

*Commission of the European Communities*

**INFORMATION ON AGRICULTURE**

**Forestry problems  
and their implications for the environment  
in the member States of the E.C.**

**I. RESULTS AND RECOMMENDATIONS**

**No. 25  
November 1976**

**FORESTRY PROBLEMS AND THEIR IMPLICATIONS FOR THE  
ENVIRONMENT IN THE MEMBER STATES OF THE EC**

**I. RESULTS AND RECOMMENDATIONS**

*Series: Information on Agriculture*

**No. 25**

The study forms part of the study programme of the Directorate-General for Agriculture and the Environment and Consumer Protection Service. It summarises the results of an extensive survey of certain problem areas in forestry in the Member States of the Community.

On the basis of written and oral information obtained at national and in some cases at regional level, analyses have been made in particular of the following areas:

- Acces of the public to forests and their use for recreational purposes.
- Position, development and problems of mechanization of stand establishment and timber harvesting.
- State aid for the financing of forestry measures in forests not owned by the State.
- Systems of forest taxation and the tax liability of private forest holdings.

In addition to the publication of this summary of results and recommendations, the detailed surveys of the above problem areas will be published in four further volumes of the same series.

*This study is published in French and in English; the original version in German has been published.*

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*Manuscript finished in August 1976*

**No. 25  
November 1976**

**COMMISSION OF THE EUROPEAN COMMUNITIES**  
**DIRECTORATE-GENERAL FOR AGRICULTURE**  
**Directorate: Agricultural Economics – Division: "Balance-sheets, Studies, Statistical Information"**

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## FOREWORD

The study 'Forestry Problems and their Implications for the Environment in the Member States of the E.C. - I. Results and Recommendations' forms part of the study programme of the Directorate General for Agriculture and the Environment and Consumer Protection Service of the Commission of the European Communities.

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The present report includes the summary results and recommendations of the different problem areas analysed.<sup>1)</sup>

The divisions 'Balance Sheets, Studies, Statistical Information', 'Forestry', 'Production Structures and Environment', 'Conditions of Competition and Market Structures' as well as 'Social Structures and Land Tenure' of the Directorate General for Agriculture and the division 'General Studies and Environmental Improvement' of the Environment and Consumer Protection Service and Financial Institutions and Taxation have cooperated in this project.

The execution of the study would not have been possible without the manifold assistance provided for by forestry and other national Public Services as well as by experts from business and science. Their kind help is hereby warmly acknowledged.

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This study does not necessarily reflect the views of the Commission of the European Communities and in no way commits the Commission as to its future position in this field.

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Original : German

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<sup>1)</sup>The detailed surveys will be published in four further volumes ( nos. 31 - 34) of the same series.

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INTRODUCTION

The present study examines certain aspects of forestry for the purposes of:

- obtaining a comprehensive picture of the situation in the specialist fields concerned in the EC Member States;
- securing an improvement in the exchange of information and experience in these fields within the EC and
- outlining measures which it might be preferable to take at Community level

The work covers the following areas and problems:

1. Admittance of the public to forests, opening up and use of forests for recreation

- Country-by-country data on the position regarding access to State-owned and other publicly-owned forests and to private forests in the Member States;
- Data obtained on the use of forests for recreation and on landscape planning and policy, data on funds made available, types of financing and results achieved;
- Analysis of data collected and drafting of recommendations on the role and significance of forests for recreation and the reconciliation of the recreational function with other functions of forests.

2. Position and development of mechanization in stand establishment and timber harvesting and its implications for the environment

- Data on methods of stand establishment and timber harvesting employed and envisaged and the technical resources applied therefor;
- Enquiry into the assessment of these methods and resources from the standpoint of their effect on the environment;
- Analysis of possible developments and their consequences, and application of environmentally acceptable methods and recommendations thereon.

3. State aid for the financing of forestry measures in EC forest not owned by the State

- Data on the provisions existing in the EC Member States for public measures to encourage forestry, on systems of encouragement, their legal basis, objectives and financing; and
- assessment of the effects of such promotional measures.

4. Systems of forest taxation and the tax liability of private forest holdings in the EC States

- Data on forest taxation systems existing in the Member States;
- The incidence of taxation compared on model holdings; and
- Effects of taxation on forest management, the incomes of forest owners, the extent of afforestation and the promotion of recreational and environmental functions.

The methods of investigation will be explained in detail in each section. Generally speaking, questionnaires were used for assessing forest resources in the Member States; these were sent in 1975 to the heads of forest services in the Member States, and were supplemented by additional information and background material collected during a series of visits in 1975 and early 1976 to the competent forestry authorities for discussions with the experts concerned.

In Germany, in addition, direct questioning of "Länder" forestry authorities proved indispensable, particularly on some subjects such as the recreational use of forests and State measures to encourage forestry on land not owned by the State, since here also the Länder are substantially involved and this was the only means of obtaining reliable information. In addition, with regard to forest techniques, in all the Länder visited the views of research and academic specialists were sought. Calculations of the incidence of taxation on private forest holdings were in most cases delegated by Länder forestry authorities to tax experts.

Our findings are based essentially upon information and upon background material provided officially by the competent forestry authorities. The experts are aware that information fed back along the channels described sometimes contains gaps and is not always adequate. The objectivity and completeness of the data would be more certain if it had also been possible to question junior forestry officials, and associations, institutions and individuals concerned with forestry, or to make more detailed enquiries among non-forestry officials who are to some extent involved, particularly with respect to subsidies and recreational uses. The limiting factors here were the time and resources available. Nevertheless, the information collected enabled the situation summarized in this report to be assessed and an initial evaluation to be made.

The results of the study "Forestry problems and their implications for the environment in the Member States of the EC" will be issued in five volumes:

Volume I:           Results and recommendations

Volume II:         Access by the public to forests and their use for recreation

- Volume III: Position and development of mechanization in stand establishment and timber harvesting and its implications for the environment
- Volume IV: State aid (subsidies) for the financing of forestry measures in forests not owned by the State
- Volume V: Systems of forest taxation and the tax liability of private forest holdings.

In these reports the EC Member States are referred to in the following order and by means of the following abbreviations:

<u>Abbreviations</u>	
The Kingdom of Belgium	Belgium (B)
The Federal Republic of Germany	Germany (D)
The Kingdom of Denmark	Denmark (DK)
The French Republic	France (F)
The Italian Republic	Italy (I)
Ireland	Ireland (IRL)
The Grand Duchy of Luxembourg	Luxembourg (L)
The Kingdom of the Netherlands	Netherlands (NL)
The United Kingdom of Great Britain and Northern Ireland	United Kingdom (UK) (GB, NIrl)

For the purposes of comparison between countries, the national currencies are interconverted or converted to units of account by reference to the values shown in Table 1 (1974 values) which are based on data provided by the EC Commission.

The presentation of the study in this form would not have been possible but for the wealth of information provided for the group of experts in all Member States and the work of the EC Commission. Particular thanks are due to the heads of the principal forestry authorities in each country for the personal interest shown and for the ready support afforded through their departments for what has often been a difficult task. Thanks are due also to the many experts and specialists in forestry and forest science in the Member States, whose close co-operation has contributed directly to the success of the study, for the personal interest and friendly understanding they have shown towards follow-up enquiries, which has often been time-consuming and complex.

Table 1: Interconversion of national currencies

Country	Currency	B/L Bfrs/Lfrs	D DM	DK Dkr	F FF	I Lit	NL Fl	UK/IRL £	EC units of account (Eur)
B/L	100 Bfrs/Lfrs	-	6,617	15,69	12,35	1670,79	6,895	1,097	2,05519
D	100 DM	1511,2	-	237,16	186,66	25250	104,20	16,585	31,0580
DK	100 Dkr	637,20	42,17	-	78,71	10646,82	43,94	6,993	13,1956
F	100 FF	809,60	53,57	127,05	-	13527,27	55,82	8,885	16,6389
I	100 Lit	5,98	0,396	0,94	0,74	-	0,41267	0,065676	0,123001
NL	100 Fl	1450,29	95,97	227,60	179,14	24232,25	-	15,9165	29,8056
UK/ IRL	100 £	9111,85	602,95	1429,97	1125,47	152246	628,28	-	187,266

## 1. FORESTS AND FORESTRY IN THE EC

The conclusions of this study must be viewed in the light of the general forest situation in the EC, which will be outlined here by way of introduction.

Table 2 contains basic data, arranged by Member State, showing the forest situation within the EC area <sup>\*)</sup>. The area of forest within the EC totals nearly 31 million hectares, corresponding to some 20% of the total land area of the EC. About 80% of the forest (26 million hectares) is regularly exploited.

As far as ecological, and particularly climatic, conditions for forests and forestry are concerned, the EC area shows a remarkable variety of type. It ranges from the equable maritime (Atlantic) climate of Britain and Ireland to the Mediterranean climate with its seasonal rainfall, and includes ranges of altitude from lowlands up to sub-alpine and alpine areas. This has given rise to extreme differences in the structure and composition of forest systems, in growth potential and hence in points of departure for forest planning in the different countries, and also in the contribution made, and the status enjoyed by forestry in the different economies.

The distribution of forests between the Member States is very uneven. France (with 45%), Germany (with 23%) and Italy (with 20%) together dispose of almost 90% of the EC forest area. The other six Member States share the remainder between them.

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\*) Anyone who has been concerned with forestry statistics in the EC area will be familiar with the considerable difficulty in collecting comparable data from country to country. Definitions and classification criteria differ not merely from country to country, but also within a single country over various periods of time. The difficulties which have arisen over the definition of "forest" itself are well known. The following data are based mainly upon official EC statistics. Other data come from UN/ECE or FAO statistics. In the individual reports, use is of course made of the divergent statistical data provided by the Member States themselves in reply to the questionnaires.

Table 2. FOREST CONDITIONS WITHIN THE EUROPEAN ECONOMIC COMMUNITY  
(Source: OSCE statistique agricole 1972 No 2;  
Population data as of 31.12.1973, according to OSCE statistique agricole 1974)

Country	Area of country	Population	FOREST AREAS		TYPE OF OWNERSHIP		TYPE OF HOLDING		Forest density	Prc- portion of EEC forest area	Per capita area of forest land		
			of which: regularly exploited	not regularly exploited (1)	Public forest land State	Local authority	Private forest land	High forest				Coppice with standards	Coppice
	1000 ha	million	1000 ha	%	in 1000 ha and (%)		% of utilized forest land		% of total forest land				
Belgium	3,090	9.8	617	100	75 (12%)	217 (35%)	325 (53%)	64.5	23.4	12.1	20	2.0	0.06
German Federal Republic	24,860	62.1	7207	97 <sup>8</sup>	2239 (31%)	1811 (25%)	3157 (44%)	94.3	1.1	4.6	29.3	23.15	0.12
Denmark	4,300	5.0	470	93	131 (28%)	19 (4%)	320 (68%)	100.0	—	—	11	1.55	0.10
France	54,910	52.4	14000	(67)	1400 (10%)	2300 (16%)	10300 (74%)	(50.6)	(49.4)	—	25	45.2	0.27
Italy	30,120	55.2	6193	97 <sup>6</sup>	286 (5%)	2123 (34%)	3784 (61%)	41.1	18.3	40.6	20.4	20	0.11
Ireland	7,030	3.1	275	94	239 (88%)	—	36 (12%)	100.0	—	—	3.75	0.9	0.09
Luxembourg	260	0.4	83	100	4 (5%)	30 (37%)	49 (58%)	80.5	—	19.5	32	0.3	0.21
Netherlands	3,670	13.5	290	82 <sup>3</sup>	69 (24%)	48 (16%)	173 (60%)	88.1	1.8	10.1	7.35	0.95	0.02
United Kingdom	24,400	56.1	1840	82	740 (40%)	—	1100 (60%)	97.0	1.0	2.0	8	5.95	0.03
E E C	152,600	257.6	30975	83	5183 (18%)	6,438 (21%)	19244 (61%)	65.5	34.5	—	20.2	100	0.12

(1) Including for German Federal Republic forest stands with rough timber yield of less than 1 m<sup>3</sup> per ha per year, stunted forest and Alpine forest; for France the "Garrigues"; for the Netherlands forest land used exclusively for recreation. In the case of Italy, forest land with very low timber yield is included under "regularly exploited forest land".

No less marked are the variations in forest density, from a mere 4% in Ireland to 29% in Germany and 32% in Luxembourg, with the values for France (25%) and Italy (20%) approaching the EC average (20%). The Netherlands, the United Kingdom and Ireland are remarkably thinly wooded. The average per capita area of forest for the EC is a mere 0.12 ha due mainly to the high density of population of the EC area (an average of 170 inhabitants per km<sup>2</sup>). The Netherlands (with 0.02 ha/head), the United Kingdom (0.04) and Belgium (0.06) are particularly badly served in this respect.

A breakdown by type of forest ownership shows that most forests are privately owned (61%) while 21% is owned by local authorities and only 18% by the State. High proportions of private woodland are characteristic of all Member States except for Ireland, where nearly 90% of forest is owned by the State. High proportions of State-owned forest are found also in the United Kingdom, Germany and Denmark. About 85% of all EC State-owned forest is in Germany (43%), France (27%) and the United Kingdom (14%).

Almost exactly two-thirds of the utilized EC forest is managed as high forest. This type of forest is dominant in Denmark, Ireland, the United Kingdom, Germany, the Netherlands and Luxembourg. The remaining forest area (one-third) consists of coppice-with-standards and coppice, with especially high proportions in France and Italy.

Tables 3, 3a and 3b provide information on the structure of forest ownership. It can be seen in a general way from these that only State-owned forest is relatively well organized into larger holdings. The average EC holding of this kind is 910 ha and it exceeds 1,000 ha in several countries. Local authority-owned forest has a less favourable size class structure averaging only 119 ha, but even here rational and continuous management is still possible. On the other hand, in private forests, which form such a high proportion of the EC forest area, the pronounced fragmentation of holdings is a positive hindrance to forest management and effective output. The average size of this kind of holding is only about 4.5 ha and varies little from country to country. Some 3.5 million private forest holdings within the EC area fall within the size category of less than 5 ha.

Table 3: Structure of forest ownership within the European Economic Community (excluding Luxembourg, Ireland and Northern Ireland).

Size category (ha)	Area of holding		No. of holdings			
	1000 ha	% of total forest	Total		Public	Private
			No.	% of total No.		
<b>BELGIUM</b>						
less than 5 ha	77	12.8	98 444	91.4	61.2	92.2
5- 50 ha	106	17.7	7 632	7.1	15.7	6.8
50- 100 ha	51	8.5	728	0.7	4.9	0.6
100- 500 ha	156	26.0	744	0.7	13.3	0.4
over 500 ha	210	35.0	164	0.2	5.0	0.03
<b>Total:</b>	<b>600</b>	<b>100</b>	<b>107 712</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>GERMAN FEDERAL REPUBLIC</b>						
less than 5 ha	662	9.5	435 354	78.7	26.6	80.5
5- 50 ha	1257	17.9	104 984	18.9	35.9	18.4
50- 100 ha	353	5.0	5 032	0.9	10.3	0.6
100- 500 ha	1294	18.5	6 073	1.1	19.5	0.4
over 500 ha	3435	49.1	1 938	0.4	7.7	0.1
<b>Total:</b>	<b>7001</b>	<b>100</b>	<b>553 381</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>DENMARK</b>						
less than 5 ha	41	8.4	25 720	79.0	4.8	80.0
5- 50 ha	75	15.3	5 916	18.2	62.3	17.6
50- 100 ha	25	5.1	361	1.1	13.5	1.0
100- 500 ha	39	18.2	408	1.3	11.0	1.1
over 500 ha	260	53.0	137	0.4	8.4	0.3
<b>Total:</b>	<b>490</b>	<b>100</b>	<b>32 542</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>FRANCE</b>						
less than 5 ha			2050 742	93.0	10.3	93.6
10- 50 ha			119 487	5.4	26.4	5.2
50- 100 ha			18 019	0.8	17.2	0.7
100- 500 ha			18 265	0.8	35.6	0.5
over 500 ha					10.5	
<b>Total:</b>	<b>13430</b>		<b>2206 513</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>ITALY</b>						
less than 10 ha	1661	26.5	1070 609	94.9	58.9	95.4
10- 50 ha	989	15.7	46 008	4.1	14.8	3.9
over 50	3632	57.8	11 257	1.0	26.3	0.71
<b>Total:</b>	<b>6282</b>	<b>100</b>	<b>1127 874</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>NETHERLANDS</b>						
less than 5 ha	38	13.8	17 347	82.6	11.2	84.8
5- 50 ha	41	14.8	2 968	14.1	44.0	13.2
100- 500 ha	72	26.1	300	1.4	19.4	0.9
over 500 ha	104	37.7	88	0.5	9.9	0.14
<b>Total:</b>	<b>276</b>	<b>100</b>	<b>21 000</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>UNITED KINGDOM</b>						
less than 5 ha	45	2.3	18 300	40.4	-	40.7
5- 50 ha	295	15.3	22 150	48.9	-	49.2
50- 100 ha	170	8.8	2 250	5.0	-	5.0
100- 500 ha	284	14.8	1 578	3.5	1.2	3.5
over 500 ha	1131	58.8	974	2.2	98.8	1.0
<b>Total:</b>	<b>1925</b>	<b>100</b>	<b>45 252</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: ECE/FAO: European Timber Trends and Prospects 1950 to 2000, Geneva 1975;  
ECE/FAO: Timber division: unpublished information, prepared in the context of this study.

Table 3a: Structure of forest ownership within the EC.  
Average size of holdings by type of ownership  
(Data in hectares).

Country	State-owned forest	Local authority forest	Private forest
Belgium	269	74	3
Germany	1 123	82	4
Denmark	1 628	122	8
France	651	167	4
Italy	857	148	3
Ireland	1 000	-	6.7
Luxembourg	108	125	2
Netherlands	170	34	7
United Kingdom	3 227	500	22
EEC	910	119	4.5

Table 3b: Structure of forest ownership within the EC.  
Average areas of private forests according to  
size category (in hectares).

Country	0-10	10-50	50-1000	above 1000
Belgium	1	21	132	1 833
Germany	1	18	151	2 458
Denmark	2	18	193	1 689
France	1	25	164	
Italy	1	19	129	1 856
Ireland	-	no information available		-
Luxembourg	2	19	129	1 990
Netherlands	2	26	163	2 000
United Kingdom	4	19	154	1 800

Source: SOEC Luxembourg

In particular there is a predominance of small private forests in the three most thickly wooded countries of the EC, Germany, France and Italy.

In Germany, and to a large extent also in France, Italy and Luxembourg, the link between agriculture and forestry is a special feature of the type of forestry practised. In Germany, for example, more than 431,000 forest holdings (i.e. 87% of the total) are mixed agriculture and forest holdings in the over 0.5 ha size category. Only 65,000 (13%) are purely forest holdings.

As regards the distribution of timber varieties (Table 4), the predominant type is broadleaved forest, covering 58% of the EC forest area. Coniferous forest covers 42% of the forest area but supplies 58% of the total timber produced and 55% of the net increment. Coniferous forests are the main type in northern countries: Denmark, the Netherlands, the United Kingdom and Ireland, and also in Germany. In more southern countries, particularly Italy and France, are found the larger areas of broadleaved forest. In these two countries extensive areas of coppice are also found, estimated in total at some 5 million hectares.

The standing timber resources of the EC area are estimated at 3 milliard m<sup>3</sup> with bark, including standing timber outside forest areas, which is considerable in some countries. This is equivalent to an EC average of resources per hectare of 101 m<sup>3</sup> with bark (124 m<sup>3</sup>/ha for coniferous forest and 85 m<sup>3</sup>/ha for broadleaved forest). Considerable differences occur from country to country (54 m<sup>3</sup>/ha in Italy, 150 m<sup>3</sup>/ha in Germany and values of around 100 m<sup>3</sup>/ha in France), due partly to varying ecological conditions and intensity of management.

For the EC area as a whole, the net annual increment is estimated at 103 million m<sup>3</sup>, or 3.5 m<sup>3</sup> with bark per year per hectare. Here also, variations between countries are very marked.

Large differences occur within the Community in respect of the level of management (Table 4) and the degree of State supervision of forestry.

Table 4: Areas, level of management, resources and increment of forests in the EC (as of the early 1970's)

(Source: ECE/FAO, European Timber Trends and Prospects, 1950 to 2000, Geneva 1976;

ECE/FAO Timber Division: unpublished information, prepared in the context of this study.)

	Unit of measurement	Belgium	Germany	Denmark	France	Italy	Ireland	Luxembourg	Netherlands	United Kingdom	EEC
Woodland a)	1000 ha	618	7 235	490	13 630	7 993	268	84	328	1 988	32 634
Forest land b)	1000 ha	604	7 207	490	13 630	6 292	268	82	276	1 646	30 495
of which areas used c)	1000 ha	604	6 837 <sup>d)</sup>	390	13 200	5 342	268	81	276	1 646	28 644
<u>Level of management:</u>											
<u>with management plan</u>											
- public forest	1000 ha	293	4 050	118	3 677	800	233	37	115	840	163
- private forest managed in accord. with general legsl. provisions	1000 ha	--	1 250	192	(9 953)	50	--	--	12	504	2 008**
<u>Breakdown by timber type: e)</u>											
Coniferous	1000 ha	284	4 717	245	3 900	1 118	240	26	197	1 208	11 935
	%	(47.0)	(69.0)	(62.8)	(29.5)	(20.9)	(89.6)	(32.1)	(71.4)	(73.4)	(41.7)
Broadleaved	1000 ha	320	2 120	145	9 300	4 224	28	55	79	438	16 709
	%	(53.0)	(31.0)	(37.2)	(70.5)	(75.1)	(10.4)	(67.9)	(28.6)	(26.6)	(58.3)
<u>Resources:</u>											
Total	mill. m <sup>3</sup>	71 <sup>f)</sup>	1 022	45	1 307	354 <sup>f)</sup>	15	13	22 <sup>f)</sup>	155	3 004
<u>of which:</u>											
- coniferous	w.b.*	40	722	22	481	128	13	2	16	72	1 496
- broadleaved	w.b.*	31	300	23	826	226	2	11	6	83	1 508
<u>Annual net increment:</u>											
Percentage increment	%	3,7	3,3	5,1	3,2	4,0	12,0**	3,1	5,5	3,7	3,4
Total	M10 m <sup>3</sup>	2,6	34,0	2,3	41,4	14,0	1,8**	0,4	1,2	5,7	103,4
<u>of which:</u>											
- coniferous	w.b.*	1,5	25,8	1,5	18,0	2,6	1,6	0,1	1,0	4,6	56,7
- broadleaved	w.b.*	1,1	8,2	0,8	23,4	11,4	0,2	0,3	0,2	1,1	46,7
<u>Annual net increment per hectare:</u>	m <sup>3</sup> w.b.*	4,30**	4,82	5,90	3,14	2,12**	6,91	4,87	4,35	3,49	**3,5

\* w.b. = with bark

\*\* = estimated

a) includes all areas (even those under 0.5 ha) with trees bushes etc. which are not used primarily for other than forestry purposes.

b) includes all tree stands with at least 20% crown density and areas exceeding 0.5 ha insofar as they are used primarily for forestry purposes including tree stands in national parks).

c) may include forests not at present used but with potential.

d) excluding 219 000 ha temporarily cleared and not yet replanted.

e) mixed stands not identified specifically but classified according to the main timber species.

f) including standing timber in plantations outside forest areas.

Whereas binding legal regulations exist in respect of afforestation and maintenance of forests in all countries, State supervision extends to private forest management in only a few, i.e. Italy (territori montani, catchment areas) and Germany. In other countries contractual agreements are required between the State and owners of private woodland (this is the case in France, the Netherlands, the United Kingdom, etc.) and the latter receive technical and financial incentives. Local authority and corporate forests\* subject to public law are usually under strict forest supervision. This is the case in Germany, France, Belgium and Luxembourg ("forêts soumises au régime forestier").

Public forests are managed in accordance with management plans in nearly all Member States, with the exception of Italy, where at present only about a quarter of public forests are under planned management. However, forest planning is under way in Italy so that it may be assumed that in the foreseeable future, the 11.7 million ha of public woodland in the EC area will be under planned management. On the other hand, only about 10% of EC private forest is managed according to a plan. This applies particularly to small and ultra-small holdings, but many holdings of a size even above 100 ha fall into this category and it seems likely that about half of the EC private forests are not managed at all but used merely to produce timber for the owner's own use and - only if the market situation and financial needs dictate - for commercial purposes.

The establishment of simple management plans or surveys of holdings is being encouraged in the meantime in various Member States by means of subsidies. The net timber harvest (or output) of the Community is considerably below the increment and averaged about 79 million m<sup>3</sup> (without bark) for the years 1969-1971. This corresponds to 2.9% of the standing timber resources, or 2.8 m<sup>3</sup> without bark per ha of utilized forest land. Table 5 breaks this down by country, type of product and type of timber. Coniferous and broadleaved timber contribute equally to the total output. About 70 million m<sup>3</sup>, or 88%, of the EC output is produced in France, Germany and Italy.

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\* Corporate forest (Körperschaftswald) = an association of private forests on a cooperative basis, usually of a traditional kind; may also include forests owned by, for example, religious bodies or communities.

Table 5: Net timber extraction (average for 1969-71) within the EC by country, type of product and type of timber  
(1000 m<sup>3</sup> without bark)

	Belgium/ Luxembourg	Germany	Denmark	France	Italy	Ireland	Netherlands	United Kingdom	E E C
Trunk wood (saw and veneer)									
- coniferous	1 416	16 298	1 450	16 891	3 720	226*	250	1 789	42 040
- broadleaved	705	12 481	752	9 448	808	208*	87	850	25 339
	711	3 817	698	7 443	2 912	18*	163	939	16 701
Pulpwood									
- coniferous	502	6 666*	110	7 103	1 433	77*	350	1 063	17 304
- broadleaved	380	3 826*	42	2 778	57	77*	231	784	8 175
	122	2 840*	68	4 325	1 376	-	119	279	9 129
Other commercial timber									
- coniferous	732	2 961*	535	1 532	1 976	-	289	231	8 256
- broadleaved	647	1 888*	437	775	245	-	267	231	4 490
	85	1 073*	98	757	1 731	-	22	-	3 766
Total commercial timber	2 650	25 925*	2 095	25 526	7 129	303	889	3 083	67 600
- coniferous	1 732	18 195*	1 231	13 001	1 110	285	584	1 865	38 003
- broadleaved	918	7 730*	864	12 525	6 019	18	305	1 218	29 597
Firewood									
- coniferous	229	1 876	135	4 300*	3 756	43	16	378	10 733
- broadleaved	7	412*	42	1 000*	217	21	10	189	1 898
	222	1 464*	93	3 300*	3 539	22	6	189	8 835
Net timber extraction	2 879	27 801	2 230	29 826*	10 885	346	905	3 461	78 333
- coniferous	1 739	18 607	1 273	14 001*	1 327	306	594	2 054	39 902
- broadleaved	1 140	9 194	957	15 825*	9 558	40	311	1 407	38 431

Source: ECE/FAO, European Timber Trends and Prospects 1950 to 2000, Geneva 1976;  
ECE/FAO Timber Division, unpublished information prepared in the context of this study.

\* = estimated

The total amount felled has decreased during the last 20 years. This is undoubtedly due to the falling off of firewood production which is estimated to have decreased in France and Italy alone from more than 28 million m<sup>3</sup> in 1950 to 8.5 million m<sup>3</sup> in 1970. In place of firewood there was an increase in the felling of commercial broadleaved timber, particularly for paper-making, although this does not compensate for the fall in firewood production. This increase accounts for the rise in the commercial timber production as a percentage of total timber extraction from 57% in 1950 to 86% in 1970. The paper-making sector and, taken overall, broadleaved timber had the greatest share of this. Of the individual countries, France was responsible for most of this change (about two-thirds); in the process it doubled its output of broadleaved timber and trebled its output of pulpwood (broadleaved).

The changes in EC forest area through afforestation during the period 1950-1973 are shown in Table 6. The sum total of land classed as "afforested" and "re-afforested" was 3.5 million ha; this corresponds to some 150,000 ha per year (1). The largest part (more than 2 million ha) was the afforestation of new land. The net increase in forest area (allowing for areas lost) was 1.6 million ha, representing a substantial increase in production potential. The main contributors have been France, Italy and the United Kingdom with a combined afforestation rate of 128,000 ha/year and a net gain in forest area of 78,000 ha per year or a total of 1.5 million ha, 60% of this being private forest.

The extensive afforestation programmes have resulted in the standing timber resources in the EC area increasing by 28% (665 million m<sup>3</sup>) between 1960 and 1970, with all countries, but especially France (54%) and Italy (22%), contributing. It must be admitted that, in both these countries, the improved recording of standing timber resources also played a role. The annual gross increment went up by about 14 million m<sup>3</sup> over the same period. The nine EC countries taken as a whole are net importers of wood in the rough and timber products. Only France is a net exporter of round timber.

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(1) These data do not apparently include, or only partially include, normal regeneration, and for that reason do not correspond to the sum of the areas reported by the national forest services during the course of this study (see page 57).

Table 6: Changes in forest areas within the EC 1950-1973

Source : ECE/FAO, *European Timber Trends and Prospects 1950 to 2000*, Geneva 1976; ECE/FAO Timber Division, unpublished information prepared in the context of this study

	a)							United Kingdom	E E C
	Belgium	Germany	Denmark	France	Italy	Ireland	Luxembourg	Netherlands	
(A) Total change 1950-1973 in 1000 ha									
(a) Increase in forest area afforestation of									
- farmland	15	140	30	..	370		..	3	..
- other non-forest areas	5	60	10	..	160		..	23	..
<u>Total</u>	20	200	40	634	530		..	26	..
							+ 0,3 b)	+ 9 b)	2 100
(b) Loss of forest areas to other uses	7	144	--	180	87		0.9	6	50
(c) Net change (a) minus (b)	+13	+ 56	+40	+454	+443		--	+29	+590
(d) Re-afforestation of forest land	133	77	--	724	227		3.0	25	238
(e) Afforest. for timber prod. purposes, total	152	277	35	1 358	79 d)	175	3.7	19	878
of which: Coniferous	115	194	30	1 175	10		3.7	8	826
Broadleaved	37	83	5	183	69		--	11	52
(B) Average annual change (1000 ha/year)									
(f) Afforest. and natural increase in forest area	1	8	1.7	28	22			1	28
(g) Loss of forest areas to other uses	0.3	6	--	8	4			--	2
(h) Net change (f) minus (g)	+0.7	+2	+1.7	+20	+18			+1	+26
(i) Re-afforestation	6.6	3	--	31	9			1	10
(k) Afforestation for timber production purposes (f+i)	7.6	11	1.5	59	31	8		1	38
									(150)

a) for the period 1950-1970. b) undoubtedly natural extension of forest areas. c) in most cases a) + d) providing the afforestation served no purpose other than timber production, as in particular with d) where the data relate mainly to poplar and eucalyptus plantations. e) excluding Ireland.

The EC can cover only about 45% of its requirements of wood in the rough and timber products from its own production. Net imports in 1970 totalled 106 million m<sup>3</sup> (W.R.M.E.<sup>\*</sup>) or 120% of the EC timber production (Tables 7a and 7b). Thus the Community is heavily dependent upon non-member countries for its timber supplies and is an important customer in the world trade in timber and timber products. It takes nearly a third of the world production and its timber requirements have steadily increased in recent years. The rise in demand between 1966 and 1970 related particularly to paper pulp, mechanical wood pulp, panel products, paper and cardboard (+ 10%/year - see table 7b). These products represent more than half of the total EC imports of timber and timber products. A further increase in demand is to be expected.

The data and comments presented lead to the following conclusions with regard to forestry policy:

- (1) The Community looks largely to the world market for its timber supplies and this will remain the case in the future in view of the substantial supply deficit and the ever-increasing demand. Nevertheless, an increase in domestic production is possible in all Member States. This must be regarded as the most important concern of a forestry policy at EC level. Only in France, United Kingdom and Ireland are the national forestry policies clearly geared towards this goal. Increasing timber production presents no insurmountable technical problems and its achievement can be completely in harmony with the present-day increased claims on forests for protective, environmental and recreational purposes.
- (2) Progress can be achieved in this direction by:
  - Extending forest areas through afforestation. In this respect, land of marginal productivity is suitable, in particular that land released as a result of agricultural restructuring. However, such land must be placed under systematic management as a contribution to the maintenance and improvement of agricultural structures, and land use generally. The problem of abandoned farmland exists in all nine Member States, although its magnitude varies from country to country.

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\* Wood raw material equivalent = round wood equivalent

Table 7a: The supply of wood in the rough within the EC (million m<sup>3</sup>)

	<u>1969</u>	<u>1970</u>
Internal production	84.5	87.5
Imports	13.0	13.0
Exports	1.0	1.0
Available (excluding stocks)	96.5	99.5
Degree of self-supply (excluding stocks)	86.5%	88.0%

Source: SOEC: Agricultural Statistics  
1969 (No. 6) and 1970 (No. 5)

Table 7b: Net imports of wood in the rough and timber products  
(million m<sup>3</sup> round timber equivalent - W.R.M.E.)

	<u>1966</u>	<u>1970</u>	Annual % increase
Wood in the rough	11 (13%)	11.5 (11%)	1.5
Sawnwood, sleepers	32 (38%)	36 (34%)	2.5
Paper pulp/mechanical wood pulp, panel products, paper, cardboard	41 (49%)	58.5 (55%)	10
<hr/> Total <hr/>	84 (100%)	106 (100%)	6

Source: Directorate general for Agriculture  
of the EC Commission

- maintenance of existing forest areas by forest protection and in particular by ensuring reforestation, especially where disasters have occurred. The latter concept finds firm support in the legislative provisions of practically all Member States;
- encouragement of timber production outside the forest. This is provided for in the majority of the Member States;
- the conversion and improvement of low-yield stands. This measure is applied by all countries in the EC area where the problem is an important element of forest policy, especially France and Italy, with their high proportions of low and medium forest, and to a limited extent, Belgium and Luxembourg. By this means also, structurally weak holdings are safeguarded and made competitive, especially in cases where there is no longer any demand for firewood;
- improved access to existing forest areas. This involves mainly the construction of forest roads and tracks. Improved access should facilitate harvesting of forest products and make possible more efficient, mechanized methods of exploitation. It can generally also contribute to the mobilization of timber reserves which have not hitherto been utilized because of the difficulty, or impossibility, of access, and to making possible the marketing of marginal products e.g. from thinning operations, which were hitherto not worth the cost of extraction, and were thus abandoned. At a time when the manifold functions of forests and forestry are being increasingly publicized, the construction of forest roads and tracks cannot be considered simply from the production angle. It must also be seen as a contribution to the improvement of the infrastructure, particularly in less developed rural areas, by:
  - better integration between forestry and agricultural activities and their respective areas;
  - improving productivity and saving labour;
  - improving the general living and working conditions in rural areas.

The importance of the road and track network for the recreational use of forests by the general public should also be emphasized here. In areas under development, and areas which are used predominantly for recreational purposes, possibilities of increased income are thus created.

- (3) Fragmentation of private forest holdings is a major forestry problem in most Member States. In general, it complicates exploitation and prevents the introduction of proper forestry methods and efficient management and work methods, particularly with regard to timber harvesting.

In some Member States, such as Belgium, the Netherlands, the United Kingdom, etc. many of the small, and even also of the medium-sized, private forest estates are **not linked** to agriculture but are predominantly in the hands of absentee owners, or are increasingly being acquired by such owners. For this class of owner, forests are often regarded chiefly as status symbols or as sporting<sup>\*</sup> preserves; direct economic interest in timber production or regular exploitation of timber does not exist, or is of secondary importance.

In the more thickly wooded countries of the Community, on the other hand, the smaller private forest holdings consist mainly of farm woodland. In the present climate of private economic goals, farm woodland usually performs the function of supplying the timber needs of the farm, i.e. providing a ready supply of firewood, timber for odd jobs and, in some cases, also constructional timber. It is frequently subjected also to harmful secondary uses (use of forest litter for animal bedding, grazing by animals). Financially it serves as a sort of capital reserve (a "living savings bank" in the form of supplies of thinnings and mature timber) for the rural economy as a whole.

The almost 3.5 million small forest holdings in the EC area, make an inadequate contribution to the national timber supply. Their timber yields are well below average and, particularly with respect to industrial wood, do not provide what is needed.

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\* hunting and shooting

It is precisely the smaller private forest holdings which in the general interest should be particularly developed and accessible to serve not only as a natural reserve of timber but also as a provider of non-timber services.

As an effective means of structural improvement consideration should be given to providing greater incentives for co-operation between the profusion of small forest holdings. Only through the formation of forestry associations can the organizational foundations be laid for better access to small forest holdings and for their proper management and efficient exploitation. This is one of the most important, and also one of the most difficult, tasks of forestry policy today. Not all the Member States have introduced measures aimed specifically at encouraging this development. In cases where this has been done, progress is very varied and is often hindered by a fundamental lack of economic interest in their woodland on the part of owners, or by personal interests and traditions, which, particularly in the case of small forest holdings, can be especially deep-rooted.

- (4) The higher timber production desired is restricted by a number of factors. In most EC countries today the notion that the forest is not to be regarded mainly or exclusively as a source of raw materials dominates political and public consciousness. There is an indication here that growing population pressure, accompanied by increased industrialization and urbanization and improved social welfare, has generated a greater public demand for action to improve the quality of life and environmental conditions, including the public amenity function of forests.

As regards these amenity functions the general public is less concerned with the beneficial effect on climate, with soil and water regimes than the forest as part of the landscape and as a green space in built-up areas. The forest as a place for relaxation and recreation is of growing significance for the well-being of the population, particularly for townfolk in view of the increasing shortage of living space, and therefore has implications for town and country planning and land use.

In all Member States it can be seen that, at the present time, more importance is attached to the non-timber producing functions of forests by politicians and public than to the raw materials functions. Under the pressure of public demand for a type of forest management which ensures that appropriate environmental functions are maintained, there is little room for forestry policies which are geared only to raw materials production. In densely populated areas open spaces must be increasingly managed according to public amenity principles and timber production must thus take second place. More areas of the countryside, including forest, will cease to be used for commercial production and will be set aside as nature reserves, national parks and recreational areas. Most of the Member States have introduced official measures which take this development into account. Examples are the town and country planning and functional planning which are under way in various countries and aim at zoning forest land according to its chief function, even though in some cases no objective criteria can be found on which to base this action.

In general, national forestry policies have sought to achieve a realistic balance between the nation's best long-term economic requirements and the social demands upon forests in the best long-term interest of society as a whole. If in connection with town and country planning and functional planning forests are increasingly being set aside for environmental and other social purposes in order to cater for the increasing public demand for a better quality of life, the raw materials functions of forests should be ensured. This can be done by making sufficient areas available for intensive exploitation and providing the necessary investment resources. This means that output losses which would otherwise occur on account of conditions imposed as to choice of timber species and rotation period or through restrictions on work methods, particularly with respect to mechanization, may be compensated by increased yields and efficient management.

At present uncertainty exists in all Member States as to whether forestry will be able, in the debate regarding social and environmental requirements, to preserve sufficient independence and bring about public understanding of the fact that a sound forest economy focussed on sustained yield management is not at odds with policies for protection of the environment, and that the social and raw materials functions of forests can best be reconciled by forestry itself.

- (5) The improvement of agricultural structures is one of the cornerstones of the EC's common agricultural policy. Forestry at the EC level must be regarded primarily from this standpoint. Its contribution to the improvement of agricultural structures is many-sided, and consists of
- the additional employment which it affords in rural areas, particularly in less developed and hill and mountain areas,
  - the possibilities it offers for the use of areas which have ceased to be used for agricultural purposes,
  - the direct protection which afforested land affords to agricultural areas and crops,
  - the improved environmental conditions it provides for agricultural production, including the mitigation of climatic extremes and the stabilization of water supplies,
  - the fact that forest land represents a capital reserve for the rural economy.

The complementary role which forestry plays in the modernization of agriculture is expressly recognized in connection with the agricultural structure and forestry policies of the Communities.

## 2. ACCESS BY THE PUBLIC TO FORESTS AND THEIR USE FOR RECREATION

### 2.1. The situation in the Member States

State-owned and other public forests in the Member States of the EC can generally be entered and used for recreational purposes. The accessibility of private forest varies from country to country. The right of access and the extent to which it can be enjoyed depend not only on the laws in force, but also on the density of population, the degree of urbanization, the density of planting, the distribution of forest within a country, the amount of accessible forest per head of population, local habits and a number of other factors. Some of the significant statistical data on the use of forests for recreational purposes are given in average terms for the Member States in Table 8. They supplement the following summaries of the situation in each Member State.

#### B E L G I U M

Belgium is not adequately provided with forests for local recreational purposes despite a favourable density of forest land. This is due to the divergent distribution of population and forest, and the fact that only public forests are available for recreational use. There is little information available on the action so far undertaken to open up and equip forests for recreational purposes. It must be concluded from this that except in certain areas adjoining cities, no great efforts have been made in this field during the last 10 years. To be sure the budgetary estimates for the next five years allow one to suppose that the possible recreational uses of public forests will be considerably improved, but there exists no central planning with defined aims and detailed programmes of implementation.

Table 8: Population, percentages of urban population, total areas, forest areas and derived parameters for the EEC Member States

Country	P o p u l a t i o n				Total area 1000 ha	Forest area 1000 ha	Forest area as % of total area (Forest density)	Population density inh./km <sup>2</sup>	Forest area per head of population	
	total M. Inh.	over 100 000 %	over 50 000 %	over 20 000 %					all forest-land ha	accessible to the public ha
Belgium	9.65	10.6	18.0	36.4	3.051	617	20.0	314	0.06	0.03
Germany	62.04	32.5	41.1	57.8	24.860	7.180	28.9	250	0.115	0.115
Denmark	5.95	17.5	32.5	54.2	4.307	473	11.0	117	0.09	0.09
France	53.40	18.1	26.5	42.2	54.910	14.000	25.5	100	0.26	0.08
Italy	55.18	29.0	38.0	53.0	30.120	6.210	20.6	117	0.11	0.04
Ireland	2.98	27.3	32.7	36.0	7.000	300	4.0	43	0.10	0.05
Luxembourg	0.34	-	22.4	30.4	259	83	32.0	131	0.24	0.24
Netherlands	13.49	28.5	42.3	63.8	3.670	290	7.4	399	0.02	0.015
Great Britain	54.39	44,9	-	68.9	23.070	1.920	8.3	235	0.03	0.015
Northern Ireland	1.53	26.0	29.7 <sub>4</sub>	38.6	1.410	75	5.3	108	0.05	0.04
EC	257.90				152.659	31.151	20.5	168	0.12	0.06

D E N M A R K

Forest areas in Denmark have in the last two decades gained rapidly in importance for holiday and weekend recreation, especially in the vicinity of the larger towns. In addition, great importance is attached to forests as an element in landscape formation and patterning, particularly in the holiday recreational areas of the Jutland coast and the islands.

There are no data on the recreational use made of forests hence no conclusions can be drawn on what further opening up and equipping of forests is required for these purposes. For some fifteen years, mainly in State-owned forests, extensive measures for opening up and equipping them have been undertaken without the effects having been assessed precisely by statistical means, or the resources used having been clearly identified. The improvement of local recreational facilities made to the south and west of Copenhagen and the plan to create "forest parks", however, are excellent examples of long-term recreational planning and its implementation.

Taken as a whole the opportunities for recreation in forests appear to meet the demand, apart from local deficiencies and seasonal peaks in demand. Although the demand for forest recreation will increase, it is expected that future supply and demand will be matched and thus that there will not be any serious problems or conflict between forestry and the public.

The consequences of using forests for recreation are not regarded as serious or likely to cause concern to timber production and forestry practice. The only conflict of interests that has arisen so far has been between those who wish to hunt and shoot and those who do not.

G E R M A N Y

Germany, with the third highest population density of the Member States, has the second highest forest density and per capita density of forest open to the public for recreational purposes. Nevertheless, here also there are insufficient facilities in the vicinity of many large towns and densely populated areas. Both by tradition and because of a partiality to forests, Germans are particularly fond of spending their weekends, leisure time and their holidays in a woodland setting. Some fifteen years ago, extensive measures began to make forests more accessible and better equipped for recreational purposes and, since then, a high proportion of the equipment regarded as necessary for this purpose has been acquired. However, facilities with special equipment and areas with highly concentrated equipment were very restricted in number and confined to small areas on the periphery of the larger towns. The harmful effects of recreation on flora and fauna generally remained within tolerable limits. On the other hand capital investment in, and maintenance of, recreational facilities imposed additional expenditure on the forest holding and reduced production, implied higher outgoings and lower earnings, to an extent which is now increasing. In connection with land planning, forestry is producing its own sectoral plans which deal also with the recreational aspect. Little work has yet been done to ascertain areas and facilities required for a given number of people taking account of ecological, demographic and other criteria.

F R A N C E

Despite the plentiful supply of forest and the high per capita forest density, the amount of forest available for recreational purposes near areas of high population density, and also in the large holiday areas on the Mediterranean and Atlantic coasts, is small. These areas are thus under heavy pressure, resulting in losses to the forest holding.

The situation is particularly unfavourable in that private forests, which represent 70% of the total forest area, make no contribution to forest recreation for the general public. The high proportion of low and medium forest further restricts the suitable areas.

In the last ten years exemplary recreational facilities have been provided, mainly in the densely populated Paris region and good planning principles have been established for further development. Records of existing facilities and data on the extra costs involved and the loss of forest production which recreational use entails are, however, lacking.

### I T A L Y

Despite the large amount of forest in Italy, the relatively low density of population and the lower degree of urbanization compared with other EC Member States, there are unfavourable factors governing the use of this forest for recreation - distribution of the forests; uncertainty of the right of access; the fact that much of the forest is coppice. The need for recreation in forests has arisen in the last decade and a half, with increased leisure time, an improved standard of living and much greater use of motor cars in the neighbourhood of towns. With the enormous growth in tourist traffic it gained in importance in holiday areas also.

Woodlands are particularly likely to suffer severe fire damage through the carelessness of visitors and because of hot and dry summer weather. These risks are greater in Italy than in other Member States.

The division of forest land into small, privately owned plots, with only a very small proportion of State-owned areas, presumably contributed to the fact that the rapid increase in the use of forests for recreation in the last few years and problems thus caused have received only belated consideration and solution. In addition, State organizational reform, in the last three years, has restricted further progress.

All this means that, in comparison with other EC Member States, Italy today has the least accessible and least well-equipped forests for recreational purposes. In planning also there is little evidence of general land-use plans or their implementation. The present situation as regards damage and the increasing pressure on forests suggest that it is urgent, however, that public forests be provided with carefully planned and purpose-designed facilities. Admittedly, legislation will be required for this purpose, especially a modern code of forest laws covering right of access, the right to restrict access and the compensation of owners of forest land.

#### I R E L A N D

In Ireland, forest recreation is a leisure form which has only recently become available to the people. Forests, especially the extensive conifer plantations, are regarded by them as new and unfamiliar features of the countryside and there are no deep attachments to them, whether rational or emotional. This state of affairs and the wide scope for seaside holidays during the summer, together with the low density of population, means that the demand for forest recreation is limited to a small area and a short season. Recreational woodland in State-owned forest appears to be quite adequate as to both area and facilities available to meet the demand. Planned developments in the next five years should produce an extension and improvement of recreational facilities which should more than keep pace with the estimated increase in recreational demand (10% per year). It must be admitted that the statistical data available are too restricted to allow clear predictions to be made or parameters to be derived.

There is no pressure in Ireland to make private forest, which covers only a very small area, accessible to the public.

Timber production and recreational use of forests have not so far conflicted with each other, nor is this expected in the foreseeable future. The negative effects on the economic output of forest holdings are insignificant. Similarly, there has hitherto been little damage or loss.

#### L U X E M B O U R G

The high density of forest and of forest area per head of population provides good conditions for recreational use of forests by the inhabitants of Luxembourg. The intensive network of roads also makes forests readily accessible and they are often traversed by public highways. Public forest land is made accessible and equipped for recreation by means of a grant of about Lfrs 1 300 per ha. The envisaged development has already largely been achieved in terms of basic and special facilities in the most important areas.

#### N E T H E R L A N D S

The Netherlands is the Member State in which the highest density of population occurs together with a very low density of forest. Despite the above-average possibilities for recreation at the seaside and on inland waters, the burden on forest is thus extremely heavy. This can also be seen from sociological studies both in the "demand" areas and in the "target" areas concerned.

The grants up to Fl 400 per ha made by the State forestry authority towards the provision of recreational facilities indicate how much has been done to open up and equip forest land for recreational purposes in the last fifteen years. It may be assumed that in forests owned by local authorities and supported by State resources, much has been done to improve forest recreational facilities. No data exist, however, for any category of forest ownership.

Surveillance of the use of the facilities provided only occurs on a local scale. A definitive quantitative programme for the opening up and equipping of forests must first await the completion of long-term planning in this field. The tendency to reduce investment in recreational facilities and to place increased emphasis on providing the public with information in special information centres, issuing pamphlets and organizing tours is, however, already becoming noticeable.

Recreational use of forests causes little conflict with forestry or nature protection interests. The fact that access is restricted to forest paths (and not permitted elsewhere in the forest) provides a suitable safeguard. Difficulties do occur, though, in keeping the forest area clean and tidy in much frequented areas, and pollution and vandalism are also problems. This is seen in the fact that each year about Fl 70 per ha is spent in maintaining recreational facilities without it being possible to state exactly how this money is deployed.

#### G R E A T   B R I T A I N

Only a small amount of forest is available to the general public for recreation in Great Britain. In southern and north western England, and the Midlands, this is particularly marked on account of the high density of population. Although exact data on the demand and the extent to which the supply meets it at present are not yet available, it can be surmised that in the vicinity of large population centres the increasing demands cannot be met. The investments made hitherto or planned during the coming five-year period thus seem essential and justified. By this means further extension will be possible around the centres of greatest demand.

Timber production is given priority, despite the considerable expenditure already incurred or planned for improving recreational facilities in State-owned forests. The general opinion is that, while the use of forests for recreation contributes not insignificantly to an increase in production costs, it causes little loss of timber production. The opening and equipping of State forests are geared to the recreational needs of the public as a whole. Special activities are allowed only to the extent that they do not affect the recreation and enjoyment of nature by the general public or conflict with other forestry aims. Damage to flora and fauna through recreation is found only locally and can be prevented or reduced to a tolerable level by closing off the endangered areas; channelling visitors to specific areas; keeping the numbers of visitors to a manageable level.

Public recreation in private forests is generally only possible in areas which belong to public utilities organizations. Very little use is made of compensation and grants for the opening up and equipping of forest areas. There is no great public demand at present for access to private forests.

#### N O R T H E R N I R E L A N D

The initial comments made in the summary on Ireland apply essentially also to the Northern Ireland population. The main difference from Ireland is that the population density is more than twice as high and that there is a markedly smaller rural population. This might explain why the number of visitors to forests is estimated to be the same as in Ireland although the total population is only half as much. The opening up and equipping of forests for recreation, which is long established practice has now reached an advanced stage, and has created conditions that may be regarded as generous and in many respects exemplary.

Despite local bottlenecks at peak periods, the supply of facilities may be regarded as better than average. The further expansion planned should lead to excellent conditions.

The high level of investment in forest recreation can, however, be explained by the particularly critical employment situation in Northern Ireland. Work created by such investment is especially suitable for the occupation of unemployed persons since in relation to the amount spent on wages, the cost of materials is low. If this factor is taken into account, the conditions in Northern Ireland are scarcely comparable with other regions of the Community.

Timber production and forest recreation have not hitherto conflicted and are not expected to do so in the foreseeable future. A modest reduction in timber production was accepted as inevitable in forestry policies. The effect of recreational use on the state and treatment of forests is regarded as positive for flora and fauna.

## 2.2 Conclusions and Recommendations

### 2.2.1 Restrictions on rights of access to private forests by third parties

Statistics on population and forest areas in the Member States of the EC (Table 8) show that out of more than 31 million ha of forest in the EC, only about 16 million ha are open and usable for recreational purposes and that an average of only 600 m<sup>2</sup> of forest is available to each inhabitant of the EC. This figure varies as between Member States from 2 400 m<sup>2</sup> in Luxembourg to 150 m<sup>2</sup> in Great Britain and the Netherlands.

Apart from differences in forest density, this variation is due to the differing proportion of private forests and the fact that in most Member States they are not available to the public for recreational purposes.

A glance at historical records shows that during the course of the last century in all the Member States, an interpretation of the concept of property grew up according to which third parties had no legal right of entry to forests. It was open to the owner to protect his land from entry by third parties and he could decide whether he allowed, tolerated or prohibited such access.

Varying use was made of the right to prohibit entry to forests from one Member State to another and also within a given State. Whereas in the United Kingdom and Ireland, access was prohibited as a rule, in large areas of Germany it was tolerated. Access to privately owned forest for recreation during the last century and at the beginning of this century admittedly occurred only rarely and was thus an event of no great consequence. It was only with increasing urbanization and higher population densities that a more generalised need for open air recreational facilities first made itself felt in such areas.

Since forest was abundant, suitable for recreational purposes and was susceptible to relatively little damage by visitors it was an obvious choice to meet this new demand. A law of the Land of Prussia made recreational areas in the Berlin and Ruhr areas accessible to the public at the beginning of this century. The 1928 Netherlands law on areas of natural beauty had the same objectives, in addition to those of protecting wildlife and planning land use. An effort was thus made for the first time to meet the needs of increasing sections of the population for outdoor recreation by legislative means. Thus the law began to differentiate in respect of access to private estates.

Owing to national and regional differences in population density, standards of living, leisure time available, forest density and recreational preferences as to areas and activities, there grew up a varying demand for the recreational use of forests. This found legal expression in several Member States. In others, no changes occurred in the legal situation, though the laws in force might not always have been strictly observed.

As a result publicly owned forests were made accessible to the public in all the Member States of the EC. The existing situation as regards access to private forests by third parties for recreational purposes may be grouped into four categories:

- 1) Forests are by law accessible to the public. They cannot be closed by the owner for any considerable period of time without official authorization. This is the case in Germany and Denmark.
- 2) Forests are not by law accessible to the public and access to them cannot be claimed by the public. In general, owners do not tolerate entry to their land. This is the case in the United Kingdom, Ireland and Belgium.

- 3) Forests are not, by law, accessible to the public, but the laws relating to protection of forests and wildlife provide for tax concessions or management subsidies to those forest owners who voluntarily admit the public to their land. This is the situation in the Netherlands and, to a small extent, also in Great Britain.
- 4) Forests are not, by law, accessible to the public, but are nevertheless used for recreational purposes by third parties. Owners cannot prevent this except at the prohibitive cost of putting up a fence. The public regards entry as a right established by custom. This is the case in France, Italy and Luxembourg. No compensation or concessions are granted in cases where forests are voluntarily made accessible to the public.

Table 9 shows a much simplified picture of the legal and actual situation as regards access. Table 10 provides information on the opportunities of access which thus arise and on the existence or absence of restrictions of entry.

A harmonization of the differences in law which have grown up during the last 150 years in the Member States, however desirable this might be, could not be fully achieved in the foreseeable future. It is, however, to be expected that a number of Member States will amend or reform the present forest laws. The provisions on access to private forests by third parties would doubtless be affected by this. Whether or not access to private woodland is provided for by law, compensated by payments or tolerated, it would appear to be in the interest of all concerned that independently of the legal situation, uniform principles with regard to access should be adopted. The main prerequisite for this is that the restrictions be laid down subject to which access can take place.

In the interest of forestry activities and the protection of the countryside and wildlife it must be possible, permanently or temporarily, to limit, prohibit or restrict entry to, and the pursuit of certain activities in, individual forest areas.

Table 9

	Legal status as regards access to forest land			Actual situation as regards access to forest land			Changes sought in legal situation			
	Permitted	Custo- mary	not permitted	Total access	Roads and tracks only	Pro- hibited	by the public		By the Administration	
							yes	no	yes	no
<u>Belgium (B)</u>										
State forests			x		x		x		x	
Other public forests			x		x		x		x	
Private forests			x			x		x		x
<u>Germany (D)</u>										
State forests	x			x				x		x
Other public forests	x			x				x		x
Private forest	x			x				x		x
<u>Denmark (DK)</u>										
State forests	x			x				x		x
Other public forests	x			x				x		x
Private forests	x				x			x		x
<u>France (F)</u>										
State forests		x		x			x			x
Other public forests		x		x			x			x
Private forests		x		x			x			x
<u>Italy (I)</u>										
State forests		x		x				x	x	
Other public forests		x		x				x	x	
Private forests		x		x				x	x	
<u>Ireland (IRL)</u>										
State forests			x	x				x		x
Private forests			x			x		x		x
<u>Luxembourg (L)</u>										
State forests		x		x			x		x	
Other public forests		x		x			x		x	
Private forests		x		x			x		x	
<u>Netherlands (NL)</u>										
State forests			x		x			x		x
Other public forests			x		x			x		x
Private forests			x		x			x		x
<u>United Kingdom (UK)</u>										
State forests			x	x				x		x
Private forests			x			x		x		x

Table 10:

	Usual modes of access				Restrictions on access			
	No admittance	Pedestrians only	Pedestrians and cyclists	Pedestrians, cyclists, horse-riders	No restriction	Laid down	None exist	Changes sought Yes No
<u>Belgium (B)</u>								
State forests		x				x		
Other public forests		x				x		x
Private forests	*							
<u>Germany (D)</u>								
State forests				x		x		x
Other public forests				x		x		x
Private forests				x		x		x
<u>Denmark (DK)</u>								
State forests				x		x		x
Other public forests				x		x		x
Private forests		x				x		x
<u>France (F)</u>								
State forests		x				x		x
Other public forests		x				x		x
Private forests		x					x	x
<u>Italy (I)</u>								
State forests		x					x	x
Other public forests					x		x	x
Private forests					x		x	x
<u>Ireland (IRL)</u>								
State forests		x				x		x
Private forests	*							x
<u>Luxembourg (L)</u>								
State forests		x					x	x
Other public forests		x					x	x
Private forests		x					x	x
<u>Netherlands (NL)</u>								
State forests					x	x		x
Other public forests					x	x		x
Private forests			x**		x	x		x
<u>United Kingdom (UK)</u>								
State forests		x				x		x
Private forests	x							x

\* access granted under the provisions of forests laws.

\*\* access granted under the provisions of law on protection of wildlife

It will in any case be necessary to exclude the public permanently from forest nurseries and other forest plantations. The need for temporary exclusion will arise during periods of high fire risk and when forest operations are taking place or shoots are being held, such as would endanger visitors. The public must be restricted to roads and tracks in areas being regenerated.

Where forests are used intensively for recreation, harmful effects upon the soil, flora and fauna are unavoidable. Table 11 shows how these effects are regarded by the national forest administrations. It can be seen that the objectives of recreational use can, and do, conflict locally with those of environmental protection.

In the case of forests serving various protective purposes, such as erosion or water control, or the protection of wildlife in general or of particular species or biotopes, it must be possible to prohibit entry permanently or for certain periods of time, to oblige the public to keep to roads and tracks and to prohibit certain activities.

It is therefore recommended that:

General principles and guidelines be worked out, laying down the conditions under which a permanent or temporary prohibition on entry to the forest or an obligation on the public to keep to roads and tracks is appropriate and necessary in the interests of forestry or for the protection of wildlife and the countryside.

The European Communities should recommend to the Member States that any legislation affecting access to forests should observe these principles and guidelines, and that they should apply them to public forests where no legislative provisions already exist.

#### 2.2.2 Risks involved for owners whose forests are used for recreation

Where the right of access to private forests by third parties is provided for by law or is exercised as of custom and where access is voluntarily granted, the owner faces increased risks. These consist of an unpredictable liability towards the third parties and the damage which may be caused by them.

Table 11: Effects on soil, flora and fauna of making forest land accessible and of equipping it for recreational purposes according to assessments made by national forest administrations

Country	S o i l				F l o r a				F a u n a			
	p.	n.	z.	k.	p.	n.	z.	k.	p.	n.	z.	k.
Belgium			X		X					X		
Denmark		X			X					X		
Germany	O	O	M		M	O				M	O	
France	X				X					X		
Ireland		X					X					X
Italy	X				X					X		
Luxembourg		X				X					X	
Netherlands		X				X				X		
Great Britain UK			X			X						X
Northern Ireland			X		X					X		

p = positive; n = negative; z = neutral; k = none

M = Majority of the Länder

O = Minority of the Länder

The degree of risk consequently varies between the Member States. While it is considerable in France, it remains in Germany and Denmark within narrow limits because here the law provides that access to privately owned forests by third parties is at the latter's own risk. But, even so, there remain certain ill-defined obligations upon forest owners to safeguard the passage of visitors. Forest owners can only cover themselves against liability towards visitors to their forests by taking out insurance. In no Member State are the costs thus arising reimbursed to owners.

On the other hand, the owner who makes his land accessible for recreation assumes considerable risks of damage, particularly in respect of damage by fire. Even where it is possible to discover who caused the damage, that person is frequently not in a position to make compensation. Hitherto, it has not for the most part been customary to insure against such damage, nor has it been possible except to a limited extent. In some of the Länder of Germany and in Denmark, fire damage which has occurred has either been compensated by the State, without recourse to legal procedures, or the costs of insuring against fire have been to some extent met by the State. In Italy, re-afforestation is the only action undertaken by the State following a forest fire.

A financial burden falls on private forest estates where access is a legal requirement. The burden includes the taking out of insurance covering liability for visitors to the forest and the lack or inadequacy of safeguards against damage caused by visitors. The financial outlay has in many cases increased drastically in the last 25 years. Where public right of access is not laid down by law, the willingness to allow access voluntarily is greatly reduced because of the risks of liability and damage. In the interests both of maintaining productive and profitable forestry and of making accessible further areas of forest which will be urgently required for future recreation, it seems imperative to seek solutions which do not unduly burden the owner.

The second recommendation is thus that:

Common principles and guidelines be worked out as to how forest owners can reduce their liability and the risks of damage to their property caused by recreation of use and how solutions may be sought which compensate for the financial burdens involved.

### 2.2.3 Determination of the direct and indirect additional expenditure and loss of income

Until now, in many cases, liability and damage risks have been the only burdens facing forest owners as a result of the public access to their land. Further direct or indirect additional expenditure or losses of income did not occur provided the forest was traversed only by existing tracks or roads needed for forestry purposes. However, as the amount of forest increases in which recreational use is provided, so must restrictions on normal forestry activities come to be accepted. Areas are taken out of production, the state of the forest is affected, the course of forestry activities is changed and the application of economic methods of stand establishment and timber harvesting is restricted. This gives rise to indirect additional expenditure for forestry holdings operated on economic principles. Further consequences are losses of income caused by reductions in area, longer rotation periods, greater disintegration of stands, the growing of low-yield tree species, the suppression of possible production increases and the disturbance or impairment of hunting, shooting and fishing preserves. In addition, recreation gives rise to direct additional expenditure for the installation and maintenance of recreational equipment, for increased forest protection and above all for the cleaning up of forests.

How the effect on forest management of opening and equipping forests for recreation is regarded may be seen from Table 12.

Table 12: Effects of providing recreational facilities in forests on the forest area, the level of timber production and forest management (Information given by the national forest services).

Country	Forest areas				Level of timber production				Forest management			
	p.	n.	z.	k.	p.	n.	z.	k.	p.	n.	z.	k.
Belgium				X				X				X
Denmark	X				X				X*	X**		
Germany	M	0	0		X				M		0	
France	X				X				X			
Ireland				X				X				X
Italy		X			X				X			
Luxembourg	X				X				X			
Netherlands	X				X				X			
Great Britain UK				X	X				X			
Northern Ireland				X	X				X			

p = positive; n = negative; z = neutral; k = none

M = Majority of Länder

0 = Minority of Länder

\* = State forest

\*\* = Private forest

In a multi-purpose forest economy the recreational function has gained priority only in a very small proportion of the forest area. The proportions in the Member States are indicated in Table 13. Account should of course be taken here of the fact that recreational use of varying intensity occurs or can occur even in forests devoted mainly to timber production.

The magnitude of the direct and indirect additional expenditure and loss of income caused by recreation depends upon the measures undertaken to improve recreation facilities and upon the intensity of recreational use. The direct additional expenditure in the case of forest parks of the Paris region, for example, comes to 30 000 EUR/ha for investment in recreational equipment and 4 000 EUR/ha for their annual maintenance. There is thus an urgent need to quantify the additional expenditure and loss of income caused by the recreational use of forests.

This should be undertaken in the Member States of the EC without delay for the following reasons:

- 1) Data on additional expenditure and loss of income are needed as a basis for planning. Before the objectives of opening up and equipping forests are laid down, the financial burdens on forestry which are expected to result from the implementation of those objectives, must be known. The forest areas can be classified and the criteria for regional and local planning worked out according to the magnitude of the additional expenditure and loss of income.
- 2) In the case of public forests there is a growing need to demonstrate convincingly to governments, parliaments and the public what services are provided for recreation in the forests, and the effects they have on timber production and forest output.
- 3) Determination of the additional expenditure and loss of income resulting from recreational use is necessary for private forest estates. Only when this has been carefully worked out, can requests be made for

Table 13: Primary functions of forest management as seen by the forestry authorities in the Member States

Country	Percentage of forest areas managed primarily according to one of the following functions									
	Timber production %	Protection against erosion %	Water conservation %	Protection against air pollution %	Climate Protection %	Protection of nature %	Protection of fauna %	Protection of Recreation %		
Belgium	77	-	3	-	-	-	-	-	-	20
Denmark	89	5	-	-	-	-	-	-	-	6
Germany*	84	5	2	2	1	1	-	-	-	5
France	87	2	2	-	-	7	1	-	-	1
Ireland	100	-	-	-	-	-	-	-	-	-
Italy	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.
Luxembourg	77	-	6	6	-	6	2	-	-	3
Netherlands	70	5	5	1	-	10	3	-	-	6
Great Britain UK	99	-	-	-	-	1	-	-	-	-
Northern Ireland	90	-	-	-	-	5	-	-	-	5

\* = excluding the Land of Lower Saxony

k.A. = no data available

services provided in the forest where the public has access or for future compensation for services provided in opening up forest for recreation.

It is difficult and time-consuming to determine the appropriate basis for the collection of data, to lay down data collection procedures and to reach agreement on how the data should be evaluated. That data collection of this kind is possible is evidenced by the random sampling which was initiated by the Deutscher Forstwirtschaftsrat (German Forestry Council) and was carried out by the forest administrations in the German Länder for test purposes in 1971.

This investigation sought to determine as exactly as possible all the additional expenditure and losses of income occasioned by the recreational use of forests, including also the effects of land improvement and protection of the environment; the method used was to collect the information by means of random samples in all categories of ownership. The information collected included: the additional expenditure caused by planning work; advisory services and further training; keeping the forest tidy; hindrances to forestry activities; protection of the forest against damage caused by visitors; the construction and maintenance of facilities; data on losses of income due to the abandoning of timber production and sporting activities; damage caused by visitors and the effect of land improvement and environmental protection.

The sampling provided only preliminary results but gave some insight into the burden which forest holdings bear. Thus for the Land of Baden-Württemberg additional expenditure and income loss for 1971 totalled DM 42.42/ha. It varies between DM 71.75/ha in forests owned by public authorities to DM 12.64/ha in small private forests. Additional expenditure and income loss due to recreational use accounted for more than 90% of the total. Thus 31% went on construction and maintenance of recreation facilities, and 13% was due to abandoning of timber production. In densely populated areas costs reached DM 107/ha, with peak values of more than DM 1000/ha in areas managed as parks, and a minimum value of DM 18/ha in rural areas with no intensive recreational use.

In the light of this experience, the infrastructure services provided in forests were investigated in 1974 by a random sampling method for the whole of the Federal Republic. The results of this investigation will be available towards the end of 1976. The experience obtained in Germany in carrying out this research could be of great assistance in the conduct of similar studies elsewhere in the Community.

The third recommendation is thus that :

The European Communities should recommend the Member States to conduct investigations, on unified principles, into the infrastructural services provided by the forests in various categories of ownership. An attempt should also be made by this means to determine the additional expenditure and loss of income incurred in different areas with identifiable boundaries in order that zones bearing different levels of burden may be distinguished.

#### 2.2.4 State compensation for additional expenditure and loss of income in private forests

Depending on the sense of justice and the legal situation obtaining in each Member State, the opening of private forests for recreation may or may not be regarded as a social duty on the part of the owner of the land. Where there is no legal right of access, the strength of the demand for the opening of private forest for recreation will depend on the strength of visitor-pressure on the available forest areas. In view of the differing situations in the Member States of the EC and also the insurmountable difficulties which militate against harmonization of the rights of access, it can be stated that:

- 1) Direct and indirect additional expenditure falling upon private forest holdings in respect of land improvement, landscape preservation and

recreation together with losses of income from the same causes, are services which are demanded or voluntarily provided in the public interest. They cannot be regarded as social obligations incumbent upon land ownership. They should thus be subject to reimbursement or compensation. Reimbursements for services provided and compensation for restrictions which add up to expropriation of the privately owned forest land, and compensation for the actual use of this land, are thus not subsidies. They would give rise to no distortion of competition between the forestry concerns of the EC Member States.

- 2) Private forest proprietors in a number of Member States have to face additional expenditure and losses of income as the result of a legal obligation to open their land to the public for recreation (e.g. Germany, Denmark) or as the result of recreational use enjoyed as a customary right (e.g. France, Italy, Luxembourg). In other Member States (e.g. Belgium, Ireland and the United Kingdom) this is not the case. In the Netherlands, tax concessions and management subsidies are granted under certain conditions for the voluntary opening of forest to the public. Thus, differences have grown up between the Member States as regards the economic conditions and the economic results attainable which give rise to distortion of competition. Member States in which even private forest is open to the public for recreation show regional and local differences in its use which can lead to greatly differing levels of financial liability. There can also be considerable distortions of the conditions of competition within one country as between forest holdings in the vicinity of large towns and those in remote rural areas without local or holiday recreational demand.
- 3) In a number of Member States (e.g. Belgium, France, United Kingdom) it will presumably only be possible to meet the increasing demand for forest recreational areas within tolerable financial limits, by the opening of private forest for recreational use. This can only be achieved and implemented if all the additional expenditure and losses of income are reimbursed and compensated.

- 4) Reimbursement or compensation can only fulfil its purpose, however, if it takes account of the real burdens on a forest holding and is not simply estimated arbitrarily at area-based flat rates applying to the whole country as is the case with the management subsidies in the Netherlands. This arrangement can be justified in the Netherlands because visitors to forests there are confined to forest tracks and recreation thus imposes only a small burden on the forest holding. Moreover, this burden varies little from region to region. If access to the forest is allowed, as for example in Germany, Denmark, France or Luxembourg, great differences in the financial burden are possible which need to be compensated differentially. It therefore seems necessary to distinguish between zones of different levels of liability on the basis of the data collected on the infrastructure provided by forest holdings.
- 5) Remuneration or compensation in the form of direct concessions is conceivable but would hardly be reconcilable with the desired regional differentiation.

The fourth recommendation is thus that :

Private forestry cannot be expected to provide services to the public without some form of compensation. Therefore the European Communities should recommend that the Member States should reimburse or compensate private forest holdings for additional financial commitments resulting from direct and indirect additional expenditure and loss of income connected with the provision of infrastructural services, in particular for the recreational use for forest. This reimbursement or compensation should be made in accordance with a scale differentiated according to region and to the level of additional financial commitment involved.

This measure appears necessary:

- 1) in the interest of maintaining a productive private forest economy,

- 2) in the interest of compensating for the competitive disparities of private forest holdings as between Member States, both those that exist and the presumably more marked discrepancies arising in the future,
- 3) in the interest of compensating for the competitive disparities between private forest holdings in individual Member States both those that exist and the presumably more marked discrepancies arising in the future,
- 4) in the interest of extending the area available for forest recreation by the opening to the public of private forest holdings in a number of Member States.

#### 2.2.5 Statistics and information

Questioning of the forest administrations in the Member States showed that the national statistics on the use of forests for recreation varied as regards both coverage and their usefulness for forecasting. In addition, it was found that too little was known about the existing situation, the planning and the research under way in neighbouring States. The exchange of information between the Member States on the recreational use of forests must thus be regarded as not very productive. This is regrettable since practical social data and related studies, and data on costs of investment and maintenance are available. In addition, new planning methods have been developed with criteria and standards relating to the actual recreation facilities desired. The mutual exchange of information, data and findings would provide material and ideas on this rapidly developing subject of the recreational use of forests, and would thus avoid unnecessary duplication of work.

The fifth recommendation is thus that :

A list be drawn up at Community level of those factors which it is thought should be taken into account in considering the recreational use of forests. This should be accompanied by common definitions of the factors to be covered so as to ensure that future statistics are fully comparable.

The European Communities might recommend the Member States to produce their national statistics in accordance with the abovementioned list and according to common definitions.

In addition, the European Communities might organize and ensure the exchange of statistical data and information on recreation between the Member States.

#### 2.2.6 Research

The use of forests for recreation is a phenomenon which has long been known. But as a problem affecting forestry objectives and the management of forest holdings it has existed little more than 20 years. In this time, the recreation in forests has undergone dramatic development and this still continues today. It is because of the shortness of the period involved, and the rapidity of the process that by no means all the required facts are yet known to enable the problem to be dealt with in the best possible way from the standpoint of forest economics and management. This applies in particular to the quantification of demand and supply and also as regards the effect of different levels of intensity of use on forest output and on other environmental aspects, particularly flora and fauna. Despite the extraordinarily varied conditions which exist both between and within Member States in respect of demand, and the differentiated effects of the various locations and conditions, it seems necessary in the interests of a rapid and economical processing of further data:

- 1) to co-ordinate research projects between the various Member States.
- 2) to urge that methods of data collection and research and the procedures for their evaluation should be such as to enable the results of

parallel investigations in different Member States to be compared.

- 3) to bring unsolved questions of general importance closer to a solution by the award and financing of research contracts.

The sixth recommendation is thus that :

The European Communities should take suitable steps to ensure co-ordination between the Member States of the EC concerning their enquiries and research into the recreational use of forests, particularly the effect on the ecosystem, and to provide funds for research into questions of general importance in this sector.

3. POSITION, DEVELOPMENT AND PROBLEMS OF MECHANIZATION IN STAND ESTABLISHMENT AND TIMBER HARVESTING AND THEIR IMPLICATIONS FOR THE ENVIRONMENT

3.1 The urgent need for rationalization

Throughout most of its area, EC forests serve a multiplicity of functions. In orders of importance which vary according to region, it is required to fulfil protection and recreational requirements. Apart from forests serving very special purposes, such as national parks or scrub and brush-wood with a predominantly landscape-forming function, it is not the forest which has been left entirely untended which best fulfils these functions, but rather the forest in whose life cycle mankind has creatively intervened. Indeed, it is by no means generally known outside forestry circles that forests in most cases require carefully planned treatment, including timber felling, if they are to fulfil their protective and recreational functions and thus contribute to the maintenance and development of the environment. The EC should regard it as a task of prime importance at all levels of competence to better inform the public of these relationships and needs by some suitable means.

The nature and scope of the measures required for optimum fulfilment of the various functions, from stand establishment to the harvesting of timber, depends upon many factors, including the level of timber felling, the structure of stands, the conditions of the ground, the degree of accessibility of the forest, the work methods used, and, of course, the main purpose for which the forest is being managed. These factors vary across a wide spectrum within the EC and as a result the extent of functionally orientated forestry measures varies widely. At present there is little information available concerning the extent of this work and what there is mainly concerns the State-owned forests.

It shows that, in regularly and intensively managed high forest, an average requirement of about 10-20 productive work hours per year per hectare of forest must be reckoned upon. It is worth noting that in forests which are managed and equipped expressly for recreation this estimate may be considerably exceeded.

There are a number of indications that the measures are no longer being carried out to the necessary or desired extent. Examples are neglected thinning and other silvicultural operations, especially in difficult terrain and in small private forest holdings. In the longer term at least, such a state of affairs must lead to a decrease in the productive capacity of the forest.

In Table 14, the areas of forestry activity are listed in order of the difficulty and the urgency of the problems arising from the implementation of forestry measures. A high degree of difficulty and urgency indicates that, in the view of the forest authorities and managements, solutions must be sought in the areas concerned as a matter of priority, if performance of the necessary work is to be ensured.

From the existing forest areas of the EC the following average picture emerges:

- It is a matter of particular urgency to find solutions for the following problems: conversion of coppice and coppice-with-standards, forest protection (particularly against damage by fire and game), tending of young stands, timber harvesting during thinning of high forest, opening up of forest land (construction of roads and tracks).
- A moderate difficulty and urgency exists in: timber harvesting on final felling of high forest, initial afforestation, re-afforestation and timber harvesting in coppice and coppice-with-standards.
- The following work presents few or no problems: special equipping of forest for recreation, protection against torrents and avalanches.

Table 14: Difficulty and urgency of problems

Nature of work	Type of forest holding	Problems with		
		low	moderate	high
		Degree of difficulty and urgency		
Afforestation	S	DK, IRL, L, NL, UK	B, D, F, I	
	Ö	DK, L, NL	B, D, F, I	
	GP	DK, IRL, L, NL, UK	B, D, F, I	
	KP	DK, IRL, L, NL, UK	B, F, I	D
Reafforestation	S	I, IRL	B, D, DK, F, I, NL	UK
	Ö	I	B, D, DK, F, L, NL	
	GP	I, IRL	B, D, DK, F, L, NL	UK
	KP	I, IRL	B, D, DK, F, L, NL	UK
Conversion of coppice and coppice-with-standards	S	D, DK, IRL, NL, UK	B, F, L	I
	Ö	D, DK, NL	B, L	F, I
	GP	DK, IRL, NL, UK	B, D, L	F, I
	KP	DK, IRL, NL, UK	B, D, L	F, I
Tending of young stands	S	IRL, UK	B, F, I	D, DK, L, NL
	Ö		B, F, I	D, DK, L, NL
	GP	IRL, UK	B, I, NL	D, DK, F, L
	KP	IRL, UK	B, I, NL	D, DK, F, L
Forest protection	S	B, DK, L, NL, UK	F, IRL	D, I
	Ö	B, DK, L, NL	F	D, I
	GP	B, DK, L, NL, UK	D, IRL	F, I
	KP	B, DK, L, NL, UK	IRL	D, F, I
Opening up of forest	S	B, DK, F, NL, UK	D, I, IRL, L	
	Ö	B, DK, F, NL	D, L	I
	GP	B, DK, NL	D, I, IRL, L, UK	F
	KP	B, DK, NL, UK	I, IRL, L	D, F
Timber harvesting of coppice and coppice-with-standards	S	D, DK, IRL, NL, UK	B, F, I, L	
	Ö	D, DK, NL	B, F, I, L	
	GP	D, DK, IRL, NL, UK	B, F, L	I
	KP	DK, IRL, NL, UK	B, D, F, L	I
Timber harvesting during thinning of high forest	S		B, F	D, DK, I, IRL, L, NL, UK
	Ö		B, F	D, DK, I, L, NL
	GP		B, I	D, DK, F, IRL, L, NL, UK
	KP		B, F, I	D, DK, IRL, L, NL, UK
Timber harvesting on final felling of high forest	S	I	B, D, DK, F, L, NL, UK	IRL
	Ö		B, D, DK, F, I, L, NL	
	GP	UK	B, D, DK, F, I, L, NL	IRL
	KP	UK	B, D, DK, F, I, L, NL	IRL
Special facilities in forest for recreational purposes	S	B, F, IRL, NL	D, I, L, UK	DK
	Ö	B, F, I, NL	D, L	DK
	GP	B, D, I, IRL, L, NL, UK	DK, F	
	KP	B, D, F, I, IRL, L, NL, UK	DK	

\*) S - State forest  
 Ö - Other public forest

GP - Private forest covering more than 100 ha  
 KP - Private forest covering less than 100 ha

The reasons for the existing problems are manifold, with the concomitant danger of a fall in the supply of forest to meet the needs of the owners, the public, the economy and the environment. The unfavourable long-term yield and the lack of man-power are of considerable importance.

Forestry is also faced with the problem that manual labour is scarce and expensive and that particularly difficult and dangerous work must be restricted on humanitarian grounds. Irrespective of whether the forest work is done by the State or by private employers, nearly all EC countries report some scarcity of man-power. This is the case even where - as in parts of Italy - jobs are lacking. In large areas of the EC, forestry work is regarded as an occupation of very low social status and is not infrequently considered less attractive than subsisting upon unemployment benefits.

The yield situation could be made more favourable on the expenditure side and the lack of man-power countered through higher labour productivity if recourse were had to increased mechanization, i.e. an intensified application of technical work aids and the corresponding work procedures. In addition, in view of the above-mentioned lowly social status of forestry work, measures are needed to improve the view taken of forestry work and raise the standing of the forester, in order to ensure the availability of the requisite man-power on a lasting basis.

### 3.2 Position of and prospects for mechanization in stand establishment and timber harvesting

The present situation regarding mechanization and work procedures in EC forest holdings cannot be described in succinct, and at the same time meaningful, terms. Certain preconditions are lacking and in particular

there is no suitable classification system covering the multiplicity of technical work aids and procedures which permits their comparison. Secondly, in most cases, central forestry authorities are not in possession of pertinent information. There is a particular lack of information regarding the smaller private forests. Among other conditions responsible for this lack of information is the fact that a high proportion of the forestry work in the EC is done by contractors or timber merchants and thus reliable information on their technical equipment and work procedures would only be available in the individual forestry concerns. The following indications are thus very general and uncertain.

Afforestation and reafforestation in the EC covered about 350 000 - 400 000 ha per year, averaged over the period 1972-74, i.e. 0.9 - 1% of the total EC forest area. Some 55% of this consisted of planting, 40% of natural regeneration including coppice growth and about 5 % of broadcast sowing.

Over the same period, about 98% of the direct planting was carried out manually with hand tools and only about 2% by means of planting machines. The Netherlands is exceptional in this respect since already about a third of the area planted is done by machine. All countries reckon that up to 1985 there will be only a slight increase in machine planting. According to somewhat conservative estimates, at least 30 - 35% of the annual area afforested in the EC would be suitable for machine planting on the basis of ground and soil type.

Preparatory work often precedes forest planting in the strict sense. In terms of area covered the most important work is cultivation of the soil - about 150 000 ha per year in 1972-74 mainly concentrated in Germany, France, Italy, Ireland and the United Kingdom. It was mainly in the form of strip or spot tillage without removal of stumps.

Today, such work is largely mechanized. However, the equipment and machinery available is not yet fully satisfactory. No great prospects are foreseen for stump removal even by 1985.

A considerable amount of labour is also deployed on felling waste removal which takes place over some 100 000 - 120 000 ha per year, evenly spread between countries. In all countries manual labour predominates here and the work consists to a large extent in the burning of waste. The same applies to the removal of harmful vegetation and undergrowth on about 50 000 ha per year.

New drainage work is largely mechanized (30 000 - 40 000 ha per year), a measure required especially in Ireland and the United Kingdom, and the same is true of the terracing of slopes (10 000 - 20 000 ha per year exclusively in France and Italy).

There are no reliable area data on the tending of young stands. It can only be surmised that this work is in the main carried out regularly in public forests but that in the smaller private forests it is irregular or even infrequent. The work is done mainly with hand tools and motorized hand equipment and in larger forest holdings chemicals are also used, although to a decreasing extent.

The felling of timber in the EC, amounting to about 75 - 80 million cubic metres per year, occurs in the ratio of about 80% in high forest, and 20% in coppice and coppice-with-standards. About a third of the felling in the high forest consists of thinnings and other selective fellings, while two-thirds are final fellings, in which clear fellings predominate.

The tendency to obtain a timber yield from forest thinnings is in fact reported to be slightly increasing in the EC but this development is generally considered by experts not to have reached the level required for good forest management. In private forest holdings the usefulness or necessity of thinning appears to be largely unrecognized, among other reasons because there is a lack of advice and concern for these forest owners on the part of forestry experts. Schematic and selective-schematic forest thinning work is at present done only hesitantly.

About 80% of thinnings in the EC consist of purely selective felling. The majority of experts are, however in favour of employing the combined selective-schematic thinning method more extensively, in order to reduce the time needed, the costs and the damage to the remaining trees.

In cases where final felling consists of clear felling the area so cut is generally less than 3 ha, and in mixed stands and broadleaf stands it is usually even below 1 ha. Compared with many countries outside the EC, this practice may be regarded as a wise management procedure, not only from the ecological and silvicultural standpoints but also for the sake of landscape values. On the other hand these relatively restricted work sites represent a considerable complication for mechanization.

Timber harvesting at the present time is divided roughly equally between the short wood system and the tree length system. Whole-tree logging and the chip system are at present still unimportant. It is generally expected that in the coming decade the short wood system will be less used, and give way more and more to the tree length system. Whole-tree logging is expected to increase only slightly in importance, while the chip system should increase somewhat more. Taken together, the latter two "modern" systems are expected by 1985 to amount to hardly more than 5% of all exploitation. The unexpectedly hesitant introduction of the chip system is due particularly to the cautious attitude of the timber industry and only in France is this system of timber harvesting expected to increase relatively quickly in importance.

The following is the picture which emerges on the mechanization of timber harvesting:

The felling procedure at present depends almost entirely on the single-operator motor saw (motor-driven hand saw). Felling machines have hitherto been used only in France, and there only to a modest extent. It is reckoned here that by 1985 about 10 - 15% of the annual felling in the EC will be done with mobile machinery. France and the United Kingdom expect the greatest progress in this respect.

About a quarter of the removal of branches in the EC is at present done with hand tools, and most of the rest by power-driven hand tools (motor saws). Debranching machines at present account for less than 1%. Most such machines are found today in Denmark, the United Kingdom and the Netherlands. According to expert forecasts, the proportion of hand-saw work will fall by 1985 to 10 - 15%, that of motor-saws to about 65 - 70%, while 15 - 20% of felled timber will be debranched by machines, mainly mobile power-units. According to the forecasts Germany, Denmark, France, the Netherlands, and especially the United Kingdom, can expect the greatest increases in mechanization among the EC countries. In the methods used to remove bark in conifers there are very large differences between the countries. Bark-stripping is mostly done in the forest in Belgium, Germany, France, Italy and Luxembourg, while in Denmark, the Netherlands and the United Kingdom, a high percentage of conifer wood is stripped only when it reaches the timber yard. In Ireland and in the United Kingdom, in addition, an appreciable proportion of conifer wood is worked or used with the bark still attached. Averaged over the period 1974-1975, about 55% of conifers are stripped in situ, about 35% by the timber industry and some 10% are worked or used with the bark intact. According to forecasts the proportions will by 1985 be somewhat as follows: about 47% forest stripping, about 45% stripping by the timber industry and about 8% unstripped use. Thus the trend is towards the removal of bark at the industrial stage.

Bark-stripping in the timber industry is largely mechanized. On the other hand, bark-stripping in the forest is done mainly by hand (to the extent of 80 - 90% for conifers stripped in situ) and only about 10 - 20% of the labour is performed by mobile and semi-mobile bark-stripping machines. Experts estimate that by 1985 the proportion of manual bark-stripping will decrease markedly and the work performed by machines will increase correspondingly. The overall forecasts for 1985 suggest that some 35 - 40% of bark-stripping will take place manually in the forest, about 10 - 15% will be performed by mobile and semi-mobile machines in the forest and about 45 - 50% will take place within the timber industry. Belgium, Germany, France and particularly Italy and Luxembourg will still do a relatively high proportion of bark-stripping with hand tools in 1985.

Where the trunks are cut into short lengths before transport, as in the short-wood system in particular, this is done at present almost exclusively with a motor-driven hand saw. This situation will not change fundamentally before 1985 and only Denmark, France, the Netherlands and the United Kingdom reckon upon semi-mobile and fixed machines (the latter set up in specially prepared sites) being introduced to an appreciable extent to perform this part of the work by 1985.

Taking all timber processing work together it can be seen that timber harvesting in the EC is at present largely done with hand tools and motor-driven hand saws. Even by 1985 most of the work will still be done with these simple tools.

Haulage between the felling site and the forest road is already about 95% mechanized. The use of draught animals has largely disappeared. The small numbers still remaining will have been further reduced by 1985. At least 70% of the tractors used for forest work (not merely timber harvesting) are of the multi-purpose type. These vehicles are primarily designed for agricultural purposes and are often also used for such purposes at busy periods of the year. Their use in forests, in some cases after the incorporation of special forestry apparatus, particularly cable winches, represents for many of the owners of these vehicles, mainly farmers, a welcome secondary function and increased applicability of the machines.

Experts predict that there will be a decrease in these multi-purpose tractors and a corresponding increase in machines developed specially for forestry. The greatest increases are expected in articulated tractors with all wheels of one size and an approximately equal load distribution between the front and back axles. Nevertheless, multi-purpose tractors will not have lost their dominant position by 1985.

The information available is not adequate to indicate quantitatively the present state of mechanization and to classify the countries accordingly. It can be seen, however, that all in all, the proportion of manual labour employed in forestry in the EC is on average still exceedingly high and, in addition, that there is a sign of some falling off in the degree of mechanization from the United Kingdom and France, through Denmark, Germany, the Netherlands and Ireland down to Belgium and Luxembourg, and finally Italy, which undoubtedly shows the lowest level of mechanization. There is no obvious correlation between the degree of mechanization and the type of forestry undertaking (i.e. the State or a private employer).

### 3.3 Factors impeding increased mechanization

Even if the experts' forecasts on the progress of mechanization by 1985 should prove accurate, this development seen in terms of the problems and needs of forestry must be regarded as rather unsatisfactory. The nature and significance of the impediments to increased mechanization as they appear at present to EC forestry authorities, can be seen from the 'degree of difficulty profile' in Diagram 1 (stand establishment) and Diagram 2 (timber harvesting).

There is no doubt that the nature of the terrain represents an important limitation on the use of machinery - a high proportion of EC forest occurs on slopes and, in Ireland and the United Kingdom for example, on soil with a low load bearing capacity. It is nevertheless surprising that foresters consider that further mechanization is restricted by the terrain in about 90% of EC forests.

In order that appropriate measures, such as the development of special equipment and methods of work, may be taken to counter these difficulties and the potentialities of new machinery may be better assessed, detailed information must be gathered on the terrain and the difficulties it presents.

Nature of the difficulty

reported to exist in . . . % of forest area

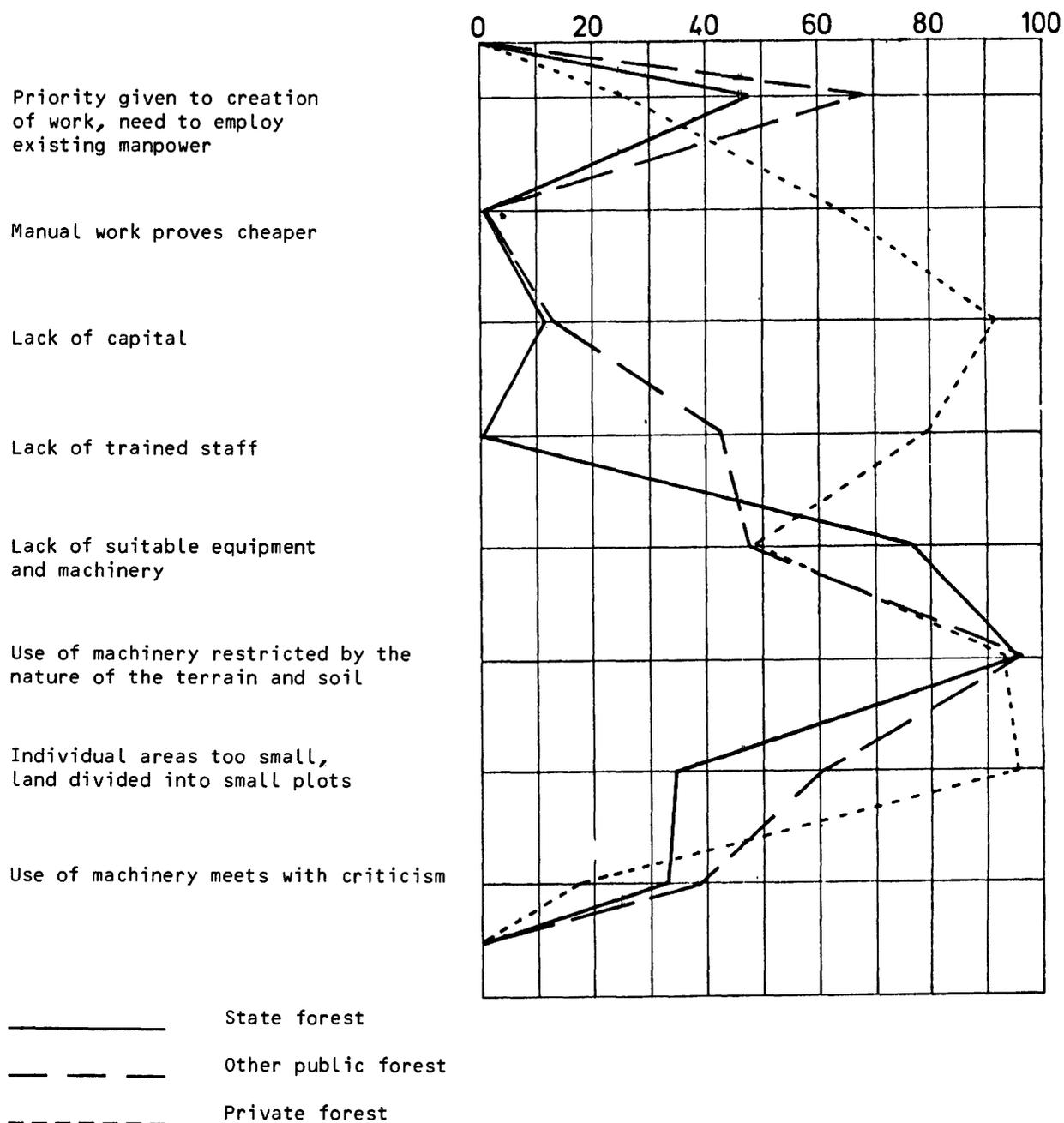


Diagram 1: Difficulties encountered in the further mechanization of stand establishment (EC-average)

Nature of the difficulty

reported to exist in . . . % of forest area

Priority given to creation of work, need to employ existing manpower

Manual work proves cheaper

Lack of capital

Lack of trained staff

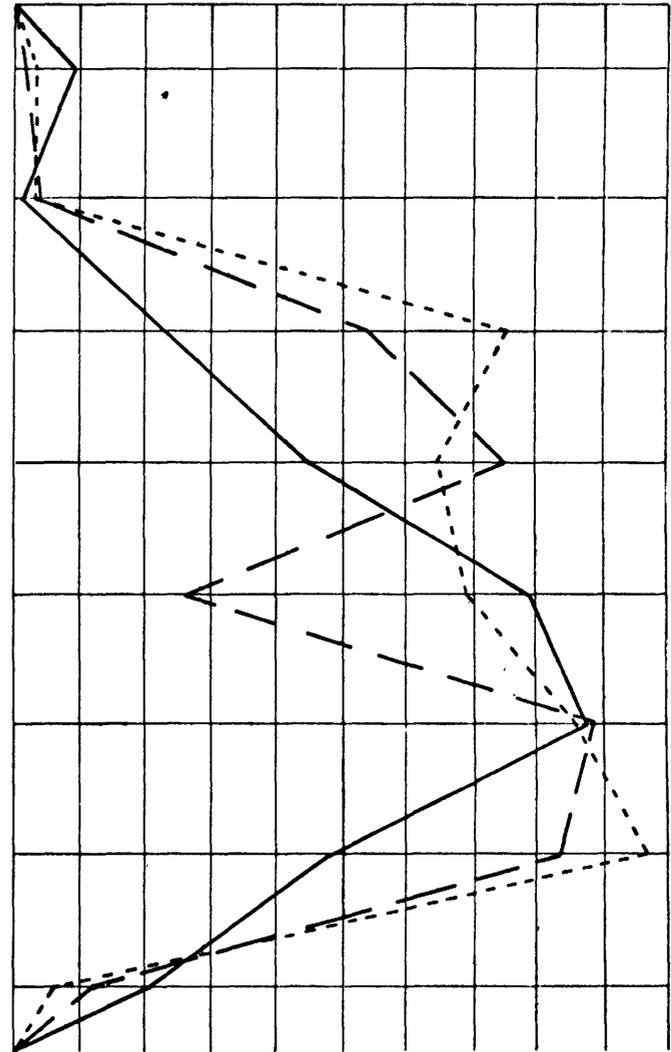
Lack of suitable equipment and machinery

Use of machinery restricted by the nature of the terrain and soil

Individual areas too small, land divided into small plots

Use of machinery meets with criticism

0 20 40 60 80 100



\_\_\_\_\_ State forest  
 - - - - - Other public forest  
 . . . . . Private forest

Diagram 2: Difficulties encountered in the further mechanization of stand establishment (EC-average)

It is therefore recommended that data be collected on the nature of EC forest terrain types. The scheme of terrain classification given in volume III, which was worked out in collaboration with experts, can be used as a basis for discussion in this connection.

Terrain classification, according to these criteria, apart from serving the purpose in view, would also be a valuable aid in assessing output and cost data obtained from the exchange of information between Member States and in the objective appraisal of the constraints imposed on mechanization by ecological considerations.

An important prerequisite for efficiency coupled with good husbandry in forest management, especially in its more highly mechanized form in difficult terrain, is the opening up of the forest by means of roads and tracks. To a certain extent, difficulties of terrain are eased if this is well done. It is therefore advisable to give official encouragement to the construction of the roads and tracks needed for forest exploitation in private forests. To be sure, the views of the experts themselves on the nature and amount of access to EC forests needed under given conditions are extremely varied.

It is therefore recommended, in connection with terrain classification

- a) that common criteria be worked out for identification of the degree of access to forest areas and on the nature and amount of fragmentation, and
- b) that terrain classification be correlated with the existing and projected degree of access.

Apart from the difficulties associated with the terrain, the restricted work sites, particularly in private forest, represent a significant impediment to the application of efficient working methods employing technical equipment. But in the case of publicly-owned forest, the small scale of operations is seen as an impediment in respect of between 40 and 80% of the total area.

Very small work sites are the result of a number of factors. In private forests they arise from the sometimes 'atomic' fragmentation of holdings between owners. In larger forest holdings they came about because of the scatter and intermixture of individual stands resulting from necessary or deliberate restrictions on the size of work sites for ecological or aesthetic reasons. A not insignificant cause is also that small scale units are needed for silvicultural treatment which in turn is determined by the tree species, the age and structure of the stands.

The decisive difficulties undoubtedly lie, however, in private forests. The problem of the fragmentation of holdings, which is undoubtedly one of the greatest problems facing EC forestry as a whole, has long been recognized. In principle, the following means, consistent with liberal principles, might be considered for overcoming, or at least mitigating, these problems:

- The formation of associations of owners of small forests for the purpose of carrying out forest operations jointly;
- The performance of these operations by independent contractors, including also, where appropriate, the timber industry, in the hope that by suitably combining the work to be done on a number of areas at the same time these contractors will reduce the work force needed to the minimum represented by efficient working methods.
- The performance of operations by neighbouring forest managements, as a rule publicly-owned ones, by way of a service to the private owner.

All these procedures are followed in the EC, although the last-named procedure is only of minor importance because the cost of such services, even when limited to the prime costs, are in general too high for owners of small forests.

The delegation of work to contractors is a frequent practice, especially in Belgium, France and Italy. The results show no uniformity. It is clear, that apart from the degree of organization and the quality of the contractors, a good deal depends on whether forest owners are willing to allow work to be done for them at all, or see it as being in their interest.

A fuller exchange of information within the EC on this subject would seem to be worthwhile.

The hopes placed in the voluntary (and financially assisted) formation of associations have long been fulfilled to only a very limited degree, although this is not always admitted officially. The willingness of many owners of small forests to form such associations is not very pronounced in many places. Where they have been formed, it is true that there has been joint construction of forest roads and joint selling of timber, but there is in most cases a strong disinclination to carry out other forest operations jointly.

These difficulties and questions apply to at least 40 - 50% of the EC forest area. There is little doubt that, for a considerable part of this area, the required level of functionally directed measures is not reached and that the considerable economic and ecological potential is insufficiently nurtured and exploited. In order to achieve an increase in the output of these forests in the longer term and in the interest of the forest owners and the public as a whole, it appears urgent to obtain much more information on this category of forest holding and to reconsider the present practice of encouraging the formation of forest associations.

It is recommended that:

- a) Investigations be instigated, with financial support, into the attitude of owners of smaller private forests towards their forest land; on their readiness for co-operative forms of forest management; on how agriculture and forestry in mixed holdings interact from an economic standpoint and with regard to the use of labour.
- b) At the same time the encouragement given to forest associations be reconsidered so as to ensure that the level of financial assistance is made dependent upon the degree of co-operation.

The greatest encouragement should be given to associations in which all the essential forest operations are carried out according to a joint plan based on efficient and sound management procedures. It might prove useful to begin by carrying out several model projects of this kind in different countries and to promote these preferentially.

To a large extent, forestry measures in the EC are based on ecological criteria, and the economic or profitability aspects are by no means always given priority. This fact, and the largely low level of mechanization found at present, explain why conflicts with environmental interest have hitherto been comparatively rare. Insofar as any criticism is made of forestry measures, it is mainly aimed at actual or supposed disturbances of recreation.

It cannot, however, be ruled out that increased mechanization will give rise to increased conflict with ecological requirements or that the introduction of machinery will run up against ecological limits. Diagrams 1 and 2 indicate that forestry reckons upon such a development.

There is no doubt that the mechanization of forestry work can only move within ecologically acceptable limits. These limits are, however, somewhat ill-defined at present, with the result that either the scope for mechanization is not fully realized or that the objectively acceptable limits are being exceeded. The former case is likely to have been easily the predominant one hitherto in the EC.

The very complex problems of the load which ecosystems can bear, e.g. through the introduction of technological processes, have in fact been investigated throughout the world and many questions have international relevance. The prevailing uncertainty as to how far the technology may be pushed, and, on the other hand, the acute need for the increased application of technology to handle the ecologically desirable amount of work, nevertheless justify the initiation and support of the appropriate research activities in the Community of the Nine.

A classification of forests according to the main function that each is designed to fulfil and an objective formulation of limits of technical measures having regard to these functions and in the light of local conditions and the type of forest stands is urgent and of equal significance for all Member States.

|| It is recommended that Community criteria be drawn up for the mapping out of forest functions and that such a mapping be undertaken.

A preparatory or parallel classification of terrain would be a useful source of information in this connection.

The lack of trained staff which is reported to be an impediment to mechanization of timber harvesting should not be regarded as applying only to forest workers. It exists also to at least the same extent, for forestry staff at all levels of competence. In most EC countries the main emphasis in training of forestry personnel is placed upon the forest ecological aspects. The underestimation of technical, economic and also ergonomic aspects of forestry leads not only to an inadequate knowledge of the requirements for an efficient use of machinery, consistent also with sound forestry practice, but not infrequently also to the a priori disregard of a mechanization which in itself is sensible. To a certain extent, the above-mentioned other impediments to mechanization are only excuses for the inadequate ability or willingness of forestry personnel to get to grips with the possibilities of mechanization and to make the necessary rearrangements in terms of management organization.

#### 3.4 Technical developments, exchange of information

The equipment, machines and working methods required vary according to the differing nature of the work in each country. The following developments are accorded high priority in practically all countries and are thus almost uniform throughout the EC:

- For locations suitable for wheeled or tracked vehicles, a power-unit which in one operation removes or shreds felling waste, tills the ground and, according to requirements, plants either "bare-rooted" or containered plants.
- For locations not suitable for wheeled or tracked vehicles, a portable planting machine for both "bare-rooted" and containered plants.
- For locations suitable for wheeled or tracked vehicles, a harvesting machine (felling, debranching, possibly cross-cutting) for the thinning of young conifer stands.
- A mobile trimming machine which can be incorporated in, or attached to, a tractor.
- A vehicle with high output capacity for difficult terrain, both for steeper slopes (mobile cable installations of labour-saving type) and for soil which cannot readily support loads (undercarriages with low specific soil compression). If this need cannot soon be met, a dramatic decrease, especially in timber harvesting, is to be expected in these places.

There is a widespread demand that power units be designed for incorporation into or attachment to tractors in order that the latter, which are more readily available, may be put to fuller use.

It is doubtful whether machines and developments in method outside the EC with other silvicultural and ecological conditions would take sufficient account of these needs. The view seems to be gaining ground, rather, that the technical means for satisfying the specific needs of forestry in the EC must, in greater measure than hitherto, be designed, developed, and built in the EC itself. A major problem in this respect is the fact that forestry equipment and machinery can often only be produced in small quantities which firstly offers no incentive to manufacturers to develop sophisticated production techniques, and secondly means that the price per unit is relatively high.

Forestry in the EC should therefore engage more than hitherto in the development of equipment and machines, whether this be by means of relevant

research of its own or through financial participation in the construction of prototypes. In addition, promising ideas and developments in trade and industry should be supported financially by the State, because only in this way can a sufficient incentive be given, despite the high risk of small-run production, to develop technically perfected equipment and machinery.

It is recommended that the development of equipment and machinery specifically designed for EC forest conditions, for which there is a considerable need in the larger forests in several Member States and for which no satisfactory solutions can be expected from outside the EC, also be supported financially by the EC. This support should be confined to the development up to the production stage of a prototype or a pre-production batch.

Although not only the individual countries, but also the various regions within a country, have specific problems and priorities, there are nevertheless numerous questions relating to forestry measures which are relevant across regional and national boundaries and which can often be solved more efficiently and more rapidly by a continuous exchange of information. We are not thinking primarily of fundamental and academic scientific problems, on which there is adequate provision for exchange of information through international bodies such as IUFRO and the FAO/ILO Joint Committee. What we have in mind, rather, are practical questions, particularly local and regional experiments and developments in forest technology.

There is extraordinarily little communication between the Member States in this respect, despite the wealth of specialist information published.

It is recommended that the EC undertake to ensure that reports are made periodically on new developments and experiments in forest technology (equipment, work methods) in Member States, e.g. in the form of supplements of uniform format to the national specialist periodicals,

and that in this way an exchange of information of practical value be provided.

For the compilation of reports of this type which transcend the boundaries of the Member States, and for other forms of information exchange, it is essential that expressions and processes which occur repeatedly should either be described in a uniform manner or at least be clearly defined. Even highly literate experts sometimes find it difficult to express themselves succinctly and clearly in matters of forest technology.

It is thus finally recommended that, in the EC

- a) uniform check-lists be drawn up and applied to the description and assessment of the main features of forestry equipment.
- b) common catalogues be drawn up and used for the systemization of forestry equipment and work methods.

In this connection the suggestions appended in Volume III of the study form a basis for discussion of these recommendations.

In the compilation of check-lists and systems catalogues of forestry equipment and work methods and also in the formulation of a classification of terrain, the experience and the work already done by the relevant international bodies should be taken into account, and contact should be sought particularly with IUFRO and the FAO/ECE/ILO Joint Committee.

4. STATE AID FOR THE FINANCING OF FORESTRY MEASURES IN FORESTS  
NOT OWNED BY THE STATE

4.1 The forest subsidy systems of the EC Member States

State aid for the financing of forestry measures may be divided into direct and indirect subsidies. Direct subsidies comprise the provision of material or money by the State or other central and local authorities to non-State forest holdings for the promotion of certain forestry measures and the maintenance of the holdings. These subsidies may or may not have conditions attached as to how they may be used; they are given without quid pro quo. They may be of the following kinds:

- the granting of money or of allocations having pecuniary value (e.g. grants in kind) carrying no repayment liability, and
- the granting of loan facilities, the terms and conditions of which (deferred repayment, reduced rates of interest) are in the nature of a subsidy.

Indirect subsidies are a temporary or permanent waiving of public tax liability by the State or other central and local authority and thus constitute a tax advantage to forestry compared with other sectors of the economy.

In the present section of the report only direct subsidies will be dealt with. Indirect subsidies belong to the specialist field of forest taxation. The description will begin with a brief summary of the subsidy systems existing in the Member States, which will then serve as the basis for comparing the payments granted in the various countries with one another and for examining whether, and to what extent, any differences in the subsidising of forest holdings affect the conditions of competition on the timber market in the Community and whether any equalizing measures at a Community level are indicated. Concessions which, according to Article 92 (2) of the EEC Treaty, are expressly regarded as compatible with the common market, for example aid to make good damage caused by natural disasters or exceptional occurrences, are excluded from the analysis.

## Belgium

Belgium is the only EC country in which private forest is not subsidized by the State. Only communal and corporate forests<sup>\*</sup> qualify for subsidies. Grants are given for the following measures :

- afforestation of heath and waste land and of abandoned agricultural land, including preparation of the land for planting and reafforestation of clear-felled conifers under difficult conditions, after destruction caused by some calamity or for replacement of low-yield stands;
- conversion and improvement of stands for reasons of forest management;
- opening up and protection of existing forest areas by improving the network of roads and tracks and providing fire-protection equipment;
- recreational facilities in forests;
- miscellaneous measures (information, instruction, research, etc.) which do not immediately benefit forest holdings.

Grants for all afforestation, conversion and improvement measures, including preparation of the soil, amount to 30% of the total costs for conifers and 45% for broadleaved species. Construction of roads and tracks and fire-protection measures are subsidized to a maximum 30% of the recognized total costs, recreational facilities in forests to the extent of 60% of the capital outlay. All these grants are non-repayable. No loans are made available.

## Denmark

Extension of forest areas, maintenance and improvement of existing forest and scientific management are the main purposes for which assistance is provided for non-State-owned forest in Denmark. Apart from money grants

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\* Corporate forest (Körperschaftswald) = see footnote on page 19.

carrying no liability for repayment, loan facilities containing a subsidy element are also available. Aid may be given for the following purposes:

- the extension of forest areas by afforestation of abandoned, marginally productive agricultural land,
- the maintenance and improvement of existing forest areas through soil improvement and silvicultural measures,
- the formation of forestry associations,
- the compensation of losses in cases of disaster.

Subsidies for new afforestation require a minimum area of 10 ha and cover 50% of the costs of fencing, road and track construction and the provision of fire breaks and ditches. For soil improvement measures loans repayable over 12 years with a 4% interest rebate are also available. For the improvement of existing stands maxima of Dkr 100/ha for broadleaved species and Dkr 50/ha for mountain pine are granted. Associations of forest owners are awarded grants only for administrative costs, to cover 70% of the subsistence and travel expenses of the forest specialist employed by the association.

#### Germany

Both the Federal Government and the Länder give subsidies. At the Federal level, material encouragement for forestry is provided through the "community task"\* of "improving agricultural structures and the protection of the coasts" undertaken jointly with agriculture. The Federal research programme also includes assistance in case of disaster, such as in recent years the removal of storm damage in 1972 and the re-afforestation of storm-damaged areas.

In the framework of the "community task" the following measures may be assisted:

#### Silvicultural and other forest measures

- afforestation of agricultural land of marginal productivity, of uncultivated and waste land when this is in line with agricultural structure policies and is unobjectionable from an agricultural point of view;

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\* A national task jointly undertaken by the Federal Government and the Länder.

- conversion and improvement of low-yield stands in locations suited for high forest;
- the planting of shelter belts and spinneys;
- pruning of young stands;
- separation of forest and pasture land to maintain forest where difficult mountain terrain requires it;
- preliminary work and preparation of the land for planting.

#### Construction of forest roads and tracks

- New construction and consolidation.

#### Formation of forestry associations

- initial investments
- administrative costs.

The cost of these subsidies, which are non-repayable, is shared as to 60% by the Federal Government and 40% by the Land. Loans are also available but only for road and track construction.

For silvicultural measures the level of assistance may not exceed 80% of the eligible costs. For afforestation and conversions the following scales of maximum assistance are provided for:

- DM 3 500/ha for broadleaved plantations,
- DM 2 000/ha for mixed plantations and conifer plantations other than fir,
- DM 1 200/ha for afforestation with firs, and in addition
- DM 1 200/ha for soil improvement, preparation of the land for planting, application of fertilizer,
- DM 200/ha for pruning,
- DM 2 000/ha for the separation of forest and pasture and
- DM 4 800 - 5 700/km for shelter belts and spinneys.

For road and track construction grants of up to 80% of the eligible construction costs are made, and in addition there are loans covering up to 66 2/3% of the eligible costs, with interest rebate of up to 5% and a minimum interest liability of 3%. The rate of assistance for the initial investments (equipment, machines, installations, plantations) of forest associations is 40%, the grant towards administrative costs is 40% in the first five years, 30% in the next five years and 20% for a further five years.

The Länder programmes for assisting forestry are today largely geared to the "community task" on agricultural structures and most Länder subsidies to forestry are awarded in this connection. There are, however, also special supplementary programmes related to the specific requirements of a Land. These include investment aid for the installation of recreational facilities in forests, grants for forest-fire insurance, multi-holding forest preservation measures, etc.

### France

The most important source of State assistance for forestry in France is the National Forest Fund (Fonds Forestier National, FFN). The FFN has, ever since its inception, been devoted primarily to afforestation. Lesser amounts of aid for forestry may come from the general State budget and other special funds.

Financial aid is available in two different forms, each of two kinds :

- non-repayable grants in the form of "subventions" and investment premiums ("primes") and
- loans with interest rebates either in the form of cash loans or of provision of services by the State under contract ("prêts en travaux").

The range of assistance is exceptionally comprehensive; it may be divided into three groups of measures:

#### (1) Afforestation measures

By far the most aid provided by the FFN is for afforestation. It includes:

- the afforestation of land of marginal productivity and waste land,
- the planting of trees outside forest areas,
- enrichment of low-yield stands with conifer interplantings,
- conversion and improvement of coppice and coppice-with-standards,
- re-afforestation after disasters.

(2) Aid for forest road and track construction and for protection against forest fires in productive forest

Two major tasks are involved here:

- the extension and improvement of the network of forest roads and tracks, and
- the protection of productive forest against fire, firstly by means of fire-breaks and secondly through the procurement of fire protection equipment and the formation and operation of fire-fighting services.

(3) Aid for various purposes

- Procurement of specialized forestry equipment,
- Forest protection (control of pests) by special teams,
- Maintenance of forest ownership, particularly at time of succession,
- The drawing up of simple management plans,
- Formation of forestry associations,
- Inspection of seeds and propagation material, nursery holdings,
- Modernization and extension of saw mills, provision of timber yards, procurement of timber harvesting machinery by felling concerns,
- Forestry activities of general interest.

Afforestation aid takes the following forms:

- the "subvention": minimum area 1 ha, maximum rate of aid 50% of costs, with an upper limit of FF 5 000 for private forest owners and of FF 10 000 for forest co-operatives and associations;
- the investment premium: minimum area 10 ha, maximum rate of aid 40% of costs, no upper limit to the area covered;
- the cash loan: minimum area 10 ha, duration 50 years, interest rate 0.25%, rate of aid, up to 100% of costs;
- the contract to provide services: minimum area 30 ha, duration 50 years, interest rate 1.5%, 100% of costs.

The construction of roads and tracks is aided by non-repayable grants of up to 50% of costs. There are also cash loans of up to 100% of costs with a duration of 30 years and interest at 2.5%. Aid for the procurement of fire-protection equipment is similar: the cash loans are even more favourable

(30 years, 1.5%). Forestry associations are aided by means of degressive subsidies for administrative costs, namely up to 70% of approved staff costs for the first year, 50% in the second year and 25% in the third year.

### Italy

State aid for the financing of forestry measures in Italy includes both money grants (subsidies) and loans at favourable interest rates, the State budget or the National Forest Fund (Fondo forestale nazionale) taking over debt service in full or in part. At present no non-repayable grants are made from the Forest Fund, but only loans with interest rebate.

For forestry there is a special aid programme ("Green Plan"), the current one being the "Piano Verde" No 2 of 1966. The main subsidies granted by the Italian State are laid down in this plan. In addition, the autonomous regions and the Cassa di Mezzogiorno (South of Italy Fund) may also grant subsidies.

The following measures may be assisted:

- afforestation of bare land and non-productive scrub,
- re-afforestation of areas destroyed by fire and stands which have suffered other disasters,
- the improvement of existing forests, especially the conversion of coppice into high forest or into forest stands which can be grazed and the planting of wind-breaks,
- measures for the improvement of pastures in forest-pasture land,
- improvement of the infrastructure of forests by the construction of roads and tracks,
- protective measures against forest fires (provision of fire-breaks, water points, construction of fire look-out towers),
- special undertakings and associations of holdings, which are formed for the purpose of managing forest-pasture estates and drawing up management plans,
- purchase of land and afforestation by mountain communities.

By far the largest portion of the forest improvement measures in Italy, namely up to 80% of all financial expenditure for this purpose, are State financed as a public function, so to speak, even though, in the majority of cases, the land involved is not State-owned.

Otherwise, the size of subsidies for afforestation and forest improvement measures amounts to 75% of the approved costs for estates specially designated as "territori montani" (mountain areas) and placed under forest-use control (transfer to other use requires authorization) pursuant to the Forest Law, and to 50% in all other cases. In addition, contracts to provide services and cash loans are available from the forestry fund with a 40-year duration at 2% interest to cover up to 90% of the approved costs. Construction of roads and tracks is subsidized to the extent of 60% of construction costs in normal cases and 75-87.5% in "territori montani", besides the loans available under the conditions referred to. The subsidizing of fire-protection measures is frequently met entirely out of State funds. In other cases, subsidies amount to 75% of the costs involved. Associations of holdings of the type mentioned above are awarded grants for five years to cover up to 75% of the staff costs, and for work and services, subsidies of up to 50% of the project costs are also available. Arrangements for aiding forestry financially from regional funds are not known in detail.

### Ireland

The main purpose of aid for forestry is to increase domestic timber production. Since forestry in Ireland is regarded primarily as a State concern, the sector which is not State-owned has hitherto played only a relatively minor role in the forest development programme.

In principle, only aid for afforestation is granted, particularly for the putting to use of unproductive scrub land. The grant amounts to £86.50/ha and is increased to £91.50/ha in cases where broadleaf or mixed stands are planted on suitable land. For poplar plantations at wide spacings a lower rate of aid of £61.78/ha applies. As a temporary measure until 1977, a further grant of £49/ha for the removal of scrub is available.

### Luxembourg

The forest policy objectives aided are maintenance, enlargement and improvement of forest areas. Thus subsidies are granted for:

- afforestation measures on marginal land, heath and waste land and on areas which have been abandoned by agriculture,
- reafforestation after disasters (wind damage, forest fires, etc.) and after clear-felling in special cases,
- planting of trees outside forest areas e.g. poplar on pasture land,
- conversion of coppice,
- measures for the improvement of forest infrastructure (road and track construction)

The rates of subsidies for afforestation measures are differentiated and amount to Lfrs 15 000/ha for conifers, Lfrs 24 000/ha for mixed forest and Lfrs 30 000/ha for broadleaved species. The conversion of coppice is also subsidized with grants of Lfrs 30 000/ha. For fencing purposes, additional funds (Lfrs 15/linear metre) are available. In the case of road and track construction, the grants are awarded not at fixed rates but according to the magnitude of the costs. They are in the range of 15 - 35% of the construction costs. Loans are not granted.

### Netherlands

The Forestry Law provides that non-State forestry shall be encouraged by the granting of subsidies and loans at reduced rates of interest. Nowadays, however, only non-repayable grants are employed.

Grants are awarded for the following:

- New afforestation serving to increase the area of forests and forest holdings. The grant is restricted to 80% of the costs. The land involved is usually heath or waste land, or sometimes old agricultural land. Subsidies are granted only for areas of 4 ha or more;
- Reafforestation is subsidized in order to compensate forest owners for this obligation. The grant amounts to 50% of the costs;

- the removal of storm damage is subsidized to the extent of 90% of costs;
- the opening up of forests for public recreational purposes. This involves in practice a grant towards operating costs which is graduated: FL 60/ha for the first 50 ha of a holding, FL 50/ha for the next 50 ha, etc. Ten hectares is stipulated as the minimum area.

### The United Kingdom

Great Britain and Northern Ireland have different systems of subsidies. In both countries, however, increased timber production by enlargement of forest areas and improved management of existing forests are regarded as the main objectives. In this connection, subsidized private forest in Great Britain is today expected, in the general public interest, to play a part in the solution of social and regional development objectives. Subsidy measures apply almost exclusively to private forest.

In Great Britain, the earlier system of subsidies, which provides for assistance in respect of afforestation and operating costs, runs concurrently with a new system started in 1974, insofar as long-term obligations entered into under the old system still exist. The new programme (The New Dedication Scheme - Basis III) is concerned exclusively with assistance for afforestation. Provision is no longer made for grants towards operating costs. Afforestation aid amounts to £45/ha, with an additional £125/ha for the planting of broadleaved trees. The minimum area is 1 ha. For areas exceeding 10 ha, a binding declaration must be made or a contract signed undertaking to dedicate the subsidized forest areas to sustained timber production and to manage them on approved Forestry Commission lines. Integrative aspects, such as effective dovetailing with agriculture, protection of the environment and the recreational value are thus taken into consideration. Windbreaks may be subsidized by the agricultural authorities, recreational facilities in forests by the Countryside Commission (a maximum of 75% of the investment costs and grants towards operating costs).

In Northern Ireland the programme of subsidies has since 1968 covered assistance for afforestation and the promotion of planned forest management on forest land not owned by the State. The "Planting and Maintenance of Woodlands Scheme" is aimed at commercial timber production. Subsidies amount to £112.50 per hectare of afforested or re-afforested area. Seventy-five pounds of this may be regarded as a grant towards afforestation, the remaining £37.50 as a grant towards operating costs. The subsidy is restricted to areas of 1 ha or more. The main programme is supplemented by the Scrub Clearance Scheme in which grants of up to £25/ha are made for the clearing of non-productive scrub land. Very small plots of land can be subsidized for the purposes of timber production outside the forest and for the creation of windbreaks by means of reduced-cost sales of propagation material from State nurseries under the "Young Trees Scheme".

#### 4.2 Comparison between countries

##### A general conspectus of the aid systems of EC Member States

Despite certain gaps in the information provided by the reports from the various countries, it has been possible to make a comparative assessment of the aid provided for forests not owned by the State. In Table 15, these systems are compared first of all with one another. The subsidized measures are for this purpose placed in three groups:

- Increase of timber production. Essentially this is the enlargement of forest areas through afforestation, re-afforestation and the conversion, improvement and enrichment of low-yield stands together with the related work of soil preparation, site improvement and clearance of vegetation. In the guidelines on aid for forestry in the different countries, increase in timber output is stated more or less explicitly as being the subsidization objective. In practically all cases, however, it is also considerations of soil improvement and the improvement of agricultural structures which motivate the subsidizing of this group of measures, especially the orderly conversion into forest of agricultural fallow land and unproductive waste land, insofar as this is desirable from an

ecological point of view and thus in the public interest. Assistance is also aimed at progressively correcting and eliminating the structural defects of forests in all countries in order to improve the yield of the smaller non-State forests.

- The opening up and maintenance of existing forest areas.

Principally there are three measures involved: the construction of forest roads and tracks, protection against forest fires and the protection of forests against animal pests, harmful vegetation and game. Road construction includes both new roads and extensions. Usually this involves expanding or improving the already available network. Improved access facilitates forestry work in a number of respects. In the first place, transport conditions are improved. The road network also serves planning and orientation, the transport of timber, equipment and personnel and the storage of timber. Roads can also play a role as work sites, particularly for mechanical operations of sorting and loading. The conditions of timber removal can thus have a considerable effect on timber harvesting costs and local price formation and above all on the level of fellings.

- Assistance for the formation of forestry associations.

These measures are aimed at countering the disadvantages of the unfavourable forestry structures which obtain for much of the non-State forest of all EC countries. The purpose of assistance is to improve incomes and to obtain more timber from the small and medium-sized forest holdings, the management of which is made difficult or impossible because of the small area involved, its inconvenient shape or its fragmentation, or because of inadequate access and other structural deficiencies. Grants are made towards expenditure on afforestation and advisory services, and in some countries also towards the cost of initial purchases of equipment, machinery and vehicles for certain forest operations and for the provision of work sites and buildings.

Table 15 brings out the considerable differences which exist between the varied aid programmes of the individual Member States. Particularly complex aid systems have developed only in France, Germany and Italy.

Of the main measures involved, only the raising of timber production and the enlargement of forest areas are common to all EC countries, and this applies only to new afforestation. In terms of the resources made available, aid for afforestation is by far the most important form of subsidy in many countries. In the majority of countries (exceptions: Netherlands, Ireland and the United Kingdom), conversion, improvement and enrichment of low-yield stands are also regarded as eligible for aid. The same is true also of reafforestation after disasters (exceptions: Denmark, Ireland and the United Kingdom), but not of normal re-afforestation which is eligible for aid only in the Netherlands, and in special cases in Luxembourg, Belgium and the United Kingdom.

For improvement of the infrastructure (construction of forest roads and tracks, fire-protection measures) there are no aid funds available in some countries (the United Kingdom, Ireland) or the aid is contingent upon afforestation or the opening up of the forest to the public (Denmark, Netherlands) and is not an aid measure of itself.

While it is an urgent concern of forest policy in most Member States, aid for the formation of forestry associations is still in its infancy. At present the only country with a comprehensive promotion programme is Germany (aid for investments and grants for personnel and administrative costs); a partial programme (grants for personnel costs) exists in Denmark and a modestly financed pilot programme in France. In Italy subsidies are granted not for forestry associations as such but for mountain community associations (enti montani) and special undertakings (aziende speciali, consorzi) which are formed for the management of forest/meadowland in mountain regions.

Table 15: Systems of aid for non-State owned forestry in the EC Member States

Purposes of the subsidy	France	Germany	Italy	Denmark	Belgium	UK	Netherl.	Luxemb.	Ireland
<u>1. Increase of timber production</u>									
First afforestation	S-D-L	S	S-D-L	S	S	S	S	S	S
Conversion/improvement	S-D-L	S	S-D-L	S	S	-	-	S	-
Re-afforestation after disasters	S-D-L	S	S-D-L	-	S	-	S	S	-
Normal re-afforestation	-	-	-	-	(S)	S	S	(S)	-
Planting outside forest areas	S-D-L	S	(S-D)	-	-	S	-	S	-
Soil preparation, clearance of vegetation	(S-D-L)	S	(S-D-L)	S-D	S	S	-	-	S
<u>2. Opening up and maintenance of existing forest areas</u>									
Construction of roads and tracks	S-D-L	S-D	S-D	(S)	S	-	(S)	S	-
Fire-protection measures	S-D-L	-	S-D	(S)	S	-	-	-	-
Forest protection (insects, mushrooms, game)	S	S	S	-	-	-	-	(S)	-
<u>3. Forestry associations</u>									
Supplying of special equipment	S	S	(S)	S	-	-	-	-	-
<u>4. Other measures</u>									
Recreational forest	-	S	D	-	S	S	S	-	-
Drawing up of economic plans	S-D	S	S	-	-	S	-	-	-
Aid after disasters	-	S	-	S	-	-	S	-	-
Owner retention of forests, land purchase	D	S-D	D	-	-	-	-	-	-
Fire insurance	-	S	-	-	-	-	-	-	-
Grant for day-to-day expenditure	-	(S)	-	-	-	(S)	(S)	-	-
Improvement of forest/meadowland	(S-D-L)	-	S	-	-	-	-	-	-
Conferences, research & other projects	S	S	S	S	S	S	-	-	-
<u>Recipients of subsidies</u>									
State forest	x	-	-	-	-	-	-	-	-
Local and corporate forest	x	x	x	(x)	x	(x)	x	(x)	-
Private forest	x	x	x	x	-	x	x	x	x

S = non-repayable grant; D = cash loan; L = loan in form of service contracts;  
 ( ) = contingent, and not an aid measure on its own.

Table 15 also gives information on the form of the grants available in individual countries. According to this, the non-repayable financial aid predominates. Only in France and Italy do loans with interest rebates play a role, either as cash loans or as loans in kind in the form of service contracts; particularly in the case of France loans far exceed in importance the direct non-repayable grants. Cash loans are also available in Germany and Denmark but here are of quite secondary significance.

#### Total amount of subsidies

The total of subsidies granted by member countries averaged over recent years, the allocation of aid between the categories of measures and the area covered by subsidies in the Community are summarized in Table 16. In this are included only such assistance to forestry as can be regarded as subsidies within the meaning of the term. The following in particular are not included:

- all those allocations which do not directly benefit forest holdings, such as aid for forestry research, for forest seed and propagation material, for advisory services, for surveys and for the holding of meetings, etc.;
- the overhead costs for the administration of the subsidy fund and the granting of aid, which are considerable in some countries;
- the exceptionally comprehensive aid provided in a number of countries in cases of disaster (wind throw, snow break, forest fire, etc.). This is aid which, according to Article 92 (2) of the EEC Treaty, may be regarded as compatible with the common market;
- in Italy, the allocations for infrastructural measures, which are financed either wholly, or up to 90% by the State in ill-provided areas. This is in fact public development aid for areas which are ill-provided or

**Table 16: Total subsidies provided in EC countries for the non-State forest and subsidies per hectare of forest (annual average values around 1970)**

Country	None-State forest hectares (000)	Amount of subsidy allocated (000 Eur) and percentage subsidy per hectare forest								Annual value averaged over the period			
		1	2	3	4	5	6	7	8		9	10	11
		EC%	Increase in timber production	Opening up and maintenance of forest areas	Other measures	Total	EC%	Increase in timber production	Opening up and maintenance of forest areas	Other measures	Total		
Belgium	542	2.1	180.9	114.8	139.4	435.1	1.0	0.33 (41.5%)	0.21 (26.4%)	0.26 (32.1%)	0.80 (100%)	1972-74	
Germany	4 968	19.3	5 073.0	5 779.3	3 674.3	14 526.6	32.4	1.02 (35.0%)	1.16 (39.8%)	0.74 (25.2%)	2.92 (100%)	1971-74	
Denmark	339	1.3	31.7	-.-	253.3	285.0	0.6	0.09 (11.2%)	-.- (0%)	0.75 (88.8%)	0.84 (100%)	1972-74	
France	12 600	48.9	9 597	2 706	1 263	13 566	30.3	0.76 (10.7%)	0.21 (19.9%)	0.10 (9.4%)	1.07 (100%)	1970-73	
Italy	5 907	22.9	3 293.9	3 073.8	4 133.3	10 501	23.4	0.56 (31.9%)	0.52 (29.7%)	0.67 (38.4%)	1.75 (100%)	1966-70	
Ireland	36	0.1	30.8	-.-	-.-	30.8	0.07	0.86 (100%)	-.-	-.-	0.86 (100%)	1971-74	
Luxembourg	79	0.3	3.1	13.6	-.-	16.7	0.04	0.04 (18.6%)	0.17 (81.4%)	-.- (0%)	0.21 (100%)	1968-70	
Netherlands	221	0.9	273	not stated	1 295.4	1 568.4	3.5	1.24 (17.4%)	not stated	5.86 (82.6%)	7.10 (100%)	1970-74	
United Kingdom	1 100	4.2	3 909.2	-.-	-.-	3 909.2	8.7	3.55 (100%)	-.-	-.-	3.55 (100%)	1972-74	
EC	25 792	100%	22 392.6 (50%)	11 687.5 (26%)	10 758.7 (24%)	44 838.8	100%	0.87 (50%)	0.45 (26%)	0.42 (24%)	1.74 (100%)	-	

structurally weak and measures which, at least, initially, do not have any effect upon the production of forest holdings.

In addition, apart from the non-repayable grants, there is aid in the form of loans at reduced rates of interest, particularly in France and Italy, where the interest subsidy element does not appear as expenditure in the national budget.

The figures given are average values in recent years expressed in EUR to permit comparison between countries. The data communicated by the countries, which are the basis of the table, do not all relate to the same time period (see last column of table). This undoubtedly affects the comparability of the figures, but despite this defect orders of magnitude of national subsidies may at least be compared. It may be seen that a total of 44.8 million EUR was granted per year on average at the beginning of the 1970's in the form of non-repayable grants for non-State forests in the EC area. This is indeed a modest and unimpressive amount. Some 40.6 million Eur of this total were granted within the Community of the six. For these, Marsch (1967)\* taking the position at 1965, calculated an average annual amount of DM 92.2 million, corresponding to 28.6 million Eur. Since that period, the increase has amounted to 42% (1965=100%), or about 6% per year, which more or less corresponds to the rate of cost inflation. There is no question, therefore, of any real increase in the level of aid.

Fifty per cent of the resources provided come under the heading of "increase in timber production", and consist essentially of afforestation of land of marginal productivity and waste land, reafforestation after disasters and conversion, improvement and enrichment of low-yield stands, as explained in more detail above. The following proportions of national aid funds are spent on these measures:

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\* Marsch, H. (1967): The direct and indirect subsidies for forestry in the EEC countries and their effect upon conditions of competition in the Community timber market, Munich, unpublished manuscript.

Ireland	100% of all aid granted
United Kingdom	100%
France	71%
Belgium	42%
Germany	35%
Italy	32%
Luxembourg	19%
Netherlands	17%
Denmark	11%
EC average	<hr/> 50% <hr/>

With the exception of Belgium, where only corporate forest is aided, by far the largest part of the subsidies provided is allocated for the afforestation of private forest land.

Averaged throughout the EC, a further 26% of the total amount of subsidies is allocated for the "opening up and maintenance of forests", i.e. mainly the construction of forest roads and tracks and protection against fire.

Country percentages for these measures are as follows:

Luxembourg	81.4% of all aid granted
Germany	39.8%
Italy	29.7%
Belgium	26.4%
France	19.9%
Netherlands	not stated
Denmark	0%
Ireland	0%
United Kingdom	0%
EC average	<hr/> 26.0% <hr/>

In the Netherlands, funds are indeed provided for the construction of roads and tracks. They are, however, not shown separately but included in the subsidies for opening forests to the public (see "Other measures"). In all countries more work seems to be done on the opening up of corporate forest than of private forests whose unfavourable structure is a decisive obstacle to such work.

For the "Other forestry measures" an average of 24% is granted within the EC. This group of measures is heterogeneous. Thus, in the Netherlands there are high levels of aid for opening forests to the public, and such grants are made only in that country. In practice, the grants are related to operating costs, which on closer examination are seen to be spent on specific forestry measures, such as afforestation, improvement of stands and road and track construction. The data from Germany, Denmark and France show that aid is provided also for forestry associations, while the majority of other Member States make no subsidies available for this purpose.

Area covered by subsidies provided

Table 16, column 7, shows the total amount of subsidies provided in the Member States. Germany provides the most, followed by France and Italy. Luxembourg provides the smallest amount. These figures acquire significance when expressed as a percentage of the EC total amount of subsidies (column 8) and compared with each country's percentage of total EC non-State forest (column 3), as follows:

Country	Percentage of EC non-State forest area	Percentage of EC total amount of subsidies granted
France	48.9	30.3
Italy	22.9	23.4
Germany	19.3	32.4
United Kingdom	4.2	8.7
Belgium	2.1	1.0
Denmark	1.3	0.6
Netherlands	0.9	3.5
Luxembourg	0.3	0.04
Ireland	0.1	0.07
EC	100.0	100.0

Compared with other EC countries the Netherlands provides a disproportionately high level of subsidies in relation to non-State forest area. The United Kingdom and Germany also provide disproportionately high amounts.

The proportions are even in Italy. In all other countries, including France with its impressive FFN<sup>\*</sup> subsidies, aid is disproportionately small. The forest area proportion is thus clearly an index of little significance. An important criterion which needs to be taken into account is the condition of the forest, but this defies simple statistical expression.

The differences in subsidy levels become clearer if expressed per hectare of non-State forest (columns 9 to 12). The following sequence then emerges:

Country	Subsidy granted per ha of non-State forest (EUR/ha)
Netherlands	7.10
United Kingdom	3.55
Germany	2.92
Italy	1.75
France	1.07
Ireland	0.86
Denmark	0.84
Belgium	0.80
Luxembourg	0.21
EC average	1.74

In this list the Netherlands occupies an exceptional position and the United Kingdom and Germany are well above the EC average, which is represented by Italy, while all the remaining countries lie at varying levels below the average value. The disproportionately high level of subsidies in the Netherlands is explained by the considerable amounts per hectare granted for opening non-State forest to the public.<sup>(1)</sup>

The actual and maximum possible subsidies granted per unit of subsidized measures

The cost of subsidies provided for non-State forest differs from one country to another in absolute terms, but the amounts become comparable when the areas involved are taken into account.

(1) These subsidies may also be considered as a compensation for services provided to the public (see page 47 onwards).

\* Fonds forestier national

one another. This is, however, only a make-shift comparison and is unreal insofar as the subsidies are not applied in a uniform manner to the benefit of non-State forest. Table 17 therefore provides an expanded country comparison, in which the effective average grants awarded in each country are compared with the maximum amount of aid per unit of subsidized measures permitted under law. Such a comparison is admittedly possible only for afforestation/conversion etc. and for road and track construction, since for the other measures suitable bases for calculation cannot be obtained. The table also contains numerical data from which differences between countries in respect of the manner of allocation of subsidies can be seen, such as the preferential subsidizing of broadleaf afforestation in certain countries.

The following sequence of countries emerges in respect of the annual average of the amount of aid effectively granted per hectare for afforestation (including conversion, improvement, enrichment by interplanting):

Country	Grants effectively provided per hectare of afforestation (Eur/ha)	Afforestation grant per hectare of non-State forest (Eur/ha)
Denmark	782	0.09
Netherlands	677	1.24
Germany	465	1.02
Italy	197	0.56
France	190	0.76
Northern Ireland	174	2.66
Great Britain	165	3.55
Belgium	116	0.33
Ireland	97	0.86
Luxembourg	66	0.04
EC average	293	0.87

According to this, above-average subsidies are granted for afforestation in Denmark, the Netherlands and Germany. The differences between countries are considerable. The ratio between the lowest grant level (Luxembourg) and the highest grant known with certainty (Netherlands) is 1 : 10. The

Table 17: Effective average grants and maximum possible amounts (EUR)

	Belgium		BRD		Denmark		France		Italy		Ireland		Luxemb.		Netherl.		United Kingdom	
	1972-74	1971-74	1972-74	1970-73	1966-70	1971-74	1970-74	1970-73	1966-70	1971-74	1968-1970	1970-74	1970-74	1970-74	1972-74	GB	NIRL	
Average annual values																		
1. Afforestation/conversion etc.																		
Average grant actually provided (Eur/ha)	116	465	782	190	197*	97	66	677	165	174								
Minimum area (ha)	1*	without	10	1	without	0.4	0.3	4	1	1								
Maximum amount of subsidy assuming a cost per hectare of																		
2000 Eur/ha: conifer stands	600	379 <sup>+</sup> )	1 000	1 000	1000-1500	162	308	1 600	84	211								
mixed wood stands not stated	not stated	627 <sup>+</sup> )	1 000	1 000	1000-1500	171	493	1 600	84	211								
broadleaf stands	900	1 606 <sup>+</sup> )	1 000	1 000	1000-1500	171	617	1 600	318	211								
Special subsidy for soil/terrain preparation	-	373	not stated	-	-	92	-	-	-	47								
2. Construction of roads and tracks																		
Average grant actually provided (Eur/ha)	1 766	3 928	-	2 651	not stated	-	1 598	-	-	-								
Maximum amount of subsidy assuming a cost per km of 1000 Eur:																		
Level of grant (% total cost)	30%	80%	-	35%	60-87.5%	-	average ++)	-	-	-								
Max. poss. subsidy (Eur/km)	3 000	8 000	-	3 500	6000-8750	-	2 000	-	-	-								
Additional loan	-	20 years with 5% interest rate	30 years/2.5%	-	40 years/2%	-	-	-	-	-								

\* = Calculated or estimated

+ ) Including 6 Eur/ha for preparatory work

++) With considerable variations (15-35%) for particular operations

order of countries is considerably changed if the aid actually granted for afforestation is expressed per hectare of non-State forest (right-hand column). Great Britain and Northern Ireland are then well at the top of the list, while the Netherlands and Germany are considerably above the EC average.

The construction of roads and tracks is subsidized as a special measure in only five of the Member States. But as the data for Italy are not broken down by years, the actual grants awarded per km of road built or improved can be compared only for the following countries:

	<u>Eur/km</u>
Germany	3 928
France	2 651
Belgium	1 766
Luxembourg	1 598

The significance of these figures is limited insofar as the relative proportions of new construction and improvement work, with their differing cost structure and amounts, are not known.

Effect of the subsidies on conditions of competition in the common market in timber

The discussion up to this point has shown that the systems of subsidies in the EC area for non-State forests are of very different kinds and that, both in respect of the overall size of the subsidies provided and in respect of individual measures, there are very marked differences from country to country. Thus, in conclusion, an examination should be made to ascertain whether, and to what extent, the conditions of competition in the common market in timber are affected by the differing levels of aid granted.

In all EC countries, certain objectives (subsidy purposes) are attached to the granting of subsidies to forest holdings. As indicated at the beginning, these are determined mainly by public interest in the implementation of certain measures which are concerned with increasing national timber production (and hence with meeting the growing domestic timber requirements in the longer term), or with the improvement of agricultural structures and the maintenance of an ecologically sound and well-looked after countryside,

and also the safeguarding of private property and the economic betterment of all those employed therein. None of the subsidies is given exclusively or mainly for the purpose of strengthening the competitiveness of individual holdings, either in the national economic context or internationally in the common market. Indeed, it can be shown that at least the more important measures which are subsidized are actually matters of public concern. By the indirect method of a subsidy incentive, the countries transfer the responsibility for these matters in part to non-State forest holdings which can carry out the measures at less expense than if the governments undertake them. The implementation of the subsidized measures is in any case dependent upon additional investment, which the holding benefitting from the subsidy always has to bear.

What has been said here applies also largely to the afforestation of marginally productive land and waste land. If conversion of forest is included in the calculation, then about 50% of the subsidy granted in the EC area is spent on these measures. Such afforestation represents for the forest holding an additional investment, which, from an economic point of view, is attractive to the holding only in exceptional cases such as the readjustment of property boundaries. It carries heavy risks (uncertainty of outcome), and can show a profit only in the long term, because of the long rotation period. The turning to use and maintenance of agricultural areas which can no longer be farmed because their yield is too low and the cost of working them excessive, is therefore regarded in all EC countries as a State responsibility. Because of the very magnitude of the fallow land problem, it is logical that the State should, by way of subsidies, meet part of the costs of afforestation. Such subsidies do not affect the conditions of competition, since, from the point of view of the forest holding, any improvement in production conditions can only be a long-term matter and no direct effects on prices can be demonstrated. Consequently, even the differences in the levels of subsidies in the individual Member States for these measures cannot be regarded as justifying Community directives or

recommendations. It must be regarded as a matter for the Member States to decide what priority they will accord politically to the problem of fallow and waste land, and to what extent they will make public funds available for dealing with it.

The subsidizing of normal reafforestation, on the other hand, as provided for in the Netherlands, and to a limited extent in special cases in Belgium, the United Kingdom and Luxembourg, affords the recipient holding direct relief from a part of its operating costs. Since the rules for this kind of subsidy are not uniform as between Member States, distortions of competition and price advantages arise in theory for the beneficiary holding. They should, however, have no effect on the common market in timber, since neither the Netherlands nor the United Kingdom export timber from domestic production to the common market, and Belgium and Luxembourg export insignificant quantities.

The conversion, improvement and enrichment of low-yield stands is grant-aided in all countries of the EC, for which the problem has particular significance in forest policy. This is true above all for Italy and France with their high proportion of coppice and to a limited extent also for Belgium and Luxembourg. In the Netherlands (with more than 10% of the forest area planted with coppice) the subsidization of these measures has recently been discontinued in view of the need of such coppice for recreational use. The subsidization of improvement and conversion is a real aid to investment. In the long run the holding may expect to enjoy an improvement in production conditions and increased profitability. In the medium term there is no effect on competition, since here again, on account of the long rotation period, results can only be obtained in the long run. It is true, that short-term competitive advantages can result from differences in subsidy levels in countries with particularly high rates of aid, from the sale of coppice products, if larger quantities of such wood, particularly pit props and pulp wood and possibly also stem timber, are disposed of at less than cost price.

In the case of France (net paper pulp exports 1973: about 1.3 million cubic metres) this can have a distorting effect upon competition and can have an effect on the EC timber market, particularly at regional level. This is not the case in Italy, Belgium and Luxembourg, which are all net importers of paper pulp.

The construction and extension of forest roads and tracks is only subsidized as a separate measure in France, Germany, Belgium, Italy and Luxembourg. The rates of aid vary from 15% (Luxembourg) to 87.5% (Italy) of the recognized total construction costs and are 80% in Germany (cf. Table 17). Although this aid is justified to some extent by public interest (structural improvement, recreational use) the construction of forest roads and tracks is not a public responsibility. Rather one must suppose that the aided holdings have obtained direct economic advantages, with a direct effect on prices, over other holdings which are obliged to invest their own resources in road and track construction in order to remain competitive. Independently of the lower harvesting costs resulting from a denser network, higher prices may be expected for readily removable timber. This can be of decisive importance particularly in respect of the sale of marginal products which, if the forest had not been made accessible, could not have been sold at economic prices and would have had to be left unused. As aid measures for the construction of forest roads and tracks in the EC are by no means uniform and differ in fact quite considerably from one country to another, from no aid at all in four Member States to up to 80% and 90% of costs, there is at least in theory the possibility of distortions of competition between Member States. The subsidies can therefore not be considered compatible with the rules on competition in the EEC Treaty. Serious price effects on the EC timber market are, however, not expected; nevertheless an attempt should be made to co-ordinate the policy on subsidies as it concerns the opening up of forests.

The infrastructure measures to provide or extend forest fire protection are closely linked with the development of the forest network and in many cases, in particular as regards the provision of fire-breaks, cannot be separated.

Apart from Belgium where the amounts of aid actually provided for such measures are insignificant, Italy and France are the main countries which subsidize forest fire protection. In both countries considerable amounts of aid are provided for this purpose. In view of the chronic forest fire problems and the resulting danger to the general public, forest fire protection in both countries must be considered a public responsibility, together with the safety precautions to prevent or to limit disasters which the individual forest owner cannot be expected to provide on his own. These measures are nearly always carried out by associations of forest holdings. If Article 92(2) of the EEC Treaty is interpreted generously enough, subsidies for forest fire precaution measures may be considered as grants to benefit the forest holdings particularly at risk and therefore as equalizing competitive disadvantages. The subsidies for supra-holding forest protection which are provided in Italy, France and in some Länder of the Federal Republic of Germany may likewise be seen as public safety precautions to prevent disasters.

Measures to encourage forestry associations as provided in Germany, Denmark, France and in a certain sense also in Italy aim at improving the profitability of small structurally weak private forests, in part at least through co-operation between forest holdings. These aid measures are not likely to give rise to distortions of competition. On the contrary, for the small-scale holdings which are aided all that is done is to create conditions in which they can compete on equal terms, which is consistent with Article 92(3) of the EEC Treaty. Insofar as subsidies are needed to achieve this aim they can be permitted by the Commission under Article 92 (3) of the EEC Treaty.

Of the other forestry aid measures within the EC only those for recreational forests are large enough to be significant.

With the exception of the Netherlands these are always investment subsidies; only occasionally do they also cover the maintenance of recreational facilities in the forest. Usually they are conditional on the facilities for which the subsidy is granted being placed at the disposal of the public free of charge. These are therefore not subsidies which could improve the profitability of the aided holding or which could give it a competitive advantage. The grants provided to non-State forests in the Netherlands for opening the forest to the public, which can amount to FL 50 per ha for the average holding, are in a quite different position.

No investment conditions are attached to this subsidy, such as the provision of specific recreational facilities which would then be available for general use free of charge. On the contrary, the subsidy is a payment by the State for the free use of the forest as a recreational area, without any restrictions being placed on forestry activities and without the subsidy being demonstrably or appropriately related to the forest owner's additional expenditure, and one must therefore conclude that the beneficiary holdings are in fact receiving grants towards operating costs. In this way they are demonstrably being placed at an advantage over holdings in other Member States. As the Netherlands is barely represented on the common timber market on the supply side, appreciable distortions of competition are however not to be expected and in any case only the Benelux area would be affected.

The report has shown that certain subsidies granted by Member States could give rise to distortions of competition on the Community timber market, in particular because of differences between countries in the scale of aid. In conclusion we shall now briefly discuss the effect of these distortions on prices and production and whether trade between Member States could be affected.

The question of price effects can only be dealt with here in theory. Exact surveys are not part of our task. The following considerations can however be advanced:

- significant price effects caused by subsidies would in any case probably only occur if the timber prices on the Community timber market were determined entirely or primarily by internal supply and demand. This is however not the case.
- only barely half of the Community's requirements of timber and wood semi-manufactures are covered by internal production. All nine Member States are net timber importing countries. The annual deficit amounts to over 90 million m<sup>3</sup> round wood equivalent (WRME). The Community timber market is therefore an import market and the price of timber depends essentially on the predominating international market in timber. Intra-Community trade in timber is insignificant.
- the upper price limit for timber is moreover determined retroactively by the production costs on the demand side.
- as an exception to the general principle of so-called market forces, production costs have little relevance, as a lower price limit on the supply side, to the round timber prices on the open market. It is moreover extremely difficult to calculate the production costs in forestry. The domestic forestry industry is allowed relatively little influence in determining prices.
- the volume of the subsidies which might have an effect on prices, i.e. mainly the aid provided for the improvement of the infrastructure, is per se far too insignificant to have an appreciable effect on prices. If one estimates the timber yield from EC non-State forests at roughly 55 million m<sup>3</sup> per year and assumes that 12 - 15 million Eur have been granted in subsidies having a potential price effect, then this would amount to a subsidy of only 0.25 Eur per cubic metre of solid timber - a negligible amount. In fact subsidies for roads and tracks, which this aid mainly comprises, do not have a direct effect on timber prices. These are investment grants and **not** grants towards maintenance costs, as the subsequent upkeep has to be borne by the forest holding itself.

Although price effects caused by subsidies are not likely to occur on the Community market in round timber, one can however imagine that the picture is sometimes quite different in inter-State trade in a particular region. Whether distortions of competition due to subsidies have actually occurred would however need to be researched and demonstrated.

On the question of whether timber supplies are increased as a result of subsidies thereby affecting competition in another way, one might possibly expect an increased supply of wood to result from the conversion of coppice and possibly also increased yields due to better forest access. The other aided measures, in particular afforestation, have a mainly long-term effect on supply. It is Italy and France which are primarily involved in converting coppice. Italy is however practically unrepresented on the EC timber market, whereas France exports considerable amounts in the form of pulp wood and broadleaved timber. Here again, it is only by more detailed investigations that it would be possible to discover whether and to what extent increases in supply can be proved to be caused by subsidies. This might possibly be the case on regional markets. It would, however, be difficult to prove the relationship between the subsidies and supplies as the origin of the wood is not known by the time it reaches the timber trade.

#### 4.3 Conclusions and recommendations

In conclusion, it may be stated that:

- (1) The volume of subsidies in aid of non-State forestry in the EC is scarcely such as to cause appreciable distortions of competition on the Community market in timber.
- (2) There are considerable structural differences between the aid systems of Member States.

- (3) There are also obvious differences from one country to another as regards the rates of aid and therefore in the absolute and relative levels of aid for non-State forests.
- (4) With few exceptions, the aid systems seem to meet the needs and forest policy objectives of the countries.
- (5) Effects that might distort competition are only likely to be produced by subsidies in certain fields, in particular the measures to improve forest infrastructure; these, however, require to be demonstrated specifically.

The co-ordination of forest subsidy policies, at least for specific areas, would certainly be in line with Community thinking and would be justified inasmuch as they are closely connected - as has been seen - with the overriding general agri-structural policy. In principle, however, solutions should be avoided which would unduly burden the forestry industries of the Member States with substantial investments.

It is therefore recommended:

that increased and more selective use be made of EC funds for the control of subsidy policy, with a view to achieving a better co-ordination of forest aid systems.

This applies primarily to the afforestation of agricultural land of marginal productivity and waste land, the conversion of coppice and the improvement of forest infrastructure in small and medium-sized non-State forests by the construction of forest roads and tracks, and by encouraging the formation of associations of forest holdings. These measures are directly related to the Community's regional and agri-structural policies inasmuch as they contribute to the improvement of agricultural structures and to the aid for ill-provided areas. In view of this they might initially be considered for funds from the EAGGF and the Regional Fund.

In the meantime the forestry sector has already gained a regular place among the projects to improve agricultural structures financed by the EAGGF Guidance Section.

Its share of project allocations from the Fund rose from a modest 1.7% in 1973 to 6.6% in 1974, although at present it is still mainly for measures concerned with the afforestation of agricultural land of marginal productivity. One must examine whether, and to what extent, the aid potential of the EAGGF for forestry could be more widely spread and more fully utilized by introducing measures for other problem areas. One thinks immediately of the construction of forest roads and tracks. In view of the unfavourable structures applying to farm woodland, the conditions for developing a rational and sensible forest organization must also be created by more selective encouragement for the formation of associations of holdings. This is in any case closely linked with the programme for the improvement of agricultural structures.

It is further recommended:

that as a first step towards a mutual adjustment of the subsidy systems of the Member States, the provision of grants from EC funds to finance forest measures should be governed by uniform principles and directives, to be drawn up jointly by the Member States.

This would mean that in future EC funds would only be provided for those forest projects in respect of which the beneficiary country guarantees the observance of Community aid principles and directives.

It might also be considered whether subsidy funds should not be extended to other measures agreed to be urgent. Present information points to the fact that in non-State forests in all member countries the tending of stands is increasingly being deferred or completely neglected because the cost of doing the work can no longer be covered. In particular, this concerns delays in carrying out thinnings, which in all countries must have led to an accumulation of considerable reserves of timber of small dimensions. The mobilization of these reserves is not only in the interest of Community timber supplies, but should also be encouraged from the soil improvement aspect and for reasons of environmental protection and forest care, because this can ensure the stability of the stands, improve their structure, and increase their output of commercial timber.

It is therefore recommended:

that the European Communities should recommend the Member States to extend the scope of subsidies for non-State forests according to requirements, in particular by including forest tending and thinning operations in the list of measures eligible for aid where these are no longer economic for the forest holding alone on grounds of cost.

The granting of such subsidies could only be supervised properly if, in the case of thinning operations, it was linked to a rate of subsidy per cubic metre of solid timber and if, in the case of uneconomic forest tending operations, it were based on a rate per hectare. The details would have to be worked out.

The granting of subsidies is without doubt an effective instrument of forestry policy to steer the economic management of non-State forests towards measures which serve the public interest. In many countries it has however been shown that private forest owners do not make use, to the extent expected, of the financial aid available in the form of direct subsidies, because they shy away from the conditions and fear high-handed supervision of the subsidized measures. The question then arises whether many forestry objectives could not be achieved more easily through tax benefits (indirect subsidies). It is well known that not only does the businessman prefer tax relief to other forms of aid, but that the general public and the legislator make less difficulty about concealed aid than direct subsidies. However, in the case of tax measures, forestry policy is less concerned with the question of indirect subsidies for private forestry than with the creation of a tax system which is just in the burden it lays on forests and forestry. It cannot be a function of forest tax policy to

give an advantage to owners of forests over other taxpayers in respect of their private economic interests. With proper procedures, in particular with regard to conditions and supervision, it is therefore direct subsidies which are the more suitable instrument for achieving forest policy objectives, in particular because direct subsidies are more transparent and can be used in a more selective manner.

## 5. SYSTEMS OF FOREST TAXATION AND THE TAX LIABILITY OF PRIVATE FOREST HOLDINGS

### 5.1 Systems of forest taxation

The systems of forest taxation in the EC States are based primarily on income tax which is supplemented in some countries by a capital or wealth tax, various taxes on land and other real property as well as the inheritance and gift taxes payable in the case of changes of ownership without valuable consideration. In addition to this, a value added tax, on uniform principles, is payable on the turnover of forest holdings.

#### Income taxes

Income tax, which is considered the principal tax and is usually integral, takes personal circumstances and the individual's ability to pay into account by granting tax allowances and by the application of graduated tax scales (comparison of tax scales, Diagram 3). A sharply progressive scale and a high tax level do not necessarily result in high taxes for the forest owner. The way in which the taxable income from forestry is assessed varies considerably in the EC Member States - a high rate of tax may be offset by a low assessment basis.

In the calculation of income from forestry the basis in Denmark, Germany, Luxembourg, Ireland and the Netherlands is a modified income/outgoings calculation, whereby earnings in excess of the sustained yield in a financial year constitute the taxable income.

In Germany, and with some exceptions in Luxembourg too, earnings received in excess of the sustained yield rate, minus the related outgoings, are considered extraordinary income and are subject to a tax rate reduced by one half. The same modified tax rate applies if the harvest follows upon a catastrophe.

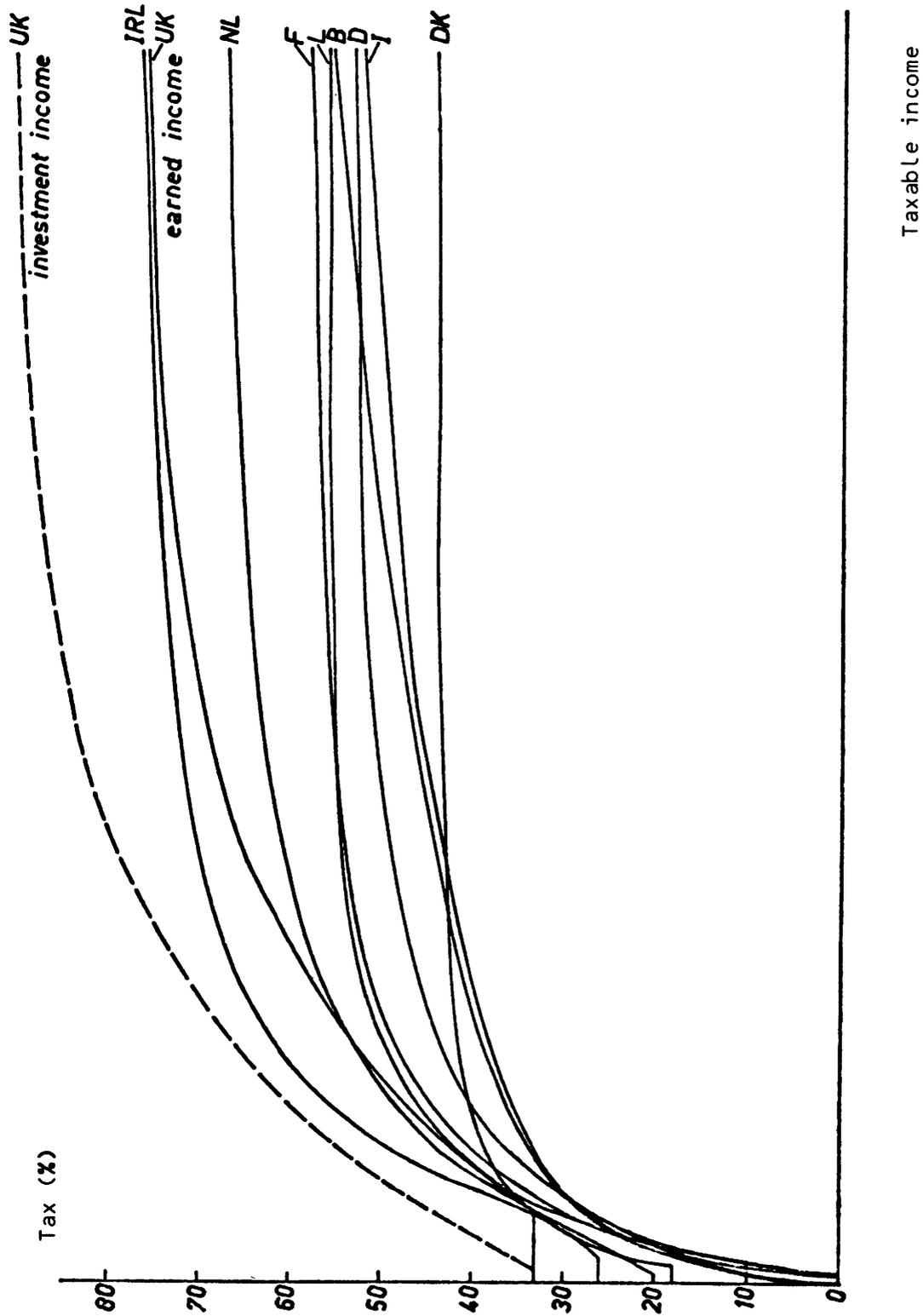


Diagram 3: Comparison of income tax scales

If the harvest exceeds the sustained yield rate following upon a catastrophe, the tax rate is reduced to one quarter, even to one eighth in exceptional cases. In Denmark, in cases of exceptional wind throw, allowance is made for the need for capital outlay by considering half of the resulting income as replacement of capital loss and therefore as not liable to income tax.

In view of the difficulty of ascertaining forestry earnings, the general provisions on the assessment of income for tax purposes must be adapted accordingly. However, it is hardly a suitable solution to the problem to exempt the income from high forest completely as is the case in the Netherlands. The disadvantage of exempting forest holdings' income from income tax is that when losses are incurred by the forest holding they cannot be set against other income, a factor which, particularly in times when the income situation is poor, further reduces the incentive to invest in forest holdings.

The system of forest income taxation applying in the United Kingdom is geared to an extreme extent to creating investment incentives. Although the United Kingdom may basically be counted as one of the countries where the income from forestry is calculated on the basis of average rates (Schedule B assessment), new and reforested properties may, however, be subjected until the next transfer of ownership, to taxation on the actual figures (Schedule D assessment). As a result, expenditure on the planting, tending and maintenance of stands may be set against other income. In view of the tax savings resulting from this, many wealthy investors have put their capital into forests, a development which is still further encouraged by the granting of afforestation and management subsidies. Although the British tax provisions may indeed be considered a useful instrument of re-forestation policy, they do however occasion a not always desirable alteration in the structure of ownership and provide a scarcely justified tax privilege, in particular in the case of investors who have a large income from sources outside forestry.

The assessment of income from forestry on the basis of average rates is another way of overcoming the profit assessment difficulty. This is the course taken in the UK (Schedule B assessment) and as a general rule in Belgium, France and Italy. It is a characteristic of average rates taxation that the tax burden on the holdings is generally less than it would be if the actual figures were taxed, as the legislator must take into consideration marginal holdings. One might therefore conclude that many owners of forests receive unjustified preferential treatment. Whether this is in fact the case depends on how accurately the average yield is estimated and whether the average rates are continuously adjusted to economic developments. But even when this is done, the question still remains whether taxation on average rates does have the effect of assessing the actual income of forest holdings in the long term.

One advantage of this type of tax assessment is that it is relatively simple and that checks can be made at little cost. The tax authorities are guaranteed an even flow of tax revenue. And it is easy for the taxpayer to make out a tax declaration. One particular deficiency of average rates assessments is however evident in the case of holdings which are being developed and from which there is little or no yield. In this case it is impossible, if there is no other income, to pay the tax out of earnings. In order that the principle of ability to pay taxes may be respected, the average rates could of course be fixed in such a way as to exempt from tax the younger stands of up to 20 or 30 years old without necessarily causing a drop in tax revenue. Where exemptions of this kind are granted at present under the system of average taxation rates (France, Italy and in connection with afforestation also in Belgium), these may be considered rather as benefits and therefore as incentives to afforest waste or fallow ground or to convert coppice or coppice-with-standards into high forest.

One should note that in principle the use of average figures for taxes or for the basis of tax assessments is not in line with modern concepts of income taxation. In the case of forestry it may however be necessary, at any rate to some extent, for purely technical reasons. The difficulties which arise in forestry in making a distinction between interest and the utilization of capital and the difficulties arising from the fact that annual proceeds may be subject to sharp fluctuations for natural reasons, but that in a very long-term production process there is a current but not immediately realizable yield in the form of increment, are certainly reasons why the income from forestry should be assessed for tax purposes on the basis of average yield figures. In addition to this there is the fact that the accounts kept by most private forest holdings are not adequate for the purposes of assessing profits, and that a sustained yield rate calculated in accordance with the principles of forest economics, which might serve to distinguish ordinary from extraordinary income, is not available. It is therefore necessary in the case of forestry to have special regard to assessments based on average rates even if this is not entirely in line with the modern income tax system.

#### Capital and wealth taxes\*

The purpose of an annual capital tax is to differentiate for tax purposes between income from capital and earned income, i.e., to tax income from capital more heavily (in the UK investment income is subject to an investment income surcharge of 15%). Considered as a supplementary income tax, capital tax should not make inroads upon the capital itself but be levied on the yield from the capital. Otherwise it would be contrary to every economic and financial objective, since by taxing the capital itself, one

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\* Translator's note: The author uses the word "Vermögensteuer" to cover two kinds of taxation of capital: the supplementary taxation of investment income (e.g. interest and rents); and the levy on capital (the wealth tax proper). Where he is referring to the first kind "Vermögensteuer" is rendered as "capital tax"; where he is referring to the levy on capital (in the second paragraph of this section) it is rendered as "wealth tax".

would be 'killing the goose which lays the golden eggs'. To avoid this, the assessment basis for the capital tax should not exceed an appropriate proportion of the actual yield.

The assessment provisions in Germany, Luxembourg, to some extent in Denmark and, so far as concerns real property for the purpose of the natural beauty law, in the Netherlands, correspond to the principle of assessment of yield. In Ireland where a wealth tax was introduced for the first time in 1975 and in the United Kingdom where it is planned to introduce one, the saleable value or market value will be retained even for forest holdings. Longer experience with the wealth tax will however probably lead here also to the creation of special assessment procedures.

Where a capital tax is intended as a special tax on investment income, it can only function as an additional tax constituting a moderate burden. From this point of view the tax rates applied in EC countries (see Diagram 4) may be considered extremely high. This is particularly the case where the tax assessment of capital is appreciably at variance with the actual yield from the capital. In such cases the capital tax law in Denmark, which is also the only EC country with a graduated scale, provides that when the taxable income is less than six per cent of the taxable capital, the capital tax is reduced on a sliding scale by up to 20%. A provision whereby capital tax is restricted to a proportion of the yield of capital is fully consistent with the character of this tax and should therefore be applied in other countries. A measure of this kind is particularly significant with regard to forestry since price and cost developments in recent years have often caused an imbalance between the yield of capital (income) and the amount of capital tax payable.

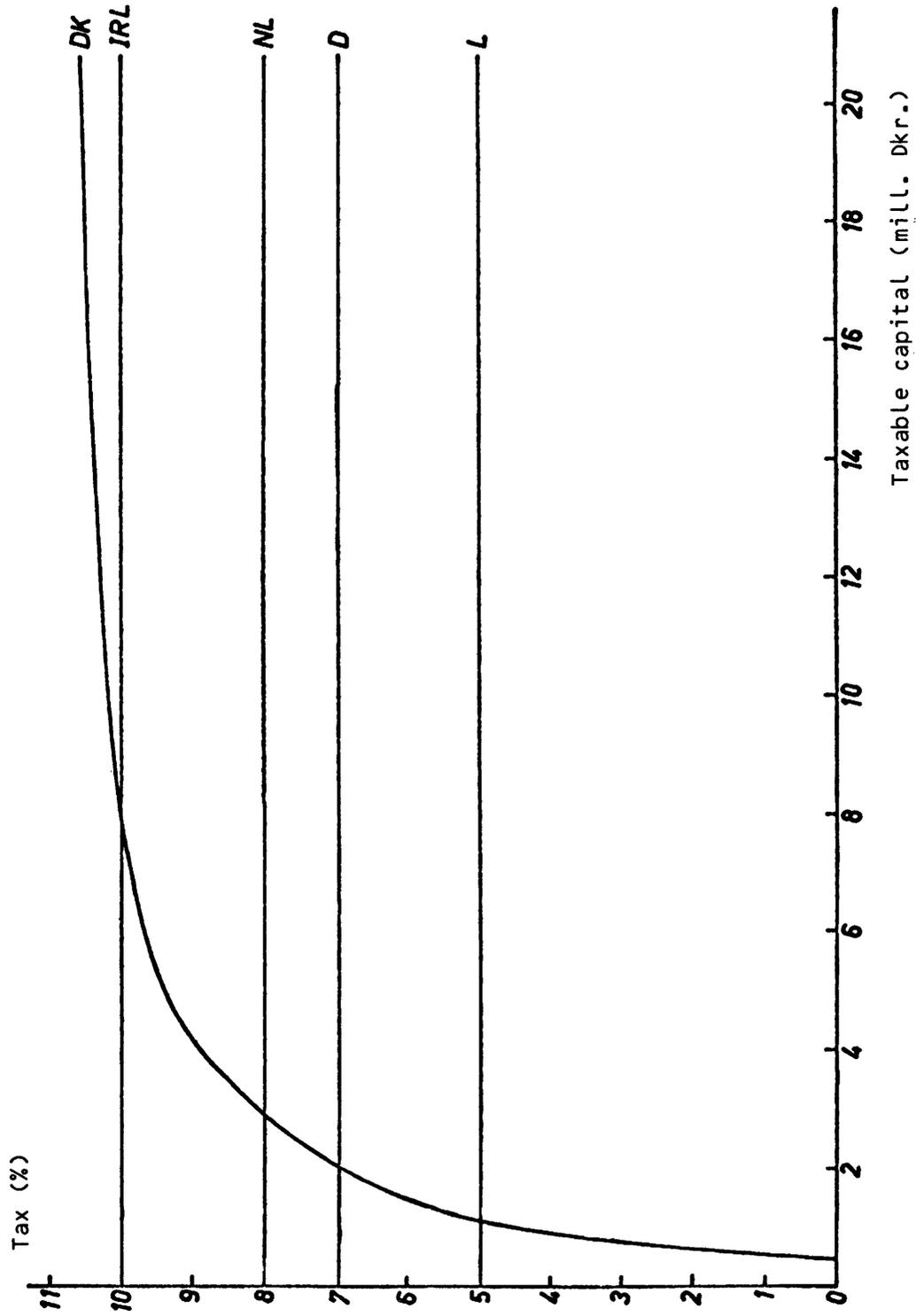


Diagram 4: Comparison of capital tax rates

### Inheritance and gift taxes

Since the forest production process lasts through several generations, inheritance and the various taxes imposed upon it deeply affect forest holdings in private ownership. A condition of sustained forest management is that a certain area should be maintained and that there should be a certain continuity of production. As history has shown, it has often been inheritances which have led to the breaking up of previously integrated forest holdings, causing uneconomic fragmentation. Apart from the laws and traditions connected with inheritance, the taxes payable when ownership is transferred are a serious danger to the continuity of private forest holdings. This applies particularly in cases where the value of the inheritance used for tax assessment purposes is based not on the income from the forest but on the saleable value of the stands. Such a procedure is at variance with the very nature of the forest since it considers the forest purely as an asset and does not take into account the fact that a forest requires continuity of production and only provides a quite modest interest.

Unlike the annual capital tax, inheritance tax is a real wealth tax i.e., tax is payable not on the yield of the property but on the property acquired itself. It is intended to tax the pecuniary gain which the heirs or beneficiaries of the gift have obtained. In the event of the heir or beneficiary continuing to manage the forest, this pecuniary gain must be seen as a value reckonable in terms of the yield from the holding; if the asset received is sold, it takes the form of a saleable value.

Account is not taken in all EC countries of the necessity for differentiated assessments of forest assets to take account of the particular characteristics of forests as well as of the purpose of inheritance tax. In Germany it is usually the capitalized-income value of agricultural and forest assets which apply and then only if the new owners sell the property inherited at a higher price.

In Belgium, Luxembourg, Ireland and Italy the assessment is based on market value. This is also true of the United Kingdom, although here it is possible in certain circumstances to defer payment of the tax in respect of the value of standing timber. In Denmark, also, it is the market value which is used, but this is determined, in the absence of comparable prices, by the indirect method of a capitalized-income valuation. In the Netherlands the saleable value of property covered by the natural beauty law is first of all converted to a capitalized-income value (determining value) and then is still further reduced, depending on whether the forest will be open to the public or not, to two-thirds or one-quarter of the "determining value". In France, also, the basis is the saleable value; there the "valeur vénale de conservation" derived from this, which may be put at about 75% of the market price, is liable to only one quarter of the tax if the owner undertakes sustained yield management of the forest for 30 years.

In Germany, and to a lesser extent in Denmark too, tax assessment bases below the market value are generally permitted for forest properties. This is done on the evident assumption, though it is not laid down anywhere, that forest holdings will continue to be maintained properly by their new owners. On the other hand in the Netherlands and in France tax assessments at below the market value are expressly conditional on sustained and proper management.

Inheritance tax rates, which are usually progressive, vary considerably in the EC countries (see Diagram 5). Whereas in Luxembourg the statutory inheritance is completely free of inheritance tax, in the case of the British Capital Transfer Tax there is no differentiation of rates according to the relationship between the testator (donor) and the beneficiary. If one takes into account the different tax categories and tax-free allowances, the property policy may be seen to be reflected particularly accurately in inheritance tax rates. In some cases inheritance tax has a confiscatory



Taxable property

Diagram 5: Comparison of inheritance tax rates (lowest tax category)

character. Where this is the case to an extent which has a damaging effect on forests, it should be the task of forest policy to show the limits which must be respected in order to maintain the social function of forests and to ensure that a conscious redistribution of property does not lead to a deterioration in the condition of forests which it would be difficult to make good.

#### Land and other real property taxes

Land and other real property taxes are among the most important sources of taxation revenue for local authorities. Some of these taxes, while they do not generally take into account the taxpayer's personal ability to pay, still observe the principle of equivalence. The theory of equivalence based on a quid pro quo by the State or other public authority no longer corresponds to today's generally recognized definition of taxes. When the legal basis for the taxation of forests was defined, the question was asked in several countries whether certain purpose-related payments to a public authority constituted a tax, or whether they had the character of a mandatory contribution or a fee. It is sometimes very difficult to draw the line between taxes, mandatory contributions and fees; however, in this study our aim has been to regard as taxation of forest holdings only those payments for which there is no corresponding quid pro quo.

So long as land and other real property taxes continue to play an important role in the tax systems of individual countries, an effort must be made to ensure that the often outdated taxation bases are adapted to the economic situation, i.e. to the yield of the forest economy. In view of the fact that when they exceed certain levels these taxes on property have a very adverse effect on forestry, it is one of the tasks of forest policy to ensure that estimates of yield are realistic and comparable with those applying to other types of holding; one must also ensure that the freedom of communes to determine rates of taxation does not unduly distort competition and that

such taxes are reduced and incorporated into the income tax system, which takes ability to pay into account, in cases where they lay too great a burden on forests.

#### Turnover taxes

As regards turnover taxes, a uniform system of value added tax, with deduction of input tax, is applied in the Member States based on various EC Directives. In spite of the harmonization of this tax system there are nevertheless considerable differences (see Table 18) in the definition of the tax base, in the tax rates charged and in the special provisions applying to agriculture and forestry.

In Denmark there are no special provisions for timber and forest products of for forest holdings. Value added tax is applied strictly to these categories in a manner which does not distort competition. In view of the large number of taxable persons often with a small turnover from agriculture or forestry, a flat-rate system is considered appropriate both to relieve the taxable person of the obligation of keeping records and to simplify administration. In Germany, Italy, Luxembourg and Ireland the input tax is offset against the taxable person's tax receipts at flat rates. This has no distorting effect on competition since the rates of tax on forest products are fixed in such a way that the resulting tax receipts match the input tax borne by the holdings. The tax rate or offsetting percentage in Italy is 6%, in Germany 4%, in Luxembourg 2% and in Ireland 1%. In Belgium and France the same effect is achieved, since in Belgium the forest owner receives from the purchaser 2% of the sales price to cover input tax and in France forest owners who are not subject to value added tax receive from the State a lump sum refund of 2.4 % of their sales of standing timber. The special rules in the Netherlands regard forest holdings as not subject to value added tax, and they therefore do not show value added tax in their invoices. Whether they recover their input tax through the price therefore depends on the

Table 18: Rates of value added tax in the EC countries (in %) (November 1976)

	B	DK	D	F	GB	IRL	I	L	NL
Standard rate	18	15	11	20	8	19.50	12	10	16
Reduced rate	6		5.5	7.5		6.75	3 or 6	2 or 5	4
Intermediate rate	14			17.6		11.11	18		
Higher rate	25			33.33	(12.5)	36.75	30 or 35		

Country	Rate of tax	Examples of forest and timber products
B	18%	Posts and poles for fencing off wild game.
	6%	Standing timber, rough timber, firewood.
D	11%	Sawmill products, unless produced by part-time forest holdings.
	5.5%	Rough timber, unless supplied by a forest holding which is taxed at flat rates.
F	17.6%	Felled rough timber, sawn timber and other processed timber products.
	7.5%	Standing timber.
GB	8%	Rough timber (not including firewood), sawmill products.
	0%	Firewood, charcoal.
IRL	19.5%	Processed timber.
	6.75%	Rough timber.
I	12%	Sawn timber.
	6%	Rough timber.
L	10%	Sawmill products.
	5%	Rough timber, unless supplied by a forest holding taxed at flat rates.
NL	18%	Processed timber.
	4%	Rough timber.

Flat rates for offsetting input tax applicable to forest holdings

B	DK	D	F	GB	IRL	I	L	NL
2%	-	4%	3.1%	-	1%	6%	2%	(4.5%)

Level of the price. In any case the customer can deduct 4/125ths of the amount of the bill as input tax. Here it is extremely doubtful whether there is no distorting effect on competition as regards forestry. In the United Kingdom, also, a forest owner who is not registered for value added tax has to bear the burden of input tax.

The flat rate for offsetting input tax should be so gauged that the holdings are not led to opt for taxation under the normal scheme. On the other hand it should be noted that if the flat rate is pitched too high, holdings would benefit from wider profit margins, against which objections may be raised as the turnover tax would no longer be such as not to distort competition.

Transfers of real property are exempted from value added tax in all countries of the European Community, since a special tax is payable on these. The tax rates applying to such land transfers of other real property transactions or, as the case may be, the rates of registration taxes vary over a relatively wide range. In some countries the tax rate is reduced if the new owner commits himself to proper management of the forest (e.g., France), or full relief is granted if an exchange of property takes place with a view to the more efficient management of fragmented or uneconomic properties and this exchange is recognized as useful by the responsible authorities (e.g., Germany). Tax relief of this kind is specially indicated where the policy is to ensure good forest management by improving the structure of ownership.

## 5.2 The incidence of taxation compared

National tax statistics do not show the tax revenue from forestry separately. To estimate the differences in the tax burden on forest holdings in the EC countries and the effects on them of the various types of tax, we must first calculate the amount of tax payable by individual holdings. It is not, however, possible, to examine all the multiplicity of different cases which occur in the taxation of private forest holdings, such as may be due to the family circumstances of the taxpayer or to variations in income and capital. Therefore an attempt is made to illustrate the incidence of taxation using model holdings (normal broadleaf and conifer forest holdings) and by posing two different questions :

1. What would be the incidence of tax on model forest holdings in each country assuming an identical yield and cost situation ?  
(Model type A)
2. What would be the incidence of tax on model forest holdings assuming that their yield and their price and cost situation correspond to the average for the country in question? (Model type B)

The bases of assessment used in calculating income taxes, capital taxes, land and other real property taxes and inheritance and gift tax are given in detail in Volume V of this study (1). Value added tax is not included in the comparison of taxation as in all countries it is possible to opt for a procedure which makes value added tax merely a self-balancing item in the holding's accounts.

In assessing the incidence of tax on private forest holdings the assumption was made that the taxable person is married and has two dependent children; the holding is assumed to be free of debt.

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(1) The rates of tax and tax provisions, and the income and cost situation for 1975 or, where these are lacking, for 1974 have been used as a basis.

In calculating inheritance tax it is assumed that the forest holding is transferred in its entirety to one heir (a descendant aged 40) without conditions and that the inheritance tax is payable once per generation (30 years). In order to show the progressivity of tax and the various tax allowances and tax-free limits several model forest holdings of varying sizes were used.

The comparison of the tax incidence which has been made on the basis of these model forest holdings ought really to be supplemented by a comparison of parafiscal charges, in particular those for social security, as only in this way can a really comparable basis be obtained in respect of the State aid described in the study. However, in connection with this study it was not possible to take parafiscal charges into account.

The absolute amounts of tax payable by the model forest holdings in the form of income, capital, land and other real property taxes, as well as the annual proportion of inheritance and gift tax, is calculated per hectare of forest area and then measured against a turnover figure (yield in  $m^3$  per hectare multiplied by the price of standing timber per  $m^3$ ). The resulting tax incidence ratios (tax incidence per ha as percentage of yield per ha net of harvesting costs) are shown in Diagrams 6,7,8 and 9 for different size of holding.

In Germany, Denmark and Luxembourg, it is the actual income from forestry which is the basis for taxation. In the case of small, low-income model holdings producing conifers, the very low rates of tax and the tax allowances and deductions have a considerable effect. In Germany this situation is obscured by the tax-equalization property levy. If this levy were not payable, Germany would be one of the countries where forest holdings are at the least taxed, the reason being that real property, capital and inheritance taxes are assessed on yields. In the Netherlands the only model used was that of forest holdings which are properties within the meaning of the natural beauty law but which are not open to the public.

On this assumption the incidence of tax on forest holdings in the Netherlands is moderate. The polder levy is, however, of particular importance especially for small holdings as it takes no account of the size of holdings. Without the polder levy, whose fiscal character is somewhat doubtful, the tax incidence would drop considerably. In the United Kingdom the liability to tax consists entirely, and in Belgium almost entirely, of inheritance tax and in both countries the rates begin to be progressive from a relatively early point. In Italy, too, the taxes and dues payable on transfer of ownership are dominant. The inheritance tax rates are so devised as to tax small holdings more lightly, and there are income tax reliefs in respect of dependants. France is one of the countries with the lightest tax on forest holdings, due partly to the fact that income is taxed on average rates and partly to the fact that the assessment basis for inheritance tax is low.

It was assumed for type A of the model broadleaf holdings that no net yield (before taxes) was obtained. On this basis the countries which tax actual income had the lowest tax figures for large holdings. For the average model broadleaf holding in Germany (model type B) a loss was assumed. In Luxembourg and Denmark a profit was assumed. For this reason Luxembourg especially comes out as one of the most heavily taxed countries for large holdings. France is one of the countries where the incidence of tax is light because of the high proportion of coppice-with-standards and coppice. In all countries where income tax on forestry is relatively light it is the broadleaf holdings which bear the most tax. This applies particularly to Belgium where the high taxation ratio is due to inheritance tax. It also applies to the Netherlands, Italy and United Kingdom. In the latter case it was assumed that inheritance tax on standing timber was deferred; otherwise the United Kingdom would be at the top of the list.

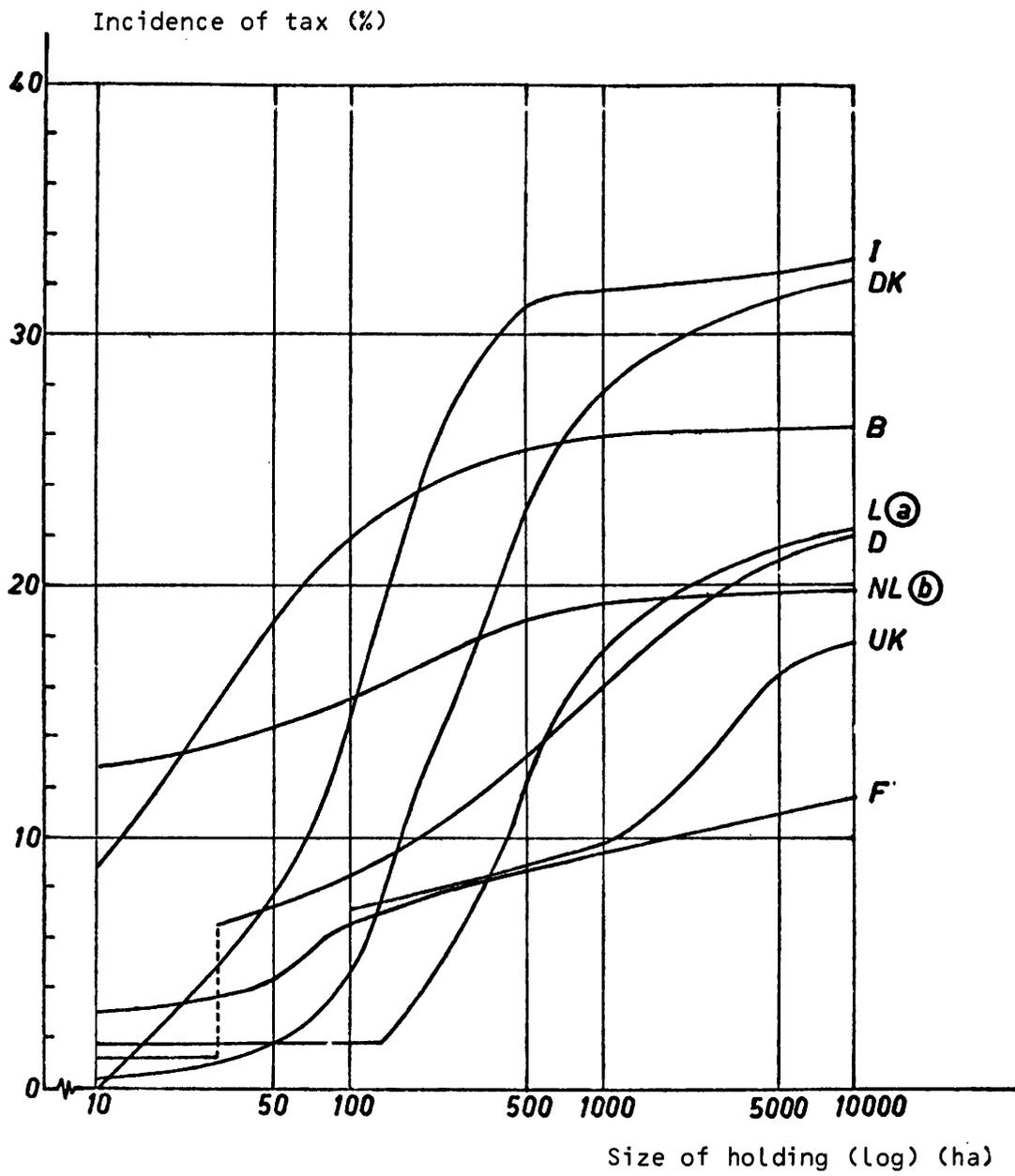


Diagram 6: Incidence of tax on private forest holdings :  
Conifers - model A

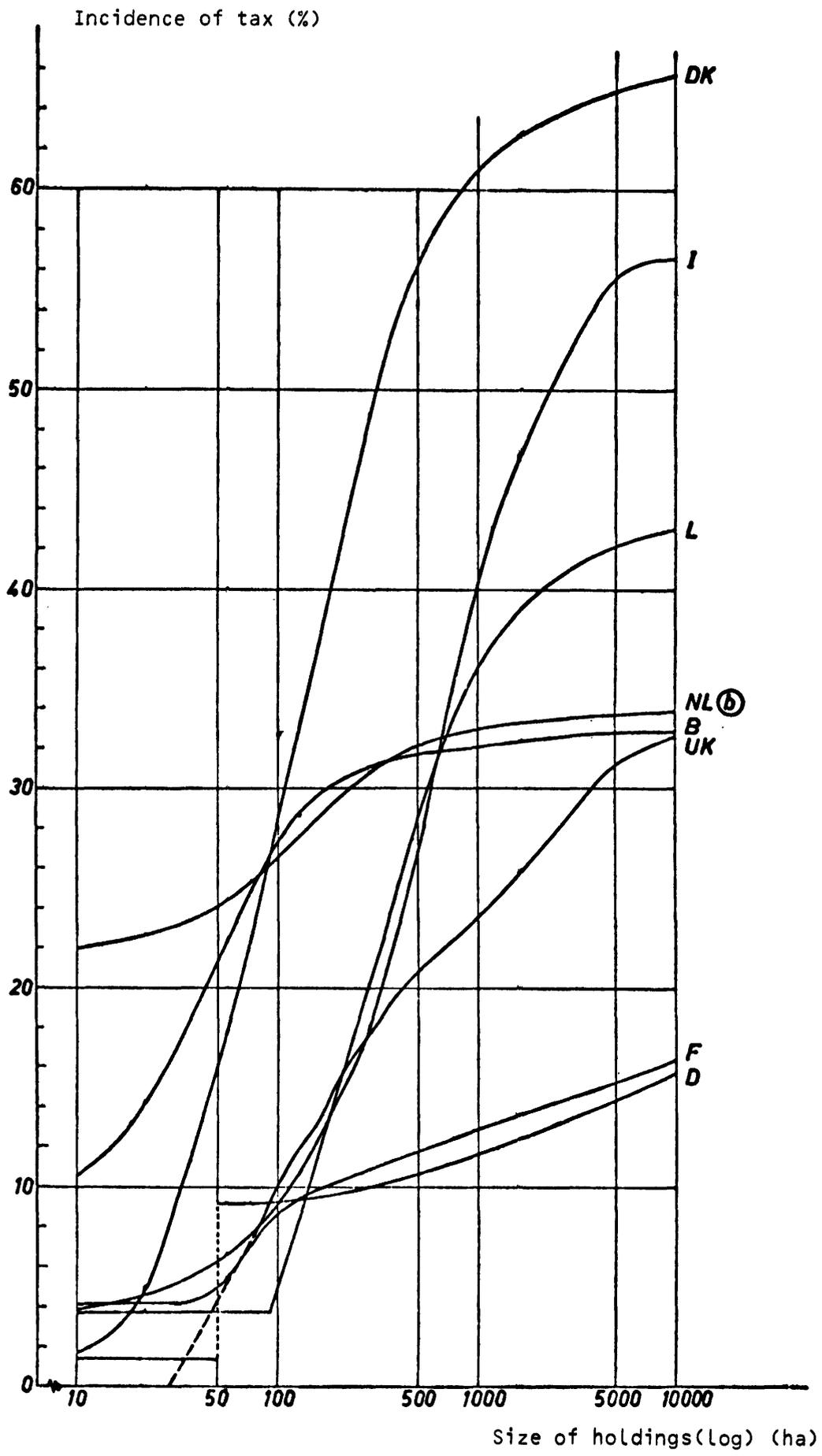


Diagram 7: Incidence of tax on private forest holdings :  
Conifers - model B

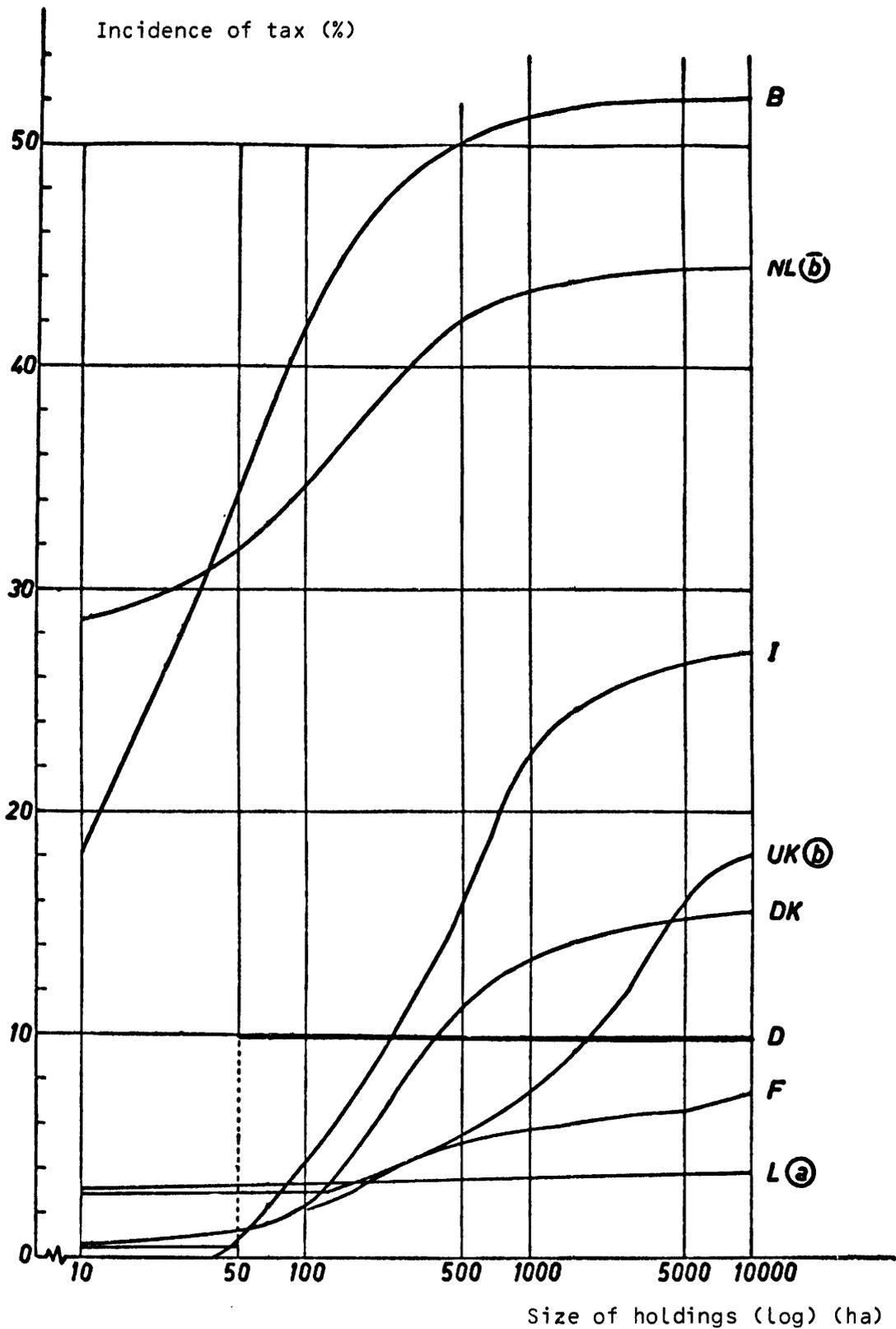


Diagram 8: Incidence of tax on private forest holdings :  
Broadleaf - model A

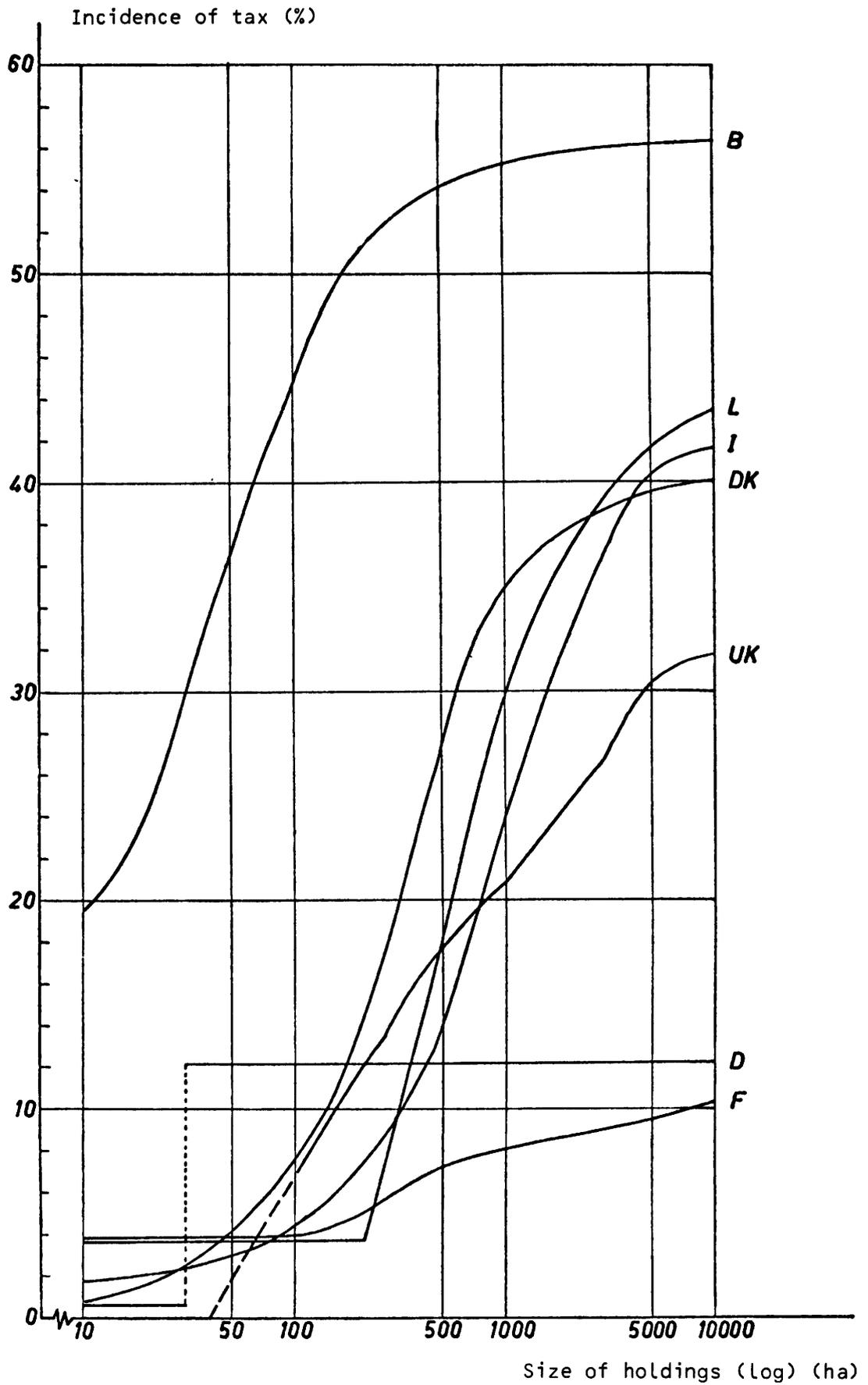


Diagram 9: Incidence of tax on private forest holdings :  
Broadleaf - model B

In the calculations made here the impact of inheritance tax is in fact offset by the amounts deducted under Schedule D taxation.

In an actual forest holding in Germany, Denmark and Luxembourg the incidence of tax depends primarily on the actual income received. Any losses on broadleaved forest can be offset against profits on conifers or other income. In Belgium, Italy and the United Kingdom the liability relates mainly to inheritance tax; there is only a loose connection with the yield situation. In France also, inheritance tax plays an important role, but it is usually kept within tolerable limits. For smaller holdings land taxes and the like are of great importance. In the Netherlands the incidence of tax depends on whether the forest holding is classified as a property within the meaning of the natural beauty law or not. If it is not, the tax burden is relatively heavy. A considerable reduction can be obtained by opening up the property to the public.

The incidence of tax on private individually-owned forest holdings varies considerably as between ECC Member States. Setting aside the structural differences in forest holdings, which we have tried to exclude in the model analysis, these differences are due primarily to the following :

1. differences in systems, i.e. differences in the tax mix or in the weight given to similar principal taxes;
2. differences in tax assessment bases: actual or average income as a basis for income or yield tax, market value or capitalized-income value as a basis for taxes assessed on assets or the like;
3. Differences in the structure of tax scales, in the progressivity of tax and in the special scales for forestry;
4. differences in tax exemptions, tax-free limits and tax-free allowances, in the deductibility or otherwise of certain expenditure and in the special rules in this respect for forestry.

5. differences in the attitude to the taxation of forest owners and in the strictness of the tax authorities in imposing and collecting taxes (not reflected in the comparison of tax incidence).

The tax systems of the EC countries contain a number of provisions which may be considered as concessions to forestry, indeed to some extent as indirect subsidies to forest holdings. Exceptions to the tax rules are sometimes part of the system, sometimes they may be considered as concessions or measures to achieve specific forest policy aims. Whether this constitutes an indirect subsidy must be judged not only in relation to the position of other taxable persons in the country in question but also in relation to the taxation of forest holdings in other EC countries.

The special provisions on taxation of income from forests in Germany, Luxembourg and Denmark may be considered as normal adjustments of the tax provisions to the peculiarities of forestry. The exemption in the Netherlands of income from high forests is doubtless a concession as is the opportunity given in the British income tax system of choosing between Schedule D and Schedule B assessments. The exemption measure in the Netherlands, on the contrary, can only be considered as subsidy where the forest holding yields taxable income; if the holding makes a loss the exemption provision becomes a distinct disadvantage since the forest owner cannot then offset the loss against other income. In Britain the right to choose between Schedule D and Schedule B can only be considered an indirect subsidy if the forest owner can offset his losses from forestry under Schedule D taxation against other income.

Taxation on the basis of average figures does normally constitute a concession in some degree, varying according to how much below the average net yield obtainable the cadastral values, and the like, have been fixed.

Tax exemptions granted in individual cases for reforestation and conversion of forest can only be seen as concessions under the system of taxing averages if this situation was not taken into consideration when the cadastral values were fixed. As this is not normally the case, measures to encourage reforestation or forest improvement can be considered as an indirect subsidy which does not, however, have any quantifiable effect on competition.

A much lower tax incidence than that based on the market value results from assessing forest assets according to yield, but this cannot be considered as either a concession or a subsidy to forestry. It is a valuation rule stemming from the purpose of capital taxes or inheritance taxes and from the nature of the taxable object, and it merely serves to provide a certain equality of treatment with other income-producing assets. According to these premisses, which it must be stressed are vital for the continuance of forestry, all other provisions which lead to a reduction in the market value must be considered as normal adjustments to forestry conditions so long as they do not lead to bases of assessment which are below the capitalized-income value. As there are obviously considerable differences between the market value and the capitalized-income value calculated at an average rate for long-term bonds or loans, even the reductions provided in the Netherlands under the natural beauty law and the reduction in France of the "valeur venale de conservation" to one quarter cannot usually be considered as subsidies.

If one follows this argument through, it is extremely difficult, in comparing the incidence of taxation, to classify a tax measure benefiting forestry as an indirect subsidy merely because it does not exist in other countries in the same form or to the same extent. Even if a measure of this kind may be considered an indirect subsidy in relation to the position of other taxpayers in the same country, such a proposition cannot be maintained in relation to the taxation of forestry in other countries.

So long as no indirect subsidies for forestry are to be found in the German system of taxing forests, one cannot, in view of the fact that the incidence of taxation on forest holdings in Germany is relatively low because of their yield situation, describe certain tax concessions in other countries with the same or similar yield situation as indirect subsidies affecting competition. Apart from the fact that their effect on competition on the European timber market cannot be clearly proved, it would be contrary to the spirit of the Treaties of Rome if one were not to see individual State measures relating to direct taxation as in large measure connected with the total incidence on taxpayers in one branch of industry. The differences in the incidence of taxation resulting from varying bases of valuation (market value - capitalized-income value) are much more important than the individual tax measures to aid or relieve forestry. The tax concessions to forestry which are considered as indirect subsidies could be abolished at no disadvantage to the forest holdings if the countries in question would follow the proposals for a more appropriate forest taxation system which emerge from this analysis.

### 5.3 Conclusions and recommendations

The predominant aim of forest policy in all Member States of the European Community is not only to conserve the natural resources of forests in the interests of a healthy environment, but also where possible to improve them. If one assumes that this aim is to be achieved without any planned alteration in the ownership structure, taxation must be made to serve as a major instrument of forest policy to enable private forest owners to make an economically optimal contribution with their forest holdings towards the supply of raw materials and the protection of the environment by developing sound and productive forests.

The foregoing analysis of forest taxation systems and the incidence of taxation shows that a system of taxation which serves appropriate forest policy aims and takes into account the nature of the forest, and at the same time reduces tax-conditioned distortions of competition between the Member States, must fulfil a number of conditions :

1. The net asset value of the forest must be used as the standard basis of assessment for capital tax and inheritance tax and also sometimes for land and other real property taxes. If this net asset value is calculated as a market value, it is generally greatly at variance with the capitalized-income value, with the result that the sustained management of the forest is endangered.

It is therefore recommended that the valuation of forest assets for tax purposes be based on the capitalized-income value in the interests of conserving and developing well-maintained forests and of safeguarding their environmental functions.

2. The taxation of capital as an addition to income tax is justified only if the capital itself is not taxed, in other words if the capital tax can be paid out of the earnings from the capital. The conditions for this are a suitable rate of tax and the income-related valuation of assets advocated under point 1. Otherwise the tax would lead to the breaking up of properties or to bad husbandry, neither of which is in the public interest.

If a capital tax is considered to be an essential part of the tax system, the capitalized-income value calculated at an interest rate appropriate for long-term investments must form the basis for it. Following Denmark's example there should be a definite relationship between taxable income and taxable assets, i.e., between income tax and capital tax.

It is therefore recommended that the capitalized-income value be used as a basis for the assessment of capital tax and that this should always be reduced if the taxable income is less than a certain percentage of the taxable capital - a maximum of about 6%.

3. The tax burden on private forest holdings through inheritance tax should not be such as to cause a breakdown of the principles of sustained forest management or to lead to an agronomically unjustifiable fragmentation of properties. Inheritance tax cannot be considered a suitable means of land reform or redistribution of property on account of its serious repercussions on the state of the forest.

On top of a capital tax, the only object of an inheritance tax in the form of a succession or gift tax can be to tax the pecuniary gain obtained by the beneficiary. For forest holdings under sustained management it is the capitalized-income value alone which must be used as the basis of assessment for inheritance tax as the pecuniary gain consists only in the yield of the forest holding. If a forest property is sold by the inheritors or if its intrinsic value is much modified by actions inimical to its sustained management, the pecuniary gain consists in its market value or in the sum for which it is sold. Only in these cases is it right to use the market value as the basis for taxation.

It is therefore recommended that the capitalized-income value be used as a basis for assessment of inheritance tax if the beneficiary (recipient) pursues the sustained management of the forest and that there should be a scale graduated according to the relationship between the testator (donor) and the beneficiary.

4. Nor should there be any taxation of capital gain in respect of land in the event of transfers of property without valuable consideration, if this capital gain is not realized by selling forest areas. Forest management should not suffer an additional tax burden on account of an increase in land prices which is unrelated to an increase in forestry yields.

This principle also applies to a development land levy which is a useful instrument of land policy only where the increase in the land value is realized through sale.

It is therefore recommended that when forest land has been inherited or received as a gift and sustained forest management is continued, there should be no tax on increased land values and as a general rule no development land levy.

5. Land and other real property taxes which are normally allotted to the local authorities are based either on the average annual yield (cadastral value, current value) or on a basis of assessment derived from the net asset value. No matter which measurement is used it should be related to recent yield figures in respect of forest holdings. As local authorities generally have the power to fix their own rates there is a danger of a very high and, above all, a very uneven tax burden on forest holdings. This danger must be met either by placing an upper limit on tax rates or by reducing the tax assessment basis by an amount corresponding to the excessive burden.

Yield taxes are not consistent with the principle of taxation according to the ability to pay. This defect should be remedied by linking these taxes in some way with income tax.

It is therefore recommended that land and other real property taxes which are not in line with the principles of modern taxation, in particular the principle of the ability to pay, should be gradually phased out or be linked with income tax in some way. Charging contributions towards costs or fees under the "user pays" principle could offset some of the tax loss suffered by local authorities.

6. Various methods can be employed to ascertain the income from forestry for purposes of income tax. One of these is the use of average rates or average yields which only very seldom correspond to the actual yield situation of the forest holding. In forests with mainly young stands it is extremely difficult for forest holdings which have no other sources of income to pay the tax without dipping into capital.

It is therefore recommended that these average rates should be continuously adjusted to changes in the actual yield situation. Average yields should therefore be so calculated that younger stands are exempted from taxation on the ability-to-pay principle (without any reduction in tax revenue for the tax authorities).

7. Total exemption of forestry from income tax to avoid the problem of assessing income would not be a satisfactory solution since losses incurred by the forest holding could not then be offset against other income.

It is therefore recommended that the income from forest holdings be accurately assessed and be included in the total income of the owner; income arising from exceptional harvesting and from harvesting following catastrophes should for the purposes of income tax be governed by a rule which takes into account replacement of capital loss; in addition, depreciation policy should provide investment incentives in line with forest policy on the most uniform principles possible.

8. In view of the large number of small forest holdings it would make for ease of administration if the rate of value-added tax on forest products were fixed at the same level as the input tax. However, there must be a continuous check on the input tax to ensure no distortion of competition.

In view of the abolition of customs frontiers between Member States the varying tax rates must be aligned.

It is therefore recommended that, in addition to bringing about a greater degree of uniformity in value-added-tax systems, the general rates of the tax should be progressively aligned and that the input tax on forest holdings should be so fixed as to avoid distortion of competition.

The EC Treaty itself provides only a modest basis for the harmonization of tax regulations. The first step has already been taken in respect of indirect taxes. A reduction in the differences in taxes among Member States of the Community which goes beyond the standardization of indirect taxes would be desirable in the interests of the common market but could not be realized by regulations in the present legal situation. Any proposals aimed at bringing about a uniform tax system are merely utopian. They disregard the fact "that the historical, psychological and political conditions for a tax standardization process in Europe simply do not exist" (Institut Finanzen und Steuern: European Economic Community and Tax Policy, Bonn 1957). Today that applies almost to the same degree as at the time when the European Community was founded. Nevertheless, in the intervening years there has been a partial approximation of tax systems in many fields which will not be without significance in connection with further attempts at harmonization.

Although forest conditions vary as between Member States, and forest management is at varying stages of development, with the result that forest policy is reflected in widely differing regulations, it does seem possible that there could be some agreement on certain generalities without directly infringing the tax or financial sovereignty of individual States.

In this study no information could be given on the effects which implementation of the proposals for a more appropriate forest taxation system, such as the general introduction of forest valuations based on yield, would have on the tax revenue of individual Member States. Member States of the EC

can only be expected to take up and in due course implement the proposals put forward for a more appropriate system of forest taxation if they are backed up by reliable statistics. Implementation of these proposals would not only improve the conditions for a more productive forest economy in line with the general interest, but would also be a further step towards the alignment of forest taxation systems and the elimination of differences in the incidence of taxation within the European Community.

The incidence of taxation on private forest holdings depends on the content of tax law in a Member State at a given time and this is influenced by short-term economic considerations. Comparisons of the tax incidence on forest holdings should be extended over a longer reference period so that current developments in tax laws may be taken into account. The method chosen in this study of a micro-economic comparison using model holdings offers a suitable basis for this work. In gathering this information a point to follow would be to what extent taxes take into account the increasing claims made on forests for public purposes.

A comparison of the incidence of taxation on forest holdings among Member States can only provide an incomplete picture of the total financial burden. To assess this the basis must be broadened to include a comparison of para-fiscal charges, in particular those relating to social security. The incidence of social charges on forest holdings is connected with wage costs and other labour costs of a social nature, which vary considerably from one Member State to another.

In conclusion it is therefore recommended that the European Communities propose to the Member States :

1. to arrange for their competent authorities to estimate the effect of the proposed tax principles on national tax revenue;
2. to arrange for comparisons of the incidence of taxation to be made using model forest holdings over a longer reference period so as to take into account tax law developments and to find out to what extent taxes take into account the increasing claims made on forests for public purposes;
3. to supplement the tax comparison by appropriate studies on the burden of forest holdings in Member States arising from parafiscal charges and in particular those relating to social security.



# Information on Agriculture

		Date	Languages
No. 1	Credit to agriculture I. France, Belgium, G.D. Luxembourg	February 1976	F
No. 2	Credit to agriculture II. Federal Republic of Germany	February 1976	D
No. 3	Credit to agriculture III. Italy	February 1976	F I
No. 4	Credit to agriculture IV. The Netherlands	February 1976	E N
No. 5	Map of the duration of the vegetation period in the Member States of the Community	March 1976	F D
No. 6	Models for analysis mixed crop and cattle farms Basic techno-economic data: Schwäbisch-bayerisches Hügelland (Federal Republic of Germany)	March 1976	D
No. 7	Models for analysis mixed crop and cattle farms Basic techno-economic data: South-East Leinster (Ireland), West Cambridgeshire (United Kingdom), Fünen (Denmark)	March 1976	E
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No. 16	Methods for the detection of the viruses of certain diseases in animals and animal products	August 1976	E
No. 17	Veterinary Vaccines -- A comparative analysis of regulations in the Member States for three major diseases	August 1976	E

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		Date	Languages
No. 18	The foreseeable trend in world availabilities of agricultural products and the consequences for the Community I. Wheat, feed grain, sugar — Summary	August 1976	D F(1)
No. 19	The foreseeable trend in world availabilities of agricultural products and the consequences for the Community II. Beef, sheepmeat, milk products	September 1976	D F(1)
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