I

(Acts whose publication is obligatory)

COMMISSION REGULATION (EEC) No 926/93

of 1 April 1993

amending Regulation (EEC) No 1696/87 laying down certain detailed rules for the implementation of Council Regulation (EEC) No 3528/86 on the protection of the Community's forests against atmospheric pollution

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Regulation (EEC) No 3528/86 of 17 November 1986 on the protection of the Community's forests against atmospheric pollution [1], as last amended by Regulation (EEC) No 2157/92 [2], and in particular Article 2 (1) and (2) thereof,

Whereas, pursuant to Article 2 (1) of Regulation (EEC) No 3528/86, the aim of the Community scheme is to help the Member States to establish, on the basis of common methods, a periodic inventory of damage caused to forests, in particular by atmospheric pollution;

Whereas the detailed rules for the implementation of the said Article and in particular those relating to the gathering, comparability and transmission of the data collected are to be laid down in accordance with the procedure provided for in Article 2 (3) of Regulation (EEC) No 3528/86;

Whereas one of the main reasons for the loss of vitality of the Community's forests is the persistent input of atmospheric pollutants; whereas, in addition to the direct damage to trees, the indirect effects of atmospheric pollutants through the soil are one of the main reasons for the deterioration of the condition of forest ecosystems;

Whereas an examination of the soil of the Community's forests would provide basic information on the chemical condition of the soil and the nutrient supply to trees as well as the influence of pollutant inputs on the condition of the soil; whereas in this way account would be taken of the increasing significance of soil for an improvement in the condition of forests; whereas a modification of Commission Regulation (EEC) No 1696/87 is necessary to take in account these tasks when defining the common rules for the implementation of Council Regulation (EEC) No 3528/86;

Whereas a modification of the Annexes to Commission Regulation (EEC) No 1696/87 is necessary in order to ensure the transfer of data in a digital format and to improve the general transparency of the agreed common methodology;

Whereas the measures provided for in this Regulation are in accordance with the opinion of the Standing Forestry Committee,

HAS ADOPTED THIS REGULATION:

Article 1

Commission Regulation (EEC) No 1696/87 [3] is hereby amended as follows:

1. the following Article is added:

'*Article 1a*

1. In addition to the annual inventory of damage caused to forests provided for in Article 2 of Regulation (EEC) No 3528/86, the condition of the soil in the Community's forests shall be recorded and assessed over the same network of observation points.

2. Soil samples shall be taken in accordance with an objective sampling method and analysed in accordance with established methods.

3. By 31 December 1995, Member States shall forward to the Commission in a standardized form the data collected and analysed for each observation point as specified in Annex VIb.

4. Technical details pertaining to the provisions of this Article are set out in Annex II.';

[1] OJ No L 326, 21. 11. 1986, p. 2.
[2] OJ No L 217, 31. 7. 1992, p. 1.
[3] OJ No L 161, 10. 6. 1987, p. 1.

2. the following third indent is inserted in Article 2 (1):

'— to carry out a soil inventory at Community level';

3. the following Article is added:

'Article 3a

1. Member States shall draw up a report on the condition of the soil in their respective areas and forward them to the Commission by 31 December 1995.

2. The contents of the reports shall comply with the requirements set out in Annex V.';

4. the Annexes and their amendments are replaced by the Annexes hereto.

Article 2

This Regulation shall enter into force on the third day following its publication in the *Official Journal of the European Communities*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 1 April 1993.

For the Commission
René STEICHEN
Member of the Commission

ANNEX I

COMMON METHODS FOR THE ESTABLISHMENT OF A PERIODIC INVENTORY OF DAMAGE CAUSED TO FORESTS

(Article 2 (1))

I. General remarks

The purpose of the scheme mentioned in Article 2 (1) is to establish a periodic inventory of the health status of forests in the Member States of the Community by collecting representative data on the extent and intensity of forest damage and to monitor its development.

This inventory is to be carried out at Community level on the basis of a 16 kilometres × 16 kilometres grid network covering the entire area of each Member State. In addition, Member States may collect information from denser networks in order to obtain representative data at a national or regional level for the presentation of their annual report. For both observation levels (Community and national or regional level) the common methods (described below) regarding the choice of the tree sample and the observation criteria shall be applied.

The inventory is to be undertaken annually between the end of the formation of new needles and leaves and before autumnal leaf discolouration.

II. Inventory methodology

II.1. *Selection of sample points*

Forests within the meaning of this inventory are forest tree stands with at least 20 % canopy closure at rotation age (closed forests according to the Food and Agriculture Organization of the United Nations (FAO) definition). However, for certain types of woodland which are characteristic of the Mediterranean region (maquis and similar woodland, stands of *Quercus suber* and *Quercus ilex,* etc.), this canopy closure should be at least 10 %. The minimum size of the forests to be sampled be 0,5 hectare.

At Community level, data should be collected by a field inventory using systematically distrubuted sample points with a grid density of 16 kilometres × 16 kilometres and covering the entire area of each Member State. The 16 kilometres × 16 kilometres grid network is established following the latitude and longitude coordinate system in north-south and east-west directions from the reference point: latitude 50°15′15″ longitude 09°47′06″. The coordinates of these points have been transmitted to each Member State by the Commission.

Grid intersection points falling outside a forested area (according to the above definition) should be rejected as sample points although they must be reconsidered, if in the future a new stand is established.

Member States which have already established a systematic network may retain the corresponding observation points of these networks for the purpose of establishing the Community network (points coinciding with or those closest to the 16 kilometres × 16 kilometres intersection points) provided that the common methods described below are applied. Member States which do not have or have only partially established such a systematic network shall establish or extend new networks in order to complete the Community network. In this case, a sample point falling in a forest (according to the above definition) should be located precisely at its predetermined geographical location.

Should the sample point be inaccessible because of the relief or the density of the vegetation (e.g. maquis), that point shall be replaced by the nearest point bordering a path (this should be at a maximum distance of 8 km from the theoretical sample point).

In addition, at places where the crowns of the trees cannot be visually examined at the sample point, notably in maquis or similar woodland, or where for any other reason, the sample plot cannot be established at the point, the point shall be shifted within the stand following an objective (unbiased) procedure.

The fact that the point has been shifted and the reason for doing so must be entered on Form 1a.

If the sample point falls within an area of maquis or within a similar stand this fact must be clearly indicated on the same form.

II.2. *Selection of sample trees*

At each sample point, sample trees should be selected according to a stringently defined, objective and unbiased statistical procedure (e.g., four point cross cluster orientated along the main compass

directions with corner points at 25 m distance from the grid point using a six-tree sampling process on each subplot or sample trees chosen following a spiral from the plot centre). In younger dense stands where individual crowns are not assessable, the selection of sample trees should be based on a defined geometrical process. This process should be repeated until a sufficient number of trees with assessable crowns has been found.

The following selection criteria are to be taken into account:

— Member States may decide on the number of trees to be assessed at each point; however, the sample may not consist of less than 20 trees nor more than 30 and the number must remain constant,

— all tree species are to be included in the assessment. Sample trees should have a minimum height of 60 cm. Only predominant, dominant and co-dominant trees (Kraft: stem classes 1 to 3) qualify as sample trees for the purpose of damage assessment. Trees of these social groups with broken tops do not qualify as sample trees,

— trees removed as part of management operations shall be replaced by new sample trees selected according to an unbiased procedure. If clear-cut, the sample point ceases to exist until a new stand has been established,

— the centre of a sampling unit should be marked for reassessment for the purpose of subsequent inventories. Sample trees shall be permanently marked,

— where the sample point falls within a coppice, only the dominant stem shall be assessed for each stump sampled. Where the area involved is one of composite forest in which coppice stands predominate, the sample trees shall be selected from within those stands,

— if high forest predominates, the sample trees shall be selected from among the dominant trees of the reserve.

II.3. *Assessment of sample trees*

Visual assessment of defoliation

Defoliation shall be estimated in 5 % steps in relation to a tree with full foliage in local conditions.

The classification of trees into degrees of defoliation shall be carried out during the observation and shall be registered in 5 % steps.

Visual assessment of discolouration

Discolouration shall be estimated in 5 % steps in relation to a healthy tree in local conditions.

The classification of trees into degrees of discolouration shall be carried out after the observations have been made.

The degrees of discolouration are defined as follows:

Class	Discolouration	Indicative percentage of leaves discoloured
0	None or negligible	0 to 10
1	Slight discolouration	11 to 25
2	Moderate discolouration	26 to 60
3	Severe discolouration	>60
4	Dead	

II.4. *Data collection*

In addition to the above forest damage assessments (defoliation and discolouration), the parameters listed below are the mandatory minimum for data collection:

for each plot (Form 1a):

— descriptive code:

  — country,

  — date of observation,

  — observation point number,

  — actual latitude, longitude coordinates,

— site data:

  — availability of water to principal species,

  — humus type,

  — altitude,

  — orientation,

— stand data:

  — mean age of dominant storey,

— soil data:

  — soil unit;

for each tree in the plot (Form 1b):

— plot number,

— sample tree data:

  — tree number (visible marks),

  — tree species,

  — defoliation,

  — discolouration,

  — damage due to easily identifiable causes (insect, fungi, abiotic agents . . .),

  — identification of damage type,

  — observations on the tree in the plot.

The common census form of this Annex (Forms 1a and 1b) can be used for the data collection.

For the transmission of the mandatory data to the Commission, the format set out in Annex VIa shall be used for the 16 kilometres × 16 kilometres Community network. Countries with a limited number of plots (less than 20) may submit the information also on paper.

II.5. *Training of field crews*

Field crews should consist of two professionals, at least one should be a diploma-level/graduate forester as responsible crew leader. Prior to the beginning of the annual field season, all inventory crews must undergo a period of intensive theoretical and practical training in measurement and assessment procedures and filling out the various forms.

II.6. *Check survey*

As customary in national forest inventories, a fraction of e.g. 5 to 10 % of field sample points must be remeasured by an independent check-survey crew.

This control survey concerns all measurements and assessments made by the field crews. In case of significant discrepancies, the necessary adjustments of instruments or clarification of instructions and their application must be immediately arranged to avoid serious systematic errors.

Form 1a: Contents of file with the information on plot level to be used in combination with the tree vitality inventory

1 ——— 4 6 —— 7 9 ——— 12 14 ———— 19 21 ———— 27 29 ———— 35 37 39 41 — 42 44 46 47 49 — 51 53 ———— 63

Sequence	Country	Observation Point	Date (DD MM YY)	Latitude coordinate (+ DD MM SS)	Longitude coordinate (± DD MM SS)	Water	Humus	Altitude	Orientation	Mean age	Soil unit	Observations
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												

Column

1 to 4		Sequence number of plots (1 to 9 999)
6 to 7	(1)	Country code (France = 01, Belgium = 02, etc.)
9 to 12	(2)	Plot number (maximum 9 999)
14 to 19	(3)	Date of observation in DD MM YY (e.g. 22 06 90)
21 to 27	(4)	Latitude in + DD MM SS (e.g. + 505852)
29 to 35	(4)	Longitude in (+ or −) DD MM SS (e.g. + 035531)
37	(5)	Water availability (insufficient = 1, sufficient = 2, excessive = 3)
39	(6)	Humus type (Mull = 1, Moder = 2, etc.)
41 to 42	(7)	Altitude (in 50-metre classes from 1 to 31)
44	(8)	Orientation (N = 1, NE = 2, etc.)
46 to 47	(9)	Mean age of dominant storey (in 20-year classes from 1 to 8)
49 to 51	(10)	Soil unit (101 to 253)

In the last column a remark on the plot can be included:

53 to 63	(11)	Other observations (word)

Explanation Forms 1a and 1b

Code lists for the common forest damage inventory data to be forwarded to the Commission

The following instructions and codes are to be adopted by the Member States to complete the common observation Forms 1a and 1b.

Form 1a (information on plot level)

(1) *Country*

01: France (FR)
02: België — Belgique (BL)
03: Nederland (NL)
04: Deutschland (DL)
05: Italia (IT)
06: United Kingdom (UK)
07: Ireland (IR)
08: Danmark (DK)
09: Ellas (EL)
10: Portugal (PO)
11: España (ES)
12: Luxembourg (LX)

(2) *Observation point number*

The observation point number corresponds to the number indicated for the intersection of the grid at this point on the list of latitude and longitude coordinates provided by the Commission (Forests and Forestry Division). Deviations from the numbers of this list shall be described clearly.

(3) *Date of observation*

The date of observation is to be completed in the following order:

e.g.

Day		Month		Year	
0	8	0	9	9	2

(4) *Latitude-/longitude coordinates*

Fill in the six-figure latitude and longitude coordinates of the observation point. These coordinates will differ from the coordinates of the corresponding point of the network provided by the Commission when the observation point in question has been replaced as instructed in paragraph II.1 of this Annex,

e.g.:

	±	Degrees		Minutes		Seconds	
— latitude	+	5	0	1	0	2	7
— longitude	–	0	1	1	5	3	2

the first box is used to indicate a + or – coordinate

(5) *Availability of water to principal species*

1: Insufficient
2: Sufficient
3: Excessive

(6) *Humus type*

1: Mull
2: Moder
3: Mor
4: Anmor
5: Peat
6: Other
7: Raw (Roh)

(7) *Altitude*

1: ≤ 50 m
2: 51 to 100 m
3: 101 to 150 m
4: 151 to 200 m
5: 201 to 250 m
6: 251 to 300 m
7: 301 to 350 m
8: 351 to 400 m
9: 401 to 450 m
10: 451 to 500 m
11: 501 to 550 m
12: 551 to 600 m
13: 601 to 650 m
14: 651 to 700 m
15: 701 to 750 m
16: 751 to 800 m
17: 801 to 850 m
18: 851 to 900 m
19: 901 to 950 m
20: 951 to 1 000 m
21: 1 001 to 1 050 m
22: 1 051 to 1 100 m
23: 1 101 to 1 150 m
24: 1 151 to 1 200 m
25: 1 201 to 1 250 m
26: 1 251 to 1 300 m
27: 1 301 to 1 350 m
28: 1 351 to 1 400 m
29: 1 401 to 1 450 m
30: 1 451 to 1 500 m
31: > 1 500 m

(8) *Orientation*

1: N
2: NE
3: E
4: SE
5: S
6: SW
7: W
8: NW
9: flat

(9) *Mean age of dominant storey (years)*

1: ≤ 20
2: 21 to 40
3: 41 to 60
4: 61 to 80
5: 81 to 100
6: 101 to 120
7: > 120
8: Irregular stands

(10) *Soil unit*

Fluvisols
101 Eutric Fluvisols
102 Calcaric Fluvisols
103 Dystric Fluvisols
104 Mollic Fluvisols
105 Umbric Fluvisols
106 Thionic Fluvisols
107 Salic Fluvisols

Gleysols
108 Eutric Gleysols
109 Calcic Gleysols
110 Dystric Gleysols
111 Andic Gleysols
112 Mollic Gleysols
113 Umbric Gleysols
114 Thionic Gleysols
115 Gelic Gleysols

Regosols
116 Eutric Regosols
117 Calcaric Regosols
118 Gypsic Regosols
119 Dystric Regosols
120 Umbric Regosols
121 Gelic Regosols

Leptosols
122 Eutric Leptosols
123 Dystric Leptosols
124 Rendzic Leptosols
125 Mollic Leptosols
126 Umbric Leptosols
127 Lithic Leptosols
128 Gelic Leptosols

Arenosols
129 Haplic Arenosols
130 Cambic Arenosols
131 Luvic Arenosols
132 Ferralic Arenosols
133 Albic Arenosols
134 Calcaric Arenosols
135 Gleyic Arenosols

Andosols
136 Haplic Andosols
137 Mollic Andosols
138 Umbric Andosols
139 Vitric Andosols
140 Gleyic Andosols
141 Gelic Andosols

Vertisols
142 Eutric Vertisols
143 Dystric Vertisols
144 Calcic Vertisols
145 Gypsic Vertisols

Cambisols
146 Eutric Cambisols
147 Dystric Cambisols
148 Humic Cambisols
149 Galcaric Cambisols
150 Chromic Cambisols
151 Vertic Cambisols
152 Ferralic Cambisols
153 Gleyic Cambisols
154 Gelic Cambisols

Calcisols
155 Haplic Calcisols
156 Luvic Calcisols
157 Petric Calcisols

Gypsisols
158 Haplic Gypsisols
159 Calcic Gypsisols
160 Luvic Gypsisols
161 Petric Gypsisols

Solonetz
162 Haplic Solonetz
163 Mollic Solonetz
164 Calcic Solonetz
165 Gypsic Solonetz
166 Stagnic Solonetz
167 Gleyic Solonetz

Solonchaks
168 Haplic Solonchaks
169 Mollic Solonchaks
170 Calcic Solonchaks
171 Gypsic Solonchaks
172 Sodic Solonchaks
173 Gleyic Solonchaks
174 Gelic Solonchaks

Kastanozems
175 Haplic Kastanozems
176 Luvic Kastanozems
177 Calcic Kastanozems
178 Gypsic Kastanozems

Chernozems

179 Haplic Chernozems
180 Calcic Chernozems
181 Luvic Chernozems
182 Glossic Chernozems
183 Gleyic Chernozems

Phaeozems

184 Haplic Phaeozems
185 Calcaric Phaeozems
186 Luvic Phaeozems
187 Stagnic Phaeozems
188 Gleyic Phaeozems

Greyzems

189 Haplic Greyzems
190 Gleyic Greyzems

Luvisols

191 Haplic Luvisols
192 Ferric Luvisols
193 Chromic Luvisols
194 Calcic Luvisols
195 Vertic Luvisols
196 Albic Luvisols
197 Stagnic Luvisols
198 Gleyic Luvisols

Lixisols

199 Haplic Lixisols
200 Ferric Lixisols
201 Plinthic Lixisols
202 Albic Lixisols
203 Stagnic Lixisols
204 Gleyic Lixisols

Planosols

205 Eutric Planosols
206 Dystric Planosols
207 Mollic Planosols
208 Umbric Planosols
209 Gelic Planosols

Podzoluvisols

210 Eutric Podzoluvisols
211 Dystric Podzoluvisols
212 Stagnic Podzoluvisols
213 Gleyic Podzoluvisols
214 Gelic Podzoluvisols

Podzols

215 Haplic Podzols
216 Cambic Podzols
217 Ferric Podzols
218 Carbic Podzols
219 Gleyic Podzols
220 Gelic Podzols

Acrisols

221 Haplic Acrisols
222 Ferric Acrisols
223 Humic Acrisols
224 Plinthic Acrisols
225 Gleyic Acrisols

Alisols

226 Haplic Alisols
227 Ferric Alisols
228 Humic Alisols
229 Plinthic Alisols
230 Stagnic Alisols
231 Gleyic Alisols

Nitisols

232 Haplic Nitisols
233 Rhodic Nitisols
234 Humic Nitisols

Ferralsols

235 Haplic Ferralsols
236 Xanthic Ferralsols
237 Rhodic Ferralsols
238 Humic Ferralsols
239 Geric Ferralsols
240 Plinthic Ferralsols

Plinthosols

241 Eutric Plinthosols
242 Dystric Plinthosols
243 Humic Plinthosols
244 Albic Plinthosols

Histosols

245 Folic Histosols
246 Terric Histosols
247 Fibric Histosols
248 Thionic Histosols
249 Gelic Histosols

Anthrosols

250 Aric Anthrosols
251 Fimic Anthrosols
252 Cumulic Anthrosols
253 Urbic Anthrosols

(11) *Other observations*

Relevant information concerning the plot shall be stated here.

Form 1b: Contents of file with the information on tree level

1 ——— 5 Sequence	7 ——— 10 Observation point	12 — 13 Tree	15 — 17 Species	19 — 21 Defoliation	23 Dis-col.	25 27 29 31 33 35 37 39 Easily identifiable causes of damage T1 T2 T3 T4 T5 T6 T7 T8	41 ——— 50 Identification of damage type	52 ——— 61 Other observations
1								
2								
3								
4								
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33								

Column

1 to 5		Sequence number of trees (1 to 99 999)
7 to 10	(12)	Plot number (maximum 9 999)
12 to 13	(13)	Tree number (according to sequence 1 to 30, replacements 31 +)
15 to 17	(14)	Species (001 to 199)
19 to 21	(15)	Defoliation (0, 5, 10, 20, 15, ..., 95, 100 %)
23	(16)	Discolouration (0, 1, 2, 3 or 4)
25	(17)	Damage caused by: game and grazing (1 = yes)
27 (*)	(17)	Damage caused by: insects (1 = yes)
29 (*)	(17)	Damage caused by: fungi (1 = yes)
31 (*)	(17)	Damage caused by: abiotic agents (1 = yes)
33 (*)	(17)	Damage caused by: direct action of man (1 = yes)
35 (*)	(17)	Damage caused by: fire (1 = yes)
37 (*)	(17)	Damage caused by: known local/regional pollutant (1 = yes)
39 (*)	(17)	Other damage (1 = yes)
41 to 50 (*)	(18)	Identification of damage type (name)
52 to 61 (*)	(19)	Other observations (word)

(*) Leave blank if no damage has been observed.

Form 1b (information on tree level)

(12) *Observation point number*

See explanation item 2 in Form 1a.

(13) *Sample tree number*

The tree sample at each observation point for the evaluation of forest damage must consist of a minimum of 20 sample trees. However, the number of sample trees may not exceed 30. Care should be taken to ensure that the same number is used for the same tree in the consequent years.

(14) *Species* (Reference *Flora Europaea*)

Broadleaves

001: *Acer campestre*
002: *Acer monspessulanum*
003: *Acer opalus*
004: *Acer platanoides*
005: *Acer pseudoplatanus*
006: *Alnus cordata*
007: *Alnus glutinosa*
008: *Alnus incana*
009: *Alnus viridis*
010: *Betula pendula*
011: *Betula pubescens*
012: *Buxus sempervirens*
013: *Carpinus betulus*
014: *Carpinus orientalis*
015: *Castanea sativa (C. vesca)*
016: *Corylus avellana*
017: *Eucalyptus sp.*
018: *Fagus moesiaca*
019: *Fagus orientalis*
020: *Fagus sylvatica*
021: *Fraxinus angustifolia* spp. *oxycarpa (F. oxyphylla)*
022: *Fraxinus excelsior*
023: *Fraxinus ornus*
024: *Ilex aquifolium*
025: *Juglans nigra*
026: *Juglans regia*
027: *Malus domestica*
028: *Olea europaea*
029: *Ostrya carpinifolia*
030: *Platanus orientalis*
031: *Populus alba*
032: *Populus canescens*
033: *Populus hybrides*
034: *Populus nigra*
035: *Populus tremula*
036: *Prunus avium*
037: *Prunus dulcis (Amygdalus communis)*
038: *Prunus padus*
039: *Prunus serotina*
040: *Pyrus communis*
041: *Quercus cerris*
042: *Quercus coccifera (Q. calliprinos)*
043: *Quercus faginea*
044: *Quercus frainetto (Q. conferta)*
045: *Quercus fruticosa (Q. lusitanica)*
046: *Quercus ilex*
047: *Quercus macrolepis (Q. aegilops)*
048: *Quercus petraea*
049: *Quercus pubescens*
050: *Quercus pyrenaica (Q. toza)*
051: *Quercus robur (Q. penduculata)*
052: *Quercus rotundifolia*
053: *Quercus rubra*
054: *Quercus suber*
055: *Quercus trojana*
056: *Robinia pseudoacacia*
057: *Salix alba*
058: *Salix caprea*
059: *Salix cinerea*
060: *Salix eleagnos*
061: *Salix fragilis*
062: *Salix sp.*
063: *Sorbus aria*
064: *Sorbus aucuparia*
065: *Sorbus domestica*
066: *Sorbus torminalis*
067: *Tamarix africana*
068: *Tilia cordata*
069: *Tilia platyphyllos*
070: *Ulmus glabra (U. scabra, U. montana)*
071: *Ulmus laevis (U. effusa)*
072: *Ulmus minor (U. campestris, U. carpinifolia)*
073: *Arbutus unedo*
074: *Arbutus andrachne*
075: *Ceratonia siliqua*
076: *Cercis siliquastrum*
077: *Erica arborea*
078: *Erica scoparia*
079: *Erica manipuliflora*
080: *Laurus nobilis*
081: *Myrtus communis*
082: *Phillyrea latifolia*
083: *Phillyrea angustifolia*
084: *Pistacia lentiscus*
085: *Pistacia terebinthus*
086: *Rhamnus oleoides*
087: *Rhamnus alaternus*
099: Other broadleaves

Conifers

100: *Abies alba*
101: *Abies borisii-regis*
102: *Abies cephalonica*

103: *Abies grandis*
104: *Abies nordmanniana*
105: *Abies pinsapo*
106: *Abies procera*
107: *Cedrus atlantica*
108: *Cedrus deodara*
109: *Cupressus lusitanica*
110: *Cupressus sempervirens*
111: *Juniperus communis*
112: *Juniperus oxycedrus*
113: *Juniperus phoenicea*
114: *Juniperus sabina*
115: *Juniperus thurifera*
116: *Larix decidua*
117: *Larix kaempferi (L. leptolepis)*
118: *Picea abies (P. excelsa)*
119: *Picea omorika*
120: *Picea sitchensis*
121: *Pinus brutia*
122: *Pinus canariensis*
123: *Pinus cembra*
124: *Pinus contorta*
125: *Pinus halepensis*
126: *Pinus heldreichii*
127: *Pinus leucodermis*
128: *Pinus mugo (P. montana)*
129: *Pinus nigra*
130: *Pinus pinaster*
131: *Pinus pinea*
132: *Pinus radiata (P. insignis)*
133: *Pinus strobus*
134: *Pinus sylvestris*
135: *Pinus uncinata*
136: *Pseudotsuga menziesii*
137: *Taxus baccata*
138: *Thuya sp.*
139: *Tsuga sp.*
199: Other conifers

(15) *Defoliation*

Defoliation figure for each sample tree expressed as a percentage (in steps of 5 %) compared with a tree with complete foliage. The actual percentage is used.

0 = 0%
5 = 1 to 5%
10 = 6 to 10%
15 = 11 to 15%.

(16) *Discolouration codes*

0: no discolouration (0 to 10%)
1: slight discolouration (11 to 25%)
2: moderate discolouration (26 to 60%)
3: severe discolouration (> 60%)
4: dead

(17) *Easily identifiable causes of damage*

Add a mark (1) in the corresponding column(s).

T1 = game ad grazing
T2 = presence or traces of an excessive number of insects
T3 = fungi
T4 = abiotic agents (wind, snow, frost, drought)
T5 = direct action of man
T6 = fire
T7 = known local/regional pollutant
T8 = other

(18) *Identification of damage type*

Where possible, further identification of the damage type should be added e.g. for insects: the species or group (e.g. 'bark beetles').

(19) *Other observations on tree level*

Any additional observations which may be of interest shall be clearly noted on the form.

(e.g. possible influencing factors (recent drought, temperature extremes); other damage/stress symptoms).

(20) *Replacing of sample trees*

In the case where trees of the original sample have been removed (extraction, windthrow, etc.) and replaced in the sample, these replaced trees receive a new number (above 30) and shall be mentioned under observations.

ANNEX II

COMMON METHODS FOR THE ESTABLISHMENT OF AN INVENTORY OF THE FORESTS SOIL CONDITION

(Article 1a)

I. General remarks

The purpose of the scheme mentioned in Article 1a is to establish an inventory of the forests soil condition in the Member States.

The inventory is to be carried out at Community level on the basis of the 16 × 16 km grid network covering the entire area of each Member State. In addition, Member States may collect information from denser networks in order to obtain representative data at a national or regional level for the presentation of their report. For both levels (Community and national/regional) the common methods (described below) shall be adopted.

This Annex is based on the results of the Soil Expert Panel of the UN-ECE/ICP on assessment and monitoring of air pollution effects on forests. Reference is made to manuals prepared by this expert group.

The inventory shall be undertaken from the beginning of 1993 till the end of 1995; Member States shall submit the analysis results to the Commission before 31 December 1995. Soil condition data, which were collected and analysed before 1993, but after 1 January 1985 could also be used if the methods as described below have been applied.

II. Inventory methodology

II.1. *Selection of sample plots*

The Member States are already using a 16 km × 16 km network of permanent plots for the inventory of the tree vitality (see Annex I (II.1) to this Regulation). The same plots will be used.

II.2. *Plot information*

To ensure a good comparability between the tree vitality inventory data and the soil sampling data, it is strongly recommended that the following plot information is collected from the sample plot and submitted to the Commission (see Form 2a):

- descriptive code:
  - country,
  - observation point number,
  - date of sampling,
  - actual latitude and longitude coordinates,
- site data:
  - altitude,
  - soil unit.

II.3. *Selection of sample location*

Soil samples will be collected at the centre of the tree vitality inventory plots, and will be statistically representative for the situation of the actual sampling area. The soil samples will be collected from a profile pit and/or taken from bores. Care should be taken to avoid any disturbance of roots belonging to sample trees.

When it is not possible to take the soil samples at the exact centre of the permanent plot, the location for the sampling will be relocated according to a stringently defined, objective and unbiased statistical procedure.

II.4. *Pedological characterization of the sample plots*

A pedological characterization shall be made for each sample plot, using bores from the plot centre. The soil unit will be determined and reported in the plot file. If a detailed profile description is made, this profile description shall be submitted as an annex to the forest soil condition report.

It is advised to make the profile description according to the FAO guidelines for profile descriptions (FAO, 1990) in the bufferzone. Care should be taken that the profile description(s) is/are made on a location which is representative for the actual sampling area.

It is recommended that the bulk density is determined from undisturbed soil to enable the calculation of the total nutrient contents.

II.5. *Method of sampling*

The soil samples shall be collected by depth or by horizon. For every sampled layer or horizon, one representative composite sample will be collected or several samples; the number of subsamples collected for the composite sample and the sampling date shall be reported.

The organic layers (O- und H-) (*) are sampled separately. In case the sampling is done by fixed depth, the following layers are to be used:

— 0 to 10 cm (it is advised to sample 0 to 5 and 5 to 10 separately)

— 10 to 20 cm.

II.6. *Transport, storage and preparation*

The samples shall be transported and stored in such a way that chemical changes are minimized.

The procedures of this transport and storage (including waiting periods) shall be reported. Where applicable the problems and deviations of these procedures shall be reported in detail. It is advised to store part of the sample in a soil bank for comparative use with future sampling (e.g. in 10 years).

Before the samples are analysed the samples have to be prepared. Large items (> 2 mm) have to be removed, the samples have to be dried (at a maximum of 40 °C), and milled or sieved.

II.7. *Analysis methods*

In the 'Manual on methodologies of forest soil sampling and analysis' prepared by the Soil Expert Panel of the ICP-forests and approved by the respective Task Force meeting, the approved methods for the analysis of the various soil parameters are described.

It is advised to use the approved methods. In case other (national) methods are applied, the comparability of the analysis results shall be reported in detail together with the presentation of the analysis results. The inventory of the forest soil condition will distinguish between mandatory and optional parameters. Member States are free to analyse more, all, or part of the optional parameters. The analysis results shall be reported using Form 2b (for mandatory analysis) and Form 2c (for optional analysis).

(*) The Soil Expert Panel of the UN-ECE/ICP has agreed to use the definitions as given in the FAO-guidelines for soil description (1990), and the definitions of the organic layers (O- and H-) are as follows:
H-horizons or layers: Layers dominated by organic material, formed from accumulations of undecomposed or partially decomposed organic material at the soil surface which may be underwater. All H-horizons are saturated with water for prolonged periods or were once saturated but are now artificially drained. An H-horizon may be on the top of mineral soils or at any depth beneath the surface if it is buried.
O-horizons or layers: Layers dominated by organic material, consisting of undecomposed or partially decomposed litter, such as leaves, needles, twigs, moss and lichens, which has accumulated on the surface; they may be on top of either mineral or organic soils. O-horizons are not saturated with water for prolonged periods. The mineral fraction of such material is only a small percentage of the volume of the material and generally is much less than half of the weight. An O-layer may be at the surface of a soil or at any depth beneath the surface if it is buried. A horizon formed by illuviation of organic material into a mineral subsoil is not an O-horizon, though some horizons formed in this matter contain much organic matter.

Form 2a: Contents of reduced plot file to be used in combination with the forest soil condition inventory

1 ———— 4 Sequence	6 ——— 7 Country	9 ——— 12 Observation point #	14 ———— 19 Date (D D M M Y Y)	21 ———————— 27 Latitude coordinate (+ D D M M S S)	29 ———————— 35 Longitude coordinate (± D D M M S S)	37 —— 38 Altitude	40 — 42 Soil unit	44 ———————— 54 Observations
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

Column

1 to 4		Sequence number of plots (1 to 9 999)
6 to 7	(1)	Country code (France = 01, Belgium = 02, etc.)
9 to 12	(2)	Plot number (maximum 9 999)
14 to 19	(3)	Date of observation in DDMMYY (e.g. 22 06 90)
21 to 27	(4)	Latitude in + DDMMSS (e.g. + 505852)
29 to 35	(4)	Longitude in (+ or −) DDMMSS (e.g. + 035531)
37 to 38	(5)	Altitude (in 50-metre classes from 1 to 31)
40 to 42	(6)	Soil unit (101 to 253)

In the last column a remark on the plot can be included:

44 to 54	(7)	Other observations (word)

Explanation Forms 2a, 2b and 2c

Code lists of the data for the inventory of the forest soil condition to be forwarded to the Commission

Form 2a: Information on plot level (to be completed at the time of sampling in the field)

(1) *Country (codes and abbreviations)*

01: France (FR)
02: België — Belgique (BL)
03: Nederland (NL)
04: Deutschland (DL)
05: Italia (IT)
06: United Kingdom (UK)
07: Ireland (IR)
08: Danmark (DK)
09: Ellas (EL)
10: Portugal (PO)
11: España (ES)
12: Luxembourg (LX)

(2) *Observation point number*

The observation point number corresponds to the number indicated for the intersection of the grid at this point on the list of latitude and longitude coordinates provided by the Commission (Forests and Forestry Division) and/or replacements. The observation points numbers shall correspond to the plot numbers of the tree vitality inventory (Annex I) in the corresponding year.

(3) *Date of sampling*

The date of sampling is to be completed in the following order:

e.g.

Day		Month		Year	
0	8	0	9	9	2

(4) *Latitude-/longitude coordinates*

Fill in the full six-figure latitude and longitude coordinates of the observation point. These coordinates will differ from the coordinates of the corresponding point of the network provided by the Commission when the observation point in question has been replaced as instructed in paragraph II.1 of Annex I.

e.g.

	±	Degrees		Minutes		Seconds	
— latitude	+	5	0	1	0	2	7
— longitude	−	0	1	1	5	3	2

The first box is used to indicate a + or − coordinate.

(5) *Altitude*

1: ≤ 50 m
2: 51—100 m
3: 101—150 m
4: 151—200 m
5: 201—250 m
6: 251—300 m
7: 301—350 m
8: 351—400 m
9: 401—450 m
10: 451—500 m
11: 501—550 m
12: 551— 600 m
13: 601— 650 m
14: 651— 700 m
15: 701— 750 m
16: 751— 800 m
17: 801— 850 m
18: 851— 900 m
19: 901— 950 m
20: 951—1 000 m
21: 1 001—1 050 m
22: 1 051—1 100 m
23: 1 101—1 150 m
24: 1 151—1 200 m
25: 1 201—1 250 m
26: 1 251—1 300 m
27: 1 301—1 350 m
28: 1 351—1 400 m
29: 1 401—1 450 m
30: 1 451—1 500 m
31: >1 500 m

(6) *Soil unit*

Fluvisols

101 Eutric Fluvisols
102 Calcaric Fluvisols
103 Dystric Fluvisols
104 Mollic Fluvisols
105 Umbric Fluvisols
106 Thionic Fluvisols
107 Salic Fluvisols

Gleysols

108 Eutric Gleysols
109 Calcic Gleysols
110 Dystric Gleysols
111 Andic Gleysols
112 Mollic Gleysols
113 Umbric Gleysols
114 Thionic Gleysols
115 Gelic Gleysols

Regosols

116 Eutric Regosols
117 Calcaric Regosols
118 Gypsic Regosols
119 Dystric Regosols
120 Umbric Regosols
121 Gelic Regosols

Leptosols

122 Eutric Leptosols
123 Dystric Leptosols
124 Rendzic Leptosols
125 Mollic Leptosols
126 Umbric Leptosols
127 Lithic Leptosols
128 Gelic Leptosols

Arenosols

129 Haplic Arenosols
130 Cambic Arenosols
131 Luvic Arenosols
132 Ferralic Arenosols
133 Albic Arenosols
134 Calcaric Arenosols
135 Gleyic Arenosols

Andosols

136 Haplic Andosols
137 Mollic Andosols
138 Umbric Andosols
139 Vitric Andosols
140 Gleyic Andosols
141 Gelic Andosols

Vertisols

142 Eutric Vertisols
143 Dystric Vertisols
144 Calcic Vertisols
145 Gypsic Vertisols

Cambisols

146 Eutric Cambisols
147 Dystric Cambisols
148 Humic Cambisols
149 Galcaric Cambisols
150 Chromic Cambisols
151 Vertic Cambisols
152 Ferralic Cambisols
153 Gleyic Cambisols
154 Gelic Cambisols

Calcisols

155 Haplic Calcisols
156 Luvic Calcisols
157 Petric Calcisols

Gypsisols

158 Haplic Gypsisols
159 Calcic Gypsisols
160 Luvic Gypsisols
161 Petric Gypsisols

Solonetz

162 Haplic Solonetz
163 Mollic Solonetz
164 Calcic Solonetz
165 Gypsic Solonetz
166 Stagnic Solonetz
167 Gleyic Solonetz

Solonchaks

168 Haplic Solonchaks
169 Mollic Solonchaks
170 Calcic Solonchaks
171 Gypsic Solonchaks
172 Sodic Solonchaks
173 Gleyic Solonchaks
174 Gelic Solonchaks

Kastanozems

175 Haplic Kastanozems
176 Luvic Kastanozems
177 Calcic Kastanozems
178 Gypsic Kastanozems

Chernozems

179 Haplic Chernozems
180 Calcic Chernozems
181 Luvic Chernozems
182 Glossic Chernozems
183 Gleyic Chernozems

Phaeozems

184 Haplic Phaeozems
185 Calcaric Phaeozems
186 Luvic Phaeozems
187 Stagnic Phaeozems
188 Gleyic Phaeozems

Greyzems

189 Haplic Greyzems
190 Gleyic Greyzems

Luvisols

191 Haplic Luvisols
192 Ferric Luvisols
193 Chromic Luvisols
194 Calcic Luvisols
195 Vertic Luvisols
196 Albic Luvisols
197 Stagnic Luvisols
198 Gleyic Luvisols

Lixisols

199 Haplic Lixisols
200 Ferric Lixisols
201 Plinthic Lixisols
202 Albic Lixisols
203 Stagnic Lixisols
204 Gleyic Lixisols

Planosols

205 Eutric Planosols
206 Dystric Planosols
207 Mollic Planosols
208 Umbric Planosols
209 Gelic Planosols

Podzoluvisols

210 Eutric Podzoluvisols
211 Dystric Podzoluvisols
212 Stagnic Podzoluvisols
213 Gleyic Podzoluvisols
214 Gelic Podzoluvisols

Podzols

215 Haplic Podzols
216 Cambic Podzols
217 Ferric Podzols
218 Carbic Podzols
219 Gleyic Podzols
220 Gelic Podzols

Acrisols

221 Haplic Acrisols
222 Ferric Acrisols
223 Humic Acrisols
224 Plinthic Acrisols
225 Gleyic Acrisols

Alisols

226 Haplic Alisols
227 Ferric Alisols
228 Humic Alisols
229 Plinthic Alisols
230 Stagnic Alisols
231 Gleyic Alisols

Nitisols

232 Haplic Nitisols
233 Rhodic Nitisols
234 Humic Nitisols

Ferralsols

235 Haplic Ferralsols
236 Xanthic Ferralsols
237 Rhodic Ferralsols
238 Humic Ferralsols
239 Geric Ferralsols
240 Plinthic Ferralsols

Plinthosols

241 Eutric Plinthosols
242 Dystric Plinthosols
243 Humic Plinthosols
244 Albic Plinthosols

Histosols

245 Folic Histosols
246 Terric Histosols
247 Fibric Histosols
248 Thionic Histosols
249 Gelic Histosols

Anthrosols

250 Aric Anthrosols
251 Fimic Anthrosols
252 Cumulic Anthrosols
253 Urbic Anthrosols

(7) *Other observations*

Relevant information concerning the plot shall be stated here.

Form 2b: Contents of file with soil sampling information (mandatory)

Sequence Number	Plot	Hori-zon	Samp Cod (0,1,2)	Date (ddmmyy)	pH ($CaCl_2$)	C_Org (g/kg)	N (g/kg)	P (mg/kg)	K (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	OrgLay (kg/m^2)	$CaCO_3$ (g/kg)	Observation
1—5	7—10	12—14	16	18—23	25—27	29—31	33—36	38—40	42—45	47—50	52—55	57—59	61—63	65—75
0	0	SAM												
1		H	0		.		.							
2		O	0		.		.							
3		M05	1		.		.							
4		M51	1		.		.							
5		M01	9		.		.							
6		M12	0		.		.							
99999	9999	M48	2	311295	9.9	999	99.9	999	9999	9999	9999	999	999	maximum value (**)

The first line (line #0) is used to indicate what sampling analysis method (SAM) has been used.

Indicate for each paramter what analysis method has been used:

0 = No deviation from approved method.
1 = Analysed according to alternative method (*).
9 = Recomputed data (*).

1—5	Sequence number	Sequence number of samples (1 to 99 999)
7—10	Observation point number	Corresponding plotnumber (maximum 9999)
12—14	Level	Code for depth level (H, O, M05, M51, M01, M12)
16	Samp cod	Code for sampling method (0 = approved method, 1 = as advised (*), 9 = recalculated (*))
18—23	Date	Date of analysis (ddmmyy)

Parameters		(Mandatory file)				
		Units (***)	H/O	Min	Approved method	Remarks
25—27	pH ($CaCl_2$)		M	M	pH-electrode	
29—31	C-org	(g/kg)	M	M	dry combustion	
33—36	N	(g/kg)	M	M	dry combustion	
38—40	P	(mg/kg)	M		extr: aqua regia	
42—45	K	(mg/kg)	M		extr: aqua regia	
47—50	Ca	(mg/kg)	M		extr: aqua regia	
52—55	Mg	(mg/kg)	M		extr: aqua regia	
57—59	OrgLayer	(kg/m^2)	M		volume dry—weight	
61—63	$CaCO_3$	(g/kg)		M	calcimeter	(if pH ($CaCl_2$) > 6)
65—75	Observation	Words				

M = mandatory, blank = not required

(*) Methods and recomputations that have been used shall be described in detail in an annex to the soil condition report.
(**) Maximum values are used when the actually registered value is equal to or higher than the maximum value. When the actual registered value is below the minimum value that could be entered, the minimum value shall be used. If no quantity could be measured (i.e. below detection limits) a special code —1 (minus 1) will be used. When no analysis has been carried out for this parameter a zero or blank shall be used.
(***) Based on oven—dry weight.

Form 2b: Mandatory sampling results (to be completed after the analysis in the laboratory)

Observation point number

See explanation item 2 in form 2a.

(8) *Sampling layer*

O: Organic layer

H: Organic layer

M01: Mineral layer (0—10 cm)

M05: Mineral layer (0—5 cm) (advised)

M51: Mineral layer (5—10 cm) (advised)

M12: Mineral layer (10—20 cm)

(9) *Sampling method code*

It is mandatory to submit the data by layer. The sampling could (if well documented) be carried out differently. The following codes shall be used to indicate the sampling method:

0 = no deviation from approved sampling method.

1 = sampled as advised.

9 = sampled in a different way, analysis results have been recomputed. A full explanation of the used method, including the recomputation shall be included in the forest soil condition report.

(10) *Date of analysis*

The date of the start of the analysis shall be completed in the same way as the date of sampling (item 3).

(11) *Soil analysis*

The following parameters are mandatory (Man) in the soil sample analysis of the organic layers (H/O) and mineral layers (M):

	Organic H/O	Mineral M01, M12 (M05, M51)	Approved methods
pH ($CaCl_2$)	Man	Man	Labex 8703-01-1-1 and ISO/TC190/SC3/GT8
C-org	Man	Man	Dry combustion
N	Man	Man	Dry combustion
P	Man		Extr: Aqua regia
K	Man		Extr: Aqua regia
Ca	Man		Extr: Aqua regia
Mg	Man		Extr: Aqua regia
OrgLay	Man		Volume (cylindric)-dry-weight
$CaCO_3$		Man	AFNOR X 31-105 (if pH ($CaCl_2$) > 6)

(12) *Sampling analysis method (SAM)*

In the first line (sequence number 0) the sampling analysis method is indicated for each parameter.

0 = sample is analysed according the method as indicated in the approved method.

1 = sample is analysed according to an alternative method (to be indicated by the Soil Expert Panel).

9 = sample is analysed by a different method and/or results have been recomputed.

In the latter two cases (SAM = 1 or 9) a full description of the used analysis methods and/or recomputations shall be given in an annex to the soil condition report.

Form 2c: Contents of file with soil sampling information (Optional)

Sequence Number	Plot	Hori-zon	Samp Cod (0,1,2)	Date (ddmmyy)	Na (mg/kg)	Al (mg/kg)	Fe (mg/kg)	Cr (mg/kg)	Ni (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Cd (mg/kg)	Ac_Exc (cmol+/kg)	BCE (cmol+/kg)	ACE (cmol+/kg)	CEC (cmol+/kg)	Base-Sat %	Observation
1—5	7—10	12—14	16	18—23	25—28	30—34	36—40	42—44	46—48	50—53	55—57	59—61	63—65	67—69	71—73	75—78	80—83	85—88	90/1	93—103
0	0	SAM																		
1		H	0											.		.		.		
2		O	0											.		.		.		
3		M05	1											.		.		.		
4		M51	1											.		.		.		
5		M01	9											.		.		.		
6		M12	0											.		.		.		
9 9 9 9 9	9 9 9 9	M48	2	31 12 95	9 9 9 9	9 9 9 9 9	9 9 9 9 9	9 9 9	9 9 9	9 9 9 9	9 9 9	9 9 9	9 9 9	9 . 9	9 9 9	9 9 . 9	9 9 . 9	9 9 . 9	9 9	(**)

The first line (line # 0) is used to indicate what sampling analysis method (SAM) has been used.

0 = no deviation from approved method.
1 = analysed according to alternative method (*)
9 = recomputed data (*)

1—5	Sequence Number	Sequence number of samples (1 to 99 999)
7—10	Observation Point number	Corresponding plotnumber (maximum 9 999)
12—14	Level	Code for depth level (H, O, M05, M51, M01, M12)
16	Samp cod	Code for sampling method (0 = approved method, 1 = as advised (*), 9 = recalculated (*))
18—23	Date	Date of analysis (ddmmyy)

Parameters	(Optional file) Units (***)	H/O	Min	Approved method	Remarks
25— 28 Na	(mg/kg)	O		extr: aqua regia	
30— 34 Al	(mg/kg)	O		extr: aqua regia	
36— 40 Fe	(mg/kg)	O		extr: aqua regia	
42— 44 Cr	(mg/kg)	O		extr: aqua regia	
46— 48 Ni	(mg/kg)	O		extr: aqua regia	
50— 53 Mn	(mg/kg)	O		extr: aqua regia	
55— 57 Zn	(mg/kg)	O		extr: aqua regia	
59— 61 Cu	(mg/kg)	O		extr: aqua regia	
63— 65 Pb	(mg/kg)	O		extr: aqua regia	
67— 69 Cd	(mg/kg)	O		extr: aqua regia	
71— 73 Ac-Exc	(cmol $^+$ /kg)		O	titration	Exchangeable acidity
75— 78 BCE	(cmol $^+$ /kg)		O	extr: $BaCl_2$	Base cations exchangeable
80— 83 ACE	(cmol $^+$ /kg)		O	$BaCl_2$	Acid cations exchangeable
85— 88 CEC	(cmol $^+$ /kg)		O		Cation exchange capacity
90— 91 BaseSat	%		O		
93—103 Observation	Words				

O = optional, blank = not required

(*) Methods and recomputations that have been used shall be described in detail in an annex to the soil condition report.
(**) Maximum values are used when the actually registered value is equal or higher than the maximum value. When the actual registered value is below the minimum value that could be entered, the minimum value shall be used. If no quantity could be measured (i.e. below detection limits) a special code — 1 (minus 1) will be used. When no analysis has been carried out for this parameter a zero or blank shall be used.
(***) Based on oven—dry weight.

Form 2c: Optional sampling results (to be completed after the analysis in the laboratory)

Observation point number

See explanation item 2 in form 2a.

(8) *Sampling layer*

O Organic layer
H Organic layer
M01 Mineral layer (0—10 cm)
M05 Mineral layer (0—5 cm) (advised)
M51 Mineral layer (5—10 cm) (advised)
M12 Mineral layer (10—20 cm)

(9) *Sampling method code*

It is mandatory to submit the data by layer. The sampling could (if well documented) be carried out differently. The following codes shall be used to indicate the sampling method:

0 = no deviation from approved sampling method.
1 = sampled as advised.
9 = sampled in a different way, analysis results have been recomputed. A full explanation of the used method, including the recomputation shall be included in the forest soil condition report.

(10) *Date of analysis*

The date of the start of the analysis shall be completed in the same way as the date of sampling (item 3).

(11) *Soil analysis*

The following parameters are optional (Opt) in the soil sample analysis of the organic layers (H/O) and mineral layers (M):

	Organic H/O	Mineral M01, M12 (M05, M51)	Approved methods
$CaCO_3$	Opt		AFNOR X 31—105 (if pH ($CaCl_2$) > 6)
Na	Opt		Extr: Aqua regia
Al	Opt		Extr: Aqua regia
Fe	Opt		Extr: Aqua regia
Cr	Opt		Extr: Aqua regia
Ni	Opt		Extr: Aqua regia
Mn	Opt		Extr: Aqua regia
Zn	Opt		Extr: Aqua regia
Cu	Opt		Extr: Aqua regia
Pb	Opt		Extr: Aqua regia
Cd	Opt		Extr: Aqua regia
Ac-Exc		Opt	LABEX L8703-26-1-1
BCE		Opt	Bascomb
ACE		Opt	Bascomb
CEC		Opt	Bascomb
BaseSat		Opt	LABEX L8703-26-1-1

(12) *Sampling analysis method* (SAM)

In the first line (sequence number 0) the sampling analysis method is indicated for each parameter.

0 = sample is analysed according to the method as indicated in the approved method.
1 = sample is analysed according to an alternative method (to be indicated by the Soil Expert Panel).
9 = sample is analysed by a different method and/or results have been recomputed.

In the latter two cases (SAM = 1 or 9) a full description of the used analysis methods and/or recomputations shall be given in an annex to the soil condition report.

ANNEX III

APPLICATIONS FOR AID FROM THE COMMUNITY IN RESPECT OF THE MEASURES TO BE CARRIED OUT PURSUANT TO ARTICLE 2 OF REGULATION (EEC) NO 3528/86 AND ITS AMENDMENTS

Application for aid must be presented in accordance with Annex A to Commission Regulation (EEC) No 526/87 together with a summary of the information listed below and the completed table as included in this Annex as Form 3a.

For each of the measures to be carried out in accordance with to Article 1 (tree vitality on an annual basis) and Article 1a (soil sampling) information on the following items shall be given:

(1) *Short description of the measures*

(2) *Applicant*

Links between the applicant and the measures.

(3) *Agency responsible for carrying out the measures*

Object and scope of the agency's main activities.

(4) *Detailed description of the measures*

where:

(a) the measures relate both to carrying-out the periodic inventory of forest damage and to establishing or extending the Community network of observation points.

— description of existing situation,

— geographical location and area of the region(s) concerned (+ cartographical document),

— number of observation points corresponding to the Community network of points (Form 3a),

— detailed description of the sampling procedure used at point level (number of trees, marking, etc.),

— indication of timetable for the execution of the projected measures (Form 3b);

(b) the measures relate to the establishment and execution of an inventory of the soil condition in forests of the Community at the observation points of the Community network of 16 km × 16 km.

— description of the existing situation,

— number of observation points corresponding to the Community's network, which are to be included in the soil condition inventory (Form 3a),

— detailed description of the sampling procedures used at point level (number of single samples, soilprofile description, etc.),

— detailed description of parameters to be determined and the analysis method to be applied including a clear description of any calibration, correction, and/or recalculation needed to make the results compatible with the results analysed according to the default methods,

— indication of the timetable for the execution of the projected measures (Form 3b).

(5) *Cost of measures under 4a and 4b* (Form 3a)

— cost per point (establishment, observation or sampling),

— total cost of establishment, observation or sampling,

— aid applied for from the Community for establishment, observation or sampling,

— costs per point for analysis and evaluation (soil sampling),

— total costs of analysis and evaluation (soil sampling),

— aid applied for from the Community for analysis and evaluation (soil sampling),

— total project costs (sum of costs for establishment, observations and/or sampling, and sum of costs for analysis and evaluation),

— total aid applied for from the Community (sum of costs for establishment, observations and/or sampling, and sum of costs for analysis and evaluation).

(6) *Complete form 3a and 3b*

.....

Date and signature

Form 3a

PROPOSED FINANCING (Article 2)

Measure	Forest area concerned (km^2)	Number of Community plots	Total cost (1)	Non-Community participation				Aid requested (1)
				State (1)	Region (1)	Other public funds (1)	Private (1)	
To carry out the periodic inventory and to establish or extend the Community network of observation plots								
To establish and execute an inventory of the forest soil condition in the observation points of the Community's network								
Total								

(1) in national currency

Form 3b

FORWARD PLAN FOR THE EXECUTION OF THE PROJECT

(to be completed for each Article 2 project proposal)

Phases	Year																																			
	Months	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1																																																		
2																																																		
3																																																		
4																																																		
5																																																		

ANNEX IV

PERIODIC FOREST CONDITION REPORTS

(Article 3 (1))

Each Member State must submit besides the vitality data (as detailed in Annex I) an annual report on the status of their forests before 15 January of the next year. This report should be based in particular on data collected from the 16 km × 16 km forest damage inventory and other observation networks.

The national reports should contain information relating to the following subjects:

I. **General information on the carrying-out of the inventory of damage caused to forests**

— agency centralizing results,

— national forested area,

— total area covered by network(s),

— grid size of other networks,

— total number of observation plots,

— total number of trees observed,

— number of sample trees per plot,

— disposition/choice of sample trees,

— observation period,

— execution and control of inventory (training period, number of observers; etc.),

— processing of data,

— problems encountered.

II. **Forest condition inventory results**

Results shall be presented in terms of the percentages of trees falling into the different defoliation and discolouration classes. The percentage of needle/leaf loss refers to damage as a result of unknown and known causes.

In a summary table (Form 4a) the overall information is to be presented on national level and per region. For each region and the total (= national) a set of four forms (Form 4b) shall be completed:

— defoliation — conifers,

— defoliation — broadleaves,

— discolouration — conifers,

— discolouration — broadleaves.

Optionally a report of the combined damage class (a combination of defoliation and discolouration) may be presented in the same form for conifers and broadleaves.

III. **Information regarding possible causes of observed damage**

A section of the national report should be devoted to the analysis of important information on the possible causes of the observed damage in particular with reference to atmospheric pollution. Results of any correlations made between different types and stages of forest damage (defoliation, discolouration, other signs of damage) and parameters such as site or stand characteristics, climatic data etc. should be included in the annual report.

IV. **Measures to maintain or restore damaged forests**

Principal results of any measures or field experiments aimed at maintaining and restoring damaged forests should be presented in the report.

V. **Socio-economic impact of forest damage**

Member States should provide any relevant information available on the socio-economic influence of forest damage.

Form 4a

ANNUAL FOREST CONDITION REPORT

(summary sheet)

Country:		Year:	19 . .
Agency:			
Contact person:		Phone:	
		Fax:	

	National	Region: 1	2	3	4	5	6	7	8
Name									
Total forested area (in km^2)									
Total area covered by network(s) (in km^2)									
Percentage (in %)									
Grid size(s) (km × km)									
Number of plots									
Number of trees									
Trees per plot									

Remarks (national):	continue on additional pages
Remarks (regional):	continue on additional pages

For each region and the total (= national area) a set of four forms (Form 4b) shall be completed with the information on the defoliation and discolouration for the conifers as well as broadleaves. The same form can also be used for the completion of the combination of defoliation and discolouration in forest damage classes.

Explanation Forms 4a and 4b

Information to be supplied in the annual forest condition report

Form 4a: Summary sheet of annual forest condition report

(1) *Country*

The name of the country.

(2) *Year*

Year of inventory.

(3) *Agency*

The name of the responsible executing agency shall be stated here. When (part of) the inventory or data handling/-evaluation is done by different agencies, this shall be stated clearly under remarks.

(4) *Contact person*

The name of the person responsible for the completion of these forms shall be stated here, including his (direct) telephone and fax numbers.

The following items are to be completed by region and as a total (national).

(5) *Total forested area*

The total forested area (in km^2) shall be stated by region and as a total (total national forest area). When the definition of forest deviates from the definition as stated in Annex I (II.1), a clear statement shall be given on the meaning of the forested area as presented here.

(6) *Total forest area covered by the network(s)*

This is the area (defined as forest under Annex I (II.1)) that is covered by the network(s). The area may differ from the total national forest area as a result of a different definition or by an incompleteness of the network(s).

(7) *Completeness percentage*

The completeness of the network(s) shall be stated as a percentage, considering the definition of forest as defined in Annex I (II.1). Differences from 100 % shall be explained.

(8) *Grid size(s)*

The actual gridsize(s) used for the determination of the location of the observation plots shall be stated in kilometres by kilometres (km × km).

(9) *Number of plots*

The total visited number of plots shall be stated here.

(10) *Number of trees*

The total observed number of trees shall be stated here.

(11) *Trees per plot*

The average number of trees per plot shall be stated here. If there are differences with the nationally determined number of trees per plot these shall be explained in detail.

(12) *Region names*

Clear indications of the regions (provinces, *Länder*, states, etc.) shall be given.

(13) *Remarks national and regional*

Any relevant information on national or regional level shall be included here or on additional pages. Information with a regional character shall be clearly linked to one (or more) regions.

Form 4b

ANNUAL REPORT ON DAMAGE STATUS OF MAIN TREE SPECIES

(to be completed for each region and the total)

Defoliation/Discolouration (*)
Conifers/Broadleaves (*)

Country:

Region:

Survey period: from . ./. . until . ./. . 199 . (in DD/MM/YY)

Classification		Percentage of trees defoliated/discoloured (*)														Undefined age	Grand total
		trees up to 60 years old							trees 60 years and older								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	9+16+17
Species (code):							others	total						others	total		
Total area of species (km^2)																	
Number of sample trees:																	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
0	0 — 10																
1	11 — 25																
2	26 — 60																
3	> 60																
4	dead																
		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(*) strike out when not applicable

Remarks:

Form 4b: Annual report on forest condition status of main tree species

For each region and the total (= national area) a set of four forms are to be completed (defoliation/conifers, defoliation/broadleaves, discolouration/conifers, and discolouration/broadleaves). On a voluntary basis an additional set of two forms can be completed for the damage (the combination of defoliation and discolouration) for conifers and broadleaves. One of the words defoliation/discolouration as well as conifers/broadleaves shall be stricken.

(1) *Country*

The name of the country.

(2) *Region*

The name of the region (see also Form 4a (11)).

(3) *Survey period*

The period in which the survey (for that region) took place shall be indicated here.

(4) *Tree species*

In columns 3 to 7 and 10 to 14 the codes of the most important tree species are stated (See Annex I (14) for an extensive list of tree species and their codes). In columns 3 to 7 trees up to 60 years old are reported, while in columns 10 to 14 trees over 60 years of age are reported. In columns 8 and 15 the total situation of the other species are reported for the younger and older trees respectively. The total area of the 'others' shall be less than 10% of the total. If needed additional species shall be presented in additional forms.

In columns 9 and 16 the totals (younger and older than 60 respectively) are reported.

In column 17 trees with an undefined age are reported.

In the final column (grand total) the sum of the totals and undefined age (6 + 16 + 17) is reported.

(5) *Total area of species*

For each species the total area is stated in km^2.

(6) *Number of sample trees*

On this line the total number of sampled trees is stated.

(7) *Percentage in classes*

In the five lines below the percentage sign (%) the percentage of trees in the five defoliation (or discolouration) classes is presented for each species, the restgroup, and the total, separated for younger trees and older trees. In the columns with total and grand total the percentage of trees in the five classes of the total group shall be stated. The sum of the percentages in one column always adds up to 100.

(8) *Remarks*

Any relevant remark considering the figures of one (or more) species shall be stated below the table, and shall be explained in more detail in the accompanying text (See Annex IV (III)).

ANNEX V

FOREST SOIL CONDITION REPORT

(Artile 3a)

Each Member State shall submit besides the soil condition inventory data (as detailed in Annex II) a report on the condition of their forest soils. This report shall be based in particular on data collected from soil sampling of the plots of the 16 km × 16 km network. Furthermore the Member States shall present summarized results of national soil surveys.

The national report shall contain information on the following subjects:

I. **General information on the execution of the forest soil condition inventory**

- national forested area,
- total area covered by network(s),
- total number of observation plots,
- total number of plots sampled in tree vitality inventory (1993 or 1994),
- total number of plots sampled in forest soil condition inventory,
- number of single samples per composite sample,
- observation period,
- analysis and processing of data (see item V),
- problems encountered.

II. **Methodology of sampling, analysis and processing**

In Annex II the approved method has been described, specifying the sampling, transport/storage, analysis of soil samples and the processing of the results. Where applicable, additional instructions, details, etc. will be distributed, after approval of the Standing Forestry Committee, to the Member States.

In the forest soil condition report a part should be devoted to describe the actually used method in detail. Especially when the used methods deviate from the approved method and/or when regional differences exist. In case different methods have been applied in the sampling, analysis and processing, clear statements and conclusive lists shall be included, showing which plots have been sampled by the different methods.

II.1. *Sampling method in the field*

If the sampling is done in full accordance with the approved method (as detailed in Annex II), this shall be stated in the report. Any differences from the approved method shall be described in detail, including clear explanations of any regional differences.

II.2. *Transport, storage and preparation*

The samples shall be transported and stored in such a way that no chemical changes can occur to the sample. The procedures of this transport, and storage (including waiting periods) shall be reported. Where applicable the problems and deviations of these procedures shall be reported in detail.

II.3. *Analysis methods*

In Annex II the details of the approved methods are explained.

In the national forest soil condition report a chapter will be devoted to the description of the methods actually used, problems encountered and the methods in which the analysis results have been corrected, calibrated, or converted.

If the analysis of the soil samples has not been executed according to the approved method, the actual method shall be described in detail. Also a conversion method (if possible) shall be presented, by which the data have been (or could have been) converted to be comparable with results obtained through the approved method.

The results of the analysis are to be presented to the Commission in a digital format. When the approved methods have been used, the data can be directly entered. If different methods have been used, the data can be reported directly, or can be converted first.

II.4. *Processing of data*

In the national forest soil condition report an evaluation of the soil analysis data shall be prepared. The evaluation shall include the evaluation of possible relations between the soil results and the recorded forest damage. An explanation shall be given of the processing methods, the statistical analysis, and the total evaluations that have been used to arrive at the reported values.

III. **Soil survey results**

Results shall be presented to the Commission in accordance with the instructions as stated in the 'Submission of soil data in a digital format' (See Annex VIb).

IV. **Information regarding soil damage and soil deterioration**

A section of the national report shall be devoted to the analysis of any other important information on the possible causes of the observed soil deterioration in particular with reference to atmospheric pollution. Results of any correlations made between different types and stages of forest damage (defoliation, discolouration, other signs of damage) and the measured soil characteristics should be included in the report.

V. **Measures to restore damaged forest soils**

Principal results of any measures or field experiments aimed at maintaining and restoring damaged forest soils should be presented in the report. Especially possible consequences as a result of the forest soil condition inventory to the forest management should be elaborated in detail.

ANNEX VI

SUBMISSION OF DATA IN A DIGITAL FORMAT

I. **General Information**

I.1. *Introduction*

Since 1987 the data of common forest damage inventory have already been forwarded to the Commission on a yearly basis. The information consists of the plot information (Annex I; Form 1a), and the tree information (Form 1b). Since 1990 the data have been submitted by Member States in a digital form on a voluntary basis.

Before the end of 1995 Member States shall submit information on the forest soil condition to the Commission. These data shall also be submitted in a digital form.

In this Annex the details on the submission of the tree damage inventory data (Annex VIa) and the soil condition data (Annex VIb) are presented.

I.2. *Hardware requirements*

As medium for the data submission, the 3,5" floppy disk (DSDD) has been selected. This floppy has become a worldwide standard and is cheap and durable. The capacity (720 KB) is enough to contain at least 10 000 trees. Diskettes of good quality are to be used.

I.3. *Software requirements*

The diskettes are to be formated on 'low density', using DOS 2.1 or higher, and should be 100 % IBM compatible. All information on the diskette shall be in ASCII characters.

I.4. *Data files*

Each diskette shall contain two files; one file with the summarized information of the plots (plot-file), and a second file with the inventoried results (datafiles). Details on the names and the contents of these files is presented in Annex VIa (tree vitality inventory) and Annex VIb (soil condition inventory).

I.5. *Example on diskette*

On request a diskette with an example of the structure and contents of the files can be supplied.

ANNEX VIa

II. Submission of forest damage inventory data in a digital format

II.1. *General*

The forest damage inventory data are collected yearly in the summer period. The data should be submitted to the Commission as soon as possible but not later than 15 December of the same year. The data shall be submitted in two files; the plot-file and the tree-data file.

II.2. *Information on plot level*

The information in the plot-file (see Annex I, Form 1a) should contain for each plot the following information in one row:

- country,
- observation point number (Plot number),
- date of observation,
- actual latitude coordinate,
- actual longitude coordinate,
- availability of water to principal species,
- humus,
- altitude,
- orientation,
- mean age of predominant storey,
- soil unit.

In an extra column remarks with regard to the plot can be added.

The abovementioned inventory data should be presented in a table with a sequence number in the first column.

II.3. *Information on tree level*

The tree-file (see Annex I, Form 1b) should contain for each tree the following information in one row:

- observation point number,
- sample tree number,
- species,
- defoliation,
- discolouration,
- causes of damage which can be identified:
  - game and grazing (T1),
  - presence or traces of an excessive number of insects (T2),
  - fungi (T3),
  - abiotic agents (wind, snow, frost, drought, . . .) (T4),
  - direct action of man (T5),
  - fire (T6),
  - known local/regional pollutant (T7),
  - other (T8).
- identification of damage type,
- other observations.

These inventory data shall be put into a table with a sequence number and a plot number in the first columns.

II.4. *Filenames*

To avoid possible confusion between countries and years the files with plot information and with tree information are to be named in such a way that country and year are known in the file name. DOS file names may consist of a name of eight characters and an extension of three characters. As characters letters, numbers and some special signs are accepted. For the names only letters and numbers are used.

The file names should include the country code, consisting of two letters (FR = France, BL = Belgium, etc.) and the year of inventory (e.g. FR1990, FR1991). The file with the plot information will have the extension .PLO. The file with the tree information will have the extension .TRE (e.g. FR1990.PLO and FR1990.TRE).

In case more than about 10 000 trees are inventoried (the capacity of a single diskette) the database should be split in two or more files, using the letters A, B, C, etc. (e.g. FR1990A.TRE, FR1990B.TRE).

II.5. *Submission of data*

Under separate cover and well packed for international transport the diskette(s) will be sent to the Commission. Together with the diskettes a printed copy of the first page of the files shall be submitted. On this first page the columns and headers shall be clearly indicated.

The diskette shall also be accompanied with a note stating the names of the files, and the total number of plots and trees in the file (last sequence number).

ANNEX VIb

III. Submission of data of the forest soil condition inventory

III.1. *General*

The forest soil condition inventory data are collected once within the framework of this Regulation (See Annex II (1)). The data should be submitted to the Commission before 31 December 1995. The data shall be submitted in two or three files; the plot-file and the mandatory soil-data file, and, if analysed, the optional soil-data file.

III.2. *Information on plot level*

The information in the plot-file (See Annex II; Form 2a) is a reduced version of the plot-file for the tree damage and should contain for each plot the following information in one row:

— Country,

— Observation point number (plot number),

— Date of observation (soil sampling),

— Actual laitude coordinate,

— Actual longitude coordinate,

— Altitude,

— Soil unit.

In an extra column remarks with regard to the plot can be added.

The abovementioned inventory data should be presented in a table with a sequence numer in the first column.

III.3. *Soil sampling results*

The samples shall be analysed and the data shall be reported by layer. The following layers are distinguished:

Organic layers:

— H-horizon

— O-horizon.

Mineral layers:

— M01 (0—10 cm)

— M12 (10—20 cm).

Where it is advised to divide the M01 layer into two sub-layers:

— M05 (0—5 cm)

— M51 (5—10 cm).

The parameters to be submitted for each organic and mineral layer are split into a mandatory set (Man) and an optional (Opt) set of parameters.

The mandatory set of parameters includes:

	Organic H/O	Mineral M01, M12 (M05, M51)	Approved methods
pH ($CaCl_2$)	Man	Man	Labex 8703-01-1-1 and ISO/TC190/SC3/GT8
C_org	Man	Man	Dry combustion
N	Man	Man	Dry combustion
P	Man		Extr: Aqua regia
K	Man		Extr: Aqua regia
Ca	Man		Extr: Aqua regia
Mg	Man		Extr: Aqua regia
OrgLay	Man		Volume (cylindric)-dry-weight
$CaCO_3$	Opt	Man	AFNOR X 31-105
Observation			

The Optional set of parameters includes:

	Organic H/O	Mineral M01, M12 (M05, M51)	Approved methods
Na	Opt		Extr. Aqua regia
Al	Opt		Extr. Aqua regia
Fe	Opt		Extr. Aqua regia
Cr	Opt		Extr. Aqua regia
Ni	Opt		Extr. Aqua regia
Mn	Opt		Extr. Aqua regia
Zn	Opt		Extr. Aqua regia
Cu	Opt		Extr. Aqua regia
Pb	Opt		Extr. Aqua regia
Cd	Opt		Extr. Aqua regia
Ac_Exc		Opt	Labex L8703-26-1-1
BCE		Opt	Bascomb
ACE		Opt	Bascomb
CEC		Opt	Bascomb
BaseSat		Opt	Labex L8703-26-1-1
Observation			

The analysis results on the above stated parameters for each layer shall be put into a table with a sequence number and a plotnumber in the first columns. In the first row (sequence number 0), the sample analysis method (SAM) shall be given in the form of a coding.

The coding to be used for the indication of the sample analysis method shall be:

0 = analysed according to approved method.

1 = analysed according to alternative method.

9 = analysed by different method.

If the samples are not analysed according to the approved method, full details of the analysis method and/or recomputation are to be included in the annex of the Forest soil condition report. A copy of this Annex should be submitted together with the soil condition inventory results.

III.4. *Filenames*

To avoid possible confusion between countries and years the files with the reduced plot information and with soil-data information are to be named in such a way that country and year are known in the file name. DOS file names may consist of a name of eight characters and an extension of three characters. As characters letters, numbers and some special signs are accepted. Capitals cannot be used. For the names only letters and numbers are used.

The file names should include the country code, consisting of two letters (FR = France, BL = Belgium, etc.) and the year of sampling (e.g. FR1994, FF1995). The file with the reduced plot information for the soil condition inventory will have the extension .PLS. The file with the mandatory soil information will have the extension .SOM and the optional soil information .SOO (e.g. FR1995.PLS, FR1995.SOM und FR1995.SOO).

III.5. *Submission of data*

Under separate cover and well packed for international transport the diskette(s) will be sent to the Commission. The diskette shall be accompanied with a note stating the names of the files, and the total number of plots and soil samples in the file (last sequence number). Together with the diskettes a printed copy of the first page of the files shall be submitted. On this first page the columns and headers shall be clearly indicated.

Details of the methodology of the sampling, analysis and (re-)computation shall be forwarded to the Commission as an annex to the forest soil condition report (See Annex V), but a copy should also be included with the data diskettes.