

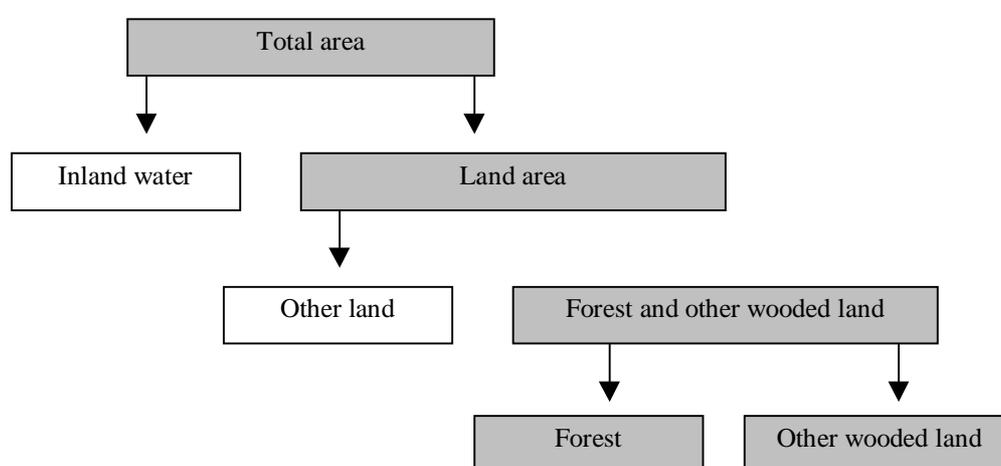
CHAPTER I: AREA OF FOREST AND OTHER WOODED LAND: STATUS AND CHANGES¹

Overview

Main Tables 1 to 8, which are included in this chapter, provide general information on the area of forest and other wooded land in the fifty-five countries covered by the Temperate and Boreal Forest Resources Assessment 2000 (TBFRA-2000). They contain the data sent by countries in response to *Enquiry Tables 1,3,4* and *7* of the TBFRA-2000 enquiry (see Appendix II), and set out the information describing the extent and basic nature of forest resources and changes to them over time. Such elements as the area of forest and other wooded land, species distribution, availability and non-availability of forest for wood supply and silvicultural systems are relevant for the assessment of the resource's biological diversity, its ability to supply wood and to sequester carbon, its vulnerability to certain forms of damage and its ability to perform certain social, protection and other environmental functions. These questions are treated in greater depth in later parts of the assessment.

Main Table 1 takes the total area of countries and sub-divides it into the area of land and inland water. The land area is then sub-divided into the area of forest and other wooded land and other land, the latter consisting of agricultural land, built-on land and other, although these are not separated out in the present assessment. The hierarchical structure of Main Table 1 is shown below (Diagram 1.1):

DIAGRAM 1.1



This table provides the basic information around which the rest of the assessment is built, and accordingly it is very important that the data on these parameters are as comprehensive and comparable as possible. Particular efforts were made, therefore, in drawing up the enquiry for TBFRA-2000, to ensure that the definitions for 'forest' and 'other wooded land' (Appendix I, items 15 and 47) could be applied by all countries, both tropical and temperate and boreal.

In the event, this proved not to be easy. Firstly, it involved changing a key element in the definition used for temperate and boreal countries in previous assessments in order to bring it into line with that used for tropical countries: the minimum tree crown cover for forest was reduced from 20 per cent to 10 per cent. Countries whose national

¹ This chapter was prepared by Mr. Tim Peck (see Appendix V).

inventories were not based on a minimum crown cover of 10 per cent were invited to make the necessary adjustment to the data they reported accompanied by an explanation of how this was done. Most countries complied with this. Switzerland's data, however, are based on the basis of 20 per cent crown cover and Japan's on 30 per cent. Norway indicated that in its National Forest Inventory it makes the distinction between forest and other wooded land on the basis of site productivity and not crown cover, and a number of other countries are reported to do the same, although in the case of Norway the data were recalculated for use in TBFRA-2000 to take account of forest cover. For the purpose of responding to the TBFRA enquiry, the United States defined forest land as consisting of all 'timberland' and 'reserved forest land'. Timberland is defined as forest land capable of producing 1.4 m³/ha/year (productive forest land) and not withdrawn by statute or administrative regulation, while reserved forest land is generally productive but withdrawn from wood supply by administrative regulation. According to the US Forest Service, forest land is defined as "Land at least 10 per cent stocked by forest trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested lands that are at least 10 percent stocked with forest trees and forested areas adjacent to urban or built-up lands. Also included are pinyon juniper and chaparral areas in the West and afforested areas". Australia counted areas with more than 20 per cent crown cover and with trees of a minimum height of 2 m (compared with 5 m in the TBFRA-2000 definition) as forest. This greatly increased the area of its forest compared with previous assessments.

For the purpose of responding to the TBFRA enquiry, the United States defined other wooded land as unproductive forest land not capable of producing 1.4 m³/ha/year (non-productive forest land). In its own classification it does not distinguish other wooded land *per se*; it is a sub-set of forest land. The situation is similar in Canada, except that it does not quantify the lower limit of productivity. Austria allocated its high altitude dwarf pine areas to other wooded land. Several other countries reported that they either made no distinction between forest and other wooded land or that the areas of the latter were insignificant (Czech Republic, Germany, Hungary, Ireland, Netherlands, Poland). New Zealand included abandoned agricultural land in the process of natural recolonization in other wooded land. Australia's data set for other wooded land was derived by using a coarse national vegetation data set at 5 million scale to select tall and low shrubs and tall, medium and low trees. The result was to class as much as 422 million ha under other wooded land or 55 per cent of Australia's total land area.

The situation as described above illustrates the complexity involved in trying to achieve absolute harmonization at the international level of even the key parameters. It is understandable that countries want to keep their existing national time series based on their own definitions, which may differ from the internationally agreed ones. Nevertheless, thanks to the great efforts of the national TBFRA-2000 correspondents, a considerable degree of harmonization and consistency has been achieved. Deviations from the TBFRA-2000 definitions are mostly considered to fall within or close to the range of error and therefore not to affect the quality of the overall results given in Main Table 1.

Area of forest and other wooded land

The total area of forest and other wooded land in the late 1990s in the fifty-five countries covered by the TBFRA-2000 amounted to 2,478 million ha, of which 1,682 million (68 per cent) were classified as forest and 795 million (32 per cent) as other wooded land. The area of forest in these countries accounted for about half of the world total, which was reported by FAO in its State of World Forestry 1999 as being 3,454 million ha. It is not possible to assess precisely their share of the global area of forest and other wooded land, because of difficulties in collecting data on other wooded land in some tropical countries and uncertainties with regard to the consistency with which the internationally agreed definition of other wooded land was applied by some countries in both the tropical and temperate and boreal regions.

The distribution of forest and other wooded land (FOWL) by country and region is quite different from that of population (Figure 1.1). Thus Europe is the most populated of the four regions presented in the tables (Europe, the Commonwealth of Independent States [CIS], North America, and Australia, Japan and New Zealand, shown in these figures and elsewhere as "Other TBFRA") with 44 per cent of the total for the TBFRA countries of 1.32 billion people, but less than 9 per cent of the area of forest and other wooded land. The CIS has 21 per cent of the population and 38 per cent of the forest and other wooded land.

The CIS countries account for over half of the total area of forest in the TBFRA area with 856 million ha and North America for over one quarter with 462 million ha (Figure 1.2). The distribution of other wooded land (OWL) is quite different: "Other TBFRA" countries account for over half the total area of 795 million ha, with Australia alone having an area of 422 million ha. North America has an area of OWL of 254 million ha or nearly one third of the TBFRA area total. Europe's share of forest is 10 per cent and of OWL 5 per cent.

FIGURE 1.1

Distribution of population (1.32 billion) and of forest and other wooded land (2.48 billion ha) in the regions of the TBFRA

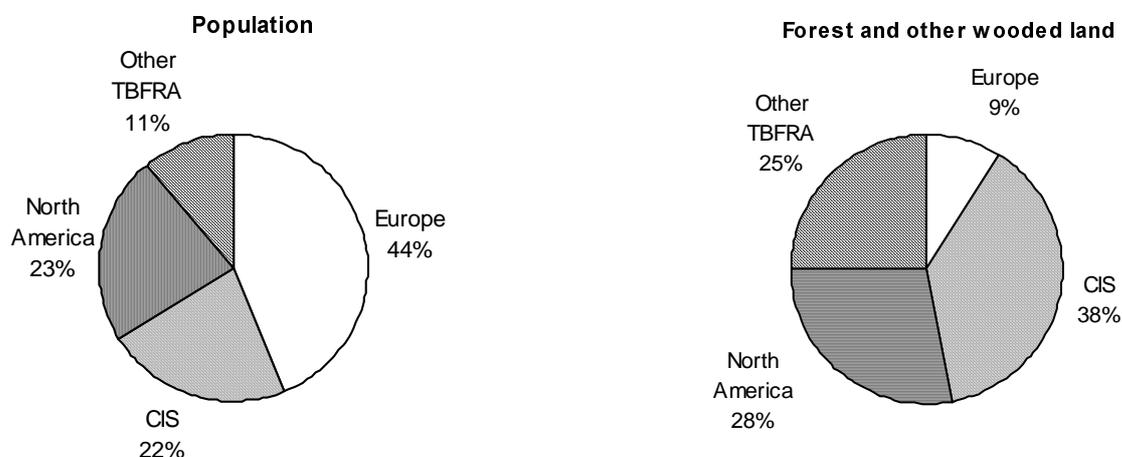
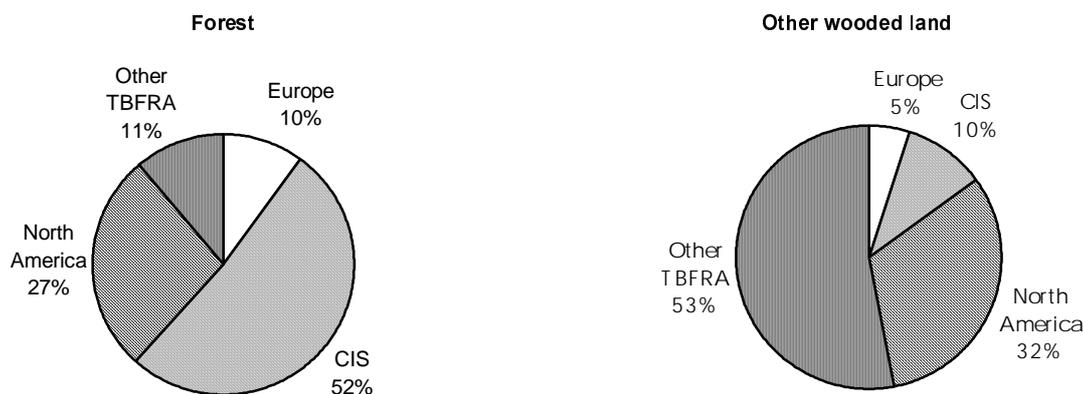


FIGURE 1.2

Distribution of forest and of other wooded land in the TBFRA area by regional groups



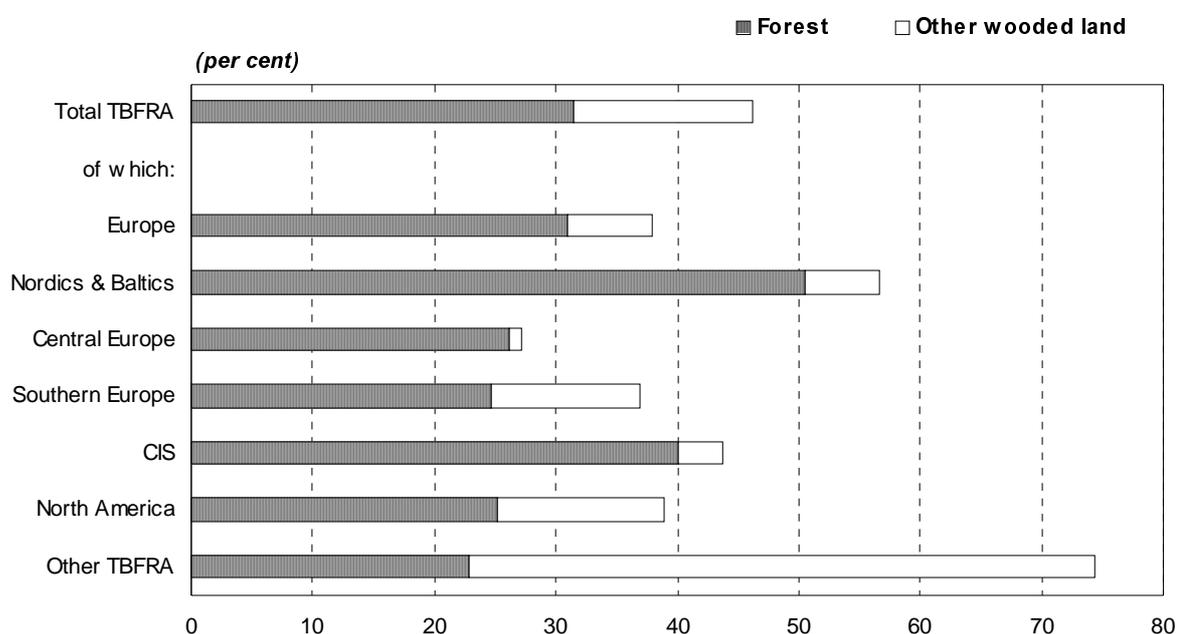
The percentage of land covered by FOWL varies widely from country to country, as seen in Main Table 2. The average for all TBFRA-2000 countries is 46 per cent, while the range is from 76 per cent in Australia, 75 per cent in Finland and 74 per cent in Sweden to little more than 1 per cent in Iceland and Malta. Figure 1.3 shows how the shares of FOWL in total land area vary between regional groups. The share in the "Other TBFRA" countries (74 per cent) is appreciably higher than the TBFRA average; those in Europe and North America are lower (38 per cent and 39 per cent respectively) than the TBFRA average.

Within Europe there is a contrast between the relatively high cover of FOWL in the Nordic countries and the Iberian peninsula (59 per cent and 50 per cent respectively) compared with the low cover in North-Western Europe (11 per cent). Similarly in the CIS, there is a marked contrast between the cover of 54 per cent in the Russian Federation and that in the other CIS countries (10 per cent). As already noted, FOWL cover is particularly high in Australia and Japan, in the former largely due to the extensive area of OWL, in the latter to the high proportion of forest. The share of forest (excluding OWL) in total land area in Japan of 66 per cent is virtually as high as Sweden's and is exceeded only by Finland with 72 per cent (Figure 1.4).

One feature worth drawing attention to is that while in most countries other wooded land accounts for a relatively small part of total FOWL, there are exceptions both in the boreal countries (Canada, Norway) and in the drier, hotter temperate countries (Spain, Greece, FYR Macedonia, Turkey, Cyprus and, above all, Australia). As noted earlier, the area of other wooded land is remarkably high in Australia in absolute terms, 422 million ha, and relative to its total

FIGURE 1.3

Share of forest and other wooded land in total land area in the TBFRA area by regional groups



land area (55 per cent). It accounts for more than half the total of other wooded land in the TBFRA area. Figure 1.5 shows that for the TBFRA area as a whole forest accounts for two-thirds of the total FOWL area and OWL for one third, but even at the regional grouping level, the proportions vary considerably, from 96 per cent forest in central Europe to 31 per cent in “Other TBFRA” countries. At the country or country group level, the contrasts are even more marked, as seen in Figure 1.6, the share of forest ranging from over 99 per cent in Central-Eastern Europe to 27 per cent in Australia.

On a per capita basis, Main Table 2 shows that on average in the TBFRA countries there are about 1.9 ha/cap of FOWL and 1.3 ha/cap of forest, the latter figure being about double the global average. Because of the differences in population density and the areas of FOWL between regions, and even more markedly so between countries, the range of values for FOWL per capita is very wide. Figure 1.7 shows the per capita figures at the regional grouping aggregates. FOWL per capita is above the TBFRA average in all groups except Europe, where at 0.37 ha/cap it is only about one-fifth of the average. In the other groups, it is above the average in North America and “Other TBFRA” only because of the large OWL component in the total.

Figure 1.8 shows the per capita data of forest and other wooded land by country or country group. Within Europe the range is from 3.5 ha/cap in the Nordic countries (with as much as 4.4 ha/cap in Finland) to 0.05 ha/cap in North-Western Europe (0.02 ha/cap in the Netherlands and 0.04 in the United Kingdom). Per capita levels are appreciably higher than the European average of 0.37 ha/cap in the Baltic countries, as well as the Nordic countries, but less than average in the other country groups. There is a marked contrast between the Russian Federation with 6 ha/cap and the other CIS countries with 0.34; between Canada with 14 ha/cap and the United States with 1.1; and in the “Other TBFRA” countries between Australia with 31 ha/cap of which 8.4 of forest, and Japan with 0.2.

The area of forest per capita (as distinct from FOWL per capita) is an indicator, although a rather crude one, of the actual or potential capacity for the forest to satisfy a nation’s demand for wood and non-wood products and services and the forest cover is another. There are only seven countries with markedly higher forest per capita than the average for the TBFRA-2000 countries, namely Australia, Canada, Russian Federation, Finland, Sweden, New Zealand, Norway. In the case of Australia and New Zealand, however, a major part of the forest area is classified as not available for wood supply (nearly 90 per cent and 77 per cent respectively). There are many more countries with much lower per capita areas of forest than the average, all of them with the exception of Japan being in Europe and the CIS. In the case of forest cover, the range is from 72 per cent in Finland to little more than zero in Iceland and Malta. Japan is an interesting case: its forest cover is among the highest in the world (66 per cent), which might suggest at first sight that it should be able to satisfy its population’s needs for forest products, until it is observed that the figure for its forest area per inhabitant is only 0.2 ha/cap.

FIGURE 1.4

Share of forest and other wooded land in total land area in the TBFRA area by country

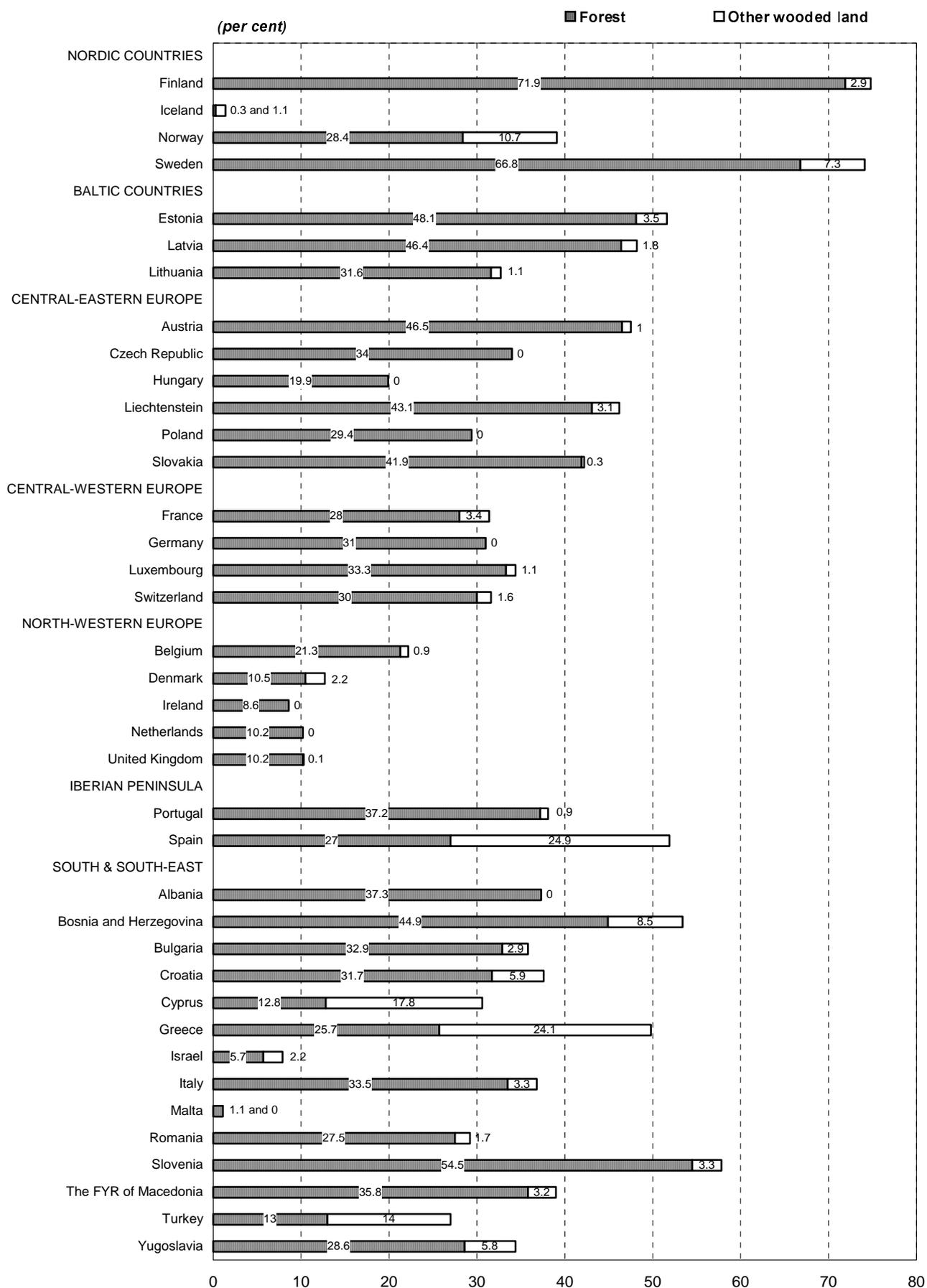


FIGURE 1.4 (continued)

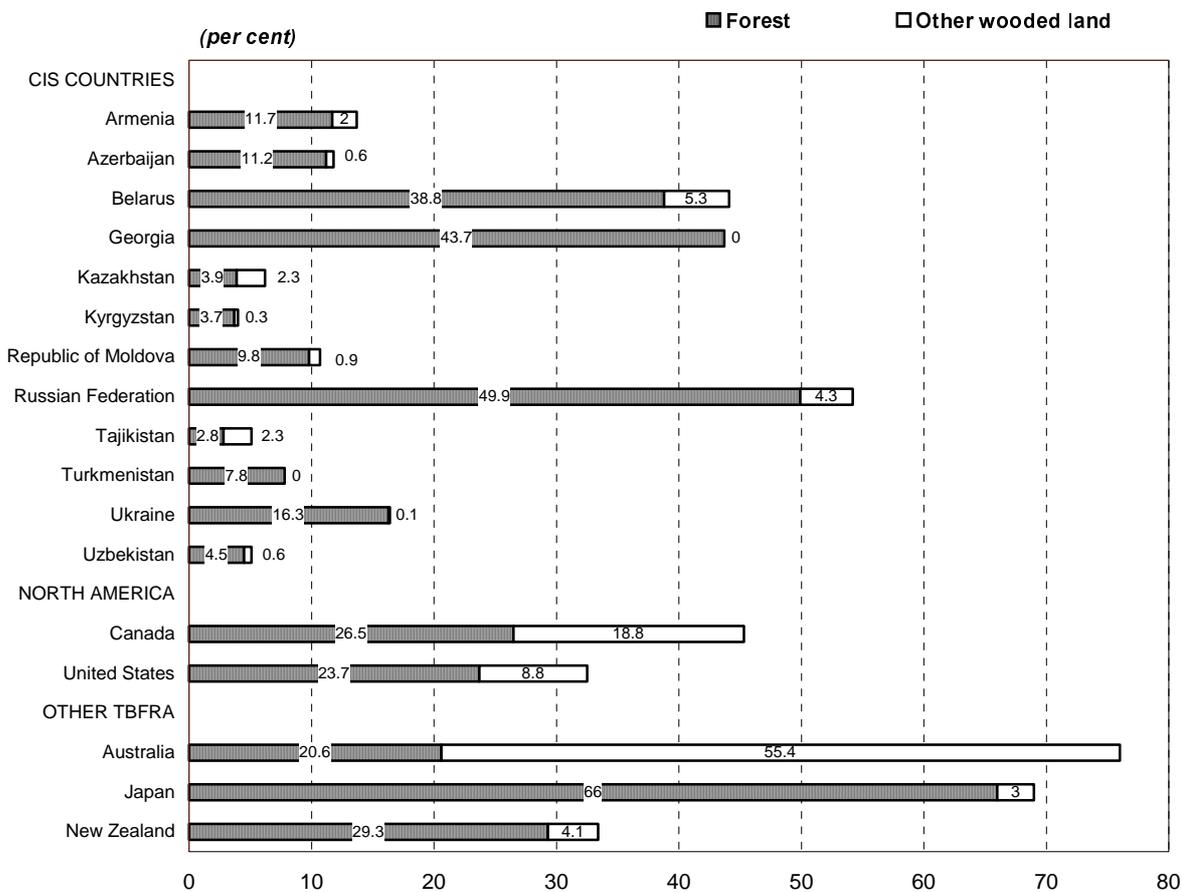


FIGURE 1.5

Shares of forest and of other wooded land in the total area of forest and other wooded land in the TBFRA area by regional groups

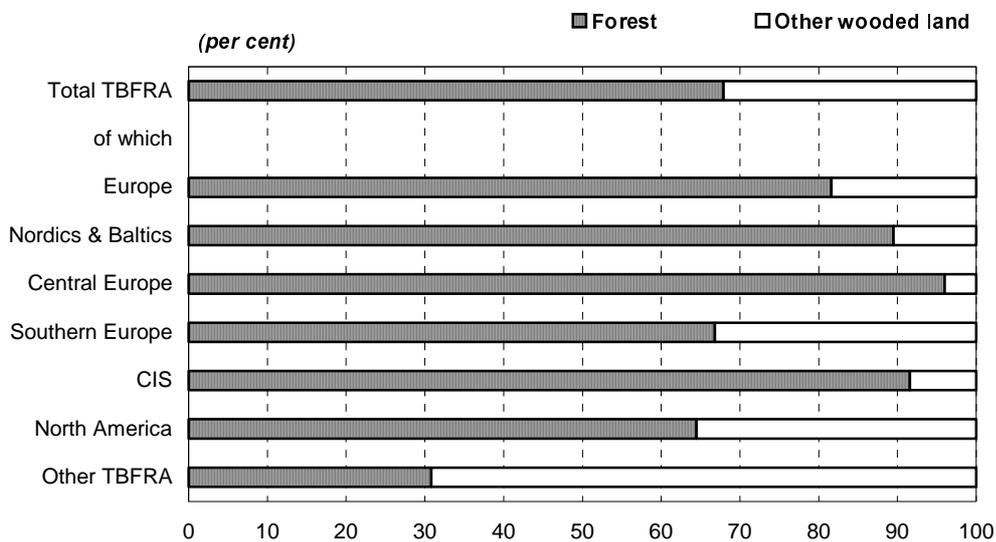


FIGURE 1.6

Shares of forest and of other wooded land in the total area of forest and other wooded land by countries or country groups

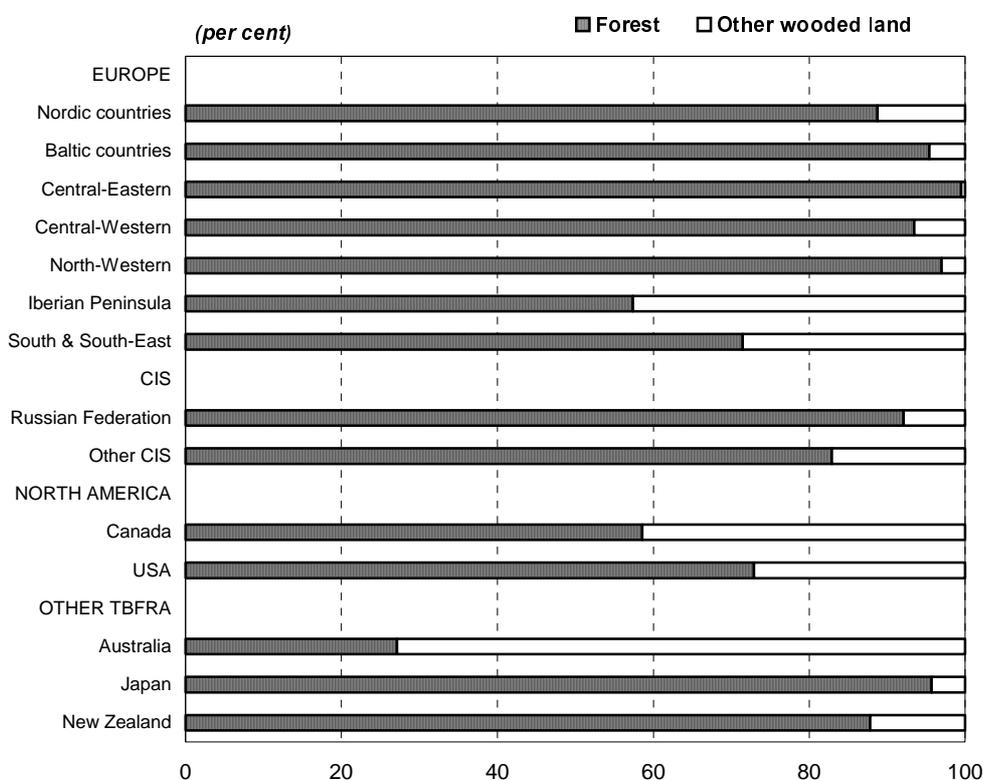
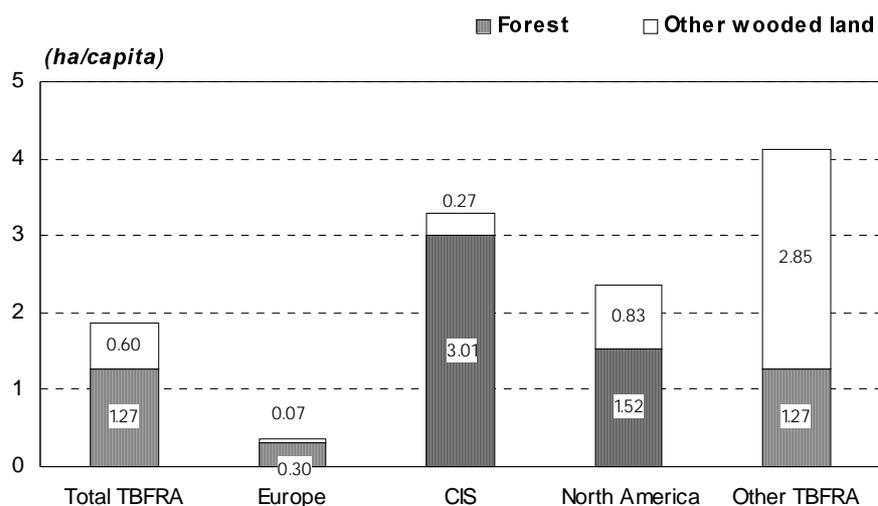


FIGURE 1.7

Forest and other wooded land per inhabitant in the TBFRA area by regional groups

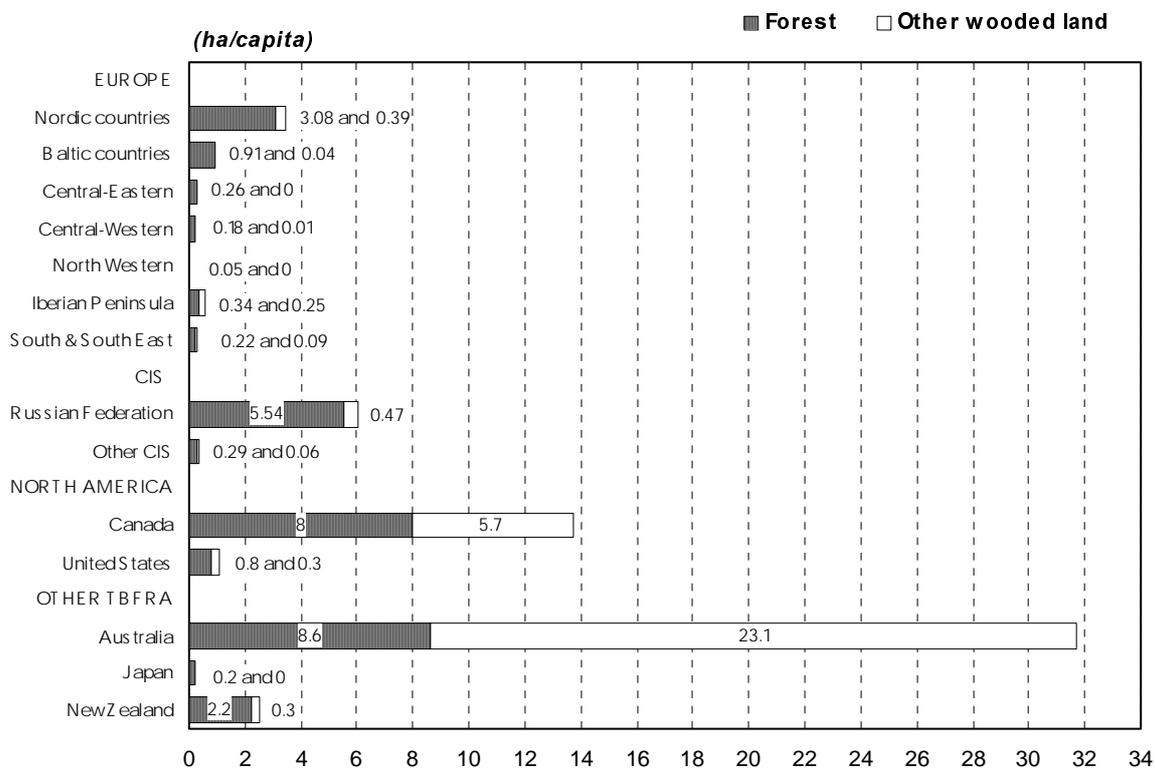


Species composition and distribution

One important change introduced in the TBFRA-2000 enquiry, compared with earlier ones, was to ask for information on “mixed” (i.e. mixed coniferous and broadleaved species) FOWL. Another change, introduced to make the TBFRA enquiry conform with FAO’s global assessment but of no importance to TBFRA countries with the

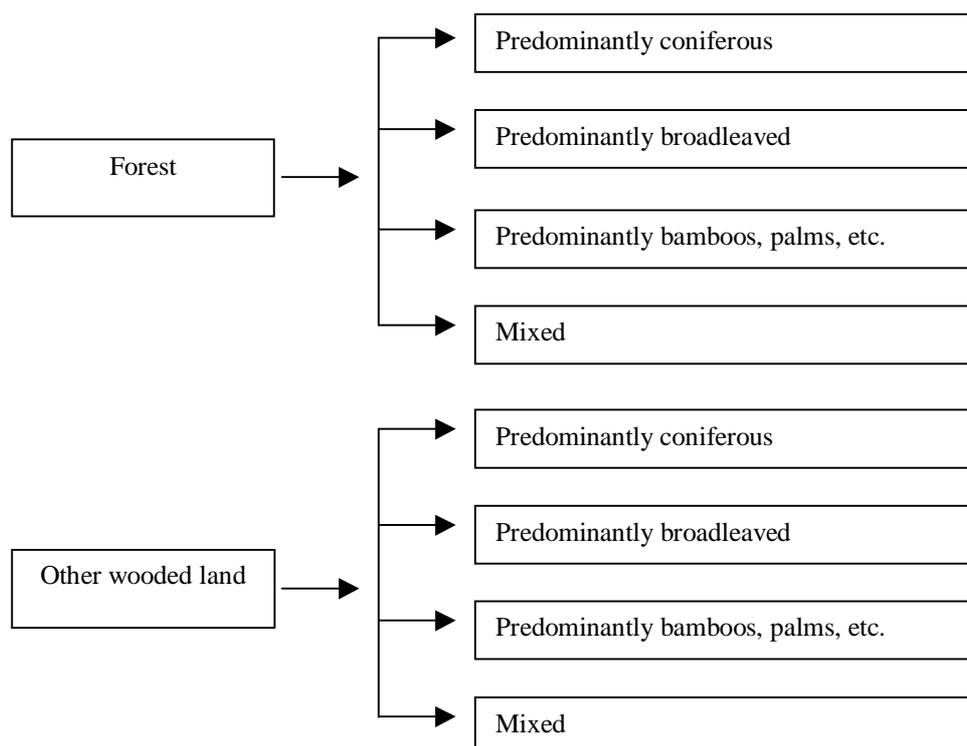
FIGURE 1.8

Forest and other wooded land per inhabitant in the TBFR area by country and country groups



exception of Japan, was the inclusion of information on bamboos, palms, etc. The definitions for “predominantly coniferous”, “predominantly broadleaved”, “predominantly bamboos, palms, etc.” and “mixed” are given in Appendix I, items 52, 51, 50 and 36 respectively. The hierarchical structure is shown below (Diagram 1.2):

DIAGRAM 1.2



The criterion for distinguishing between these categories was that if 75 per cent or more of the tree crown cover consisted of coniferous or broadleaved species or bamboos, etc., the area should be classified as “predominantly coniferous”, “predominantly broadleaved” or “predominantly bamboos, palms, etc.” respectively. Any area falling between should be classified as “mixed”. The inclusion of the “mixed” category caused problems for a few countries, whose inventories are based on a simple distinction between coniferous and broadleaved areas. These either had to make estimates of the breakdown into the three categories (Denmark), or reported that the area of mixed was negligible (Greece, Turkey). The Russian Federation’s inventory uses a criterion of more than 40 per cent coniferous for coniferous stands and more than 60 per cent broadleaved for broadleaved. The adjustment to the TBFRA definitions resulted in about 40 per cent of all stands being classified as mixed. In Norway the limit is 70 per cent rather than 75 per cent; its reported data were not adjusted to the TBFRA definitions.

Main Table 3 contains information on the distribution in forest by species groups for virtually all countries, which is summarized for the TBFRA-2000 area as a whole in Figures 1.9, 1.10 and 1.11; that on the distribution in other wooded land is slightly less complete. The figures show the species distribution by area for forest and other wooded land separately for the TBFRA area and the main regional groupings. For forest, predominantly coniferous holds the largest share, with 785 million ha for the TBFRA area (47 per cent of the total); it has also the largest share in each of the regional groupings except for “Other TBFRA”, where predominantly broadleaved is the most important. The area of mixed forest amounted to 452 million ha (27 per cent) of the total forest in the TBFRA area and predominantly broadleaved 445 million ha (26 per cent). For other wooded land, predominantly broadleaved is the largest species group, with about two thirds of the total in the TBFRA area, mainly because of the very large area of this type of vegetation in “Other TBFRA” and more specifically Australia.

Countries’ species composition and distribution reflect their geographic location in terms of latitude and the altitude at which their forests are growing. In addition, in those countries where the forest is under intensive management, past policy decisions on afforestation and reforestation have sometimes had an important influence, for example the establishment of coniferous stands, generally monocultures, in temperate areas where the natural composition might have been predominantly broadleaved or mixed.

In the northern hemisphere the boreal forest belt, consisting predominantly of coniferous species, runs across the Russian Federation, Alaska (USA), Canada and the Nordic countries, bounded by the tundra to the north and the temperate zones to the south. In planning the TBFRA-2000 enquiry the possibility was explored of separating boreal from temperate forests statistically, but in practice no internationally accepted definitions could be found to achieve this. As a very rough approximation, it could be said that the northern boreal forests cover approximately 1000 million ha or 60 per cent of the total temperate and boreal forest area. In the northern temperate zones (excluding boreal), broadleaved or mixed forests predominate, although coniferous forests are found in some areas, either naturally at higher elevations or in certain hotter, drier areas, or artificially as a result of afforestation or silvicultural practices. In Australia and New Zealand, broadleaved forests predominate except where exotic coniferous species, such as Radiata pine, have been introduced. It is interesting to note that the broadleaved forests of the southern hemisphere are mostly evergreen, in contrast to the broadleaved deciduous forests generally found in the northern hemisphere.

It is worth noting that in Australia, as much as 47.6 per cent of the total forest area, or around 75 million ha, which lies to the north of the Tropic of Capricorn, is considered to be tropical. Small areas of tropical (or at least sub-tropical) forest may also occur in a few other ‘temperate’ countries, such as the USA. Conversely, a number of countries not covered by the TBFRA-2000, in both the northern and southern hemispheres, possess substantial areas of temperate forests as, for example, China and the two Koreas in the former and Argentine and Chile in the latter.

At the country level, there is a wide range of species group distribution in forests, as is shown in Main Tables 3 and 4 and Figure 1.12.

FIGURE 1.9

Distribution of forest and of other wooded land in the TBFRA area by species groups

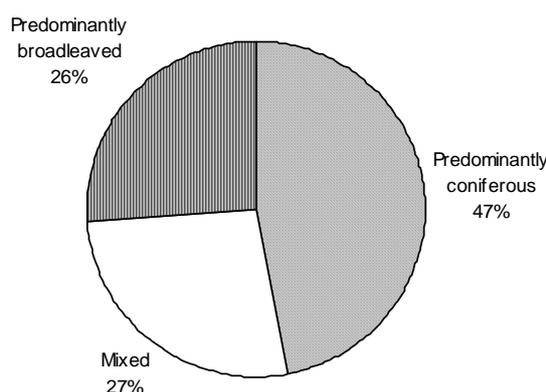


FIGURE 1.10

Distribution of forest and of other wooded land in the TBFRA area by species groups and regional groups

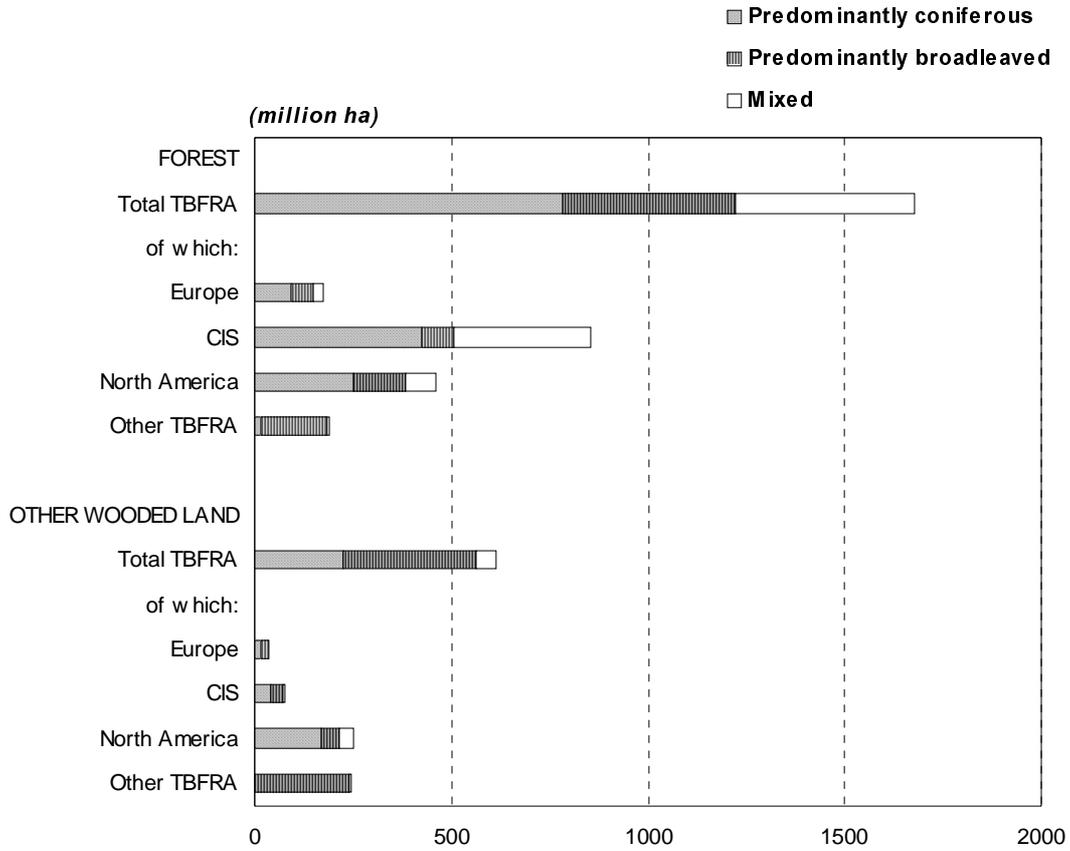


FIGURE 1.11

Distribution of forest and of other wooded land in the TBFRA area by species groups and regional groups

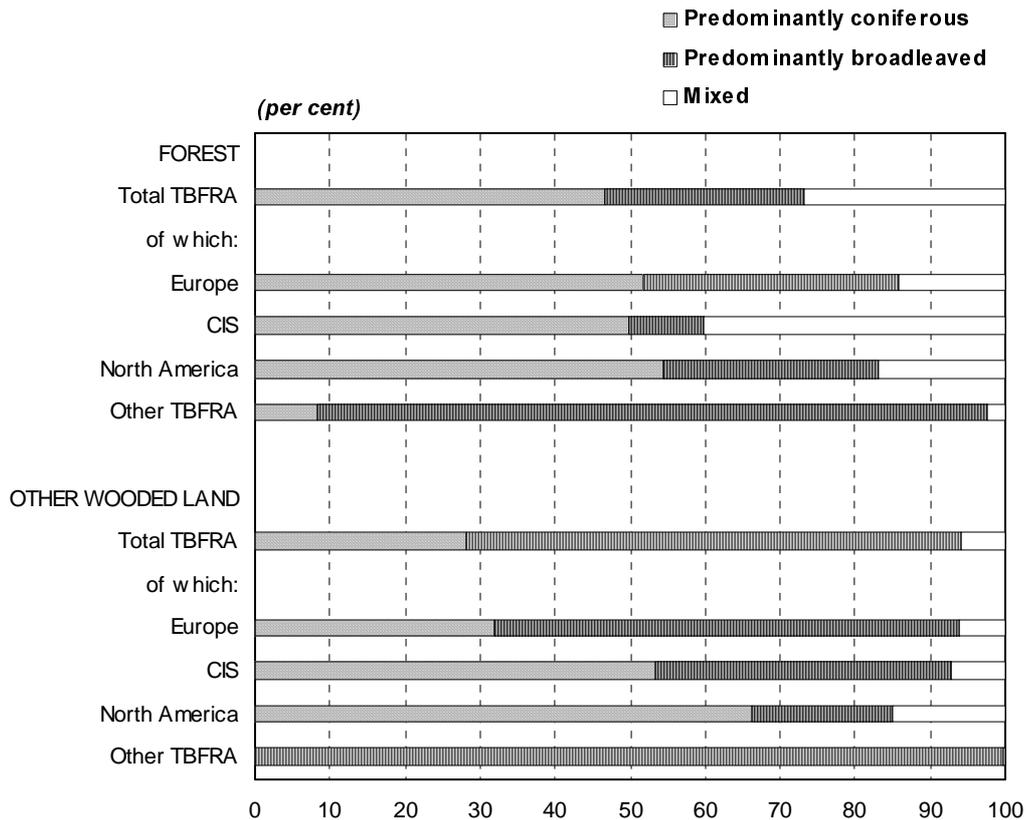


FIGURE 1.12

Distribution of forest by species groups in the TBFRA area by country

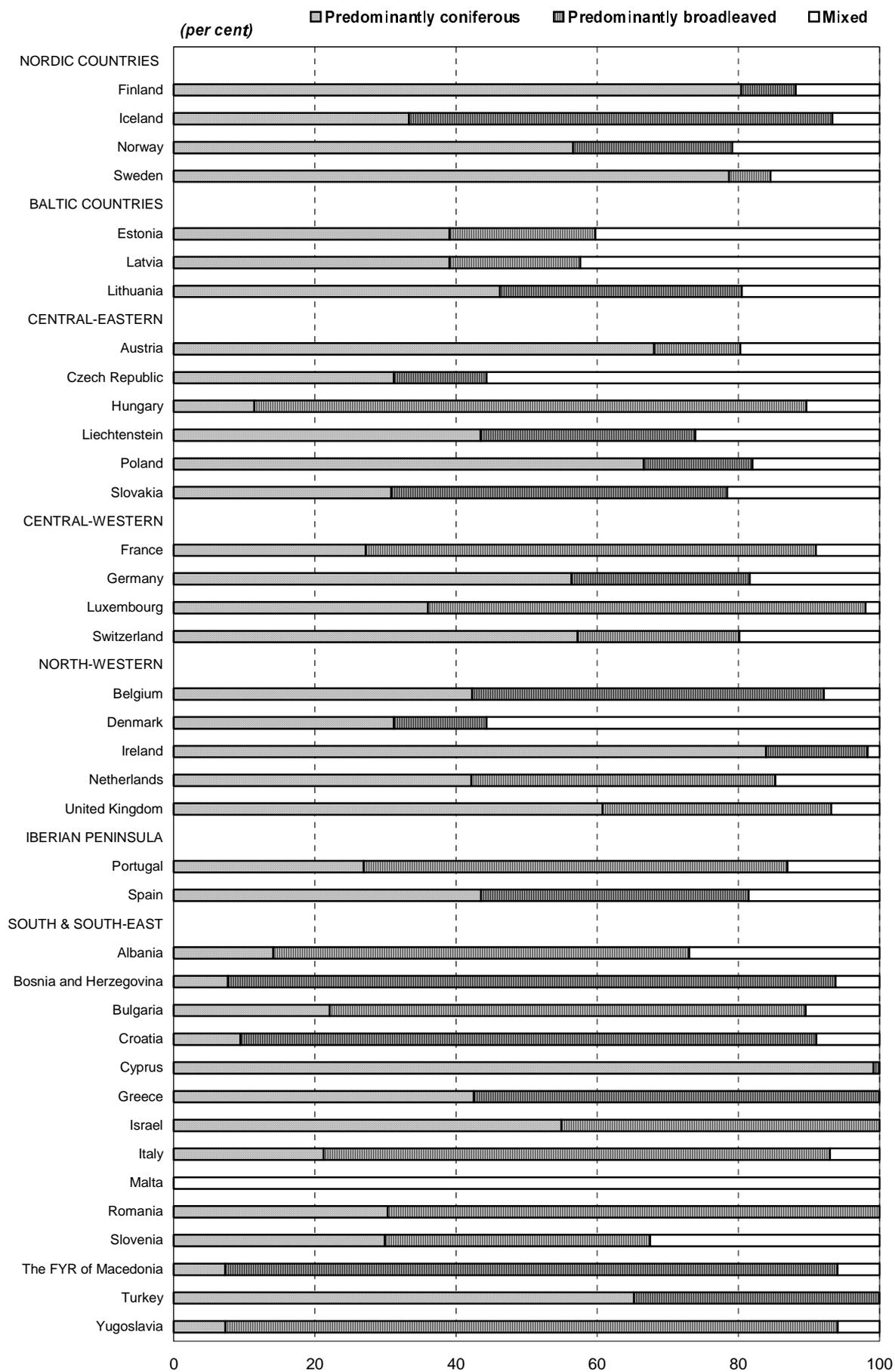
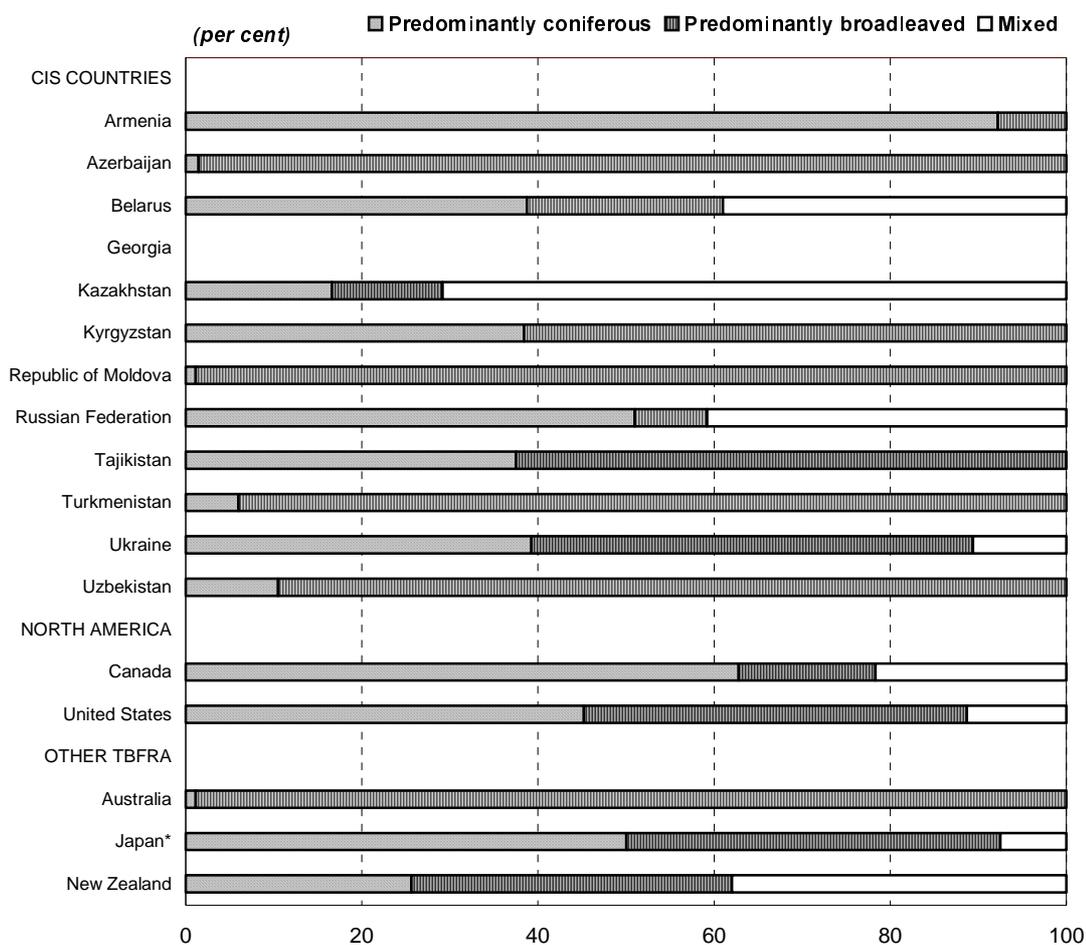


FIGURE 1.12 (continued)



* Bamboos in Japan included in predominantly coniferous.

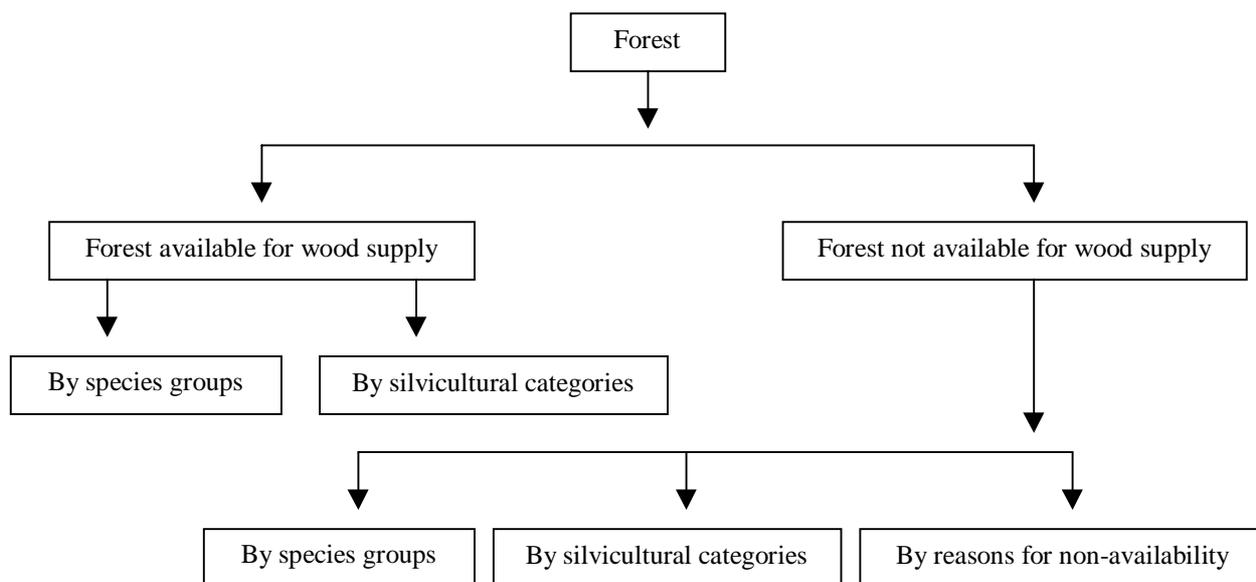
Coniferous species predominate in Cyprus with 99 per cent of the total, while among the major forest countries they account for more than three quarters in Finland and Sweden, 68 per cent in Austria, 63 per cent in Canada and 51 per cent in the Russian Federation. Broadleaved species predominate in several CIS countries (over 90 per cent in Armenia, Azerbaijan, Moldova and Turkmenistan) as well as Australia. In Europe, Yugoslavia has the highest proportion of broadleaved species with 87 per cent, while among other major forest countries there is France with 64 per cent, Romania with 70 per cent and Italy with 72 per cent. In the United States areas of predominantly coniferous and broadleaved are roughly similar with 45 per cent and 44 per cent of the total and 11 per cent mixed.

Forest available and not available for wood supply

In previous assessments, other terms were used to distinguish those areas where it was considered that wood could be harvested from those where it could not. These terms included 'productive' and 'unproductive', 'operable' and 'inoperable' and 'exploitable' and 'unexploitable', the last being the ones used in the 1990 assessment. With the increasing demand for and supply of non-wood goods and services, these terms were felt to be ambiguous (exploitable for what?). It was therefore agreed to adopt the terms 'available for wood supply' and 'not available for wood supply', to make it clear that the criterion for separating the two was an area's actual or potential use as a source of wood, which still remains in most forests the single most important output. In practice, the comparability between available for/not available for wood supply in the present assessment and exploitable/unexploitable in the 1990 assessment is probably quite good.

Forest available for wood supply (FAWS) was separated according to (1) species groups, and (2) silvicultural categories, while that not available for wood supply (FNAWS) was separated by three criteria: (1) species groups, (2) silvicultural systems, and (3) the reasons for non-availability. The hierarchical structure is as follows (Diagram 1.3):

DIAGRAM 1.3



Main Table 5 contains information on forest available for wood supply (FAWS) and is in three parts. First, the total area of FAWS is shown for virtually all TBFRA-2000 countries, together with its share of the total forest area. Secondly the total area is broken down by species groups. And thirdly, it is sub-divided between high forest and coppice with standards.

Figure 1.13 shows the shares of FAWS and FNAWS in the total area of forest by regional groupings. On average in the TBFRA-2000 countries, 63 per cent of the total area is available for wood supply with a range from 85 per cent in Europe to 22 per cent in “Other TBFRA”. The majority of European countries have 75 per cent or more of their forest available for wood supply, as do Belarus, USA and Japan (Figure 1.14). Among the other countries the percentage of FAWS is zero in Kyrgyzstan and Tajikistan and 10 per cent or less in Armenia and Australia. The Russian Federation has 64 per cent of its huge forest area classed as FAWS, close to the average for all TBFRA-2000 countries.

FIGURE 1.13

Forest available and not available for wood supply in the TBFRA area by regional groupings

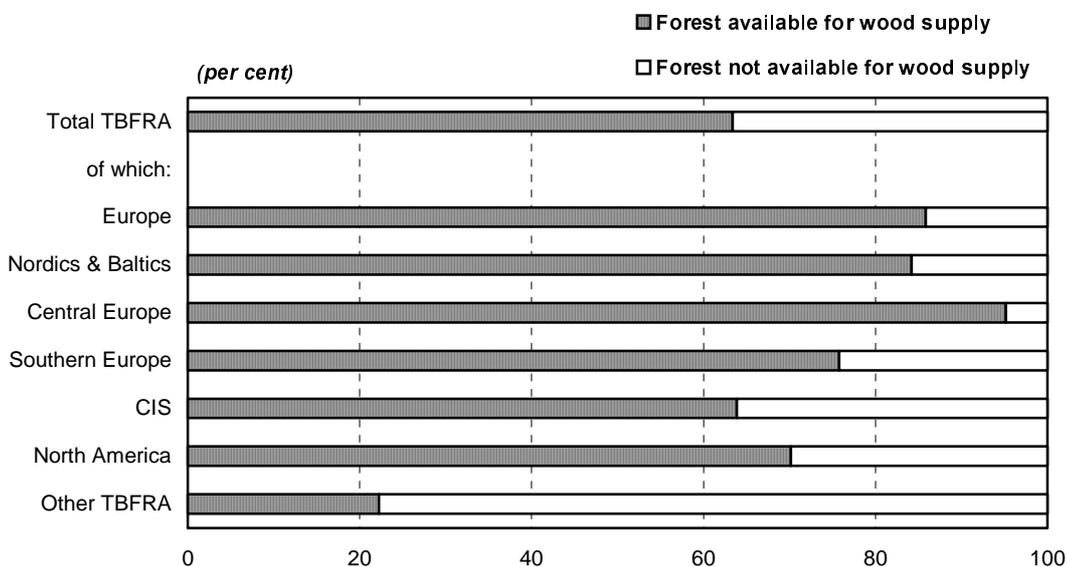


FIGURE 1.14

Share of forest available and not available for wood supply in the TBFRA area by country

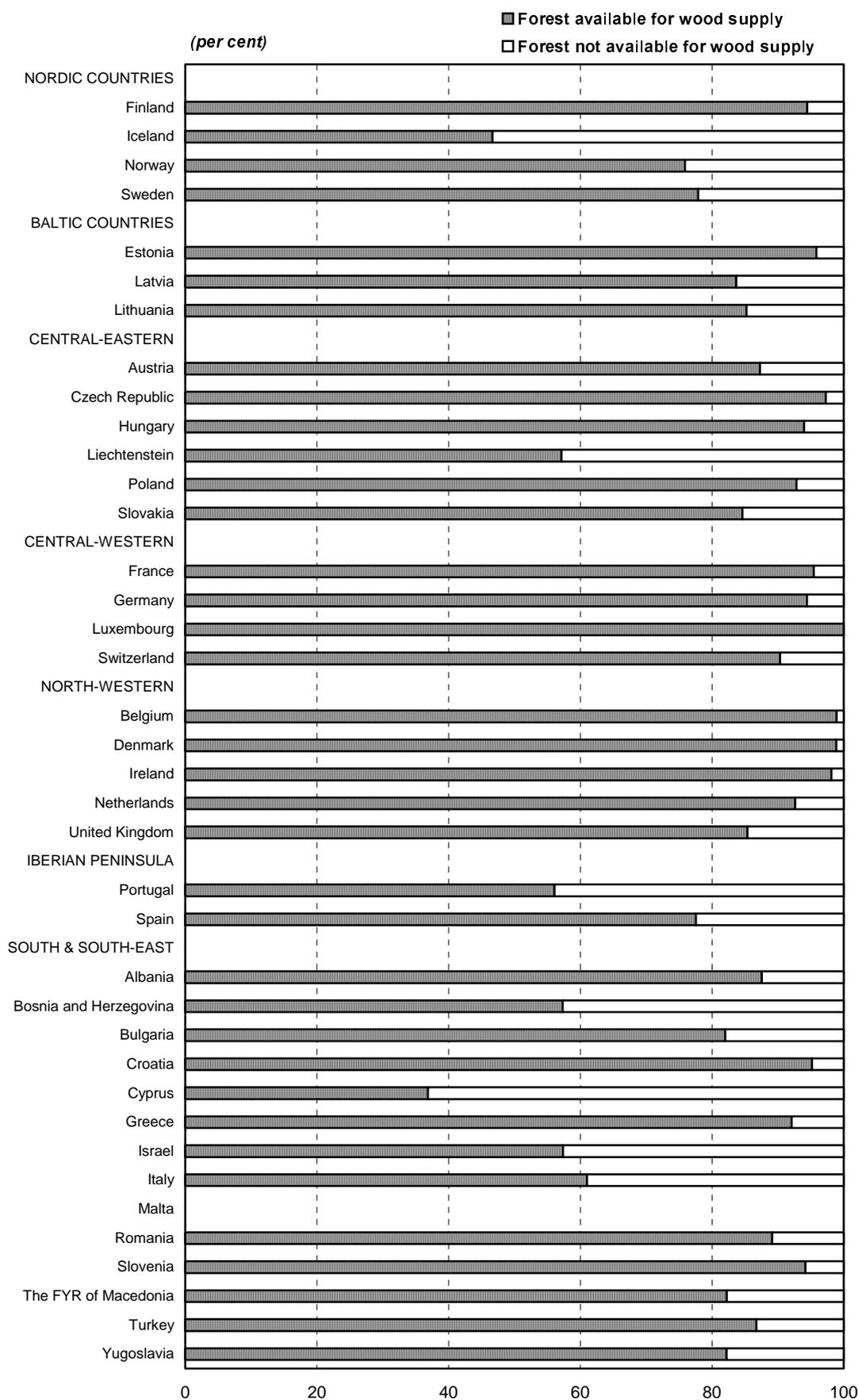
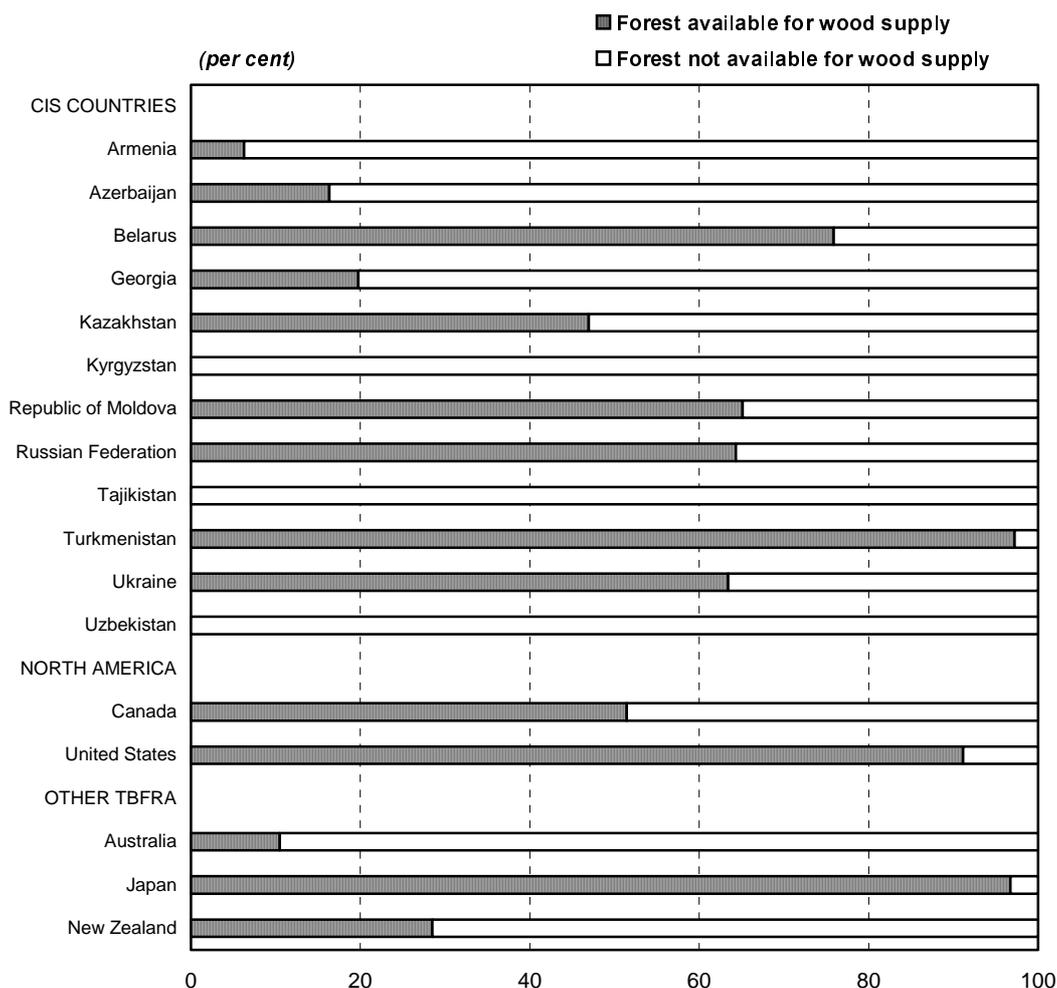


FIGURE 1.14 (continued)



It seems that the majority of countries were able to follow the TBFRA definitions of FAWS and FNAWS (see Appendix I, items 14 and 18 respectively). In Australia, FNAWS included 17.6 million ha of National Conservation Reserves and 121.7 million ha not harvested for a combination of ecological and economic reasons. In Germany FAWS was defined as areas with productivity of over 1 m³/ha/year (Wirtschaftswald) and FNAWS with less than that. Hungary included forest where wood production is the primary function under FAWS and that where a non-wood function or functions has the primary role under FNAWS. Romania estimated FNAWS as being the area without road access, i.e. a haulage distance of more than 2 km on average. In the Russian Federation FAWS includes stands identified as suitable for commercial logging and 'reserved' forests of Group III according to that country's classification system. Slovakia included 332,000 ha of 'special purpose forests' in FAWS, where wood production is a secondary function.

In the TBFRA-2000 countries in aggregate, nearly 97 per cent of the area of FAWS was classified as 'high forest' and less than 3 per cent as 'coppice and coppice with standards' (Main Table 5). The latter are of virtually no importance in North America or "Other TBFRA", apart from a small area in Japan. On the other hand, coppice and coppice with standards account for 16 per cent of the area of FAWS in Europe and cover extensive areas in several countries including France, Italy, Greece, Turkey, Spain and Bulgaria. Other countries with smaller areas but where they account for more than half the total of FAWS include Albania and Yugoslavia. It can be noted that, with the partial exception of France, all these countries are in southern Europe. Coppice and coppice with standards cover large areas in several CIS countries, including the Russian Federation, Ukraine, Kazakhstan and Belarus.

Main Table 6 contains information, in addition to the total area of forest not available for wood supply (FNAWS) and area by species groups and silvicultural categories, also on why forest is not available for wood supply, that is either for conservation/protection reasons or for economic ones. Several countries place the major part of their forests under FNAWS, including Armenia, Azerbaijan, Kyrgyzstan and Tajikistan in the CIS and Australia and New Zealand in "Other TBFRA". Several European countries have 40 per cent or more of FNAWS, including Bosnia and Herzegovina, Cyprus, Iceland, Israel, Liechtenstein and Portugal. Canada has 49 per cent of FNAWS, while the USA's proportion is 9 per cent.

Concerning the reasons for non-availability for wood supply, over 80 per cent of the area of FNAWS in the TBFRA-2000 countries in aggregate is put in the 'for economic reasons' category and less than 20 per cent under 'for

conservation/protection reasons' although this is largely due to the weighting of the very large forest countries, the Russian Federation and Canada with their extensive areas of remote forest. However, in several European countries economic reasons also predominate, including Albania, Cyprus, France, Germany, Italy, Norway and Portugal. For Europe as a whole, nearly two thirds of the area of FNAWS comes into the 'for conservation/protection reasons' category, with Sweden, Finland, Spain and Turkey having most of their FNAWS in this category. The USA and Japan put all their FNAWS under 'for conservation/protection reasons'.

It is not absolutely clear to what extent there is consistency between countries in distinguishing between forest available and not available for wood supply; nor, with regard to the latter, between non-availability for conservation/protection reasons and for economic ones. There is certainly value in making these distinctions, but it would appear necessary for further research and consultations to be made in order to refine the definitions and to assure that they can be applied in practice in future assessments. The objective should be to reduce the degree of subjectivity that has to be applied by national correspondents to make the distinctions.

Changes in area over time

There are good prospects that sooner or later remote sensing will become an effective means of monitoring changes over time in the area of forest and other wooded land. Satellite images were indeed used on a sampling basis for making estimates of change in tropical forests for the 1990 Global Forest Assessment, but have so far been used to only a limited extent for this purpose in the TBFRA countries. This has been because of the considerable difficulties in obtaining representative coverage of the TBFRA area with accurate enough resolution to allow identification of the land use classes used in the TBFRA. In the absence of data based on remote sensing, and despite the importance attached to information about change expressed at numerous international conferences, it is still proving difficult for some countries to provide reliable information based on traditional inventory methods. One of the problems has been changes in definitions between one assessment and the next. In an attempt to overcome this and other difficulties, the TBFRA-2000 enquiry asked countries to adapt data from an earlier inventory (Reference period 1 in the enquiry, see Appendix I, item 61) to the definitions used in the one on which their reply to the TBFRA-2000 enquiry was based (Reference period 2).

The results, which are set out in Main Tables 7 and 8, should be treated with caution. Not all countries have been able to provide change data, and the very large changes reported by the Russian Federation, which contrast markedly with the smaller ones in most other countries, as well as the lack of change data for Australia, make any attempt at estimating a figure for the TBFRA-2000 countries as a whole not worthwhile. For all the TBFRA countries that were able to provide data, the net average annual increase in the area of forest was roughly 600,000 and of OWL 1.3 million ha. For the European countries there was in aggregate an average annual increase in the area of forest of approximately 500,000 ha and a decrease in that of other wooded land of about 200,000 ha. The countries reporting the largest increases in forest area were Spain, France, Portugal, Turkey, Greece and Italy, all Mediterranean countries with active programmes of afforestation or conversion of other wooded land to forest. Other countries with active planting programmes included Bulgaria, Ireland and the United Kingdom (Figure 1.15). Only a few countries reported a declining trend in the area of forest, including Albania, Belgium, Finland and Yugoslavia; the falls have generally been small (Figure 1.16).

FIGURE 1.15

European countries with the largest average annual increases in area of forest during reporting periods

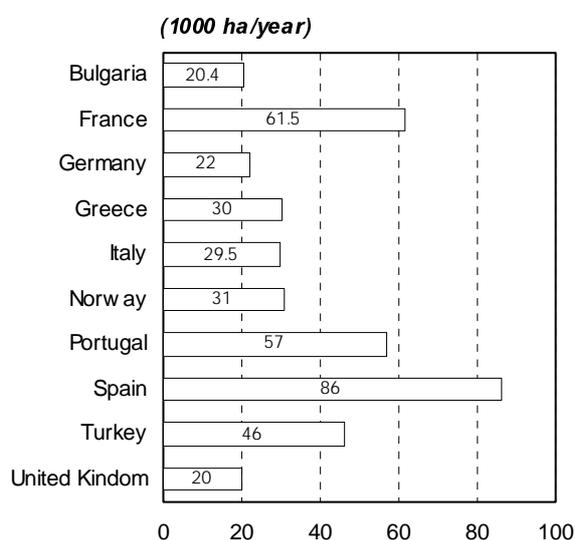
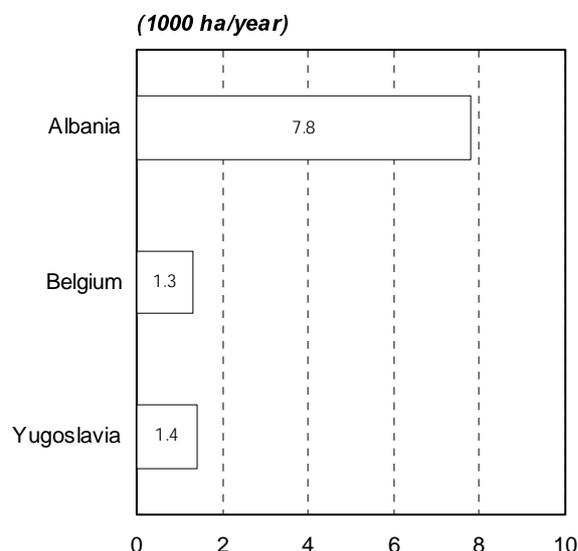


FIGURE 1.16

European countries with average annual decreases in area of forest during reporting periods



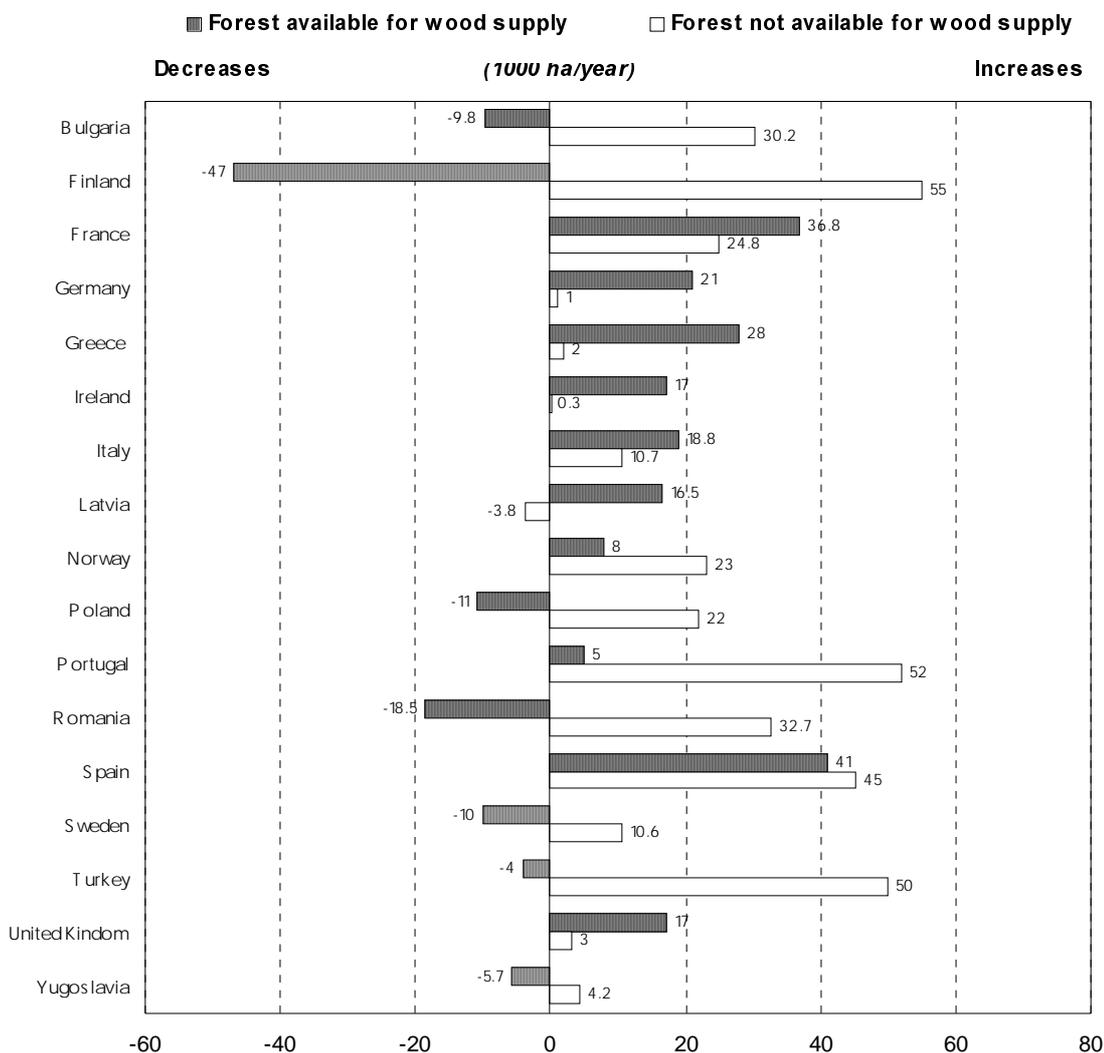
The USA and New Zealand also reported substantial increases in the area of forest, in the case of the USA partly offset by a declining area of other wooded land. In New Zealand a rising trend for other wooded land is attributable to natural colonization by trees of abandoned agricultural land. In Canada it is not possible to determine changes in the area of FOWL with the existing forest inventories, so it has been assumed that the area FOWL has remained constant since 1981. Japan reports a small increase in forest area. Australia was not able to make estimates of change.

In the Russian Federation the area of forest was reported to fall at an average annual rate of 1.1 million ha, while that of other wooded land rose by 1.6 million ha. Transfers have been occurring of State-owned forest to other authorities for non-forestry related purposes, such as the establishment of nature reserves (3.2 million ha) and land for construction. It is also possible that some of the considerable areas clear-felled in the past have not (yet) reverted to forest but only to what could be classified as other wooded land. At the same time, it would seem that areas of other (non-forest) land have either been naturally colonized or planted, for example as windbreaks. In other CIS countries the areas of both forest and other wooded land are reported to have been increasing, the most notable cases being in Belarus and Kazakhstan.

Main Table 8 shows the changes in areas of forest available and not available for wood supply. Given the increasing emphasis in many countries' policies towards non-wood services of the forest, such as nature conservation and protection, it could have been expected that these would be reflected in the respective changes in the areas of FAWS and FNAWS. Several European countries do indeed report an increasing trend in FNAWS, more or less offset by a decline in FAWS, including Finland, Poland, Romania and Sweden (Figure 1.17). In others, most of the increase was in FNAWS (Bulgaria, Norway, Portugal, Turkey). In France and Spain the increase was more evenly divided between the two. For the reporting countries of Europe in aggregate, the average annual increase in FNAWS was over 380,000 ha compared with one of about 110,000 for FAWS.

FIGURE 1.17

Average annual changes in forest available for wood supply and forest not available for wood supply in selected European countries during reporting periods



Summary and conclusions

A. Main findings

1. **General.** The total area of forest and other wooded land (FOWL) in the 55 TBFRA-2000 countries in the late 1990s was nearly 2.5 billion ha or somewhat less than half the total land area. Nearly half of the forest was classified as predominantly coniferous and nearly two thirds of it as available for wood supply. With the main exception of the Russian Federation, net changes in the area of FOWL have not been very large. More specifically:
2. **Area of forest and other wooded land.** The total area of forest and other wooded land (FOWL) in the late 1990s in the 55 countries covered by the TBFRA-2000 amounted to 2,478 million hectares. Of this, 1,682 million (68 per cent) were classified as forest and 795 million (32 per cent) as other wooded land. Thirty-eight percent of the total area of FOWL was located in the CIS countries, 29 per cent in North America, 25 per cent in "Other TBFRA" countries (Australia, Japan, New Zealand) and 9 per cent in Europe. There was on average about 1.9 ha per capita of FOWL, of which 1.3 ha/cap. of forest, the latter being about double the global average. At the country level, the range is very wide, from 31 ha of FOWL per capita in Australia and 14 ha/cap. in Canada to virtually nil in Malta. On average in the TBFRA area FOWL covered 46 per cent of the total land area, ranging from 76 per cent in Australia, 75 per cent in Finland and 74 per cent in Sweden to little more than 1 per cent in Iceland and Malta. Australia's area of other wooded land is remarkable in absolute terms (422 million ha), and for its share of Australia's total land area (55 per cent). It accounts for more than half the total of other wooded land in the TBFRA area.
3. **Species composition and distribution.** For the TBFRA countries in aggregate the species distribution in forest on an area basis was as follows: predominantly coniferous 47 per cent, predominantly broadleaved 26 per cent, mixed coniferous and broadleaved 27 per cent; with a small area (in Japan) of predominantly bamboos, palms, etc. About three quarters of the coniferous area lies in the northern boreal belt, while broadleaved or mixed forests predominate in the temperate areas of the northern and southern hemispheres.
4. **Forest available and not available for wood supply.** About 63 per cent of the total area of forest in the TBFRA countries is classified as available for wood supply (FAWS). The proportion of FAWS is high in Europe (85 per cent) and low in "Other TBFRA" (22 per cent). About 97 per cent of all FAWS is categorized as high forest; coppice and coppice with standards is of importance in some countries, mainly in southern Europe. Approximately 80 per cent of the total area of forest not available for wood supply (FNAWS) is considered to fall into this category for economic reasons and 20 per cent for conservation/protection reasons. The importance of the 'economic reasons' category is largely due to the figures for the Russian Federation and Canada with their vast areas of remote forest. For Europe as a whole nearly two-thirds of FNAWS come under 'conservation/protection reasons' and the USA and Japan put all their FNAWS into this category.
5. **Changes in area over time.** Because not all countries could provide data on changes and there are doubts about the consistency of data between countries, it is not possible to give an estimate of the average annual change in area of FOWL for the TBFRA countries as a whole. Data from reporting countries show an average annual increase in FOWL of about 1.95 million ha, of which over 600,000 ha in forest and over 1.3 million ha in OWL. The largest reported changes were in the Russian Federation with an average annual decline in the area of forest of 1.1 million ha and a rise in that of other wooded land of 1.6 million. For European countries in total the average annual increase in the area of forest is estimated at nearly 500,000 ha and a decrease in that of other wooded land of about 200,000, mainly due to conversion to forest. There were substantial increases in forest area in the USA and New Zealand; in Canada the area was assumed to remain more or less unchanged. From the available data, it is estimated that the average annual increase in the area of FNAWS in Europe was more than three times that of FAWS. Even though individual countries' trends were different, it appears that in many there was a transfer of areas of FAWS to FNAWS reflecting shifting policies in favour of non-wood goods and services, which was partly offset by afforestation and conversion of other wooded land to establish FAWS.

B. Conclusions

1. On the basis of a preliminary analysis of the data provided by countries for Main Tables 1 to 8 in this chapter, it appears that the quality of the statistics is generally good, meaning that the figures can be considered reliable and that there is mostly an acceptable level of comparability between countries. A partial exception to the reliability of data is that of change in area over time. National correspondents are to be warmly congratulated for the immense efforts they have made to achieve these satisfactory results. This has involved them sometimes in making certain assumptions, where 'hard' data were not available, in order to adjust data from the national inventories to fit into the TBFRA framework and definitions.
2. In reality, there is often no clear demarcation line between forest and other wooded land, nor between other wooded land and other (non-wooded) land, so that no definition of these categories is likely to be entirely satisfactory. Most countries, however, appear to have been able to report figures of the area of forest that conform with the TBFRA definition, although the change, compared with previous temperate region assessments, in the

minimum tree crown cover from 20 per cent to 10 per cent caused problems for a few. On the other hand, several countries, particularly but not only those outside Europe, have encountered problems in producing data on the area of other wooded land that conform to the TBFRA definition.

3. The introduction of the item 'mixed' (species composition) did not cause serious problems for most countries. One disadvantage of introducing the 'mixed' category is that it is no longer possible to derive data of growing stock and increment per hectare by species groups, only totals.
4. There are three reasonably distinct components of temperate and boreal forest and other wooded land: the boreal zone; the hotter, drier (Mediterranean-type) zone; and, in between, the cool, moist temperate zone. Each has its particular ecological characteristics. Internationally agreed definitions do not exist, which would allow data to be separated into these three categories.
5. It would seem that there were some inconsistencies between countries in the way that they interpreted the TBFRA definitions of forest available for wood supply and forest not available for wood supply, which reduces the possibility of making reliable inter-country comparisons. The same comment relates to the reasons for the non-availability of forest for wood supply. It has to be borne in mind that forest available for wood supply is in most instances also providing non-wood goods and services, which may to some extent limit its wood supply function. Conversely, forest not available for wood supply may, under particular circumstances, e.g. after fire or storm damage, be a source of wood. In some cases non-availability for wood supply may be for a combination of conservation/protection and economic reasons. The allocation of areas to 'not available for economic reasons' appears to be made at present often on a subjective and non-comparable basis.
6. Information on changes in area over time is one of the most important items needed by policy makers and managers, but for some TBFRA countries is still proving difficult to provide. This situation is likely to improve, provided the key definitions of forest and other wooded land remain unchanged between one assessment and the next. New technologies, notably remote sensing, should also contribute significantly to improve data in this area, and research needs to be actively pursued. They will not be able to answer all questions, however, for example changes in forest use, as distinct from forest cover, such as between forest available for, and not available for, wood supply.
7. Generally speaking, it appears that the terms and definitions agreed upon for use in the TBFRA-2000 enquiry, at least those figuring in this chapter, were satisfactory in the sense that most countries' data conformed to them or could be adjusted to them. In some cases the definitions may have been ambiguous or lacking in clarity. Refinements to these should be possible without jeopardizing the important principle of keeping changes to an absolute minimum in order to allow countries to have confidence in adapting national definitions to the international ones and to achieve comparability between one assessment and the next.
8. While the TBFRA-2000 has revealed that there are still areas in need of improvement so far as quality, comparability and consistency of data are concerned, even for some of the basic parameters, it is also clear that good progress has been made compared with previous assessments, thanks in large part to the excellent spirit of cooperation and support for the secretariat within the Team of Specialists and among the national correspondents.

TABLE 1
Overall land classification and population

Country	Reference period	Total area	Land area	Inland water	Forest and other wooded land	Forest	Other wooded land	Other land	Population
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Albania ©	1995	2,875	2,759	115	1,030	1,030	0	1,729	3,119
Austria ©	1992-96	8,387	8,252	135	3,924	3,840	84	4,328	8,140
Belgium ©	1997	3,053	3,030	22	672	646	26	2,358	10,141
Bosnia and Herzegovina ©	1995	5,120	5,073	47	2,710	2,276	434	2,363	3,675
Bulgaria	1995	11,098	10,895	202	3,903	3,590	314	6,992	8,336
Croatia	1996	5,654	5,592	62	2,105	1,775 ①	330 ①	3,487	4,481
Cyprus ©	1996	925	916	9	280	117	163	636	771
Czech Republic ©	1995	7,887	7,728	159	2,630	2,630	0	5,098	10,282
Denmark ©	1990	4,309	4,239	70	538	445	93 ①	3,701	5,270
Estonia ©	1996	4,523	4,187	336	2,162	2,016	146	2,025	1,429
Finland ©	1991-96	33,814	30,454	3,360	22,768	21,883 ①	885 ①	7,686	5,154
France ©	1997	54,919	54,148	771	16,989	15,156 ①	1,833 ①	37,159	58,683
Germany ©	1987	35,702	34,613	1,089	10,740	10,740	0	23,873	82,133
Greece ©	1992	13,196	13,076	120	6,513	3,359	3,154	6,563	10,600
Hungary ©	1996	9,303	9,093	210	1,811	1,811 ①	0	7,282	10,116
Iceland ©	1998	10,295	9,024	1,271	130	30 ①	100 ①	8,894	276
Ireland	1996	7,029	6,890	139	591	591	0	6,299	3,681
Israel	1997	2,195	2,150	45	170	122	48	1,980	5,984
Italy ©	1995	30,132	29,412	720	10,842	9,857 ①	985 ①	18,570	57,369
Latvia ©	1997	6,459	6,222	237	2,995	2,884	111	3,227	2,424
Liechtenstein	1995	16	16	0	7	7	0.50	9	32
Lithuania ©	1996	6,530	6,267	263	2,050	1,978	72	4,217	3,694
Luxembourg	1994-97	259	258	1	89	86 ①	3 ①	169	422
Malta ©	1996	31.6	31.6	0	0.347	0.347	0	31	384
Netherlands ©	1992-96	3,735	3,388	347	339	339	0	3,049	15,678
Norway ©	1994-96	32,376	30,625	1,751	12,000	8,710 ①	3,290 ①	18,625	4,419
Poland ©	1992-96	31,268	30,435	833	8,942	8,942 ①	0 ①	21,493	38,718
Portugal ©	1995	9,204	9,105	99	3,467	3,383	84	5,638	9,869
Romania ©	1992-97	23,839	22,949	890	6,680	6,301	379	16,269	22,474
Slovakia ©	1996	4,903	4,810	93	2,031	2,016 ①	15 ①	2,779	5,377
Slovenia ©	1996	2,027	2,016	11	1,166	1,099 ①	67 ①	850	1,993
Spain ©	1990	50,596	50,055	541	25,984	13,509 ①	12,475 ①	24,071	39,628
Sweden ©	1992-96	45,218	40,843	4,375	30,259	27,264 ①	2,995 ①	10,584	8,875
Switzerland ©	1993-95	4,129	3,916	213	1,234	1,173	61	2,682	7,299
The FYR of Macedonia ©	1995	2,571	2,531	40	988	906	82	1,543	1,999
Turkey ©	1996	77,945	76,729	1,216	20,713	9,954	10,759	56,016	62,866
United Kingdom ©	1995	24,410	24,088	322	2,489	2,469 ①	20 ①	21,599	58,649
Yugoslavia	1995	10,217	10,112	105	3,480	2,894	586	6,632	10,635
Total: Europe		586,149	565,930	20,219	215,422	175,829	39,593	350,508	585,075
of which: EU 15		323,963	311,852	12,111	136,204	113,567	22,637	175,648	374,292
Armenia ©	1996	2,974	2,846	128	392	334 ①	58 ①	2,454	3,536
Azerbaijan	1988	8,642	8,342	300	990	936	54	7,352	7,669
Belarus ©	1994-97	20,760	20,285	475	8,936	7,865 ①	1,071 ①	11,349	10,315
Georgia ©	1995	6,970	6,831	139	2,988	2,988	0	3,843	5,059
Kazakhstan	1993	272,490	272,490	0	16,673	10,504	6,169	255,817	16,319
Kyrgyzstan ©	1995	19,850	19,700	150	797	729	68	18,903	4,643
Republic of Moldova ©	1997	3,385	3,309	75	355	324	31	2,954	4,378
Russian Federation ©	1993	1,709,761	1,637,733	72,028	886,538	816,538 ①	70,000 ①	751,195	147,434
Tajikistan ©	1995	14,310	14,270	40	730	400	330	13,540	6,015
Turkmenistan ©	1995	48,800	48,100	700	3,754	3,754	0	44,346	4,309
Ukraine	1996	60,355	57,936	2,419	9,494	9,458 ①	36 ①	48,442	50,861
Uzbekistan ©	1988	44,740	42,540	2,200	2,170	1,909	261	40,370	23,574
Total: CIS		2,213,036	2,134,382	78,654	933,817	855,739	78,078	1,200,564	284,112
Canada ©	1994	997,061	921,543	75,518	417,584	244,571	173,013	503,959	30,563
United States of America ©	1992	980,963	915,941	65,022	298,135	217,333	80,802	617,806	274,028
Total: North America		1,978,024	1,837,484	140,540	715,719	461,904	253,815	1,121,765	304,591
Australia ©	1990-94	768,230	760,926	7,304	578,467	156,877 ①	421,590 ①	182,459	18,709
Japan ©	1995	37,780	36,460	1,320	25,146	24,064	1,082	11,314	126,281
New Zealand ©	1996	27,574	27,053	521	9,040	7,940	1,100	18,013	3,796
Total: Other TBFRA		833,584	824,439	9,145	612,653	188,881	423,772	211,786	148,786
Grand total		5,610,792	5,362,234	248,558	2,477,611	1,682,353	795,258	2,884,623	1,322,564

© See notes and comments in Chapter I.

① Adjustment to achieve conformity with TBFRA definitions carried out by the National Correspondent.

Source: for the Population data: *World Population Prospects, the 1998 Revision* (ESA/P/WP.150, 24 November 1998),

United Nations, Department of Economic and Social Affairs, Population Division, Table A.16

"Annual interpolated mid-year population by major area, region and Country: 1995-2015".

Note: Population data for Turkey and Australia are National data.

TABLE 2
Forest and other wooded land: comparative data

Country	Total land/ capita	Forest and OWL		Forest			Other wooded land	
		Per cent of land area	Forest and OWL/capita	Per cent of land area	Per cent of forest and OWL	Forest/ capita	Per cent of land area	OWL/ capita
		(ha/cap)	(Per cent)	(ha/cap)	(Per cent)	(ha/cap)	(Per cent)	(ha/cap)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Albania	0.88	37.3	0.33	37.3	100.0	0.33	0.0	0.00
Austria	1.01	47.6	0.48	46.5	97.9	0.47	1.0	0.01
Belgium	0.30	22.2	0.07	21.3	96.1	0.06	0.9	0.00
Bosnia and Herzegovina	1.38	53.4	0.74	44.9	84.0	0.62	8.5	0.12
Bulgaria	1.31	35.8	0.47	32.9	92.0	0.43	2.9	0.04
Croatia	1.25	37.6	0.47	31.7	84.3	0.40	5.9	0.07
Cyprus	1.19	30.6	0.36	12.8	41.8	0.15	17.8	0.21
Czech Republic	0.75	34.0	0.26	34.0	100.0	0.26	0.0	0.00
Denmark	0.80	12.7	0.10	10.5	82.7	0.08	2.2	0.02
Estonia	2.93	51.6	1.51	48.1	93.2	1.41	3.5	0.10
Finland	5.91	74.8	4.42	71.9	96.1	4.25	2.9	0.17
France	0.92	31.4	0.29	28.0	89.2	0.26	3.4	0.03
Germany	0.42	31.0	0.13	31.0	100.0	0.13	0.0	0.00
Greece	1.23	49.8	0.61	25.7	51.6	0.32	24.1	0.30
Hungary	0.90	19.9	0.18	19.9	100.0	0.18	0.0	0.00
Iceland	32.70	1.4	0.47	0.3	23.1	0.11	1.1	0.36
Ireland	1.87	8.6	0.16	8.6	100.0	0.16	0.0	0.00
Israel	0.36	7.9	0.03	5.7	71.8	0.02	2.2	0.01
Italy	0.51	36.9	0.19	33.5	90.9	0.17	3.3	0.02
Latvia	2.57	48.1	1.24	46.4	96.3	1.19	1.8	0.05
Liechtenstein	0.50	46.3	0.23	43.1	93.2	0.22	3.1	0.02
Lithuania	1.70	32.7	0.55	31.6	96.5	0.54	1.1	0.02
Luxembourg	0.61	34.4	0.21	33.3	96.8	0.20	1.1	0.01
Malta	0.08	1.1	0.001	1.1	100.0	0.001	0.0	0.00
Netherlands	0.22	10.0	0.02	10.0	100.0	0.02	0.0	0.00
Norway	6.93	39.2	2.72	28.4	72.6	1.97	10.7	0.74
Poland	0.79	29.4	0.23	29.4	100.0	0.23	0.0	0.00
Portugal	0.92	38.1	0.35	37.2	97.6	0.34	0.9	0.01
Romania	1.02	29.1	0.30	27.5	94.3	0.28	1.7	0.02
Slovakia	0.89	42.2	0.38	41.9	99.3	0.37	0.3	0.00
Slovenia	1.01	57.8	0.59	54.5	94.3	0.55	3.3	0.03
Spain	1.26	51.9	0.66	27.0	52.0	0.34	24.9	0.31
Sweden	4.60	74.1	3.41	66.8	90.1	3.07	7.3	0.34
Switzerland	0.54	31.5	0.17	30.0	95.1	0.16	1.6	0.01
The FYR of Macedonia	1.27	39.0	0.49	35.8	91.7	0.45	3.2	0.04
Turkey	1.22	27.0	0.33	13.0	48.1	0.16	14.0	0.17
United Kingdom	0.41	10.3	0.04	10.2	99.2	0.04	0.1	0.00
Yugoslavia	0.95	34.4	0.33	28.6	83.2	0.27	5.8	0.06
Total: Europe	0.97	38.1	0.37	31.1	81.6	0.3	7.0	0.07
of which: EU 15	0.83	43.7	0.36	36.4	83.4	0.3	7.3	0.06
Armenia	0.80	13.8	0.11	11.7	85.2	0.09	2.0	0.02
Azerbaijan	1.09	11.9	0.13	11.2	94.5	0.12	0.6	0.01
Belarus	1.97	44.1	0.87	38.8	88.0	0.76	5.3	0.10
Georgia	1.35	43.7	0.59	43.7	100.0	0.59	0.0	0.00
Kazakhstan	16.70	6.1	1.02	3.9	63.0	0.64	2.3	0.38
Kyrgyzstan	4.24	4.0	0.17	3.7	91.5	0.16	0.3	0.01
Republic of Moldova	0.76	10.7	0.08	9.8	91.3	0.07	0.9	0.01
Russian Federation	11.11	54.1	6.01	49.9	92.1	5.54	4.3	0.47
Tajikistan	2.37	5.1	0.12	2.8	54.8	0.07	2.3	0.05
Turkmenistan	11.16	7.8	0.87	7.8	100.0	0.87	0.0	0.00
Ukraine	1.14	16.4	0.19	16.3	99.6	0.19	0.1	0.00
Uzbekistan	1.80	5.1	0.09	4.5	88.0	0.08	0.6	0.01
Total: CIS	7.51	43.8	3.29	40.1	91.6	3.01	3.7	0.27
Canada	30.15	45.3	13.66	26.5	58.6	8.00	18.8	5.66
United States of America	3.34	32.5	1.09	23.7	72.9	0.79	8.8	0.29
Total: North America	6.03	39.0	2.35	25.1	64.5	1.52	13.8	0.83
Australia	40.67	76.0	30.92	20.6	27.1	8.39	55.4	22.53
Japan	0.29	69.0	0.20	66.0	95.7	0.19	3.0	0.01
New Zealand	7.13	33.4	2.38	29.3	87.8	2.09	4.1	0.29
Total: Other TBFRA	5.54	74.3	4.12	22.9	30.8	1.3	51.4	2.85
Grand total	4.05	46.2	1.87	31.4	67.9	1.3	14.8	0.60

TABLE 3
Forest and other wooded land by species groups

Country	Reference period	Forest				Other wooded land			
		Predominantly coniferous	Predominantly broadleaved	Predominantly bamboos, palms, etc.	Mixed	Predominantly coniferous	Predominantly broadleaved	Predominantly bamboos, palms, etc.	Mixed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Albania ©	1995	146	607	0	278	0	0	0	0
Austria	1992-96	2'613	470	0	757	84	0	0	0
Belgium ©	1997	273	322	0	51	0	25	0	2
Bosnia and Herzegovina ©	1995								
Bulgaria	1995	793	2,421	0	376	150	163	0	0
Croatia	1996	168	1,448	0	159	0	330	0	0
Cyprus	1996	116	1	0	0	0	0	0	163
Czech Republic ©	1995	820	346	0	1,464	0	0	0	0
Denmark ©	1990	168 ①	111 ①	0 ①	166 ①				
Estonia	1996	788 ①	416 ①	0 ①	812 ①	29	80	0	37
Finland ©	1991-96	17,596	1,692	0	2,595	762	123	0	0
France ©	1997	4,124	9,667	0	1,365	92	1,649	0	92
Germany ©	1997	6,052	2,715	0	1,973	0	0	0	0
Greece ©	1992	1,429	1,930	0	0	0	3,154	0	0
Hungary ©	1996	207 ①	1,416 ①	0	188 ①	0	0	0	0
Iceland	1998	10 ①	18 ①	0 ①	2	0	100	0	0
Ireland	1996	496	85	0	10	0	0	0	0
Israel	1997	67	55	0	0	0	48	0	0
Italy	1995	2,094 ①	7,071 ①	0 ①	692 ①	209	707	0	69
Latvia	1997	1,127	534	0	1,223	0	111	0	0
Liechtenstein	1995	3.0	2.10	0	1.80	0.20	0.20	0	0.10
Lithuania	1996	914	678	0	386	6	39	0	27
Luxembourg	1994	31 ①	53 ①	0 ①	2 ①	0	3	0	0
Malta	1996	0	0	0	0.347	0	0	0	0
Netherlands ©	1992-96	143	146	0	50	0	0	0	0
Norway ©	1994-96	4,930	1,962	0	1,818	702	2,407	0	181
Poland ©	1992-96	5,955 ①	1,377 ①	0	1,610 ①	0	0	0	0
Portugal	1995	911	2,031	0	441	0	39	0	45
Romania ©	1990-97	1,909	4,392	0	0	0	379	0	0
Slovakia ©	1996	621 ①	960 ①	0 ①	435 ①	2	8	0	5
Slovenia ©	1996	329 ①	413 ①	0	357 ①	29	30	0	8
Spain	1990	5,879 ①	5,123 ①	0 ①	2,507 ①	3,743	7,484	0	1,248
Sweden ©	1992-96	21,452	1,599	0	4,213	2,077	412	0	506
Switzerland ©	1997	671	269	0	233	15	38	0	8
The FYR of Macedonia ©	1995								
Turkey ©	1996	6,492	3,462	0	0	4,617	6,142	0	0
United Kingdom ©	1995	1,500 ①	800 ①	0	169	0	20	0	0
Yugoslavia ©	1995	212	2,511	0	171	43	507	0	35
Total: Europe									
of which: EU 15		64,761	33,816	0	14,990			0	
Armenia	1996	308	26	0	0	10	32	0	16
Azerbaijan ©	1988	14	922	0	0	7	47	0	0
Belarus	1994-97	3,046 ①	1,751 ①	0 ①	3,067 ①	108	854	0	110
Georgia ©	1995								
Kazakhstan	1993	1,742	1,320	0	7,442	438	113	0	5,618
Kyrgyzstan ©	1988	280	449	0	0	0	68	0	0
Republic of Moldova	1997	4	320	0	0	0	31	0	0
Russian Federation ©	1993	416,434 ①	66,912 ①	0 ①	333,192 ①	41,000	29,000	0	0
Tajikistan ©	1995	150	250	0	0	100	230	0	0
Turkmenistan ©	1995	225	3,529	0	0	0	0	0	0
Ukraine	1996	3,711	4,745	0	1,002	7	29	0	0
Uzbekistan ©	1988	200	1,709	0	0				
Total: CIS									
Canada ©	1994	153,533 ①	38,007 ①	0 ①	53,031 ①	107,000	28,000	0	38,013
United States of America ©	1992	98,253	94,506	0	24,574	61,360	19,158	0	284
Total: North America		251,786	132,513	0	77,605	168,360	47,158	0	38,297
Australia ©	1990-94	1,751	155,127	0	0				
Japan	1995	11,963 ①	10,158 ①	152 ①	1,788 ①				
New Zealand ©	1996	2,035	2,891	0	3,014	0	0	0	1'100
Total: Other TBFRA		15,749	168,176	152	4,802				
Grand total									

© See notes and comments in Chapter I.

① Adjustment to achieve conformity with TBFRA definitions carried out by the National Correspondent.

TABLE 5
Forest available for wood supply by species groups and silvicultural categories

Country	Reference period	Forest available for wood supply		By species groups				By silvicultural categories		
		Total (1000 ha)	Per cent of total forest area (Per cent)	Predominantly coniferous (1000 ha)	Predominantly broadleaved (1000 ha)	Predominantly bamboos palms, etc. (1000 ha)	Mixed (1000 ha)	High forest (1000 ha)	High forest as per cent of total FAWS (Per cent)	Coppice & coppice with standards (1000 ha)
Albania ©	1995	902	87.6	127	537	0	239	404	44.8	498
Austria	1992-96	3,352	87.3	2,125	470	0	757	3,256	97.1	96
Belgium ©	1997	639	99.0	272	317	0	50	556	87.0	83
Bosnia and Herzegovina ©	1995	1,305	57.3							
Bulgaria	1995	3,124	87.0	746	2,029	0	349	1,868	59.8	1,255
Croatia	1996	1,690	95.2	149	1,399	0	142	1,198	70.9	492
Cyprus	1996	43	36.9	43	0	0	0	43	100.0	0
Czech Republic ©	1995	2,559	97.3	786	340	0	1,433	2,555	99.8	4
Denmark ©	1990	440	98.9	168	106	0	166	438	99.5	2
Estonia	1996	1,932	95.8	746	401	0	785	1,932 ①	100.0	0 ①
Finland ©	1991-96	20,675	94.5	16,810	1,324	0	2,541	20,675 ①	100.0	0 ①
France ©	1997	14,470	95.5	3,992	9,194	0	1,284	7,648	52.9	6,822
Germany ©	1987	10,142	94.4	5,852	2,515	0	1,775			
Greece ©	1992	3,094	92.1	1,315	1,779	0	0	1,000	32.3	2,094
Hungary ©	1996	1,702	94.0	201	1,340	0	161	1,201 ①	70.6	501 ①
Iceland	1998	14	46.7	8	5	0	1	14 ①	100.0	0 ①
Ireland	1996	580	98.1	492	78	0	10	580	100.0	0
Israel ©	1997	70	57.4	40	30	0	0	40	57.1	30
Italy	1995	6,013	61.0	1,278	4,313	0	422	2,616 ①	43.5	3,397 ①
Latvia	1997	2,413	83.7	907	458	0	1,048	2,413	100.0	0
Liechtenstein	1995	4	58.0	2	1	0	2	4	100.0	0
Lithuania	1996	1,686	85.2	752	594	0	340	1,686	100.0	0
Luxembourg	1994	86	100.0	31	53	0	2	73	84.6	13
Malta	1996	0	0.0	0	0	0	0	0	0	0
Netherlands ©	1992-96	314	92.6	134	131	0	49	308	98.1	6
Norway ©	1994-96	6,609	75.9	4,103	1,085	0	1,421	6,609	100.0	0
Poland ©	1992-96	8,300	92.8	5,528	1,278	0	1,494	8,300	100.0	0
Portugal	1995	1,897	56.1	849	704	0	344	1,201	63.3	696
Romania ©	1990	5,617	89.1	1,702	3,915	0	0	5,248	93.4	369
Slovakia ©	1996	1,706	84.6	488	846	0	372	1,647 ①	96.5	59
Slovenia ©	1996	1,035	94.2	310	389	0	336	925 ①	89.4	110 ①
Spain	1990	10,479	77.6	4,452	4,366	0	1,661	8,845 ①	84.4	1,634 ①
Sweden ©	1992-96	21,236	77.9	17,378	887	0	2,971	21,220	99.9	16
Switzerland ©	1993-95	1,060	90.4	597	245	0	218	980	92.5	80
The FYR of Macedonia ©	1995	745	82.2							
Turkey ©	1996	8,635	86.7	5,547	3,088	0	0	6,911	80.0	1,724
United Kingdom ©	1995	2,108	85.4	1,454	518	0	136	2,088	99.1	20 ①
Yugoslavia ©	1995	2,379	82.2	187	2,038	0	154	1,172	49.2	1,207
Total: Europe		149,056	84.8							
of which: EU 15		95,525	84.1	56,603	26,755	0	12,167			
Armenia	1996	21	6.3	0	21	0	0	21	100.0	0
Azerbaijan ©	1988	153	16.3	0	153	0	0	141	92.2	12
Belarus	1994	5,966	75.9	2,309	1,330	0	2,327	5,071 ①	85.0	895 ①
Georgia ©	1995	591	19.8	118	473	0	0	527	89.3	63
Kazakhstan	1993	4,933	47.0	1,428	1,207	0	2,298	3,607	73.1	1,326
Kyrgyzstan ©	1988	0	0.0	0	0	0	0	0		
Republic of Moldova	1997	211	65.1	4	207	0	0	55 ①	25.8	156 ①
Russian Federation ©	1993	525,191	64.3	267,847	42,016	0	215,328	516,391	98.3	8,800
Tajikistan ©	1995	0	0.0	0	0	0	0	0		0
Turkmenistan ©	1995	3,650	97.2	219	3,431	0	0			
Ukraine	1996	5,999	63.4	2,455	2,797	0	747	4,608 ①	76.8	1,391 ①
Uzbekistan ©	1988	0	0.0	0	0	0	0			
Total: CIS		546,714	63.9	274,379	51,635	0	220,700			
Canada ©	1994	125,863	51.5	68,114	28,098	0	29,651	125,863 ①	100.0	0 ①
United States of America ©	1992	198,123	91.2	84,322	89,462	0	24,339	198,123	100.0	0
Total: North America		323,986	70.1	152,436	117,560	0	53,990	323,986	100.0	0
Australia ©	1990-94	16,438	10.5	1721	14,717	0	0	16,438	100.0	0
Japan	1995	23,276	96.7					23,226 ①	99.8	56 ①
New Zealand ©	1996	1,851	23.3	1,517	128	0	206	1,851	100.0	0
Total: Other TBFA		41,565	22.0					41,515	99.9	56
Grand total		1,061,321	63.1							

© See notes and comments in Chapter I.

① Adjustment to achieve conformity with TBFA definitions carried out by the National Correspondent.

TABLE 6

Forest not available for wood supply by species groups, silvicultural categories and reasons for non-availability

Country	Reference period	Forest not available for wood supply		By species groups				By silvicultural categories		By reasons for non-availability											
		Total (1000 ha)	Per cent of total forest area Per cent	Predominantly coniferous	Predominantly broadleaved	Predominantly bamboos, palms, etc.	Mixed	High Forest	Coppice & coppice with standards	For conservation/protection reasons	For economic reasons										
												(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
												(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Albania ©	1995	128	12.4	19	70	0	39	67	61	29	99										
Austria	1992-96	488	12.7	488	0	0	0	488	0	488	0										
Belgium ©	1997	7	1.0	1	5	0	1	3	3	7	0										
Bosnia and Herzegovina ©	1995	971	42.7																		
Bulgaria	1995	466	13.0	47	392	0	27	375	91	265	201										
Croatia	1996	85	4.8	19	49	0	17	65	20	85	0										
Cyprus	1996	74	63.1	73	1	0	0	73	1	11	63										
Czech Republic ©	1995	71	2.7	34	6	0	31	71	0	71	0										
Denmark ©	1990	5	1.1	0	5	0	0	5	0	5	0										
Estonia	1996	84	4.2	42	15	0	27	84	0	61	23										
Finland ©	1991-96	1,208	5.5	786	368	0	54	1,208	0	1,208	0										
France ©	1997	686	4.5	132	473	0	81	686	0	0	686										
Germany ©	1987	598	5.6	200	200	0	198			83	515										
Greece ©	1992	265	7.9	114	151	0	0	165	100	142	123										
Hungary ©	1996	109	6.0	6	76	0	27	57	52	68	41										
Iceland	1998	16	53.3	2	13	0	1	16	0	2	14										
Ireland	1996	11	1.9	4	7	0	0	11	0	6	5										
Israel	1997	52	42.6	27	25	0	0	2	50	10	42										
Italy	1995	3,844	39.0	816	2,758	0	270	2,052	1,792	1,855	1,989										
Latvia	1997	471	16.3	220	76	0	175	471	0	471	0										
Liechtenstein	1995	2.90	42.0	1.40	1.20	0	0.30	2.1	0.8	1.5	1.4										
Lithuania	1996	292	14.8	162	84	0	46	292	0	249	43										
Luxembourg	1994	0	0.0	0	0	0	0	0	0	0	0										
Malta	1996	0.347	100.0	0	0	0	0.347	0.347	0	0.347	0										
Netherlands ©	1992-96	25	7.4	9	15	0	1	25	0	3	22										
Norway ©	1994-96	2,101	24.1	827	877	0	397	2,101	0	114	1,987										
Poland ©	1992-96	642	7.2	427	99	0	116	642	0	398	244										
Portugal	1995	1,486	43.9	62	1,327	0	97	1,485	1	76	1,410										
Romania ©	1990	684	10.9	207	477	0	0	0	0												
Slovakia ©	1996	310	15.4	133	114	0	63	306	4	310	0										
Slovenia ©	1996	64	5.8	19	24	0	21	54	10	52	12										
Spain	1990	3,030	22.4	1,427	757	0	846	1,211	1,819	2,727	303										
Sweden ©	1992-96	6,028	22.1	4,074	712	0	1,242	6,028	0	5,180	848										
Switzerland ©	1993-95	113	9.6	74	24	0	15	107	4	7	106										
The FYR of Macedonia ©	1995	161	17.8																		
Turkey ©	1996	1,319	13.3	945	374	0	0	1,250	69	1,319	0										
United Kingdom ©	1995	361	14.6	46	282	0	33	361	0	75	286										
Yugoslavia ©	1995	515	17.8	25	473	0	17	118	397	515											
Total: Europe		26,773	15.2																		
of which: EU 15		18,042	15.9	8,159	7,060	0	2,823			11,855	6,187										
Armenia	1996	313	93.7	308	5	0	0	203	110	102	211										
Azerbaijan ©	1988	783	83.7	14	769	0	0	743	40	633	150										
Belarus	1994	1,899	24.1	738	421	0	741	1,614	285	1,719	180										
Georgia ©	1995	2,398	80.2																		
Kazakhstan	1993	5,571	53.0	314	113	0	5,144	1,964	3,607	590	4,981										
Kyrgyzstan ©	1988	729	100.0	280	449	0	0			600	129										
Republic of Moldova	1997	113	34.9	0	113	0	0	40	74												
Russian Federation ©	1993	291,347	35.7	148,587	24,896	0	117,864	280,847	10,500	23,691	267,656										
Tajikistan ©	1995	400	100.0	150	250	0	0	210	190	360	40										
Turkmenistan ©	1995	104	2.8	6	98	0	0			104	0										
Ukraine	1996	3,459	36.6	1,256	1,948	0	255	2,194	1,265	3,445	14										
Uzbekistan ©	1988	1,909	100.0	200	1,709	0	0														
Total: CIS		309,025	36.1																		
Canada ©	1994	118,708	48.5	85,419	9,909	0	23,380	118,708	0	19,664	99,044										
United States of America ©	1992	19,210	8.8	13,931	5,044	0	235	19,210	0	19,210	0										
Total: North America		137,918	29.9	99,350	14,953	0	23,615	137,918	0	38,874	99,044										
Australia ©	1990-94	140,439	89.5	30	140,410	0	0														
Japan	1995	788	3.3							788	0										
New Zealand ©	1996	6,089	76.7	518	2,763	0	2,808	6,089	0	5,573	516										
Total: Other TBFR A		147,316	78.0																		
Grand total		621,032	36.9																		

TABLE 7
Changes over time in area of forest and other wooded land

Country	Reference period 1	Reference period 2	Forest			Other wooded land		
			Period 1	Period 2	Average annual change	Period 1	Period 2	Average annual change
			(1000 ha)		(±1000 ha)	(1000 ha)		(±1000 ha)
			(1)	(2)	(3)	(4)	(5)	(6)
Albania ©	1957	1995	1,328	1,030	-7.80	0	0	0.00
Austria ©	1986-90	1992-96	3,794	3,840	7.70	84	84	0.00
Belgium	1982	1997	665	646	-1.26	25	26	0.10
Bosnia and Herzegovina ©	1990	1995	2,276	2,276	0.00	434	434	0.00
Bulgaria	1985	1995	3,386	3,590	20.38	298	314	1.60
Croatia	1986	1996	1,758	1,775	2.00	333	330	-0.10
Cyprus	1980-90	1990-98	117	117	0.00	163	163	0.00
Czech Republic ©	1986	1995	2,625	2,630	0.50	0	0	0.00
Denmark ©	1976	1990	434	445	0.98	85	113	2.00
Estonia	1988	1996	1,916	2,016	12.50	102	146	5.50
Finland	1980-89	1991-96	21,805	21,883	8.00	1,085	885	-20.00
France ©	1987	1997	14,540	15,156	61.60	2,015	1,833	-18.20
Germany ©	1961	1987	10,162	10,740	22.00	0	0	0.00
Greece ©	1964	1992	2,512	3,359	30.00	3,960	3,154	-29.00
Hungary ©	1990	1996	1,768	1,811	7.20	0	0	0.00
Iceland ©	1990	1998	25	30	0.60	100	100	0.00
Ireland	1987	1996	421	591	17.00	0	0	0.00
Israel ©	1990	1997	82	122	5.00	25	48	2.90
Italy ©	1980	1995	9,415	9,857	29.50	1,427	985	-29.50
Latvia	1988	1997	2,757	2,884	12.70	143	111	-3.20
Liechtenstein	1975	1995	5.30	6.90	0.08	0.50	0.50	0.00
Lithuania	1987	1996	1,930	1,978	4.80	64	72	0.80
Luxembourg	1994	1997	86	86	0.00	3	3	0.00
Malta	1993	1996-1996	0.347	0.347	0.00	0	0	0.00
Netherlands ©	1988-92	1992-96	334	339	1.00	0	0	0.00
Norway ©	1980-86	1994-96	8,300	8,710	31.00	3,100	3,290	15.00
Poland ©	1987-91	1992-96	8,886	8,942	11.00	0	0	0.00
Portugal ©	1985	1995	2,814	3,383	57.00	389	84	-31.00
Romania ©	1955	1990	5,772	6,301	14.70			
Slovakia ©	1988	1996	1,961	2,016	6.88	15	15	0.00
Slovenia ©	1986	1996	1,077	1,099	2.20	67	67	0.00
Spain	1970	1990	11,786	13,509	86.00	13,830	12,475	-68.00
Sweden ©	1985-89	1992-96	27,260	27,264	0.60	2,975	2,995	2.90
Switzerland	1983-85	1993-95	1,130	1,173	4.30	56	61	0.50
The FYR of Macedonia ©	1990	1995	906	906	0.00		82	
Turkey	1963-72	1973-96	8,856	9,954	46.00	11,343	10,759	-24.00
United Kingdom ©	1980	1995	2,174	2,469	20.00	20	20	0.00
Yugoslavia	1979	1995	2,918	2,894	-1.45		586	
Total: Europe					512.71			-191.70
of which: EU 15					340.12			
Armenia	1983	1996	292	334	4.20	35	58	2.30
Azerbaijan ©	1983	1988	870	936	13.00	52	54	0.40
Belarus	1988	1994	6,327	7,865	256.20	857	1,071	35.60
Georgia ©	1990	1995	2,988	2,988	0.00	0	0	0.00
Kazakhstan	1988	1993	9,310	10,504	239.00	5,787	6,169	76.00
Kyrgyzstan ©	1988	1993	729	843 ②	22.80	68	68	0.00
Republic of Moldova	1988	1997	318	324	0.65	31	31	0.00
Russian Federation ©	1988	1993	821,988	816,538	-1,090.00	62,105	70,000	1,579.00
Tajikistan ©	1988	1995	386	400	2.00	330	330	0.00
Turkmenistan ©	1990	1995	3,754	3,754	0.00	0	0	0.00
Ukraine	1988	1996	9,213	9,458	31.00	35	36	0.10
Uzbekistan ©	1988	1995	1,909	1,946 ②	4.58	261		
Total: CIS			858,085	855,890	-516.57	69,561		1,693.40
Canada ©	1980	1994	244,571	244,571	0.00	173,013	173,013	0.00
United States of America ©	1987	1992	214,391	217,333	588.00	81,597	80,802	-159.00
Total: North America					588.00			-159.00
Australia ©		1994		156,877			421,590	
Japan ©	1986	1995	24,033	24,064	3.40	1,222	1,214	-0.90
New Zealand ©	1986	1996	7,552	7,940	39.00	1,000	1,100	10.00
Total: Other TBFA								
Grand total								

© See notes and comments in Chapter I.

② The data are different than in enquiry table 1 "Total area by main classes" for forest

TABLE 8

Changes over time in area of forest available and not available for wood supply

Country	Reference period 1	Reference period 2	Forest					
			Available for wood supply			Not available for wood supply		
			Period 1	Period 2	Average annual change	Period 1	Period 2	Average annual change
			(1000 ha)	(1000 ha)	(±1000 ha)	(1000 ha)	(1000 ha)	(±1000 ha)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Albania ©	1957	1995	1,328	902	-11.20	0	128	3.40
Austria ©	1986-90	1992-96	3,331	3,352	3.50	463	488	4.20
Belgium	1982	1997	659	639	-1.32	6	7	0.05
Bosnia and Herzegovina ©	1990	1995	1,305	1,305	0.00	971	971	0.00
Bulgaria	1985	1995	3,222	3,124	-9.80	164	466	30.18
Croatia	1986	1996	1,674	1,690	2.00	84	85	0.10
Cyprus	1980-90	1990-98	43	43	0.00	74	74	0.00
Czech Republic ©	1986	1995	2,546	2,559	1.30	79	71	-0.80
Denmark ©	1976	1990	433	440	0.51	1	5	0.33
Estonia	1988	1996	1,844	1,932	11.00	72	84	1.50
Finland	1980-89	1991-96	21,150	20,675	-47.00	655	1,208	55.00
France ©	1987	1997	14,102	14,470	36.80	438	686	24.80
Germany ©	1961	1987	9,590	10,142	21.00	572	598	1.00
Greece ©	1964	1992	2,314	3,094	28.00	198	265	2.00
Hungary ©	1990	1996	1,685	1,702	2.90	83	109	4.30
Iceland ©	1990	1998	10	14	0.50	15	16	0.10
Ireland	1987	1996	413	580	17.00	8	11	0.30
Israel ©	1990	1997	53	70	2.10	29	52	2.90
Italy ©	1980	1995	5,731	6,013	18.80	3,684	3,844	10.70
Latvia	1988	1997	2,248	2,413	16.50	509	471	-3.80
Liechtenstein	1975	1995	3	4	0.07	3	3	0.02
Lithuania	1987	1996	1,652	1,686	3.40	278	292	1.40
Luxembourg	1994	1997	86	86	0.00	0	0	0.00
Malta	1993	1996-1996	0	0	0.00	0.347	0.347	0.00
Netherlands ©	1988-92	1992-96	306	314	1.60	28	25	-0.60
Norway ©	1980-86	1994-96	6,500	6,609	8.00	1,800	2,101	23.00
Poland ©	1987-91	1992-96	8,357	8,300	-11.00	529	642	22.00
Portugal ©	1985	1995	1,846	1,897	5.00	968	1,486	52.00
Romania ©	1955	1990	4,950	5,617	-18.50	822	684	32.70
Slovakia ©	1988	1996	1,700	1,706	0.75	261	310	6.13
Slovenia ©	1986	1996	1,013	1,035	2.20	64	64	0.00
Spain	1970	1990	9,658	10,479	41.00	2,128	3,030	45.00
Sweden ©	1985-89	1992-96	21,306	21,236	-10.00	5,954	6,028	10.60
Switzerland	1983-85	1993-95	1,003	1,060	5.70	127	113	-1.40
The FYR of Macedonia ©	1990	1995	745	745	0.00	161	161	0.00
Turkey	1963-72	1973-96	8,730	8,635	-4.00	126	1,319	50.00
United Kingdom ©	1980	1995	1,854	2,108	17.00	320	361	3.00
Yugoslavia	1979	1995	2,470	2,379	-5.67	448	515	4.20
Total: Europe					128.14			384.30
of which: EU 15					131.90			208.38
Armenia	1983	1996	20	21	0.10	272	313	4.10
Azerbaijan ©	1983	1988	181	153	-5.60	689	783	18.90
Belarus	1988	1994	5,392	5,966	95.60	936	1,899	160.50
Georgia ©	1990	1995	591	591	0.00	2,398	2,398	0.00
Kazakhstan	1988	1993	4,397	4,933	107.00	4,913	5,571	132.00
Kyrgyzstan ©	1988	1993	0	0	0.00	729	843	22.80
Republic of Moldova	1988	1997	204	211	0.65	113	113	0.00
Russian Federation ©	1988	1993	572,979	525,191	-9,557.60	249,009	291,347	8,467.60
Tajikistan ©	1988	1995	0	0	0.00	386	400	2.00
Turkmenistan ©	1990	1995	3,650	3,650	0.00	104	104	0.00
Ukraine	1988	1996	6,120	5,999	-15.00	3,093	3,459	46.00
Uzbekistan ©	1988	1995	0	0	0.00	1,909	1,909	4.58
Total: CIS					-9374.85			8858.48
Canada ©	1980	1994	125,863	125,863	0.00	118,708	118,708	0.00
United States of America ©	1987	1992	195,596	198,123	505.00	18,795	19,210	83.00
Total: North America					505.00			83.00
Australia ©		1994		16,438			140,439	
Japan ©	1986	1995	23,267	23,276	1.00	766	788	2.44
New Zealand ©	1986	1996	1,461	1,851	39.00	6,091	6,089	0.00
Total: Other TBFRA								
Grand total								

NOTES AND COMMENTS RELATING TO CHAPTER I

Main Tables

Comments

Albania

1, 2

Enquiry Table 1: The share of Albania's forests in total land area has been decreasing for the last 50 years because the rate of deforestation for transfer to agriculture land was larger than increases and because of the exclusion of much forest area due to changed definition of forest in the later forest inventories (a lot of forest area, mainly of small bushes and degraded forest areas changed utilization, primarily for pasture of goats, etc.).

3, 4, 5, 6

Enquiry Table 3: The trends since the 1950s were as follows:

The coniferous forests increased, the broadleaved and mixed forests decreased and forests not available for wood supply increased. The coniferous forests increased as a result of reforestation mainly with black pine and Mediterranean pines (Aleppo pine, Stone pine, Maritime pine) while the broadleaved and mixed forests decreased as a result of deforestation to provide more arable land and because the area of forests not available for wood supply increased.

5, 6

Enquiry Table 4: The larger part of the Albanian forest area is composed of coppice with standards.

7, 8

Enquiry Table 7: By comparing the figures for 1957 and 1995, the trends were as follows:

- There were reductions in the area of total forest and forest available for wood supply (respectively, from 1,328,000 ha in 1957 to 1,030,000 ha in 1995 and, from 1,328,000 ha in 1957 to 902,100 ha 1995).
- There was an increase in the area of forest not available for wood supply (from zero in 1957 to 127,900 ha in 1995).

The annual average reduction of the total area was 7,800 ha and of the forest available for wood supply was 11,200 ha, while the annual average increased for forest not available for wood supply was 3,400 ha.

Armenia

1, 2

Enquiry Table 1: Method of adjustment to TBFRA definition: recalculation of the national forest survey data, and rough estimates for OWL were done by the national correspondent (areas involved are rather small).

Australia

1, 2

Enquiry Table 1: The definition of forest used in this report is: An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding two metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20 per cent.

This definition is different from previous definitions used in Australia in several important ways:

1. The minimum potential crown cover to qualify an area of trees as forest has been set at 20 per cent. This is generally equivalent to the widely used lower boundary of woodland. Thus, woodlands are now included in the definition of forest where they were formerly excluded. This change in definition adds about 112 million hectares to the total forest estate previously report for Australia.

2. The definition refers to "usually" single stemmed trees and sets the lower tree height limit at two metres.

This allows the inclusion of the mallee formation, Australia's multi-stemmed Eucalyptus trees, in the definition. The full definition, which requires that vegetation be of tree formation, excludes shrublands even if they are higher than two metres.

Using the Tropic of Capricorn as the boundary to divide tropical and temperate forests, 47.6 per cent is tropical and 52.4 per cent temperate (no boreal).

The definition of other wooded land used in this report: Data on other wooded land were derived by using a coarse national vegetation data set at 5 million scale to select tall shrubs and tall, medium and low trees. This data set does not separately identify forests where *Callitris glaucophylla* (Cypress Pine, which is Australia's major native softwood) is the dominant or sub-dominant canopy species. From this vegetation data set (Commonwealth of Australia 1990, J. A. Carnahan) areas were included in "other

wooded land” where projected foliage cover was less than 10 per cent (this is equivalent to a crown cover of 0.25 to 25 per cent). The following were included: Tall, Medium and Low Trees (>30, 10-30 and <10m respectively) and Tall Shrubs (>2m). The Tall Shrubs category excludes eucalyptus as these were included under 'forest' as Mallees.

3, 4, 5, 6

Enquiry Table 3: Forest available for wood supply:

Across Australia, State Agency assessments for all forest types within State Forest tenures result in a proportion of 54.47 per cent of forested land being available for wood supply. This proportion has been applied to forested land in other tenures, where no other data exist, to infer the area available for wood supply.

These statistics do not take into account the location of processing facilities or road access. They should therefore only be used as indicative figures.

Significant work is currently being undertaken to quantify the potential forest resources on private land within existing commercial regions.

Forest not available for wood supply, and reasons: Of the forest which is not available for wood supply, Nature Conservation Reserves protect 17.6 million ha. A further 121.7 million ha are not harvested for both economic and protection reasons. The greater proportion of State Forest which is not harvestable is likely to be for conservation reasons. The greater proportion of other tenures combined which are not harvestable is likely to be for economic reasons.

5, 6

Enquiry Table 4: The high forest figure for “High forest” includes a certain amount of natural coppicing in response to harvesting or natural damage.

7, 8

Enquiry Table 7: No data on change are available at present. The National Land Cover Change Project is currently in progress. On completion at the end of 1998, three data sets will be produced : baseline, 1990 and 1995. These will be useful for assessing change in land cover.

Austria

1, 2

Enquiry Table 1: The 1986-1990 assessment of the Austrian Forest Inventory did not distinguish between forest and other wooded land. Therefore a reliable estimate on other wooded land data was of no practical use for the TBFRA-1990. Additionally, such data had been unavailable for decades.

Therefore in the 1992-1996 assessment of the Austrian Forest Inventory, the terms and definitions were expanded and fit to the TBFRA-2000 terms and definitions.

Austrian other wooded land is the “dwarf-pine-belt” (*Pinus mugo* var.), which is mainly in high mountainous regions (see also comments on table 7 “Changes in area of forest and other wooded land over time by main categories” and table 21 “Protection”).

7, 8

Enquiry Table 7: The data for the previous reference are adapted to the TBFRA-2000 definition of “forest” and “other wooded land”.

In the TBFRA-1990 the forest area (3,877,000 ha) includes other wooded land (see also comments on table 1 “Total area by main classes”). However, it has been assumed that the area of other wooded land, which is mainly in high mountain regions, does not change too much—it was estimated to remain stable between the two reference periods.

Therefore: TBFRA-1990: 3,878,000 ha - 84,000 ha = 3,794,000 ha.

TBFRA-2000: 3,924,000 ha - 84,000 ha = 3,840,000 ha (table 1 “Total area by main classes”)

The data on “average annual change between reference periods” are calculated results of the assessment periods 1986-1990 and 1992-1996 of the Austrian Forest Inventory, which is based on permanent plots.

Azerbaijan

3, 4, 5, 6

Enquiry Table 3: Figures not adjusted for lack of objective data. Significant areas of forest (783,000 ha) are not suitable for cutting from an environmental and economic standpoint.

5, 6

Enquiry Table 4: Unadjusted - no factual data for recent years.

7, 8

Enquiry Table 7: There were changes between the base periods, especially in forest not available for wood supply.

Belarus

1, 2

Enquiry Table 1: “Forest” includes land:

1. Covered in trees (main and other forest-forming species), non-continuous forest growth, nurseries and plantations;
2. Not covered in trees—openings, slashes, dead stands, cuttings, clearings.

“Other wooded land” includes areas of shrubs and bushes.

The distribution of land by the land categories adopted in the Russian State forest resource census (GULF) is shown in supplementary table which is available in the secretariat.

3. The accuracy of the geodesic measurements made for forestry applications (“Instructions on the conduct of forestry operations in Russia's forest resources,” Vols. I and II, (Moscow, VNIITslesresurs, 1995) was used in determining the likely range.

Belgium

1, 2

Enquiry Table 1: Forest land areas (items 1.4 to 1.6 in this table) are estimated by a count of grid points. Errors on those estimations are calculated according to the Zöhrer formula (1970) for a probability $p=0.95$.

3, 4, 5, 6

Enquiry Table 3: The criterion for differentiating between coniferous, broadleaved and mixed is the land area and not the crown cover.

Bosnia and Herzegovina

1, 2

Enquiry Table 1: Source for Total area, and Forest area: Data provided by the Forest authorities of Bosnia and Herzegovina (through the Permanent Mission of Bosnia and Herzegovina in Geneva) in their reply to the concise enquiry for SOFO-1997 (15.08.1996).

Source for Inland water and Land area: Information is the secretariat estimates based on different sources.

The figure for the Other wooded land area is the secretariat estimate on the basis of 16 per cent of the area of FOWL (in Croatia 15.6 per cent; in Yugoslavia 16.8 per cent).

Information on managed other wooded land is not available.

3, 4, 5, 6

Enquiry Table 3: The data for “Forest available for wood supply” and for “Forest not available for wood supply” are the secretariat estimates based on the information from different literature sources.

7, 8

Enquiry Table 7: The data for Forest are the secretariat estimates based on the information from different literature sources.

Canada

1, 2

Enquiry Table 1: Canada's Forest Inventory 1991 (CanFI91), 1994 version is the authoritative national database on the distribution and structure of the forest resource. CanFI91 is a spatially referenced database containing the best information available in 1991. The main numerical change to the database in 1994 was the incorporation of new source data from the province of Quebec.

The inventory is aggregated from many sources. Over the years the specifications of the modern source inventories have become more complete, and most provinces and territories have programs of periodic inventory renewal for the active areas of forest management. The oldest source inventories, with the most missing values in the data, tend to occur in more remote areas.

Canada's Forest Inventory takes advantage of existing data available in the inventory organizations of the provincial and territorial forest services, and uses very economical methods for aggregation to the national level. It represents the best information available at the time. It and its source inventories are not time-series entities, and users are advised that mathematical differences between successive inventories are not necessarily due to real change during that 5-year period.

Reference Sources:

“Total area”: Canada Year Book 1992, total area of Canada.

“Inland water”: Freshwater area from Canada Year Book 1992.

“Forest and other wooded land”: Forest land + timber productive forest + timber unproductive forest (CanFI land classes 1, 2, and 3) This number is almost 36 million hectares smaller than the estimate reported in FRA1990 because that figure, from Canada's Forest Inventory 1986, included an estimate of 55 million hectares of forest land in uninventoried portions of Quebec, Ontario and Manitoba. This estimate was replaced in the 1991 national forest inventory by low intensity samples of the previously uninventoried area. The historical estimates were considerably larger than the new estimates, resulting in an apparent reduction in the forest area.

“Forest”: Timber productive forest land (CanFI land class 1).

“Other wooded land”: Forest land (unspecified productivity) + timber unproductive land (CanFI land classes 2 and 3).

“Other land”: Calculated residual, i.e., Land area–Forest & other wooded land = Other land.

3, 4, 5, 6

Enquiry Table 3: Reference Source: Canada's Forest Inventory.

“Forest, total”: From Table 1, Timber productive forest land (CanFI land class 1)

“Predominantly coniferous”: Timber productive forest land of softwood forest type + the softwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the softwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type.

“Predominantly broadleaved”: Timber productive forest land of hardwood forest type + the hardwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the hardwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type.

“Predominantly bamboos, palms, etc”.: Not applicable.

“Mixed”: Timber productive forest land of mixedwood forest type + the mixedwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the mixedwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type.

“Forest available for wood supply”: Accessed nonreserved timber productive forest land, with adjustments downward in BC, Alberta, and Nova Scotia (provided by provincial forestry authorities) .

“Predominantly coniferous on Forest available for wood supply”: Accessed nonreserved timber productive forest land of softwood forest type + the softwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the softwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type (Adjusted as above in "Forest available for wood supply).

“Predominantly broadleaved”: Accessed nonreserved timber productive forest land of hardwood forest type + the hardwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the hardwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type (Adjusted as above in “Forest available for wood supply”).

“Predominantly bamboos, palms etc.” on forest available for wood supply: Not applicable.

“Mixed” on Forest available for wood supply: Accessed nonreserved timber productive forest land mixedwood forest type + the mixedwood part of the missing value forest type, assigned according to the proportions of the classified forest type + the mixedwood part of the nonstocked and unproven stocking class (forest type not available), assigned according to the proportions of the classified forest type (Adjusted as above in Forest available for wood supply).

“Forest not available for wood supply”: Calculated residual, i.e., Forest, total–Forest available for wood supply = Forest not available for wood supply.

“For conservation/protection reasons on Forest not available for wood supply: Reserved timber productive forest (Adjusted as above in Forest available for wood supply).

“For economic reasons” on Forest not available for wood supply: (Accessed reserved timber productive forest + non-accessed timber productive forest) - Reserved timber productive forest (Adjusted as above in Forest available for wood supply).

“Other wooded land”: (From table 1) Forest + timber unproductive forest (CanFI land classes 2 and 3).

Predominantly coniferous, broadleaved, bamboos, palms etc., and mixed: There is no basis for estimating this value because timber unproductive forest land is not classified as to forest type, age class, etc. in CanFI. See below for supplementary information. The distribution of other wooded land areas by species group in the table is the secretariat's estimate based on the assumption that the proportion of coniferous, broadleaved and mixed species groups on other wooded land is similar to that of on forest land.

Supplementary information:

Other wooded land–The following information, provided by the Ontario Ministry of Natural Resources, is illustrative of the situation in Canada:

The area figure provided for “other wooded land” consists of the sum of non-productive land features, namely treed muskeg, open muskeg, brush and alder, and rock. Protection forest site class 4, a category under “productive forest” within the Forest Resource Inventory (FRI) database is also included in “other wooded land” In terms of relative abundance, treed muskeg (~35 per cent) is the single largest category within the “other wooded land” class, followed by brush and alder (~20 per cent), protection forest site class 4 (~15 per cent), and rock (~10 per cent).

The majority of non-productive lands and protection forest site class 4 exist in northern Ontario where coniferous vegetation dominates the landscape. Coniferous vegetation is most dominant in the treed muskeg, rock, and protection forest site class 4 categories, while deciduous vegetation dominates the brush and alder category and have a significant presence in the protection forest site class 4 category. Mixedwood conditions occur infrequently within the “other wooded land” class, but do occur within the protection forest site class 4 and rock categories.

The primary coniferous tree species occupying “other wooded lands” are black spruce and jack pine, while the primary deciduous species growing within “other wooded lands” are trembling aspen and white birch. Mixedwood conditions, where they occur, are often composed of black spruce, jack pine, trembling aspen, and birch in the boreal regions of Ontario, and a combination of white pine, red pine, white birch, trembling aspen, red maple, sugar maple, and red oak in the temperate parts of Ontario.

5, 6

Enquiry Table 4: Forest inventories in Canada do not distinguish between high forest and coppice and coppice and standards. The entire timber productive forest area is assumed to be high forest.

7, 8

Enquiry Table 7: In the annual report to Parliament on the state of Canada's forests, the correspondents assume that the forest land base remains constant and that the impact of fires, pests, harvesting, etc. is reflected in changes to the age-class distribution and stocking. We are not able to make estimates of the changes sought in table 7 "Changes in area of forest and other wooded land over time by main categories" and will not support estimates made by another body.

Cyprus

1, 2

Enquiry Table 1: Official estimated data.

There exists supportive information on the "National Forest Inventory Results" in the reply to the enquiry, which is available at the secretariat.

Czech Republic

1, 2

Enquiry Table 1: Definitions for parameters used in the TBFRA-2000 enquiry are close to those of the Czech Republic; therefore, no adjustments considered necessary.

3, 4, 5, 6

Enquiry Table 3: In the Czech forestry database, the two categories of forest areas are registered:

(i) area of forest stands = an area of land actually covered by forest trees and temporary unstocked areas, and (ii) area of forest [= TBFRA-2000 forest] = the same area as above plus land without trees that is permanently used for forestry purposes (forest roads, cleared tracks, etc.).

Most of the registered data are based on the area of forest stands. These are adjusted here and in the other tables using a difference coefficient: area of forest = 2,630 thousands of ha; area of forest stands = 2,584 thousands of ha; coefficient for stands area multiplication = 1.0178

Data on predominance within inventory units have been specially processed for the TBFRA-2000. The average area of one inventory unit is 2.23 ha. The Forestry database contains data on civil forests only [area of forest stands]. These were adjusted to the total forest area including military forests [see *Enquiry Table 13* for details].

The area of protection forests is mentioned as the forest not available for wood supply. Protection forest [Czech forest category 2] includes: 2a—forests on extremely unfavourable sites, 2b—forests on tree line that protect forests below the line, exposed mountain ridge tops, protection forests in localities endangered by avalanches etc., 2c—forests in the zone of mountain dwarf pine, 2d—soil protection forests. Felling in the category is significantly limited if allowed at all. The other forests including major parts of the national parks are regenerated with human intervention [felling] and the wood is available. The area of forest stands in the forest category 2 is 70 thousand ha forming 2.71 per cent of the total area.

The true area of forest not available for wood supply could be within 70 and 115 thousands of ha because a part of the category has been registered as the sub-category 3e—forest damaged by air pollution. The precise area will be known by 1999. In this range, about 5 thousand ha are forest stands in national parks where disturbance of natural processes will be not allowed [the size is still undergoing change].

Concerning the economic problems with small wood coming from thinning of young forest stands, these are not included. Non economic stands [from the point of view of rotation period] are located in forest category 2.

7, 8

Enquiry Table 7: Forest not available for wood supply = Czech forest category 2 protected forest. That category is overlapped [hidden] by the forests damaged by air pollution.

Denmark

1, 2

Enquiry Table 1: Estimates on other wooded land have not been included in former FAO-statistics for Denmark. This time an estimate has been made mainly for two reasons: one is the change in the FAO-definitions on other wooded land which are regarded as more precise and thus useable for Denmark, another is the reality that the total area of other different reasons mentioned below.

Therefore comparisons with previous FAO-statistics can not be made on the item "other wooded land".

The area of other wooded land is based on a number of estimations: The whole group consists of different types of area within the TBFRA-definition but outside the normal Danish definition of forest, that would say area with woody plants which are or in a short time will be higher than 10 m, wider than 20 m, have a crown-cover of more than 50 per cent, and is more than 0.5 ha.

In Denmark, other wooded land consists of: Shelterbelts and windbreaks: Ministry for Food, Agriculture and Fisheries, The Structure-directorate, estimates, that the total amount of these make up about 40,000 km with an average width of 6 m: Total: 24,000 ha

As mentioned the total area of shelterbelts and windbreaks is estimated very roughly. The proportion of these areas is anyhow increasing as public subsidies for wider broadleaved shelterbelts with supplementary broadleaved groves are exchanged.

Wild-life-planting: National Forest and Nature Agency, Bureau for Hunting and Wildlife-administration, have estimated this area to be: 6,000 ha

The estimate is based on the statistics on the last 20-25 years public subsidies given.

Planting of Christmas trees outside forests: The private organisation for Christmas trees "Juletræsforeningen" estimates this area as 1.5 times the registered area within forests according to the "Skove og Plantager i 1990", published by Danmarks Statistik and Skov- og Naturstyrelsen, including conifers other than *Abies nordmannia* and *A. procera*: 30,000 ha

This area excludes Christmas-trees within forests—these stands are parts of the total forest area (445.391 ha). Scrubs along slopes etc, according to National Forest and Nature Agency, Bureau of the Administration of Nature: 20,000 ha

The very rough estimate is based on studies of about 4 maps at the scale 1:25.000 in Mid-Jutland. Overlap with the other types of other wooded land can only be expected to a very limited extent. Different planting along major roads, etc, a very rough estimate by Bureau of Forestry Management Planning: 13,000 ha

Total: 93,000 ha

There is an inconsistency with table 2.5-2.7 where it seems that "other wooded land" can be either undisturbed by man or semi-natural (as pointed out in the meeting of the National Correspondents in Geneva in November 1997): In the Danish delimitation of the vegetation-type as described above most other wooded land is not undisturbed by man—actually a large part of the other wooded land in Denmark is intensely managed.

3, 4, 5, 6

Enquiry Table 3: Figures on forests which are mainly broadleaved, mainly coniferous or mixed do not exist for Denmark.

The figures in the table are calculated in the following way:

First the figures are calculated for state forests. The state forests are spread all over the country but with a considerable variation of appearance. This will be taken into account in the following.

A central database for the state forests ("CSR") contains information on every stand, forest, forest-district and so on. In the head groups Dune-districts ("kli"), Heather-districts ("hede"), old forest in the west (gamle skovegne west) and old forests in the east ("gamle skovegne øst") totals on forests with less than 25 per cent, between 25 and 75 per cent. and over 75 per cent broadleaves have been calculated.

For somewhat similar regions (counties: Norjyland, Viborg, Ringkjøbing and Ribe, Fyn, Århus, Vejle and Sønderjylland, respectively Bornholm, Frederiksborg, Vestsjælland, Roskilde, Storstrøm and København), the proportions between state- and privately owned forests have been calculated. The first part of the state forests 'dune-districts' have not been included in this calculation, although these areas almost only contain state forests. This calculation was based on: Danmarks Statistik and Skov- og Naturstyrelsen: Skove og Plantager 1990.

Totals for Denmark of forests which are mainly broadleaved, mainly coniferous or mixed have then finally been calculated by a combination of the composition of these three forest types in the state forests with the composition between state- and privately owned forests.

The estimate is based on two assumptions: 1. the proportion broadleaved/coniferous/mixed forest is the same in state and privately owned forests—no aspects argue against this assumption, and 2. the borderlines between counties and the main-grouping of state forests do not affect the final calculation - it is not strictly correct, but it does not affect the main lines of the result.

Forests not available for wood supply: The figure on forests not available for wood supply is calculated for 1996 and contains:

private forests: 46 reserves with an total of 1147 ha.

public owned forests: 246 reserves with a total of 3937 ha.

total 292 reserves with 5086 ha.

These figures are given to EFI 'European Forest Institute' investigations on Europe's natural forests by the national Forest and Nature Agency.

Known deviations from the TBFR-2000 definitions: In the 1990 FAO/ECE Forest Resources Assessment a total Danish forest area of 466,000 ha (forests including open areas in accordance with the forest statistic of 1976) was divided into 316,000 ha coniferous forests and 150,000 ha broadleaved forests. These figures are based on stands and not on forests and the group 'mixed forests' did not occur in the 1990-investigation.

If the figures based on the 1976 Danish forest statistic should be compared with the next and newest 1990-forest statistic (stand-based figures) it could look like this:

Conifers: 1976: 269,000 ha, 1990: 268,000 ha

Broadleaved: 1976 : 137,000 ha, 1990: 143,000 ha

(the figures in the 1990 FAO/ECE are adjusted in relation to the 1976 Danish forest statistics.).

The calculation done in this table concerning division of the Danish forest area into < 25 per cent / 25-75 per cent / 75 per cent categories on broadleaved/conifers has not been done before and the precision is therefore difficult to estimate.

5, 6

Enquiry Table 4: No valid information exists on the area of coppice. Due to the forest law coppice is only allowed if there is an old habit on the area or if special permission is given by the authorities.

The figures on coppice are estimated based on interview's with state forest district where most coppice exists. The special and local historic oak-bushes ('egekrat') are not included in the estimate. It is presumed that all coppice is rejuvenated every 20-40 year—if not the stand will not be regarded as coppice.

7, 8

Enquiry Table 7: The two latest forest statistics are from 1990 and 1976 respectively.

In 1976 all areas belonging to forestry-holdings, including much agriculture land, was listed. The same group of holdings was included in the 1990 statistics but the figures were 'cleaned' for areas which were not forestry or areas in close connection to forestry. The figure for the previous period is thus calculated in a way that the amount of non-wooded area (help-areas etc.) is relatively the same as in the 1990 forest statistics. The amount of areas not available for wood supply in the previous period is estimated at the same magnitude as forests undisturbed by man in that period.

Other wooded land: the figures are comparable with the rest of TBFRA.

In the estimate on the average change in other wooded areas, it is assumed that the average rotation time for such areas mentioned under table 1 is 30 years except for scrub along slopes etc., which do not have any specific rotation time.

Important:

In the period afforestation due to a number of Government activities has increased considerably. A main aim for the next forest statistics would presumably be to give good estimates for this activity. It is assumed that the annual average afforestation in the mid-1990s has been about 1,900 ha and afforestation at the moment has the amount of about 2,500 ha.

Estonia

1, 2

Enquiry Table 1: Other wooded land includes shrubs, bushes and non-agricultural land covered with trees.

Finland

1, 2

Enquiry Table 1: For each field plot, the expected canopy coverage between 0 and 30 per cent, the actual coverage was estimated by means of modelling and partly aerial photographs interpretation.

3, 4, 5, 6

Enquiry Table 3: The differences between the total areas and the sums of the classes is due to the open regeneration areas (on forest land 308,000 ha and on forest land available for wood supply 307,000 ha). The predominant species is determined on the basis of the volume distribution of the species. In Finland, the difference with the TBFRA-classification is of minor importance.

France

1, 2

Enquiry Table 1: Forests also include poplar stands of between 0.05 and 0.5 hectares.

Other wooded land: this refers to heathland in the sense of the land use survey, and is defined as "Formations generally of large extent. Grassy vegetation most often makes up the bulk of the plant life, but 25 per cent at least of the ground cover consists of woody or semi-woody plants such as ferns, heather, broom and gorse... Wooded areas represent less than 10 per cent of the total.

Likely range: 95 per cent confidence sampling errors.

3, 4, 5, 6

Enquiry Table 3: Species composition was assessed per stand.

Likely range: i.e. estimates of area at the 95 per cent confidence level.

Sources: "Forest, total" to Forest, "Mixed": Land use survey (TERUTI), 1997.

All rows under "Forest available for wood supply" and for the row "Forest not available for wood supply": Forest area broken down in line with the data from the national forest inventory available as at 31 December 1997 (period 1980-1996).

"Predominantly coniferous; broadleaved; bamboos, palms, etc.; and Mixed" on other wooded land: Estimate provided by the National Correspondent. The conifers on other wooded land are mainly junipers.

5, 6

Enquiry Table 4: "Coppice and coppice with standards" on forest available for wood supply: The area of coppice and coppice with standards is shrinking by 0.8 per cent per year.

"Coppice and coppice with standards" on forest not available for wood supply: Apart from a few thousand hectares near large towns, the forest not available for wood supply is very largely high forest in mountain areas.

Likely range: i.e. estimates of area at the 95 per cent confidence level.

7, 8

Enquiry Table 7: Source for "Forest" and "Other wooded land": Land use survey (TERUTI), 1987 and 1997. To make them comparable with the 1997 data, 409,700 hectares of forests have been added to the 1987 figures and 75,800 hectares of other wooded land have been taken away. This adjustment corresponds to a shift that occurred in 1991-1992 in the annual TERUTI surveys, due to a change in the TERUTI sample at that time.

"Forest available for wood supply" and "Forest not available for wood supply": breakdown of forest area follows the national forest inventory figures available as on 31 December 1987 (period 1973-1986) and 31 December 1997 (period 1980-1996).

Georgia

1, 2

Enquiry Table 1: About 98 per cent of the Georgian State Forests are located on mountain slopes reaching an elevation of 2300-2500 m, of which 76.5 per cent of forests grow above 500 m, and 80 per cent are on the steep slopes of mountains.

3, 4, 5, 6

Enquiry Table 3: Secretariat estimates based on the information that coniferous species occupy about 20 per cent of forest area of the country (and comprise about 30 per cent of growing stock).

5, 6

Enquiry Table 4: "Coppice and coppice with standard": Data are available on oak coppice only (as provided by the Ministry of Environment of Georgia in 1996).

7, 8

Enquiry Table 7: According to the information received from the State Department of Forest Management of Georgia (23.08.1996), "no significant changes have taken place during the period 1990-1995, except that the total growing stock was 434 million m³ in 1996 (to compare with 421.2 million m³ in 1990, see table 17 "Change in growing stock on forest available for wood supply")"

Germany

1, 2

Enquiry Table 1: The survey year 1987 was chosen as it is the sampling year of the Federal forest inventory, which provided the key data.

Reference year (1987): For 1987 the areas of the Federal Republic of Germany, as of 3 October 1990, and the former GDR areas were added together.

Other wooded land: Not surveyed separately in Germany, but completely insignificant in terms of area.

Adjustment: Definition varies. Yet in terms of the forest structure, both definitions will probably lead to areas only slightly varying from each other.

The likely range (taking account of errors due to measurement, sampling and adjustment): Estimated in relation to the sampling error of the federal forest inventory in the old L ander.

3, 4, 5, 6

Enquiry Table 3: "Forest not available for wood supply": A very rough estimate was made for forest not available for wood supply (equal shares of coniferous/broadleaved/mixed), in order to get a total for all forest. (FAWS = "Wirtschaftswald" defined as over 1 m³/ha/year).

Stands with more than 90 per cent coniferous or broadleaved are classified as predominantly coniferous/broadleaved stands, stands with less than 90 per cent are mixed stands. The way the data-collection is conducted leads to a tendency to show pure stands.

5, 6

Enquiry Table 4: Since the survey in the former GDR did not differentiate between high forest and coppice, the data do not allow a differentiation.

7, 8

Enquiry Table 7: Average annual change between reference periods for forest available for wood supply and for forest not available for wood supply: A very rough estimate was made of the rate of change by category: + 21,000 a year for FAWS and + 1,000 a year for FNAWS, making it possible to calculate back to 1961 data.

Greece

1, 2

Enquiry Table 1: Definitions used in the Greek forest inventory of 1992 correspond closely with those of the TBFRA.

3, 4, 5, 6

Enquiry Table 3: There are some areas of mixed forest but they are relatively unimportant (the national inventory does not distinguish this category).

7, 8

Enquiry Table 7: We consider the data for the 1992 survey to be more accurate and may not be totally comparable with those of 1964, which were assessed using a different methodology.

Hungary

1, 2

Enquiry Table 1: All data in this enquiry relate to 1 January 1996.

In the absence of a country-wide land cover survey, there is no reliable information available on the area of OWL. Regarding the definitions applied in TBFRA 2000, approximately 4,000 ha would fall into the OWL category, but for consistency reasons, it is included here and in the other tables in the area of "Forest".

"Forest": known deviations left after adjustment:

- Minimum area $\geq 1500 \text{ m}^2$ instead of 5000 m^2 .
- Tree crown cover ≥ 30 per cent in open forest formations instead of 10 per cent. Not adjustable, but expected to cause negligible effect on the true values.

In Hungary, all forest resources area statistics, except that of primary forest functions, relate to stocked and temporarily unstocked (i.e. under regeneration) forests. The unstocked areas constituting integral parts of the forest according to the TBFRA 2000 definition are registered separately. These areas were added to the area of forests by proportionally distributing them between the different forest categories:

$$\text{Area X}_{\text{TBFRA}} = \text{Area X}_{\text{National}} + \text{Unstocked}_{\text{TBFRA}} * \frac{\text{Area X}_{\text{National}}}{\text{Total Area}_{\text{National}}} * 100$$

This method was applied in all the tables which are concerned with the definition of "Forest".

There is an area about 4,000 ha (i.e. 0.22 per cent) recorded as forest in the national statistics, which would fall into the category of other wooded land regarding the 0.5 ha area limit of the TBFRA definitions. Given the fact that there is no reliable information on land cover available from those areas, which fall outside the sphere of competence of the forestry administration, adjustment was not carried out here, and these areas are displayed as forest in this enquiry. The above value is considered in the likely range values where possible.

This applies to all tables where "other wooded land" is mentioned.

3, 4, 5, 6

Enquiry Table 3: "Forest available" and "not available for wood supply" categories are not used in the national forestry statistics. National categories are: "Forest with production primary function" and "Forest with non-production primary function". In order to bridge this gap "Forest not available for wood supply" was computed from inventory raw data as described below:

For conservation/protection reasons = area of forest reserves and strictly protected areas

For economic reasons = Hunting reserves, seed orchards, steep slopes, forests with indefinite rotation period.

"Forest available..." is of course an inverted value. Based on this grouping area and volume, data were calculated from the raw data.

Please refer to comments in *Enquiry Table 1* "Total area by main classes" for the definition of "Forest" and "Other wooded land" and *Enquiry Table 3* "Forest and OWL according to availability of wood supply" for the definition of "Forest not available for wood supply".

7, 8

Enquiry Table 7: Data were recalculated from 1990 using the TBFRA-2000 definitions.

Iceland

1, 2

Enquiry Table 1: Inland waters include glaciers.

7, 8

Enquiry Table 7: Less total FOWL than in TBFRA1990 due to new survey, not a real decrease.

Israel

5, 6

Enquiry Table 4: The data are calculated by estimation only.

7, 8

Enquiry Table 7:

- 1) "Forest": Forest plantation rate is 2500 ha/year.
- 2) "Forest not available for wood supply" and "Other wooded land": The main change is because of new mapping and change in the traditional land use, which lets vegetation grow.

Italy

1, 2

Enquiry Table 1: Information on managed other wooded land is not available.

7, 8

Enquiry Table 7: The data on “change” are the secretariat's estimates based on ISTAT publications. They differ from the Forest Inventory data used for compiling other tables of the enquiry, because the latter include approximately 2 million hectares of abandoned farmland which are in the process of natural colonization to forest.

Japan

1, 2

Enquiry Table 1: The data for “forest and other wooded land” and “other land” are dependent on different statistics which were inventoried on different definitions and dates. Forest with a crown cover of less than 30 per cent is classified under other wooded land in Japan.

7, 8

Enquiry Table 7: The forest areas which are temporarily unstocked as a result of human intervention are included in 1995 and not included in 1986. Forest area in 1986 excluded temporarily unstocked area, and temporarily unstocked area was included in other wooded land in 1986.

Kyrgyzstan

1, 2

Enquiry Table 1: Source: Information is the secretariat estimates based on various literature sources and analysis of the situation in neighbouring countries.

3, 4, 5, 6

Enquiry Table 3: Information on Forest available for wood supply and Forest not available for wood supply, and for conservation/protection reasons on forest not available for wood supply the secretariat estimate is based on information from different literature sources, including the article “Forest biodiversity and forest genetic resources in the Kyrgyz Republic”, T. S. Mussuraliev, FAO, 1997.

7, 8

Enquiry Table 7: Information on Forest is secretariat estimates based on information from different literature sources, including the article “Forest biodiversity and genetic resources in the Kyrgyz Republic”, T. S. Mussuraliev, FAO, 1997.

Latvia

1, 2

Enquiry Table 1: Forest area according to State Land Service statistical information is 2,858,000 ha. This figure does not correspond to terms and definitions used here. At the same time it seems that some thousand hectares of forests, converted from agriculture lands and other wooded land to forest, are not yet inventoried as forest and not included in figure of forest area.

Other wooded land includes area covered by shrubs and bushes. There are some 300,000 hectares of bogs in Latvia. This area has not been included either under “forest” or under “other wooded land”, because it does not correspond to definitions of the existing classes. However bogs are partly covered by sparsely located trees in Latvia.

Lithuania

1, 2

Enquiry Table 1: Forest land area according to stand-wise inventory is 1,938,000 ha (computerized up-date 01.01.1996). Difference is the result of different interpretation of land area covered by forest by Land Fund Assessment.

Malta

1, 2

Enquiry Table 1: With the exception of a few clumps of oaks and tamarix all woodland is man made or at the most regeneration of man-made woodlands.

Netherlands

1, 2

Enquiry Table 1: Source: CBS, 1993 on 1.1,1.2 and 1.3. Statistiek van het bodemgebruik 1993. Centraal Bureau voor de Statistiek.

There exists supportive information on “Types of area of forest and other wooded land” in tabular form in the reply to the enquiry, which is available at the secretariat.

The difference between forest land definition of TBFRA-2000 and the definition used in the HOSP-project is: TBFRA: 10 per cent coverage while HOSP-project uses 20 per cent coverage. The 20 per cent coverage is according to the former definition

used in the Global Forest Resource Assessment 1990. No corrections in the HOSP figures are made: the forest area with a coverage of 10-20 per cent is negligible.

The likely range is more dependent on whether all area is accounted for than a matter of sampling design. The area covered by the HOSP-project has a confidence-interval at 95 per cent level of about 4 per cent. The area not monitored is estimated with no possibility to estimate the accuracy.

General comments:

The forest inventory system in the Netherlands consists of an area census which is periodically carried out, and a survey of growing stock, growth and removals which is carried out every year since 1988. A complete description of the inventory system in the Netherlands can be found in the EFICS study: Reports on forestry inventory and survey systems, European Commission, 1997.

The area census (National Forest Area Survey, 1980-1983) is an integral survey of all forest area that meets the FAO-definition from 1980 (more than 0.5 ha and at least 20 per cent crown coverage).

For this enquiry the forest area definition has been changed in such a way that the crown coverage has to be at least 10 per cent. The change in definition of forest land does not have any impact on the forest area in the Netherlands: The forest area with a crown coverage of 10-20 per cent is negligible.

On the basis of the monitoring system HOSP, basic data for section I (*Enquiry Tables 1 to 7*) section II (*Enquiry Tables 11 and 12*) and section III (*Enquiry Tables 13 to 17*) could be provided. Data for these tables on areas not covered by HOSP are provided by the National Forest Area Survey.

3, 4, 5, 6

Enquiry Table 3: The difference in definition is:

TBFRA-2000: In mixed forest neither coniferous or deciduous species account for more than 75 per cent of crown coverage. The HOSP-definition for mixed forests is a proportion of less than 80 per cent instead of 75 per cent.

No adjustments are made since the differences are considered as negligible.

The estimate of the total area of forest available for wood supply according to the new definition is provided herewith. There exists supportive information on the "different forest type and areas considered as available", in tabular form, in the reply to the enquiry, which is available at the secretariat.

5, 6

Enquiry Table 4: The known area of coppice and coppice with standards is excluded from the 314,000 ha forest available for wood supply.

7, 8

Enquiry Table 7: Sources: 1. Daamen, W.P. 1993. Oogst uit dunning. HOSP-cyclus 1: periode 1988-1992. Daamen Schoonderwoerd Miedema & de Klein, Rapport 41.

2. Daamen, W.P. 1996. Velling en oogst HOSP-cyclus 2: periode 1992-1996. Daamen Schoonderwoerd & de Klein, Rapport 70.

Since no data are available on areas not covered by HOSP these areas are assumed constant.

New Zealand

1, 2

Enquiry Table 1: New Zealand does not have a formal forest inventory system as used in many of the countries in the TBFRA2000 grouping. This is a result of a set of circumstances which has led New Zealand to rely almost entirely on the creation of a forest estate based on introduced species for its wood supply purposes over the last 100 years. The absence of a formal NFI over all the New Zealand forest estate has meant that for many of the tables in the Enquiry informed estimates have had to be provided, rather than relying entirely on directly measured survey data.

The development of this planted production forest estate has been based on the technology of short-rotation plantation forestry. Short rotation forest management requires a commitment to good forest inventory data for wood supply forecasting purposes. For primarily national wood supply forecasting purposes New Zealand has evolved a high-level National Exotic Forest Description (NEFD) system which regularly updates the characteristics of the plantation estate in terms of the key variables for wood supply forecasting work. The system used has taken account of the ownership structure of the plantation estate and the record-keeping that forestry companies maintain. It is described more fully in the publication A National Exotic Forest Description as at 1 April 1996, (Ministry of Forestry, 1996). Two accompanying publications NEFD Regional Yield Tables as at 1 April 1995 (Ministry of Forestry, 1996) and NEFD National and Regional Wood Supply Forecasts 1996 (Ministry of Forestry, 1996) show how the results of the NEFD work are used.

The bulk of the remaining New Zealand indigenous forest (4.9 million hectares out of a total 6.4 million hectares of indigenous forest) continues to be State-owned but is legislatively protected in the form of national parks, forest parks, reserves and other mechanisms from being logged for wood supply. In 1996 only 142,000 hectares of State-owned indigenous forest were available for timber production and this is now subject to close public scrutiny with increasing pressures being brought to bear for these forests to no longer be available for timber production.

In 1996 an amendment to the Forests Act 1949 came into force which required private forest owners wishing to utilize their indigenous forests for timber production to manage them in accordance with an approved sustainable management plan or permit. There were an estimated 124,000 hectares of privately-owned indigenous forest which were potentially commercially available for timber production if the owners managed these forests in accordance with an approved plan. The booklet Indigenous Forestry—

Sustainable Management (Ministry of Forestry and New Zealand Farm Forestry Association, 1998) gives fuller details of the current situation with respect to New Zealand's indigenous forests.

Several other publications—The Vegetative Cover of New Zealand (PFJ Newsome, 1987); New Zealand Institute of Forestry Handbook (1995); New Zealand Country Report - Montreal Process Criteria and Indicators for the Conservation and Sustainable management of Temperate and Boreal Forests (Ministry of Forestry, 1997); Forestry Sector Issues (Ministry of Forestry, 1996); and Environmental Effects of Planted Forests in New Zealand (JP Maclaren, 1996) provide further background on the New Zealand forestry situation.

The source for the data in this table is primarily mapping data from the New Zealand Department of Survey and Land Information, and informed estimates by the Ministry of Forestry. No adjustments to the key parameter of forest have been made because it was considered in the New Zealand context that the TBFRA-2000 criteria would be met in most cases because of the intense crown cover of both the indigenous forests and the plantation forests and the heights to which the trees grow. It has not been possible to determine whether the minimum area of 0.5 ha has always been met, where it is not met, the area estimates would be considered to be under-estimates. For other wooded land this parameter is largely what is regarded in New Zealand as scrub in transition to high forest. With the removal of subsidies to agriculture, land which was predominantly used in the past for livestock grazing is quickly reverting to scrub in the absence of grazing pressures. This land is also available for the establishing of plantation forests on suitable sites. As work is currently in progress to complete the New Zealand Land Cover Database (NZLCDB) using SPOT satellite images taken in January and February 1996 the estimates of the area for forest and other wooded land may be subject to change, especially that for other wooded land. The large error range on this latter estimate reflects a lack of reliable measuring in the past for this parameter. For both these parameters the ranges are estimates of the likely ranges and are not based on statistical sample error ranges.

Progress with completing the NZLCDB has meant that all the North Island is now available for cross-checking the estimates but this work is not yet complete for the South Island. It is just possible that the South Island may be complete by the end of 1998 (certainly 80 per cent will be) and that a first set of revisions could be supplied. The North Island, although not having the largest forest area, does have the majority of other wooded land (as reverting scrub).

3, 4, 5, 6

Enquiry Table 3: The sources for the data in this table are informed estimates made by the Ministry of Forestry using historical records and other current NEFD data. No adjustment was considered to be needed to meet the TBFRA-2000 definitions. The error ranges are estimates of the likely ranges and are not based on statistical sample error ranges.

As information on "Other wooded land" was uncertain, no attempt was made to split it into coniferous and broadleaved etc. Hence the use of the .. symbol. Zero (0) could be put in Predominantly coniferous and broadleaved—certainly at the 000 hectare level. This has been done in the revised table. The question as to whether coniferous species readily re-colonize abandoned grazing land as well as broadleaves is difficult to answer. Typically, if the re-colonisation is with indigenous species the succession is through broadleaf (hardwood) species such as manuka or kanuka (see list in Table 9) until some conifers (podocarps) begin to emerge. The resulting forest at this stage could be regarded as mixed. It is difficult to determine whether a "pure" indigenous conifer stand could emerge, after a sufficiently long period of time. There are forest areas where rimu (a conifer) is dominant but usually it grows in association with other species. Similarly with kauri. The reference Indigenous Forestry—Sustainable Management (Ministry of Forestry and New Zealand Farm Forestry Association, 1998) gives further discussion on how the natural forests grow and the associations between species. The exotic species *Pinus contorta* readily colonizes areas by wilding spread and for this reason it is listed in *Enquiry Table 10* as a problematic introduced species. *Pinus radiata* is normally hand planted rather than allowed to re-germinate and does not spread "naturally" to abandoned farm land.

5, 6

Enquiry Table 4: The sources for the data in this table are informed estimates made by the Ministry of Forestry using historical records and other current NEFD data. Adjustments were not required to meet the TBFRA2000 definition. The error range is an estimate of the likely range and is not based on statistical sample error ranges.

7, 8

Enquiry Table 7: The source for this table was the Ministry of Forestry using historical records and current NEFD data. The area in other wooded land has been increasing over the decade since the removal of subsidies to livestock farming. The consequential reduction in grazing pressures on the land has allowed regeneration through scrub to occur.

Norway

1, 2

Enquiry Table 1: The national definitions of forest and other wooded land are based on production capacity, not on crown cover. As crown cover is being assessed on every sample plot of the National Forest Inventory, a new forest area has been calculated, taking into consideration the FAO definition. The revised forest area is considerably higher than the forest area according to the national definition. The northernmost county (Finnmark) is not being covered by the National Forest Inventory, and this county's forest area is taken from the Census of Agriculture and Forestry 1989 (Statistics Norway).

Thus, forest area has been calculated in the following way:

Forest, national definition (National Forest Inventory) + forest, Finnmark county (Statistics Norway) + forest with a production capacity less than 1 m³ o.b./ha/year, having crown cover more than 10 per cent (NFI) + forest roads, small open areas etc. (NFI)

Other wooded land is calculated as: total forest and other wooded land (Norwegian Mapping Authority)—forest area (FAO definition, as described above).

3, 4, 5, 6

Enquiry Table 3: The limit between the different tree species groups is 70 per cent instead of 75, as specified in the definitions. Our national forest inventory also applies a rule that the volume distribution should be decisive for tree species classification in older stands, while crown cover should be taken into consideration in young forest. No attempts have been made to adjust for these deviations from the guidelines.

5, 6

Enquiry Table 4: It is assumed that the occurrence of coppice and coppice with standards in Norway is negligible.

7, 8

Enquiry Table 7: Data for previous reference period are “informed estimates”, and not inventory results.

Poland**1, 2**

Enquiry Table 1: In Poland there exist areas which correspond to the TBFRA definition of other wooded land. The way in which they are reported in Polish statistics makes it impossible to separate out those areas as a whole. A short review of those areas, according to the TBFRA criteria, is supplied below.

Due to the Polish definitions, the minimum area of forest should be at least 0.1 ha. Up to now there are no data evaluating the share of forest tracts greater than 0.1 ha and less than 0.5 ha. The total number of those forest tracts is big, but we are of the opinion that the area occupied by them is not significant, therefore this item has not been specified. Small forest tracts are reported in the forest category.

Also data concerning potential tree height are not available; the areas where trees are not able to reach 5 m in situ in TBFRA 2000 Questionnaire are included in the forest category too.

In the Polish land use system the category of “woodlots” exists (217 thousand ha in 1996), but there is no other information about the use and resources of those areas. This category was not included either in the forest or in the other wooded land. Since the FRA 1990, on the basis of new information from the National Forest Inventory, small pieces of forest, riverine bushes etc. have been regarded as trees outside the forest.

“Forest”: In the Polish classification, forest roads, nurseries, etc. are excluded from the forest. For the needs of TBFRA 2000, those areas (193 thousand ha in 1996) were incorporated into forests. “Grounds linked with forestry” (according to the Polish definition), occur in the state-owned forests only.

Other comments:

The numbers presented in the Table are averages of data for the years 1992 to 1996. The accuracy of forest area assessment depends on ownership. In the State Forests enterprise (comprising the majority of State owned forests) that accuracy is high—about 1,000 ha; for other forests information could not be very precise, therefore the possible error was evaluated at 200,000 hectares.

3, 4, 5, 6

Enquiry Table 3: 3.2—Predominantly coniferous, 3.3—Predominantly broadleaved, 3.5—Mixed.

In the Polish management system, stands are grouped into two classes: predominantly coniferous and predominantly broadleaved. A breakdown into coniferous, broadleaved and mixed is adopted in our site assessment system, but this information could not be useful, because it refers primarily to the potential and not to the real stand type.

Therefore, especially for the needs of TBFRA, specific calculations were done. The source database was the set of assessment records of the stand inventory of State Forests enterprise for the period of the last 10 years. According to the species composition and the TBFRA criteria, each of about 2 million stands was assigned to one of the three groups mentioned. The results of that query: 66.6 per cent of predominantly coniferous, 18.0 per cent of mixed and 15.4 per cent of predominantly broadleaved were accepted as the coefficients for further calculations, for all forests in Poland.

Forest available for wood supply is the difference between Forest, total and the area of Forest not available for wood supply.

Forest not available for wood supply is the sum of forest not available for wood supply for conservation and protection reasons and forest not available for wood supply for economic reasons. There are no such classes in the Polish management system; for the needs of this questionnaire the TBFRA definitions had been interpreted and subsequently the decision on what Polish categories should be included, or matched with those of TBFRA was undertaken. The averages of 1992 and 1996 data are reported in these categories.

Forest not available for wood supply for conservation and protection reasons. In this class the following forest areas are included:

- forest areas of National Parks,
- forest areas of nature reservations (outside of National Parks),
- refuges of protected animals,
- areas of forests on boggy sites,
- forest on the soil model areas,
- protected forests constituting valuable fragments of native nature—outside National Parks and nature reservations.

Forests not available for wood supply for economic reasons are the forests where fellings are severely limited for the reasons other than protection. The following forest areas are included in this class:

- inaccessible forests,
- forests in the timberline zone,
- national defence forests,
- State owned forests beyond the State Forests enterprise and National Parks (managed by other Ministries than the Ministry of Environmental Protection, Nature Resources and Forestry).

5, 6

Enquiry Table 4: Coppice occurs in Poland but its area is not known. According to the experts, its total extent is decreasing and amounts to a few thousand ha.

7, 8

Enquiry Table 7: Forest acreage shares (17.1 - 17.3) in the Previous reference period were calculated in the similar way like for Latest reference period - as an average of 1987 and 1991 data.

Portugal

1, 2

Enquiry Table 1: Total area includes continental Portuguese area, as well as the islands of Azores and Madiera. Terms and definitions employed in the Portuguese National Forest Inventory:

Forest stands: Forest formations constituted by woody trees with a single main stem or in the case of coppice with several stems having a more or less definite crown with tree crown cover with more than 10 per cent, area more than 0.5 ha and width more than 15 m: the trees should be able to reach a minimum height of 5m at maturity.

7, 8

Enquiry Table 7: Concerning the previous reference period, the area values were adjusted to the TBFRA2000 definitions.

Republic of Moldova

1, 2

Enquiry Table 1: The background material used in the compilation of this assessment consisted of data from the State Forestry Inventory of 1988, the national report on the state of Moldovan forests (1997), yearly data from the land register and forest monitoring exercise, the national report on the state of the environment in the Republic of Moldova in 1997 and material from the State forestry agencies.

All forests in the Republic are the property of the State (art. 127 of the Constitution, art. 6 of the Forest Code).

Private ownership of woodland is permitted where forest has been planted on land that is private property.

All forests, land intended for afforestation and made available for forestry needs, operations and/or management, and unproductive land encompassed in forestry activities together constitute the country's forest resources.

The system used for the qualitative and quantitative assessment of the status of the forest resources is the State forestry inventory, based on a synchronous compilation of valuation data from the forestry survey and changes over the period under review.

The forestry survey is conducted once every ten years. All forests in the Republic are taken into account. Synchronous surveys have been carried out in 1957, 1965, 1975 and 1985. Since 1992, surveys have been conducted at individual forestry enterprises—35,000 to 49,000 hectares per year. The survey conducted on 1 January 1998 covered 200,000 hectares of forest resources. The last State forestry inventory was conducted in 1988.

A national report on the state of the Republic's forests was produced and published in 1997, updating qualitative and quantitative data on a number of components of the State inventory.

A State forestry inventory is planned for 1998, with the data being published in 1999.

All Moldovan forests are assigned to Category I, as performing exclusively environment-protection functions. Depending on the particular functions they serve, they are grouped into the following forest-protection categories:

- (a) Water-retention, soil-retention, environmental protection and protecting sites of national value;
- (b) Pollution-abatement and recreational;
- (c) Gene-pool maintenance (forest reservations, national parks, natural monuments etc.).

The main features of the forest survey (wood and non-wood resources) are shown in the tables. Given the country's circumstances, the significance of both wood and non-wood resources, the influence they have and the functions they serve will grow in the future. To meet needs, the area of land occupied by forest must be increased, and reconstruction measures must be taken to improve and raise forest output.

As agricultural reform – land privatization - has progressed, the expansion of wooded land has slowed.

State forestry agencies are concentrating their main efforts on improving the age and species mix and productivity and on substituting local, indigenous species for introduced varieties (white acacia, coniferous species). This should increase the hardiness of the country's timber stands and preserve the biological diversity of the forests.

These and other principles governing forestry activities are laid down in the Forestry Code that was adopted and took effect in December 1996.

The notion of sustainable forest development is central to the Republic's programme for the development of its forest resources.

There are plans to draw up a strategy in 1998 for the sustainable development of the forestry sector, enlisting the aid of international organizations and experts.

Romania

1, 2

Enquiry Table 1: According to the definition given in our “Forest Code”, forest is considered land covered by forest vegetation with an area of more than 0.25 ha. In order to approximate the TBFRA definition of the forest, the item “Forest” includes lands needed for culture (nurseries, orchards...), for production (game food...), for administration (forest roads, fire breaks...) and temporarily excluded from the “forest fund”. These are separately recorded in our statistics and in addition to forest area make “forest fund”.

“Other wooded land” defines forests owned by different state owners outside the “forest fund”—which are not characterized to be statistical parameters.

3, 4, 5, 6

Enquiry Table 3: Estimates for Predominantly coniferous and Predominantly broadleaved on Forest, total, and on Forest available for wood supply are made by the secretariat.

For the data on Forest not available for wood supply, the data are estimated area of the forest land without road access (with a hauling distance more than 2 km, on average).

5, 6

Enquiry Table 4: The data for “Forest available for wood supply” include also the forest area without road access (with an average hauling distance of more than 2 km).

7, 8

Enquiry Table 7: Source: Report prepared by the Forestry Institute.

Russian Federation

1, 2

Enquiry Table 1: National classification of the Forest Fund Lands is given in the original reply from the Russian Federation.

“Forest” includes land:

1. Wooded land (main and other forest-forming tree species), non-continuous forest growth, nurseries and plantations;
2. Unwooded land—openings, slashes, dead stands, cuttings, clearings

“Other wooded land” includes areas of shrubs and bushes.

The distribution of land by the land categories adopted in the Russian State Forest Resource Census (GULF) is shown in the supplementary table (in the original reply) which is available at the secretariat.

3. The accuracy of the geodesic measurements made for forestry applications (“Instructions on the conduct of forestry operations in Russia’s forest resources,” Volumes I and II, (Moscow, VNIITslesresurs, 1995) was used in determining the likely range. The maximum errors assumed were: forest: +/- 2 per cent, other wooded land: +/- 5 per cent.

The scheme of the national classification of the Forest Fund Lands is given in the original reply from the Russian Federation (in Russian, available from the secretariat).

3, 4, 5, 6

Enquiry Table 3: Distribution by species groups is estimated by the National Correspondent.

Under the current forestry instructions, predominantly coniferous stands/coniferous forest management embrace forest in which conifers account for not less than 4 units, or at least 40 per cent of stocks. Broadleaved stands include forests in which broadleaved species predominate (over 60 per cent of stocks). Mixed stands do exist and account for more than about 40 per cent of total forest area, but cannot be identified precisely on the basis of the information available. The “predominantly coniferous” and “predominantly broadleaved” stands by the FAO method, as well as the likely range of error are determined on the basis of estimates. The areas of the different categories of land shown in the table were compiled on enterprise by enterprise basis. “Forest available for wood supply” includes stands identified as suitable for exploitation (commercial logging) and the “reserved” forests of group III.

5, 6

Enquiry Table 4: In forestry inventory documents, coppice is identified only under broadleaved forest management. This includes coppice oak, maple, wych elm and other varieties of elm. The area of coppice forest is obviously low given that broadleaved forest is often formed both from coppices and from seedings; but it is not possible with the data available to differentiate between the two. The likely range for category “Coppice and coppice with stands” on forest available for wood supply was determined on the basis of an expert appraisal by Dr. A. N. Filipchuk.

7, 8

Enquiry Table 7: GULF data for 1988 have been converted to the TBFRA-2000 classification system. The decline in forest area between 1988 and 1993 is the result of transfers of land from the Russian State Forest Service to other authorities for non-forestry-related purposes (Establishment of nature reserves covering 3.2 million hectares, allocation of land for construction of

various kinds and so forth.) Forestry inventory has also resulted in a clearer definition of the categories of land in the country's forest fund resources.

Slovakia

1, 2

Enquiry Table 1: Data concerning the total area of the Slovak Republic (SR) are taken from "Statistical yearbook on the land resources in SR according to the data in the Cadastre of real estates on 1 January 1997" (Office of Geodesy, Cartography and Cadastre of SR, 1997).

The data on the area of forest (forest land resources) are taken from the Permanent Forest Inventory", status to December 31, 1996 (PIL 96), Lesoprojekt Zvolen.

3, 4, 5, 6

Enquiry Table 3: Source: Data were taken from PIL (PFI) 96, tab. AO - LPF and tab. CO - stand land according to the category of forests. "Forest, total" includes forest land (1,998,000 hectares) and "white" areas (28,000 hectares) according to the definition of "Forest". Data on Forest, Total—"Predominantly coniferous, broadleaved, bamboos, palms, mixed etc." were calculated from JPRL (unit of area stand arrangement of forest) of Lesoprojekt as follows: "Predominantly coniferous" with the share of coniferous tree species more than 75 per cent, "Predominantly broadleaved" with the share of broadleaved tree species more than 75 per cent, "Predominantly bamboos, palms etc." other stands, mixed.

Stand land was re-calculated to the forest land by the coefficient calculated from the ratio of the total forest area in Slovakia and stand area.

Data for "forest available for wood supply" are taken from the area of the forest categories H (commercial forests) + Z (areas delimited from the agricultural land resources to the forest land resources which are intended for afforestation) + U (special purpose forests) + "white" areas (pieces of land included into the agricultural land resources covered by forest tree species), reduced by the area of 16,000 hectares of the special purpose forests according to the nature protection degrees 4 and 5 with impossible or very limited fellings (as published in Linderová et al.: Quantification of increased costs and detriment due to ensuring the public-beneficial functions. Final report of the reference task, LVU Zvolen, 1997, 46 pp).

The special purpose forests mentioned as the forest available for wood supply (332,000 hectares) are mainly intended for fulfilling of the public benefit functions and their production function is just secondary.

Data for Forest available for wood supply—Predominantly coniferous, broadleaved, bamboos, palms etc., and mixed were calculated from units of area stand arrangement of forests (JPRL in Slovak) of Lesoprojekt, in the same way as for Forest, total—Predominantly coniferous, broadleaved, bamboos, palms etc., and were adjusted from the stand land to the forest land area.

Data for "Forest not available for wood supply" are obtained from the area of the forest category O (protection) + 16,000 hectares of the special purpose forests with impossible or very limited felling. These are for protection and conservation purposes. Non-availability for economic reasons is not significant in our country. Data are also adjusted from the stand land to the forest land area.

Data for Other wooded land—Predominantly coniferous, broadleaved, bamboos, palms, etc., and mixed are not available. An estimate of these has been provided using a method of the overlapping maps: Tree species composition of forests in Slovakia (Bucha, Bothar, Vladovic, Menus; 1997) and Agricultural soil of 'N' category for agricultural ecosystems unsuitable in compliance with the cadastres of Slovakia (Durkovic et al., 1997).

5, 6

Enquiry Table 4: Data were taken from PIL (PFI) 96 (tab. CO, p. 3) with the adjustment as in *Enquiry Table 3* in "Forest available for wood supply" and "Forest not available for wood supply" and they were calculated from the stand land to the forest land.

7, 8

Enquiry Table 7: Data for the previous reference period were taken from the Total Forest Management Plan of Lesoprojekt (SLHP) 1988 as follows: "Forest"—total forest land resources from tab. A1 (p.1), "Forest available for wood supply" from tab. C1 (p. 6) for the category of forest H+Z+U, "Forest not available for wood supply" also from tab. C1 for the forest category O. Stand area was converted to the forest land area by the coefficient calculated as the ratio of the total forest area of SR and stand area.

Slovenia

1, 2

Enquiry Table 1: Expert assessments are based on the data from the forest management plans.

3, 4, 5, 6

Enquiry Table 3: Parameter estimates are based on the data from the Forest management plans and National Forest Inventory ("NF" is based on 712 permanent sampling plots (double stage sampling with tracts)).

5, 6

Enquiry Table 4: Forest management plans are used for "Forest available for wood supply" and "Forest not available for wood supply". Data for "Available for wood supply"—"High forest, and Coppice and coppice with standards" are based on the "NFI".

7, 8

Enquiry Table 7: According to the data from the forest management plans and "NFI" in 1996.

Spain

1, 2

Enquiry Table 1: Adjustment process: Adjustment for area of forest from 20 per cent to 10 per cent of the land area covered by trees.

Sweden

1, 2

Enquiry Table 1: FRA2000: 1992-1996

FRA1990: 1985-1989 (is updated where it is needed to the definitions of FRA2000)

Enquiry Table 1: Parameters “Forest” and “Other wooded land” have been composed of different land-use classes according to Swedish definitions and other data source available.

Area “Forest and other wooded land” in total protected areas and the high mountains has been estimated by means of remote sensing techniques.

Units:

m^3 o.b. = stem volume above the felling cut (which is 1 per cent of tree height), including the top of the tree and the bark.

m^3 u.b. = stem volume above the felling cut (which is 1 per cent of tree height), including the top of the tree but excluding the bark.

For both o.b. and u.b. the top is excluded when it comes to removals and harvest (for example in *Enquiry Table 16* “Fellings & Removals).

Tree = according to definition, but the interpretation is: trees are able to reach the height 5 m when the soil fertility and the surrounding environment is optimal.

Species mixture = based on percentage of basal area instead of percentage of tree crown cover to classify into species mixture classes for stands > 7 m height. For stands (that is plots) <= 7 m the proportion of the main stems (which should not be taken away if a pre-commercial thinning took place) are used instead.

Areas:

Forest: The TBFRA-2000 definition. is “land with a tree crown cover of more than 10 per cent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity...”. Sweden has instead used “... all land with a tree crown cover of more than 20 per cent plus half of the land with a tree crown cover ranging from 1 per cent to 20 per cent, and area more than 0.25 ha ...”. This is due to the fact that our field inventories have conducted their measurements according to these definitions during the period 1983-1987 and from this period we can use quotients between the different crown cover classes that can be used for the present reference period.

Other wooded land: The TBFRA-2000 definition is “Land either with a tree crown cover of 5-10 per cent.. height of 5 m at maturity in situ; or a crown cover of more than 10 per cent of tree not able to reach a height of 5 m at maturity in situ ...”. Sweden will instead use “...a quarter of the land with a tree crown cover ranging from 1-20 per cent ...”, and we will also use areas larger than 0.25 ha and we do not consider the width of the area.

For the standing stock and related figures all trees > 0 cm are included. For fellings and removals all stumps > 4 cm are included and for trees up to 4 cm a correction is done.

3, 4, 5, 6

Enquiry Table 3:

See *Enquiry Table 1* “Total area by main classes” for the definition of “Forest” and “Other wooded land”.

Forest not available for wood supply (and other wooded land not available for wood supply):

1) For conservation/protection reasons: National parks, nature reserves, all sub-alpine birch forests, all low productive forest with a production capacity less than $1 m^3$ o.b./ha/year. Also areas (if not already excluded above) that are classified as protection forests or forests for recreation or near cities.

2) For economic reasons: Areas which are classified as power-lines and/or road/railroad areas. Areas situated more than 2000 m from a public or forest road or forest areas with a combination of steepness > 50 per cent or a “very rough” ground structure. Also areas (if not already excluded above) with definite technical hindrances are excluded.

Special comment on areas voluntarily set aside for environmental and/or nature conservation purposes:

The above protection/conservation areas are due to “hard” legislation reasons, etc. However, Swedish forestry has radically changed the environmental/nature conservation policy in the last ten years. As a result land-owners of all sizes are setting small and large areas aside as (more or less) private reserves. The latest data on these areas, voluntarily excluded from wood supply, tell us that about 2-4 per cent of the productive forest (production > $1 m^3$ o.b./ha/year) areas are set aside as “special care areas” (> 0.5 ha per object). This adds up to about 450,000-900,000 ha. Also, when the final fellings are to be done about 5 per cent of the final felling areas are voluntarily set aside as “special care plots” (0.01-0.5 ha operation). Assuming that this “trend” will hold in the long run, then the accumulated “special care plots” will approach about 1,000,000 ha in a 100-year period.

As we do not know about the future (the trends are constantly changing) and as neither the “special care areas” nor the “special care plot” has any “hard” legislative protection, we are including them into the FRA 2000 category “Forest available for wood supply”.

5, 6

Enquiry Table 4: See notes to *Enquiry Table 1* “Total area by main classes” for the definition of “Forest” and “Other wooded land”.

Coppice: Only willow bio-energy plantations are included.

7, 8

See notes to the *Enquiry Table 1* “Total area by main classes” for the definition of “Forest” and “Other wooded land”.

Reference period 1985-1989 updated according definitions FRA2000.

Source: Swedish University of Agricultural Sciences/Department of Forest Resource Management and Geomatics. Section of Forest Survey / BSc (For) Hans Toet.

The changes in *Enquiry Table 7* have a low accuracy and might not be valid at all. The reason for this is that the area sampling method used in our National Forest Survey holds a large area estimate random error component. And when it comes to area changes (if the changes are moderate) the random error component might (as in this case) be larger than the presented “change” figures. Therefore the presented figures are also calibrated “ad hoc” somewhat to better correspond to reality. This has also given effects on *Enquiry Table 17* “Changes in area of forest and other wooded land over time by main categories”.

Switzerland

1, 2

Enquiry Table 1: Forest: The figures of forest area refer to the forest area definition of the Swiss NFI. The application of the TBFRA Definition will lead to an increase of about 20,000 ha (1.7 per cent). This result was derived from a remeasured sample of 5,000 plots on the air photos interpreted for the second Swiss NFI. In the given statistics for Switzerland, it was decided not to consider this result because the reliability for smaller units than the total forest area of Switzerland is unknown.

Forest area definition: The definition is given in the EFICS study (Report on forestry inventory and survey systems, Volume 2), and depends on the following measures derived from air photos: Width: at least 25m with canopy closure of 100 per cent and 50m with crown cover of 20 per cent. The functional relation between crown cover and minimum width is explained in the above mentioned report. Canopy closure: at least 20 per cent. Minimum top height: 3m (exception: afforestation, young growth, mountain alder, mountain pine).

Information on the managed other wooded land is not available.

3, 4, 5, 6

Enquiry Tables 3 and 5: Forest area available for wood supply:

Generally, the total forest area of Switzerland is available for wood supply if one follows the definition of TBFRA.

Exceptions are protected areas which amount to 7,000 ha in Switzerland. The amount of 103,000 ha which was estimated not to be available for wood supply for economic reasons is based on expert opinions from WSL and ETHZ researchers.

There is a broad consensus that from the economic point of view, it is not meaningful to harvest those stands regularly at all. However logging actually was, is and will be done to some extent with cable crane and helicopter in those “remote areas”.

5, 6

Enquiry Table 4: Forest available for wood supply--Coppice and coppice with standards, and Forest not available for wood supply--Coppice and coppice with standards: Figures do not originate from the NFI database but were derived from the figures in High forest of Forest available for wood supply, and High forest of Forest not available for wood supply.

Tajikistan

1, 2

Enquiry Table 1: Source for land area figures: <http://www.odci.gov/CIA/publications/factbook/ti.html>

Information on forest and other wooded land has been received from the TBFRA-2000 National Correspondent Mr. G. A. Avsalov, Director General of the Forest Association “Tajikles”, in reply to the Table of the TBFRA Essential Data, 20.11.1998.

3, 4, 5, 6

Enquiry Table 3: Source for Conservation/protection reasons on forest not available for wood supply: Secretariat estimate based on the information from different literature sources.

Practically all forests are in mountainous area, and not available for wood supply for conservation (protection) or economic reasons; Forest area of the so called “1st Group”;

Sources for Forest available for wood supply, and Forest not available for wood supply: Information from the TBFRA-2000 National Correspondent Mr. G. A. Avsalov.

5, 6

Enquiry Table 4: Source for High forest on forest not available for wood supply: Secretariat estimates based on different literature sources of information.

7, 8

Enquiry Table 7: Information on “forest” is from the TBFRA-2000 National Correspondent Mr. G. A. Avsalov.

The FYR of Macedonia

1, 2

Enquiry Table 1: Source for Total area, and Forest: Data for Forest and Other wooded land are provided by the Statistical office of the former Yugoslav Republic of Macedonia in their reply to the concise enquiry for SOFO-1997 (30.08.1996).

Source for Total area, Inland water, Land area and Other land: Information is the secretariat estimates based on literature sources and the evaluation of the situation in neighbouring countries.

3, 4, 5, 6

Enquiry Table 3: The data for Forest available for wood supply, Forest not available for wood supply and for Other wooded land are the secretariat estimates based on the information from different literature sources.

7, 8

Enquiry Table 7: The data for Forest are the secretariat estimates based on the information from different literature sources.

Turkey

1, 2

Enquiry Table 1: The first regular forest inventories were done between 1963-1972. According to forest management planning system, each year roughly 10 per cent of the forest land is re-inventoried. The new figures are the product of latest forest management plans by 1996 (5 per cent of forest land has still not been re-inventoried). When the two inventory cycles are compared (1963-1972 and 1973-1996) we witnessed an increase in total FOWL and the forest area, a decrease in OWL.

Please also note that definition of forest in Turkey includes the Other Wooded land also. The definition is as following:

“All tree and tree formations communities together with their land are forest. Except for land covered with steppe vegetation, marshes and wetland covered with bushes, city park areas, cemeteries, private lands with tree cover which is not grown in surrounding forests naturally, land out of forest borders with an area of less than 3 hectares.”

Forest land is also classified according to its crown cover. Therefore Turkey has no difficulty to comply with the forest and other wooded land definitions of TBFRA.

3, 4, 5, 6

Enquiry Table 3: With regard to the classification by species groups, we divide the forest into three classes: pure coniferous, pure broadleaved, and mixed. Please note that 8.4 per cent of the figures of predominantly coniferous and 2.8 per cent of the figures of predominantly broadleaved forest are related with mixed (conifers and broadleaved) forests. In other words 11.2 per cent of the total forest and other wooded land is mixed forest.

5, 6

Enquiry Table 4: In high forests available for wood supply, our forest management planning system uses both age and diameters classes methods. In coppices and coppices with standards, coppice-planning system is used.

Turkmenistan

1, 2

Enquiry Table 1: Source for Total area, Forest and other wooded land: Data provided by the Ministry of Natural Resources Utilization and Environmental Protection of Turkmenistan in their reply to the concise enquiry for SOFO-97 (12.08.1996).

Source for Inland water, Land area, and Other land: Secretariat estimates based on different literature sources.

Turkmenistan covers a territory comparable to the size of France with a population of 4.2 million. The Kara-Kum Desert covers big parts of the country, and irrigated land represents 1.3 million hectares.

3, 4, 5, 6

Enquiry Table 3: Secretariat estimates on the basis of analysis of the available data on growing stock volume by species groups. The categories “exploitable” and “unexploitable” are used for the estimates for “availability for wood supply” and “not available for wood supply” respectively.

5, 6

Enquiry Table 4: Data on high forests and coppice are not available. About 80-90 per cent of the country are the sand deserts (the main one is Kara-Kum). Fertile land is only about 3 per cent of the territory. Cultivation oases are from ancient times located around the rivers Murgab and Tejen, and along the northern highlands of Kapet Dag mountains.

7, 8

Enquiry Table 7: Data provided by the Ministry of Natural Resources Utilization and Environmental Protection of Turkmenistan in their reply to the concise enquiry for SOFO-97 (12.08.1996).

Secretariat estimates based on different literature sources.

United Kingdom

1, 2

Enquiry Table 1: The United Kingdom definition of forest is minimum 20 per cent crown cover, minimum area 0.25 ha, but this gives similar area.

Other wooded land is estimate of wood pastures.

Source: Annual Abstract of Statistics; Forest from Census of Woodland 1980, adjusted to 1995 using annual administrative data.

3, 4, 5, 6

Enquiry Table 3:

Conifer = GB (Great Britain) conifer high forest + NIFS (Northern Ireland Forest Service) conifer + 10 NI private—half of mixed; broadleaved by subtraction.

Available for wood supply estimated using same assumptions as production forecast.

Mixed is 20-80 per cent mix, not 25-75 per cent, some estimated over larger area than single stand.

Broadleaved: Data adjusted: Estimate for all broadleaved, then subtracted half of estimate for mixed.

Mixed: Data adjusted: Estimate = around 7 per cent of forest total, based on recent air photography.

5, 6

Enquiry Table 4: Source: Census of Woodland 1980 adjusted to 1995 using admin data.

High forest available for wood supply: Data not adjusted; but increased by 20 to balance 20 decrease in estimate for coppice.

The figure for Coppice is a new estimate; previous estimate (published in Forestry Facts & Figures) was 40,000 ha. It is assumed that all coppice is available for wood supply.

7, 8

Enquiry Table 7:

1980 = 2108 GB from Census + 66 Northern Ireland; “Forest not available for wood supply” is estimate using same methodology as 1995.

United States of America

1, 2

Enquiry Table 1: The data in this report represent the 50 States and do not include the Commonwealth of Puerto Rico, USA Virgin Islands, Commonwealth of the Northern Marianas, or the Trust Territory of the Pacific Islands. Future assessments will provide these data.

Forest land [1.5] consists of all timberland and all reserved forest land. Timberland is defined as forest land available for wood supply, capable of producing 1.4 m³/ha/year, and not withdrawn by statute or administrative regulation. Reserved forest is generally productive but withdrawn from wood supply by statute or administrative regulation. Much of the land reported as “other forest land” in this report may be classified as “forest land” in future reports as new statewide inventories are completed and establish proper classification parameters to conform explicitly to TBFRA definitions.

Other wooded land [1.6] is currently defined as unproductive forest land: forest land not capable of producing 1.4 m³/ha/year. In the northern boreal regions of the continental USA and Alaska, the primary tree species occupying “other wooded lands” are jack pine, black spruce, aspen and white birch. In the interior and coastal west regions of the continental USA the primary tree species occupying “other wooded lands” are scrub oaks, pinyon juniper, chapparal, and mesquite. The USA has begun placing inventory samples on all such lands since 1995 and subsequent assessments will place many of these wooded lands in the forest category. It will take 10 years to complete a full inventory of these lands.

IMPORTANT NOTES on reported area and volume estimates

The reader is cautioned that there are important differences between the numbers provided in this report and those found in domestic USA reports. Terms used in the TBFRA such as “forest land” and “growing stock” are the same terms used in the USA but the meanings have subtle differences. Please read the following notes and understand these differences.

Forest land area—By USA Forest Service definition, forest land is at least 10 per cent stocked by forest trees, and at least 0.5 hectare in size. This is similar to the FAO definition, which defines forest land as land with tree crown cover of more than 10 per cent and minimum size of 0.5 ha. In general, the USA definition is considered to be compliant with the TBFRA 2000 definition for productive forest land. However, much of the land presented in this report for the USA as ‘Other wooded land’ may in fact be “Forest land” by the TBFRA definition. Full inventory data for these lands to assure compliance with the TBFRA definition is currently underway but will not be available for 3 to 5 years. The lands reported as “Other wooded land” in this report are generally of low productivity (less than 1.4 m³/ha/year) and listed as “unproductive forest” or “other forest land” in USA reports. The USA response is generally consistent with the Canadian response for this land category.

Other wooded land area—“Other wooded land” in this report is primarily unproductive forest land, not capable of producing 1.4 m³ per hectare of industrial wood annually. Most of this land will probably be re-classified as forest land in future TBFRA Assessments. See discussion of forest land above.

3, 4, 5, 6

Enquiry Table 3:

Forest land [3.1] consists of all timberland and all reserved forest land. Timberland is defined as forest land available for wood supply, capable of producing 1.4 m³/ha/year, and not withdrawn by statute or administrative regulation. Reserved forest is generally productive but withdrawn from wood supply by statute or administrative regulation. Much of the land reported as “other forest land” in this report may be classified as “forest land” in future reports as new statewide inventories are completed and establish proper classification parameters to conform explicitly to TBFRA definitions.

Other wooded land [3.14] is currently defined as unproductive forest land. Forest land not capable of producing 1.4 m³/ha/year. In the northern boreal regions of the continental USA and Alaska, the primary tree species occupying “other wooded lands” are jack pine, black spruce, aspen and white birch. In the interior and coastal west regions of the continental USA the primary tree species occupying “other wooded lands” are scrub oaks, pinyon juniper, chapparal, and mesquite. The USA has begun placing inventory samples on all such lands since 1995 and subsequent assessments will place many of these wooded lands in the forest category. It will take 10 years to complete a full inventory of these lands.

Predominant forest composition is based on forest cover type classification of species presently forming a plurality of the all-live tree stocking. Conifer is assumed to mean all relatively pure conifer cover types, broadleaved is assumed to mean all relatively pure broadleaved cover types, and mixed is assumed to mean cover types where up to 75 percent of the cover is one of these two broad cover groups. Examples of mixed types in the USA are oak-pine and oak-gum-cypress.

IMPORTANT NOTES on reported area and volume estimates

There are important differences between the numbers provided in this report and those found in domestic United States reports. Terms used in the TBFRA such as 'forest land' and 'growing stock' are the same terms used in the United States but the meanings have subtle differences. The following notes explain these differences.

Forest Available for Wood Supply—In the context of this report “available for wood supply” means only that the forest land is not withdrawn from timber production by law or administrative regulation. Actual availability, at any given time, will vary by ownership objectives. For instance, on public lands in the USA such as National Forest System lands, availability of forest land for timber production is further restricted in the planning process by determining if it is currently 'suitable' for timber management. Suitability varies based on factors such as available markets, accessibility, aesthetic restrictions, conservation restrictions, higher value alternative uses, and many other considerations. Private industrial forests are also subject to restrictions in the corporate planning process. The nearly 10 million non-industrial private forest landowners have management objectives perhaps as diverse as their numbers. Thus, in general, the values reported here as “available for wood supply” will overstate the actual area and volume available for wood supply by the cumulative restrictions of the forest planning process. For example, current plans suggest that perhaps only 1/3 of the available National Forest lands and, according to a recent private ownership study in the USA, only 1/3 of privately owned forest lands have timber management as a primary objective.

5, 6

Enquiry Table 4: Forest inventories in the United States do not distinguish between high forest and coppice or coppice with standards. The entire area of forest available for wood supply is assumed to be high forest. While a large area of the aspen forest in the United States is regenerated by root suckering after harvest, it is not monitored as a specific method of regeneration.

7, 8

Enquiry Table 7: Source: Smith, W. Brad; Joanne I. Faulkner; and Douglas S. Powell. 1994. Forest Statistics of the United States, 1992 .

Metric Units. Gen. Tech. Rep. NC-168: USDA Forest Service, St. Paul, MN. 147 p.

Waddell, K.L.; Oswald, D.O.; Powell, D.S. 1989. Forest Statistics of the United States, 1987. Resour. Bull. PNW-RB-168.

Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 106 p.

Data in the *Enquiry Table 7* show the current allocation of land in the “other wooded land” classification based on productivity (less than 1.4 m³/ha/year) and not percent of tree cover as per TBFRA definition. As new state inventories are completed, much of what is currently labelled “other wooded land” may be re-classified as “forest land”. This will cause an artificial shift to appear in future reports for these categories in both area and volume statistics.

Uzbekistan

1, 2

Enquiry Table 1: Source for land area figures: <http://www.odci.gov/cta/publications/factbook/uz.html>

Source for Forest, and Other wooded land: Secretariat estimates based on literature sources.

3, 4, 5, 6

Enquiry Table 3: Source for Conservation/protection reasons on forest not available for wood supply: Secretariat estimates based on the information from different literature sources.

The area under *Juniperus spp.* (coniferous) amounts to 183.4 thousand ha. The area with predominantly *Haloxylon spp.* (broadleaved) amounts to 1450 thousand ha, or 75 per cent of the total forest area.

7, 8

Enquiry Table 7: Information on Forest is from the article “Biological diversity and genetic resources of forest in Uzbekistan”, FAO, 1997 by A.K. Kayimov and E.S. Alexandrovsky.

Yugoslavia**3, 4, 5, 6**

Enquiry Table 3: Mixed Forest of broadleaved: 107,380 ha; Mixed Forest of coniferous: 64,963 ha; Mixed Forest of broadleaved and coniferous: 171,343 ha.

5, 6

Enquiry Table 4: "Forest not available for wood supply—Coppice and coppice with standards" include the Maguis area of 14,645 ha and an area of coppice, scrub and brushland which covers 209,882 ha in Montenegro.