taxons" (which in near future will change its name to "Inventory of Biodiversity") has developed the "Atlas of habitats and taxons". Up to the moment, some volumes of this "Atlas" corresponding to some groups of species: Fishes, Amphibians and Reptiles, have been already published. Some others will be published soon: Mamals and Birds. www.mma.es/conserv_nat/biodiv/index.htm http://www.mma.es/bd_nat/menu.htm		X		
Sweden		X			

Are there country wide biodiversity monitoring programmes (not only focussing on protected areas, not only focussing on forests)?					
	Source/name	I	II	III	IV
Switzerland	<p>Biodiversity-Monitoring Switzerland: http://www.biodiversitymonitoring.ch/</p> <p>In 2000, the Swiss Biodiversity Monitoring (BDM-CH) programme was launched. This long-term programme will show for example how the mean species diversity of forests changes over time in relation to other ecosystems.</p> <p>In order to determine whether the limited number of species groups included in this programme can provide a representative picture of a larger number of taxonomic groups, the BDM-CH is being temporarily supplemented by the Rapid Biodiversity Assessment (RBA) (Vonwil, 2000)</p> <p>Ground vegetation:</p> <p>An inventory of the vegetation on a part (4 x 4 km network) of the National Forest Inventory network of plots was made between 1996 and 1999 (independent form NFI). The vegetation (tree, shrub, herb and moss layers) on the plots was assessed using concentric sample areas (30 m2, 200 m2, and 500 m2) and the Braun-Blanquet classification system (Kull 1996). Supplementary information is being collected on disturbances, micro-structure, conservation features and the degree of homogeneity of the plot.</p> <p>Fungi</p> <p>Distribution maps of Swiss fungi (http://www.wsl.ch/swissfungi/welcome-en.ehtml)</p> <p>Lichen: (8 by 8 km grid): quantitative floristical data over the whole of Switzerland. → diversity and pattern of epiphytic lichen vegetation, and the frequency of the species.</p>				X
U.K.	Country side survey 2000: http://www.cs2000.org.uk				X

I – no information or programme missing
II – programme planned
III – implementation phase
IV – programme implemented

Table 10: Additional biodiversity monitoring programmes (excluding National Forest Inventories)

Are there additional biodiversity monitoring programmes implemented ? (e.g. focussing on protected areas or on forests only)?		
Country	Source/name	type
Austria	Hemerobie study (1996), includes many biodiversity aspects although the ultimate focus is on human influence and not biological diversity.	
Belgium (Flanders)		
Czech Republic	<p>CBD reports: Synecological Biomonitoring in protected areas: 1995 – 1998. Focused on vegetation, birds, epigeon and water organisms. At present, 42 monitoring areas are officially registered, including 286 testing plots.</p> <p>2nd phase 1999 within the project Biomonitoring in Protected Areas involves complex monitoring in selected permanent monitoring plots, and includes selection of key bioindicators. This second phase has not been implemented so far due to lack of funds.</p>	
Denmark		
Estonia		
Finland		

Are there additional biodiversity monitoring programmes implemented ?
(e.g. focussing on protected areas or on forests only)?

Country	Source/name	type	
Ireland	<u>CBD reports</u> : A Native Woodland Scheme is about to be launched. To complement the Native Woodland Scheme, a series of Monitoring Sites has been established to assess different management approaches within various native woodland types, specifically to gather information and to highlight specific areas requiring further research and development		
Germany	<u>CDB reports</u> : several activities by the states (<i>Länder</i>)		
The Netherlands			
Norway	<u>Tonje Økland, Vegar Bakkestuen, Rune H. Økland & Odd Eilertsen, 2001. Vegetasjonsendringer i Nasjonalt nettverk av flater for intensivovervåking i skog:</u> Norway has developed a methodology for collecting information on forest bio-diversity and key biotopes at forest property level. Regular inventories started in 2001. 1000 plots from 17 reference areas (11 in spruce forest and 6 in birch forest) make up a suitable "National Network of Plots for Intensive Forest Monitoring"		
Poland			
Spain			
Sweden	<u>National inventory of woodland key-habitats and monitoring of biodiversity in Woodland key-habitats</u> is a survey of woodland key-habitats" on 11.7 million hectares of privately owned forest land. This survey is recently completed. Starting from 2000,a sample of woodland key-habitats will be repeatedly investigated regarding changes in their biological values; focus on selected "indicator-species" most of these are either lichens or mosses and a few are vascular plants and wood-living fungi.		
Switzerland			
United Kingdom	http://www.ukbiodiversity.net/ : " National Biodiversity Network " has been developed. It selects a series of habitat and species groups which are likely to be representative of UK biodiversity as a whole, and ensures these features are regularly monitored. It does not only cover forests. The NBN is a internet interface to connect the huge number of volunteer and professional "data collectors" and to make the data available to a wide range of users. This system builds on and integrates existing monitoring activities and fills a number of critical gaps in current monitoring.		

in forests, comprehensive as regards the area				in forests, in selected areas				country wide, comprehensive as regards the area				country wide, in selected area			
															

I.3.4 National Forest Inventories

The National Forest Inventories (NFI) are usually the most detailed national sources for forest related information. Traditionally they were mostly designed under forest management and wood production aspects. However, especially in countries with new NFIs, biodiversity plays an increasingly important role. Thus it seems inevitable to provide an overview on their potential in the field of biodiversity. The overview in this study is rather coarse and a

refinement e.g. in the frame of a working group meeting might be necessary. Presently it focuses on ground vegetation, stand layer information, crown closure and dead wood as these parameters might be assessed in an ICP Forests test-phase in the future and as they are available in several NFIs. This overview does not report on the availability of general tree information like species, age, dbh and height as these parameters are core contents of all NFIs, although not based on methods harmonized across country borders. The sources utilized in this subchapter are given in Annex I. They mostly include information until 1997. For Germany and Austria the information is based on the ongoing NFIs.

The results show that almost all NFIs assess information on ground vegetation (Table 11). However, in most cases it is classified into national and predefined categories mainly aiming at describing site types. Sweden has included a comparatively large number of the most common and well known ground vegetation species. Almost all evaluated NFIs include information on stand layers and approximately half of them assess crown closure (Table 12). 9 out of 13 evaluated countries have included any form on deadwood information in their Forest Inventories. However there is a great variety of parameters and classifications that are available (Table 13, Table 14).

Table 11: Ground vegetation information (beyond woody plants and regeneration)

	any inform. on species in ground vegetation	(Compre- hensive) species lists	Predefined or single species (-groups)	incl. any inform on mosses	incl. any inform on lichens
Austria	X		50 types	2 types	
Belgium/F	X		X		
Czech Republic	X				
Denmark					
Estonia		not reviewed			
Finland	X	few species	X		2 types + few species
Germany	X		14 types	1 type	1 type
Ireland					
The Netherlands	X		N species	N species	
Norway	X		27 types		1 type
Poland	X		7 types	?	?
Spain					
Sweden	X	267 species and groups		22 species and groups	
Switzerland	X	At forest edge	closure of berries + GV	no	4x4 km (once)
U.K.					

Table 12: Layers¹ and crown closure

	layer	crown closure
Austria	X	X
Belgium/F	X	X
Czech Republic	X	
Denmark		
Estonia	not reviewed	
Finland	X	
Germany	X	
Ireland		
The Netherlands	X	X
Norway	X	X
Poland	X	X
Spain	X	X
Sweden	X	
Switzerland	X	X
U.K.	X	

¹ Layer information can in some NFIs be indirectly derived from tree measurement data. This was not taken into account. This table only refers to NFIs that explicitly give information on the number or composition of tree layers.

Table 13: Dead wood (I)

	any form of dead wood inform.	decay stage	dimension/ quantity	species (group)
Austria	X	X	X	X
Belgium/F	X		X	
Czech Republic	not reviewed			
Denmark				
Estonia	not reviewed			
Finland	X	X	X	
Germany	X	X	X	X
Ireland				
The Netherlands	X		X	
Norway	X	X	X	
Poland				
Spain				
Sweden	X	X	X	X
Switzerland	X		X	X
U.K.	X		X	

Table 14: Dead wood (II)

	stumps	standing	lying	standing and broken	woody debris	abandon. timber
Austria	X	X	X	=standing	=lying	X
Belgium/F		X				
Czech Republic	not reviewed					
Denmark						
Estonia	not reviewed					
Finland	X	X				
Germany	X	X	X	X		X
Ireland						
Netherlands		X	X			
Norway	X	X		X	X	
Poland						
Spain						
Sweden	X	"dead trees"			X	X
Switzerland	X	"dead trees"		X	X	
U.K.		X	X			X

I.4 Conclusions

The importance of forest biological diversity and the necessity of related monitoring systems have been widely recognized.

The standardized answers in the CBD reports show that in **almost all evaluated countries monitoring activities have been implemented** focussing on key species groups and major ecosystems. Also, at least some experience with indicators for monitoring forest biodiversity is available in the countries. The answers in the CBD reports can only offer a very rough overview as they are very general.

Therefore, a first step was undertaken to identify concrete national programmes in order to more specifically analyze the methods and approaches in the countries. **However, an identification of national programmes is difficult without the support by the countries.** It is hampered by a great multitude of programmes that are operated in parallel, subsequently and by different institutions in the countries. Often the information and reports are not available in English. The evaluation will continue in this field as soon as internet links and more information are contributed by the NFCs.

The National Forest Inventories of 13 countries were screened for biodiversity relevant information. Results show that **even though there is ground vegetation information available it might in most cases not be useful for diversity evaluations** as it is mostly not species specific or does only include a limited number of species. Exceptions are countries, like e.g. Sweden that have defined key species with relevance for biodiversity.

Some kind of stand structural information is available in all inventories. Canopy closure and layer descriptions are a good starting point in many NFIs. However, when aiming at structural information, results derived from dbh and height measurements should as well be taken into account, as they are practically available in all inventories. It would constitute a task beyond the aims of the ICP Forests to check whether transnational and harmonized stand structural information can be derived from these measurements.

Some kind of deadwood information is available in most of the evaluated inventories. Due to the multitude of assessment methods it seems however impossible to deduct comparable transnational deadwood information from them.

Proposal for future ICP Forests contributions in the field of biodiversity assessment.

Abstract

At its 18th Meeting held in Lisbon in May 2002, the ICP Forests Task Force decided to carry out a biodiversity feasibility study in 2002 and a subsequent two years test phase aiming at specifying the possible contributions of the programme in the field of biodiversity assessments. This draft proposal outlines possible contributions and is meant as a basis for discussion by national experts.

The study consists of two parts:

Part A: In a test-phase on a limited number of Level II plots additional and improved assessments are recommended mainly focussing on ground vegetation, epiphytic lichens and stand structure. Based on the experiences of the test-phase it is foreseen to elaborate a proposal for biodiversity assessments on a larger number of plots afterwards.

Part B: For Level I it is proposed to conduct co-ordinated national evaluations of existing ground vegetation data in at least five countries and to present the results in a common report.

II Part A – Level II test-phase 2003-2005

II.1 Introduction

Two years ago the ICP Forests has widened its objectives which now include contributions “...by means of the monitoring activities to ... aspects of forest policy [like] ... biodiversity in forests.”²

At its 18th Meeting held in Lisbon in May 2002, the ICP Forests Task Force decided to carry out a biodiversity feasibility study in 2002. The Task Force in addition agreed to conduct a “test phase (2003-2005) aiming at specifying the possible contributions of the programme in the field of biodiversity assessments and keeping in mind the outcome of the feasibility study. A number of countries already offered their participation in the test phase. In close co-operation with the national experts additional assessments on a limited number of Level II plots might be tested.”¹

This feasibility study describes possible activities of the programme during the test-phase 2003 - 2005 and is meant as a basis for discussion. It takes into account and further develops the work and suggestions of the ICP Forests working group on biodiversity. Comments of national experts were submitted and included in this study.

II.2 The forest biodiversity context in Europe

II.2.1 Ministerial Conference on the Protection of Forests in Europe (MCPFE)

The MCPFE has recently formulated improved pan-European indicators for sustainable forest management. Under Criterion 4 (“Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems”) nine indicators have been proposed for adoption through the responsible ministers at the 4th Ministerial Conference in 2003 in Vienna³:

- 4.1 Tree species composition
- 4.2 Regeneration
- 4.3 Naturalness
- 4.4 Introduced tree species
- 4.5 Deadwood
- 4.6 Genetic resources
- 4.7 Landscape pattern
- 4.8 Threatened forest species
- 4.9 Protected forests

² ICP Forests. 2002. Minutes of the eighteenth meeting of the Programme Task Force held from 25 to 29 May 2002 in Lisbon, Portugal (<http://www.icp-forests.org/pdf/minutes2002.rtf>)

³ MCPFE. 2002. Advisory group recommendations for improved pan-European indicators for sustainable forest management (meeting documents for Expert Level Meeting October 2002) (<http://www.minconf-forests.net/secure/k-tools/phplib/MedienDatenbankView.inc.php?id=299>)

Relevance for ICP Forests

The MCPFE indicators are mainly designed as a basis for common national reporting on forest biological diversity in Europe. As the Level II monitoring plots are not representative for Europe, results can not deliver representative information on any indicator. Nevertheless, the MCPFE indicators can point out main fields of interest on which biodiversity case studies on Level II plots should focus. Thus it is relevant to evaluate the potential of the Level II data in relation to these indicators.

Information on *tree species composition, regeneration, introduced tree species, and threatened forest species* is directly available from Level II plots or can be deduced from the data base. *Deadwood* assessments and *protection status* might be possible new elements. The inclusion *naturalness* of forest ecosystems has not yet been discussed and would require a principal decision. Information collection on *genetic resources* and *landscape pattern* seems to be beyond the possibilities of ICP Forests at present.

II.2.2 Environment for Europe and the pan-European Biological and Landscape Diversity Strategy (PEBLDS)

Under the Environment for Europe ministerial process the PEBLDS clearly states the demand for transnational monitoring data related to biodiversity⁴. One of the activities in the work programme of the PEBLDS is the development and implementation of the European Biodiversity Monitoring and Indicator Framework (EBMI-F), the joint lead for which has been given to the European Environment Agency (EEA) and the European Centre for Nature Conservation (ECNC)⁵. The EBMI-F is “a concept for promoting and facilitating collaboration in monitoring and indicators towards reporting on Europe’s biodiversity”. Own monitoring activities are not foreseen under this concept. In the field of forest biological diversity the collaboration with the MCPFE is an important issue and a “Draft framework for cooperation between MCPFE and Environment for Europe/PEBLDS”⁶ has been elaborated for the Ministerial Conferences in 2003.

Relevance for ICP Forests

Due to the close collaboration between the MCPFE and the PEBLDS the latter strategy is automatically taken into account by the ICP Forests activities as long as they are in line with the MCPFE.

II.2.3 EU “Forest Focus” regulation

The European Commission DG Environment has recently elaborated a “Proposal for a European parliament and council regulation concerning monitoring of forests and environmental interactions in the Community (Forest Focus)”⁷. Compared to the expiring

4 EC, EEA and ECNC. 2002. STRA-CO (2002) 24: Indicators, Monitoring and Clearing-House Mechanisms – Tools for policy making and awareness raising ([http://www.strategyguide.org/docs/budapest/STRA-CO%20\(2002\)%2044.doc](http://www.strategyguide.org/docs/budapest/STRA-CO%20(2002)%2044.doc))

5 EC, EEA and ECNC. 2002. STRA-CO (2002) 13: EBMI-F: Progress Report February 2002 ([http://www.strategyguide.org/docs/budapest/STRA-CO%20\(2002\)%2013.doc](http://www.strategyguide.org/docs/budapest/STRA-CO%20(2002)%2013.doc))

6 MCPFE. 2002. Draft Framework for Cooperation between the MCPFE and Environment for Europe/PEBLDS (<http://www.minconf-forests.net/secure/k-tools/phplib/MedienDatenbankView.inc.php?id=302>)

7 EC. 2002. Proposal for a European parliament and council regulation concerning monitoring of forests and environmental interactions in the Community (Forest Focus) (<http://europa.eu.int/comm/environment/nature/forest-regulations.htm>)

Council regulation No. 3528/86 more emphasis is laid upon forest biodiversity monitoring. One of the objectives of the proposed regulation is the “monitoring of biodiversity, climate change, carbon sequestration and soils” (Article 1.c) which includes the identification of “key structural and functional ecosystem elements to be used as indicators for assessing status and trends of forest ecosystems biodiversity” (Article 6.1.c). It is presently unclear whether the new regulation will, as envisaged, enter into force in 2003.

Relevance for ICP Forests

Given the case that the regulation will enter into force without major changes compared to the presented draft it will be necessary to more specifically describe operational contributions of the programme in the field of biodiversity monitoring. The test-phase initiated by ICP Forests could be relevant as a forum to proceed into this direction.

II.2.4 The Biodiversity Evaluation Tools for European Forests (BEAR) project

Experts from 27 European research organisations elaborated key-factors and indicators for forest biodiversity related to 33 forest types that have been defined by the project⁸.

The key factors are structured according to national, landscape and stand scale and divided into structural, compositional and functional key factors (Table 15).

Table 15: Key factors of European forest biodiversity⁷

Scale	Structural key factors	Compositional key factors	Functional key factors
National regional	Total area of forest with respect to: - Legal status/utilisation or protection - Forest ownership - Tree species and age - Old growth/Forest left for free development - Afforestation/deforestation	- Native species - Non-native or not “site original” tree species	FOR ALL SCALES: NATURAL DISTURBANCE: - Fire - Wind and snow - Biological disturbance HUMAN INFLUENCE: - Forestry - Agriculture and grazing - Other land-use - Pollution
Land-scape	- Number and type of habitats (incl. water courses) - Continuity and connectivity of important habitats - Fragmentation - History of landscape use		
Stand	- Tree species - Stand size - Stand edge/shape - Forest history - Habitat type(s) - Tree stand structural complexity - Dead wood - Litter	- Species with specific landscape-scale requirements - Non-native or not “site original” tree species - Species with specific stand type and scale requirements Biological soil condition	

Relevance for ICP Forests

As the key factors of the BEAR project are underpinned by operational indicators they give a valuable starting point for the ICP Forests test phase. Taking into account the plot related monitoring activities at Level II, mainly activities at the stand scale are relevant. Future efforts must be directed towards structural and partly on functional key factors. Information on compositional key factors (species lists and soil/humus information) is already assessed.

⁸ Larsson T.-B. et al. 2001. Biodiversity Evaluation Tools for European Forests. Ecological Bulletins No. 50

II.3 The biodiversity activities of ICP Forests until now

The ICP Forests has established a working group on biodiversity that has met three times until now. The experts have identified and described the so-called stand scale approach as most relevant for the monitoring activities of the programme:

“The stand-scale structural approach uses the description of the forest stand as an indicator of forest biodiversity. The assumption behind this approach is that the more structurally diverse a forest stand is (e.g. in terms of the presence or absence of vertical and horizontal layers), the greater range of habitat types that may be associated with that stand, thus suggesting a greater biodiversity potential.”⁹

The working group has elaborated an overview of parameters relevant for monitoring of forest biological diversity through the ICP Forests programme (Table 16).

Table 16: ICP Forests parameters in relation to the BEAR and MCPFE indicators

Relevant parameters as defined by ICP Forests working group	related BEAR stand scale, structural indicators	existing (e), partly assessed (p) or new (n) parameter at Level II	related MCPFE indicator
Tree species	- Volume/biomass (total m ³ , % per species) - Basal area, m ² , % (or numbers) - Numbers, density, clustering measures	e (partly) e (partly) e (partly)	Tree species composition
Exotic vs indigenous tree species	„site original“, „not site original“ and non-native	e (question of definition)	Introduced tree species
Stand age	Presence and spatial distribution of different tree size and age classes [per tree species]	p (only stand age in 20 years intervals, no spatial distribution)	
Vertical structure	- Layering (single, multi, understorey) - Canopy layering (even, undulating) - Shrub-layer (% area)	p (% cover of different layers)	
Horizontal structure	- Gap occurrence - Tree clustering	p (dbh of trees)	
Presence of large / old trees		e (question of definition)	
Ground Vegetation	Status of selected taxa, trend estimates (compositional factor)	e (need for harmonisation, probably need for more detailed assessment)	Threatened forest species
Lichens, bryophytes and epiphytic flora	lichens monitoring, trend indication (compositional factor)	e (partly, need for harmonisation, probably need for more detailed assessment)	
Canopy closure		n (partly % cover of tree layer available)	
Natural regeneration	- Natural regeneration (seedling	e (question of	Regeneration

⁹ ICP Forests and EC. 2002. An Assessment of Biodiversity in European Forests. A contribution by the European Commission and ICP Forests. (<http://www.nisk.no/forskning/skogpatologi/ops/icp-for-veg/WG-on-Biodiv-in-Forests/Forest%20Biodiversity.doc>)

Relevant parameters as defined by ICP Forests working group	related BEAR stand scale, structural indicators	existing (e), partly assessed (p) or new (n) parameter at Level II	related MCPFE indicator
	density)	definition)	
Stand history and management regime (legal status)	Stand continuity: <ul style="list-style-type: none"> - Indicator species - Historical maps - Area of old growth/ancient forest - Area of recent forest Area of plantations	n	
Forest deadwood	Presence, nature and spatial distribution of standing and lying dead wood: <ul style="list-style-type: none"> - Type (snag, lying position), species, decay class and amount (volume, diameter distribution, basal area) 	n	Deadwood
Litterfall	Humus: <ul style="list-style-type: none"> - Type or quality of humus form, amount (cm) Flammable litter: <ul style="list-style-type: none"> - Amount (cm) 	e (litterfall partly, need for harmonisation. Thickness of litter layer in soil data)	
Habitat information	Area (%) of different habitat: <ul style="list-style-type: none"> - Agreed classification schemes 	n	
Forest stratification (e.g. BEAR types)	National forest types	n	
Forest pests and diseases	Natural disturbance (functional key factor)	e (in some countries)	
Disturbance events		e (partly)	
Remote sensing		e (partly)	
	Stand size in ha		
	Stand shape: <ul style="list-style-type: none"> - edge to area ratio Ecotone: <ul style="list-style-type: none"> - type - surrounding habitat 		
			Naturalness
			Genetic resources
			Landscape pattern
			Protected forests

The overview shows that the proposals of the ICP Forests working group mostly cover the recommended stand scale structural indicators as defined by the BEAR project. The latter are more precisely defined. Together they should be the basis for future activities in the course of the test-phase.

II.4 Possible objectives of the test-phase

Possible objectives are:

1. Testing and elaboration of a methodology for biodiversity assessments and evaluations specifically for ICP Forests Level II plots.
2. Validation of key factors and their related indicators with respect to their effect on
 - Ground vegetation
 - Bryophytes
 - Lichens

The question to be answered in this context is: How is stand structure in terms of clearly defined indicators related to biodiversity, are there easily assessable and meaningful indicators, possibly suitable for application at Level I?

It is obvious that ground vegetation, bryophytes and lichens constitute only a small proportion of the total species diversity. Taking into account the pan-European character of the programme and the experiences gained until now, the restriction seems necessary as other species groups require much more expert knowledge (e.g. fungi, insects), other plot designs (e.g. birds) or very intensive monitoring activities (e.g. soil fauna).

The evaluation of anthropogenic and natural pressures onto species diversity is another important objective which has more intensively to be tackled at a later stage, as soon as the basic monitoring is implemented. The relation between deposition and general site characteristics on one hand and ground vegetation on the other hand has already been examined in present reports^{10,11}. The present monitoring programme is well equipped to evaluate the impact of anthropogenic stressors, in particular air pollution, at the European Level. Work is continuing in this field.

10 UNECE and EC. 2002. Fischer, R. et al. The Condition of Forests in Europe. 2002 Executive Report. Geneva and Brussels.

11 UNECE and EC. 2002. De Vries, W. et al. Intensive Monitoring of Forest Ecosystems in Europe. 2002 Technical Report. Geneva and Brussels.

Chapters II.5 and II.6 have become outdated by the ongoing activities and discussions of the ICP Forests working group on biodiversity, in particular by the results of the meeting in Sabaudia, Italy in February 2003. Latest results see <http://www.icp-forests.org/biodiv.htm>

II.5 Implementation of the test phase

II.5.1 Assessments

Details of assessment methods need to be further elaborated by the working group on biodiversity. The following subchapter is still under construction. It presents a rough outline as a starting point for discussion and further comments are welcomed.

On a limited number of Level II plots the following assessments are under discussion:

Harmonised ground vegetation assessments in line with the ICP Forests manual¹² and partly even more precisely defined: 400 m² with defined subplots – that enables to produce species number/area curves and enables mosses and lichens assessments on defined subplots.

(support by O. Granke / I. Schulze / W. Seidling)

Comments H. van Dobben: “Well I don't think species / area really gives any useful information (always loglinear in the cases I tried) but of course there is nothing against still trying it!”

Comments B. Petriccione: “400 sqm o.k., but it is very important to have a less detailed survey of the species occurring on the whole plot (2.500 sqm).”

Epiphytic lichens mapping.

Standardized methodology is available (VDI guideline 3799 – Measurement and evaluation of phytotoxic effects of ambient air pollutants with lichens, Mapping of lichens for assessment of the air quality). Presently a forest specific methodology “Anleitung zur Erfassung von Moosen und Flechten in Waldökosystemen” is elaborated at the University of Bonn, Germany and might be available at the end of 2002 (Contact to K. Stetzka and N.J. Stapper has been established. They might also introduce German experiences with epiphytic lichen monitoring on 20 Level II plots¹³) Also contacts to Prof. Nimis (Triest, Italy) have been initiated.

First reactions from H. van Dobben (The Netherlands) are in favour of a more simple method mainly based on presence/absence of species. “It's mainly the species that count not their exact quantity”. Are the subplots really necessary?

Deadwood assessment

Methods for assessment can be elaborated comparatively easy by the working group itself, based on experiences with deadwood assessments in a number of National Forest Inventories (e.g. Austria, Germany...). Standing/lying and decay classes need to be distinguished. Total plot (2500 m²) needs to be taken into account. Probably there are little amounts of dead wood on the plots as they are located in managed forests (?).

¹² Federal Research Centre for Forestry and Forest Products. 1998. Manual on methods and criteria for harmonized sampling, assessment and analysis of the effects of air pollution on forests. Part VIII Assessment of Ground Vegetation, in the version adopted by ICP Forests Task Force 2002.

¹³ Stetzka, K.M., Stapper, N.J. 2001. Moose und Flechten im Level II Programm: Erste Untersuchungsergebnisse aus Hessen, Sachsen, und Nordrhein-Westfalen. In: BMVEL. 2001: Dauerbeobachtung der Waldvegetation im Level II Programm: Methoden und Auswertung. Bericht des Arbeitskreis F "Waldvegetation" der Bund-Länder-Arbeitsgruppe Level II.

Chapters II.5 and II.6 have become outdated by the ongoing activities and discussions of the ICP Forests working group on biodiversity, in particular by the results of the meeting in Sabaudia, Italy in February 2003. Latest results see <http://www.icp-forests.org/biodiv.htm>

Stand structure assessments

Canopy closure is a comparatively easy parameter and highly needed to obtain information on light regime in the stands.

Additional parameters for horizontal and vertical structure still need to be elaborated (PCC offers to check presently available approaches, also ask M. Dobbertin (ICP Forests Expert Panel on Forest Growth), Mr. Sterba, experiences of BioAssess Project, M. Neumann has worked on structural parameters on Austrian Level II plots.¹⁴

Forest stratification

BEAR Forest Types are elaborated, stratification should be easy. Sub-stratification might be necessary and would need to be agreed on.

W. Seidling: A statistical approach would be to use cluster analysis and ordination techniques for a classification of the evaluated Level II plots.

Habitat classification

A classification needs to be elaborated and to be agreed on.

Remote sensing

A principal decision is necessary in the working group on biodiversity whether the test-phase should include structural analysis based on aerial photographs.

Contacts: C.P. Gross (DE), Marlies Sanders (NL), Tuomas Häme (FIN)

Forest history evaluation and management regime

It is necessary to collect as much information as possible. Available sources may vary between the plots. Information may be difficult to include into databases in standardized forms.

H. van Dobben: For management regime 3 classes may be feasible (i) production, (ii) semi-protected (=multifunctional timber prod + recreation etc), (iii) completely protected (=no management).

Stand size measurements

Stand size and edge to area ratio should be comparatively easy to calculate based on maps existing in the countries. An open question is however the stand definition.

Naturalness/Hemerobie

Assessments of naturalness/hemerobie have not been discussed in the working group until now. They would go beyond a mere description of biodiversity as they aim at a valuation of the ecological state of the stands. However there are different approaches available in the countries:

The Austrian approach is mainly based on Grabherr¹⁵. It is an evaluation of human influence, classified into 9 categories.

O. Granke (Germany) has proposed a comparison between phyto-diversity of potential natural vegetation (pnv) and the actual state (e.g. proportion of forest species against ubiquitous species; proportion of autochthonal species against neophytes; rareness).

¹⁴ Neumann, M., Starlinger, F. 2001. The significance of different indices for stand structure and diversity in forests. *Forest Ecology and Management* 145 (2001) 91-106.

¹⁵ GRABHERR, G., KOCH, G., KIRCHMEIR, H. & REITER, K (1998): Hemerobie österreichischer Waldökosysteme. Österreichische Akademie der Wissenschaften. Veröffentlichungen des Österreichischen MaB-Programms; Bd. 17: 493 S.

Chapters II.5 and II.6 have become outdated by the ongoing activities and discussions of the ICP Forests working group on biodiversity, in particular by the results of the meeting in Sabaudia, Italy in February 2003. Latest results see <http://www.icp-forests.org/biodiv.htm>

Mai-He Li and N. Kräuchi (Switzerland)¹⁶ have developed an “Eco-index” that combines the quantitative and qualitative differences between the present vegetation and its theoretic ideal stage. It is calculated by statistical models.

Insects and fungi

Their assessment has been regarded as too expansive and not feasible at a European scale by the working group on biodiversity. However Italy comments that “it could be very useful and not very expensive performing specific surveys on fungi and insects on a small selection of European plots, like in Italy (3-4 plots)”. Also France has already assessed fungi on parts of the Level II plots.

II.5.2 Selection of Level II test plots

In principal harmonized test-phase assessments should be carried out on as many plots as possible. All countries are asked to propose and “offer” their plots according to their national interests and possibilities.

In order to have the possibility to focus on stand structure and plant diversity it is proposed (but not absolutely necessary) to include series of 3-4 Level II plots, each one focussing on one main tree species /BEAR forest type. The plots within the sequences should be as homogeneous as possible as regards site conditions and should vary with respect to stand structure. This might be a suitable approach to evaluate influences of stand structure on vegetation (cross check with statisticians still necessary to clarify whether 4 plots per series are enough!!). This approach still needs to be discussed. In principal sequences across country borders are possible too, but might need more co-ordination.

Presently Italy has already offered to participate with

3-4 *Quercus ilex* plots and

3-4 *Quercus cerris* plots

Presently Germany has already offered to participate with

3-4 *Picea abies* plots in *Saxony*

and is considering participating with

3-4 *Fagus sylvatica* plots in *Hesse*

Finland is considering participating with

3-4 *Pinus sylvestris* plots

France is considering participating with

3-4 *Quercus robur et petraea* plots

Other countries are still invited to participate with one ore more plots.

¹⁶ abstract in: Tim Peschel et al. (eds) Changing Landscapes – Changing Ecology (Verhandlungen der Gesellschaft für Oekologie, Band 32), Cottbus 2002

Chapters II.5 and II.6 have become outdated by the ongoing activities and discussions of the ICP Forests working group on biodiversity, in particular by the results of the meeting in Sabaudia, Italy in February 2003. Latest results see <http://www.icp-forests.org/biodiv.htm>

II.6 Implementing a project

The operation of the test-phase will be under the responsibility of the ICP Forests working group on biodiversity.

Taking into account the numerous activities in the field of biodiversity assessment and monitoring across Europe, it seems advisable to approach external experts and install an advisory group in order to ensure that the new activities fit into the pan-European context. The “Forest Biodiversity Group” installed at the European Environment Agency (EEA) might be a suitable forum for this. The Chairman of the ICP Forests working group, FIMCI and PCC have already participated in a recent meeting in Copenhagen (12 September 2002) and established some contacts.

In addition it is recommended to install a central co-ordination and data processing / evaluation unit. PCC offers its infrastructure for this. PCC is currently engaged in evaluating funding possibilities for the following activities.

- parts of the data collection
- co-ordination
- evaluation
- reporting

As stand structure assessments are a substantial part of the new assessments, their central assessment through PCC in collaboration with the national experts might be taken into consideration.

The other assessments (mainly ground vegetation, bryophytes and lichens) might be under the responsibility of the national experts as they require national/local expert knowledge. It should be aimed at a co-financing of activities that are beyond the mandatory assessments of the ICP Forests manual.

Countries should be free to publish their national results at any time. At the same time they should agree to a central reporting of the transnational data and results.

A project proposal should be finalised until end of October 2002 to have options for financing from summer 2003 onwards.

It is proposed to prepare a project proposal for submission to the European Commission (DG ENV, so-called “Article 4 Project”). It is unclear at the moment whether the (co-) financing of monitoring and evaluation activities will be possible in 2003 under the new regulation (“Forest Focus”). The future of the test-phase is therefore open. However, in case that in general (co-) financing becomes possible, applications might have to be submitted on a comparatively short notice. Therefore a project proposal should be formulated still in October 2002. In case that financial support from the DG ENV does not become available, other possibilities for financing will have to be checked.

Due to the limited time available, a project proposal will have to be formulated on the basis of e-mail contacts. Detailed assessment methods might be elaborated afterwards by the working group on biodiversity.

III Part B – Level I – co-ordinated evaluation of existing national data

III.1 Introduction

On the pan – European Level the demand for transnational monitoring data related to biodiversity has clearly been stated¹⁷. Level I as a representative forest monitoring grid net in Europe should therefore be taken into consideration. And indeed, ground vegetation assessments on all plots or on subsets have been conducted by some countries or are discussed as an additional feature of a repeated soil survey in the coming years.

However, on the transnational scale there is presently no mandate by the ICP Forests Task Force related to biodiversity. Additional Level I assessments and an extension of the existing data base are therefore clearly beyond the scope at the moment. A feasible approach might however be to jointly evaluate existing national data sets with respect to biodiversity aspects.

This part describes existing national ground vegetation data sets at Level I and presents a general proposal for their joint evaluation. It is meant as a basis for discussion and might be a starting point for drafting a project proposal aiming at obtaining financial support from the European Commission.

A first and probably incomplete overview based on telephone calls, and existing reports¹⁸ revealed that the following countries already conducted ground vegetation assessments at Level I plots:

Austria, Bulgaria, France, Finland, Germany, Norway, Switzerland.

A co-ordinated evaluation – or perhaps only presentation – of the existing information may be a first step in the “awareness raising” and already a contribution in the field of transnational biodiversity monitoring, as other comparable grid-nets do not exist in Europe.

III.2 Objectives

The objectives of a coordinated re-evaluation are:

1. Compilation of information on existing ground vegetation data at Level I
2. Test for co-ordinated evaluations
3. Contribution to pan-European forest plant diversity monitoring
 - a.) documentation of status quo – also as a basis for re-assessment
 - b.) assessment of ground vegetation in relation to influencing factors

17 EC, EEA and ECNC. 2002. STRA-CO (2002) 24: Indicators, Monitoring and Clearing-House Mechanisms – Tools for policy making and awareness raising ([http://www.strategyguide.org/docs/budapest/STRA-CO%20\(2002\)%2044.doc](http://www.strategyguide.org/docs/budapest/STRA-CO%20(2002)%2044.doc))

18 UNECE and EC. 2002. De Vries, W. et al. Intensive Monitoring of Forest Ecosystems in Europe. 2002 Technical Report. Geneva and Brussels.

III.3 Existing data sets

In general the Level I ground vegetation data are under national responsibility, a potential re-evaluation will be on a voluntary basis. Possibilities for financial support are currently evaluated (see below).

Requests revealed that in some of the listed countries, the data might not be suitable for a transnational, biodiversity oriented evaluation.

In **Austria** the vegetation survey was not based on a clearly defined plot area. Level I plots are located in the vicinity of National Forest inventory (NFI) plots, in some cases directly at the NFI plots. Possibilities for an inclusion into a new re-evaluation are limited and need to be thoroughly checked.

In **Norway** only species groups were recorded, which are not comparable to the surveys in other countries. Thus an inclusion into a transnational evaluation is impossible.

The data sets of other countries seem more promising with respect to a transnational evaluation.

In **Bulgaria** ground vegetation assessments were carried out on all Level I plots in 1992. Tree information (dbh and height) also exists, however not electronically stored in a data base. Also soil analyses were carried out on the same plots.

In **France** ground vegetation has been recorded on Level I plots in the course of the soil survey. Mostly a 400 m² sampling area was the basis. There are also tree measurements (dbh and height) as well as soil information available. Data evaluation until now mainly focussed on Ellenberg numbers, other ecological indices and general plot characterization¹⁹.

In **Germany** two *Länder* carried out Level I vegetation surveys (Saxony and Baden Württemberg). There are species lists as well as soil information available.

In **Finland** Level I plots are integrated into the National Forest Inventory. Around 400 NFI plots are included under the Level I programme. All together there are 3000 NFI plots on which ground vegetation assessments have been carried out. Assessments were conducted on 4 – 6 subplots of 2m² each resulting in a total sampling area of 8 – 12 m². Plot-wise stand and tree information is available from the NFI data set; also plotwise soil information is available on the Level I plots. Assessments were carried out in 1985-86 and in 1995.

In **Switzerland** Level I plots are integrated into the National Forest Inventory. Vascular plants, mosses and lichens have been assessed once on 30, 200 and 500 m² subplots. Soil and plot-wise stand and tree information is also available.

Information on ground vegetation Level I data from **other countries** was not available. If such data exist, the respective countries could be invited to participate in a joint evaluation.

In principal countries with species wise assessment of ground vegetation in the **National Forest Inventories** could as well participate in the joint project.

19 Ministère de L'Agriculture et de la Pêche. 1998. Caractérisation écologique du Réseau européen de suivi des dommages forestiers. Les cahiers du DSF 5/1998.

III.4 A co-ordinated new evaluation

As the data were not assessed in a harmonized way, their common evaluation is hardly possible. However a “multi-national” and co-ordinated re-evaluation with respect to biodiversity aspects seems worthwhile. The following steps are proposed:

1. Detailed description of national data sets and methods used (year of assessment, size of sampling area, use of Braun-Blanquet method or percentage cover)
2. Common elaboration of an evaluation strategy. Where available, the evaluation might be targeted towards species richness per plot, diversity indices (e.g. Evenness, Shannon-, Simpson Index), structural parameters of the stand (e.g. standard deviation of dbh, canopy closure, age), soil parameters as well as their inter-relations.
3. National evaluation of data sets. These activities will produce a number of plot-wise results and indices that have been agreed upon beforehand.
4. Submission of plot-wise results to PCC or another central evaluation unit and common reporting. It will be important to point out that due to methodological differences the results are not comparable across the borders. This could be underlined by country wise maps instead of European maps. Nevertheless the potential of Level I could be demonstrated by the country examples.

III.5 Towards financial support

A new project can only be carried out with financial support. A parallel approach as described under part A is therefore suggested, which means that a common project proposal should be elaborated still in October 2002.

Annexes

Annex 1: Sources for information on National Forest Inventories

all sources (*except when given in italics*) are cited according to:

“European Commission. 1997. Study on European Forestry Information and Communication System. Report on forestry inventory and survey systems. Vol.1, 2. European Communities, 1997. 1328 p.“

Country	Source	year
Austria	<i>Schieler, K.; Hauk, E. 2001: Instruktion für die Feldarbeit. Österreichische Waldinventur 2000/2002. FBVA</i>	2001
Belgium/F	Concept bosinventarisatie Vlaams Gewest (Fac. Landbouwkundige en Toegepaste biologische wetenschappen, Gent, Juli 1995. 80 p.)	1995
Czech Republic		
Denmark 90	Skove og plantager 1990, Miljøministeriet, Skov- og Naturstyrelsen and Danmarks Statistik	1990
Estonia		
Finland	National Forestry Inventory of Finland <i>EFI: External Review of the Finnish Forest Condition Monitoring Programme. Final Report</i>	1996 August 2002
Germany	<i>Bundesministerium der Justiz: Allgemeine Verwaltungsvorschrift zur Durchführung der Bundeswaldinventur II (VwV-BWI II) vom 17 Juli 2000</i>	2000
Ireland	Coillte's Forest Survey	?
Netherlands	Growing Stock Growth and Removals Survey (HOSP) 1984 Environmental Issues, Stand Structure, Vegetation and Soil Survey 1984-1985	1984 1985
Norway	National Forest Inventory	1994-1998
Poland	Forest Inventory	1989
Spain	Second National Forest Inventory of Spain	1997
Sweden	The Swedish National Forest Inventory <i>Comments to the CBD Reports</i>	1993 2001
Switzerland	The Swiss National Forest Inventory	1993-1998
U.K.	National Inventory of Woodlands and trees – Woodlands survey	1982