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**KIEV ASSESSMENT:
DRAFT CHAPTER ON FORESTRY**

Submitted by the European Environment Agency (EEA)

The total forest area in Europe is increasing and the annual increment of the growing stock has been larger than annual fellings in nearly all European countries. The timber resource in Europe's forests is therefore increasing.

*The forest area has increased mainly in the Mediterranean region and the South-Eastern NIS.
1/ In the Russian Federation there has been an annual decline in the forest area, but the area of forest plus 'other wooded land' has been increasing.*

About three quarters of the total forest area is 'undisturbed'; most of this is in the Russian Federation. About 7% is under some form of protection and about 3% under strict protection.

The relatively low exploitation of Europe's valuable timber resources provides opportunities for policy makers and forest managers to diversify the functions of Europe's forests and better balance environmental, social and economic interests in forest areas. In the large forests, generally far from human settlements, current exploitation could generally continue to protect biodiversity, soil and water catchments. The generally smaller forests, in countries not highly dependent on forestry or where opportunities for commercial exploitation are more limited, could increasingly satisfy functions other than production, including recreation, education, nature protection and buffer zones between built-up areas.

Introduction

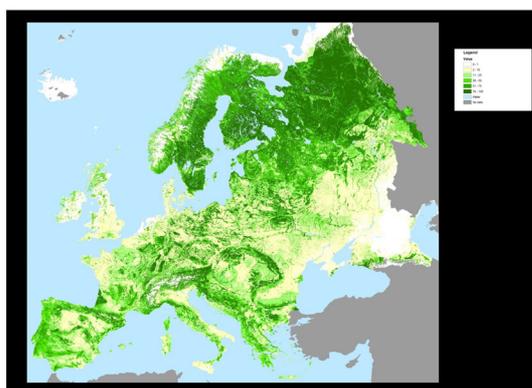
1. Forests constitute an important natural resource. They cover about 38% of the land area of

1/ Newly Independent States (NIS) means twelve countries of Eastern Europe, Caucasus and Central Asia.

the pan-European region that this report deals with (figure 1). They provide a wide range of goods and services for society. These include renewable fibre and timber resources, and non-wood goods and services. Forests host a major part of Europe's biodiversity and provide important general ecological functions, as they serve as carbon sinks, improve water quality and protect soils. They are also of great value for tourism, recreation and education.

2. European forests are subject to many political initiatives and processes at different levels, including a number of international conventions and two ministerial processes at the European level: "Environment for Europe" and "Protection of Forests in Europe".
3. In the European Union these initiatives are implemented through a set of strategies, action plans, directives and regulations. This policy framework reflects the long silvicultural tradition in the Member States and ensures that the forest resource is relatively well controlled and protected, although environmental challenges remain (halting the loss of biodiversity, improving carbon sink capacities, etc.).
4. On a pan-European scale the situation is more complex. Forests in countries with economies in transition are experiencing many changes resulting from the opening-up of new export markets, institutional restructuring and changes in ownership structure.
5. Evaluating the development of forests and forestry requires indicators that reflect the various aspects of the development of the forest resource: forest area and composition, the volume and increment of the timber resource, markets and use of forest products, socio-economic factors and environmental conditions. The information base should improve significantly as a result of the set of better indicators of sustainable forest management that has been prepared for adoption at the 2003 Ministerial Conference on the Protection of Forests in Europe.

Figure 1. Forest map of Europe to the Ural Mountains



Note: Based on remote-sensing technologies and forest inventory statistics.
Source: Päivinen et al., 2001.

Forest area

Total forest area

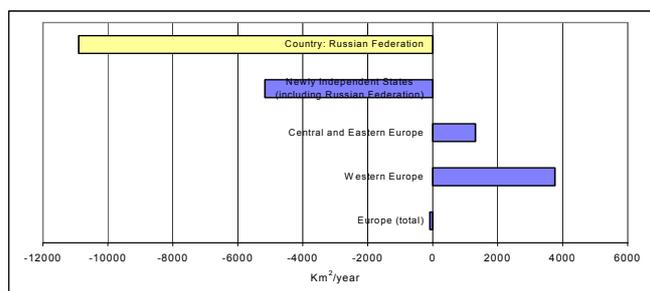
6. The total forest area in Europe (excluding other wooded land) amounts to 10.3 million km². Even without taking into account the vast forest resources of the Russian Federation, the

area is 2.1 million km².

7. Figure 2 shows the recent average annual change in forest area based upon two reference periods (cf. figure note) for different country groupings and separately for the Russian Federation.

☺ *The total forest area in Europe (excluding the Russian Federation) is increasing by 10 000 km²/year. The forest area has increased mainly in the Mediterranean region and the South-Eastern NIS. The Russian Federation reported a decrease in forest area at a similar rate (11 000 km²/year). This, however, was more than offset by an increase of about 16 000 km²/year in the area of 'other wooded land' (UNECE/FAO, 2000).*

Figure 2. Average annual change of forest between two reference periods



Note: Calculation of annual change is based upon two reference periods; most countries compared data for a period of 1-5 years in mid-late 1990s with an earlier reference period that was generally 5-10 years before.

Source: UNECE/FAO, 2000.

8. The countries reporting the largest increase are NIS (in particular Belarus and Kazakhstan) and Mediterranean countries (Spain, France, Portugal, Greece and Italy). The only countries indicating a slight decline in forest area are Yugoslavia, Albania and Belgium. Countries with an increase in forest area in the EU are mainly those that have implemented afforestation programmes through planting or by allowing 'other wooded land' to be converted to forest.

9. A problem related to monitoring developments in forest area is the lack of comparability between inventories in different countries, especially for changes over time because of changes in definitions between assessment periods. Land-use change is an important indicator related, for example, to biodiversity and carbon sequestration; frequent reporting is therefore likely to be demanded in future. In the near future more emphasis will need to be put on using remote-sensing technologies and combined approaches (remote sensing and inventory statistics) in order to guarantee continuous monitoring of changes in forest area.

Composition trends

10. In Europe, broadleaved forests dominate in several NIS (Republic of Moldova, Azerbaijan Turkmenistan, Uzbekistan) and in the Balkans (Yugoslavia, Croatia). Coniferous forests dominate in the densely forested countries, particularly the Nordic countries (Sweden and Finland: ~75%) but also Western-Central Europe (e.g. Austria: ~70%).

11. Forest management in many parts of Europe during the past two centuries has often

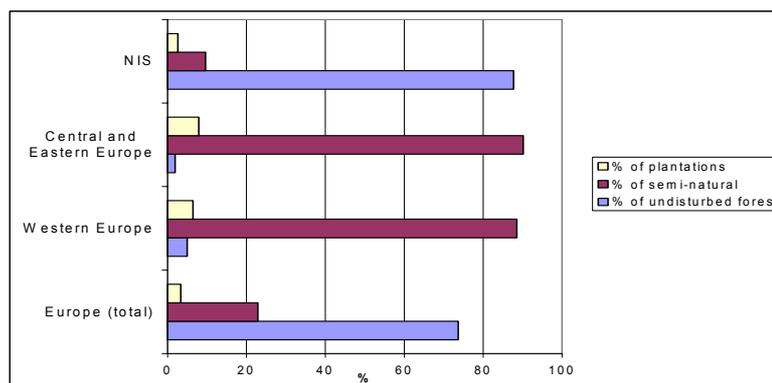
favoured single-species stands. Currently, there is a general trend, especially in Western-Central Europe, to increase the share of mixed forests by converting monocultural stands. Natural regeneration is becoming a more common forest management practice and often increases the amount of mixed forests (Bartelink and Olsthoorn, 1999).

12. However, active tree species policies change forest composition only slowly. There are many different targets that relate to the composition of forests and may influence its rate of change. For example, demands for more stability of forests against natural disturbances, biodiversity issues, forest protection and the use of forests as carbon sinks may target different tree species or mixes of species. For instance, coniferous species have been shown to have a higher carbon sink capacity than deciduous species (Päivinen et al., 1999).

Naturalness

13. In Europe about three quarters of the forest area is considered to be undisturbed. However, nearly 99% of these forests lie within the Russian Federation, mainly in the north-east. According to a study by Yaroshenko et al. (2001), forests essentially undisturbed by human development in the far north of the European part of the Russian Federation have a production potential of less than 1m³/ha/year and are therefore not suitable for sustainable wood production.

Figure 3. Forest land in categories of “naturalness”



Note: No data available for Greece and Luxembourg.

Source: UNECE/FAO, 2000.

14. The proportion of forest undisturbed by man in most European countries is less than 1%, with the exception of the Russian Federation and the Nordic countries (northern Sweden, Finland and Norway). Therefore, the undisturbed boreal forest area of North-Western Europe, with its continuation into the Russian Federation, is quite outstanding. The smallness of the area of totally undisturbed forests that remains in Europe reflects the long tradition of forest use and management. However, these small remnants may be highly important for nature protection and conservation of biological diversity. Prominent examples are the Bialowieza forest in Poland and the protected laurel forests in Atlantic islands such as Madeira (Portugal) and La Gomera (Spain).

15. Forest classified as ‘*semi-natural*’ dominates in Europe when excluding the Russian Federation. Some countries in Western Europe (Germany, Austria, Switzerland, Italy), Central and Eastern Europe (Czech Republic, Slovakia, Poland and Yugoslavia) and the NIS have

reported their forests to be between 98 and 100% semi-natural. Overall semi-natural forest comprises only about 23% of the total forest area in Europe when including the Russian Federation.

16. So-called *plantations* are classified as forest areas mostly covered by non-native tree species. They comprise only 3% of the total forest area. Countries with notable proportions of plantations are Ireland, Denmark and the United Kingdom.

Forest condition

17. Forest condition is assessed annually in 37 European countries participating in the International Cooperative Programme (ICP-Forests) set up in 1985 under the UNECE Convention on Long-range Transboundary Air Pollution.

18. Crown condition in European forests deteriorated considerably during the first decade of monitoring. After some recovery in the mid-1990s, the deterioration has resumed in recent years with more than 20% of trees classified as damaged. Severe deterioration in crown condition is to be found in southern Finland and Estonia as well as in Latvia. Increasing defoliation was registered in central Romania, Bulgaria and the west of the Iberian Peninsula. Improving crown condition was mainly observed in southern Poland, western Romania and in Slovakia after considerable damage in the past.

19. Results from the intensive monitoring of plots indicate a threat to forests from depositions of nitrogen and acidity particularly in Central Europe. Nitrogen depositions constitute a particular risk in Western Europe. Sulphur depositions were reduced on many plots, which is a clear result of the drastic reduction in sulphur emissions in Europe under the above-mentioned Convention and other pollution abatement strategies.

Protected areas

20. Concerns about a decline in natural forests, accompanied by a loss of biological diversity, created a political momentum, particularly during the 1980s, to increase the area of protected forest. The initiatives have aimed mainly to protect biodiversity and consider related ecological, social and cultural values. A general strategy has been to expand existing protection networks, such as Natura 2000 in the EU, in order to improve regional representativeness.

21. Including all IUCN categories of protection, 7.3% of forest land was reported to the Temperate and Boreal Forest Resources Assessment (TBFRA) 2000 in Europe (UNECE/FAO, 2000) as being protected. About 3% was classified as being under stricter protection (IUCN categories I and II).

22. A European project 'Forest Reserves Research Network (COST E4)' reported that 1.6% of the overall forest area in 27 participating European countries was strictly protected (EC, 2000). Work is in hand to harmonize definitions and data collection on protected areas in the EU and at the pan-European level.

Annual fellings and total annual increment of forest growing stock

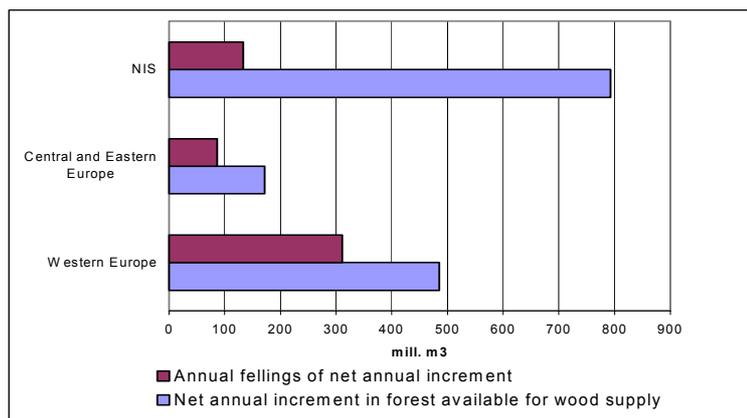
23. The largest forest resources are located in the North, North-East and Central Europe. The Russian Federation has a growing stock of about 85 000 million m³, or three quarters of the total resource in Europe. Together with the growing stock in Finland, Sweden, Germany, France, Poland, Italy and Ukraine, this represents 88% of all forest resources in Europe.

24. The 'net annual increment' (NAI) of forest available for wood supply in the Russian Federation is about 740 million m³. By comparison, the remaining European countries (excluding those for which no data were available) have 708 million m³ of NAI.

☺ *In general, both NAI and annual fellings have increased during recent decades, with annual fellings rising much more slowly. The balance between NAI and annual fellings is a major indicator of the long-term sustainability of forestry with respect to the overall timber resource.*

25. The NAI is generally well above annual fellings in most of Europe (Figure 4). The Russian Federation uses less than 20% of its NAI. This is largely explained by the collapse of fellings after the break-up of the USSR in the early 1990s. This becomes clearer when looking at the figures of the previous (1990) Forest Resources Assessment, for which the former USSR reported fellings reaching about 74% of NAI in forests available for wood supply (UNECE/FAO, 1992).

Figure 4. Annual fellings and the net annual increment of forest growing stock of forest available for wood supply in Europe



Source: UNECE/FAO, 2000.

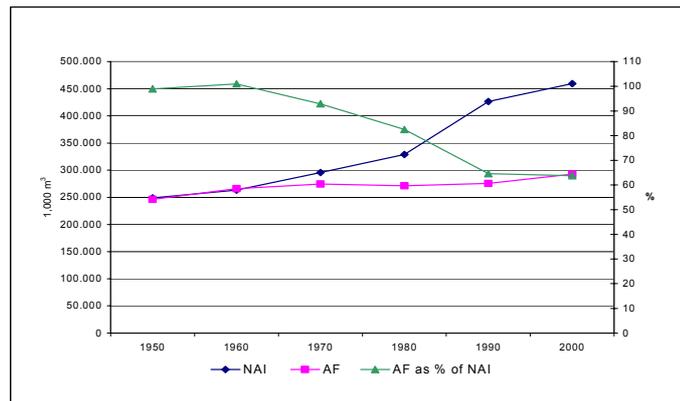
26. The NAI of Europe's forests available for wood supply started to exceed annual fellings significantly in the 1960s (Kuusela, 1994). Possible causes for the increase include (Spiecker et al. 1996; Päivinen et al., 1999):

- Increased growing stock and expansion of the forest area;
- Improved forest management practices and changes in forest structure aimed at higher

- wood production;
- Environmental changes;
- Changes in the forest definitions and more accurate inventory methods.

27. The gap between the NAI and annual fellings may also be increasing for reasons related to the economic profitability of harvesting and large-scale use of the entire NAI.

Figure 5. Development of the net annual increment and annual fellings (AF) of the growing stock of forests in the European Union



Source: Kuusela, 1994; UNECE/FAO, 2000.

28. If current supply-demand structures stay in place, the growing stock will continue to increase. However, wood supply-demand patterns are dynamic; both market and policy forces can have measurable impacts on felling levels. One example of increasing demand for timber can be related to the aim of the European Commission to increase the share of renewable energy in the European Union by 50% (partly based on wood), reaching an increase of 12% by the year 2001 (European Commission, 1997).

29. Further increases in private ownership of forests in countries with economies in transition can lead to an increase in fellings as the owners continue to see the forest as a potential source of income (Csoka, 1998). However, concerns are also expressed that, in these countries where privatization and restitution are expected to yield some 2.3 to 3.5 million forest owners, many of the new owners will receive very small holdings for which they may show only limited interest with regard to management. A recovery of the Russian forest sector and active consumer behaviour (e.g. increased demand for products from sustainably produced timber) should contribute to an increase in supply and demand for wood and wood products. Other issues related to conservation and biodiversity, social functions of forests, environmental changes and carbon sequestration may result in an adaptation of forest management procedures in ways that enable the demands of various stakeholders to be met simultaneously.

30. It is the currently low use of the available resources that is providing scope for European policy makers to design more socially, economically and environmentally balanced options for forest management and exploitation (Nabuurs et al., in prep.).

Forest sector as part of the national economy

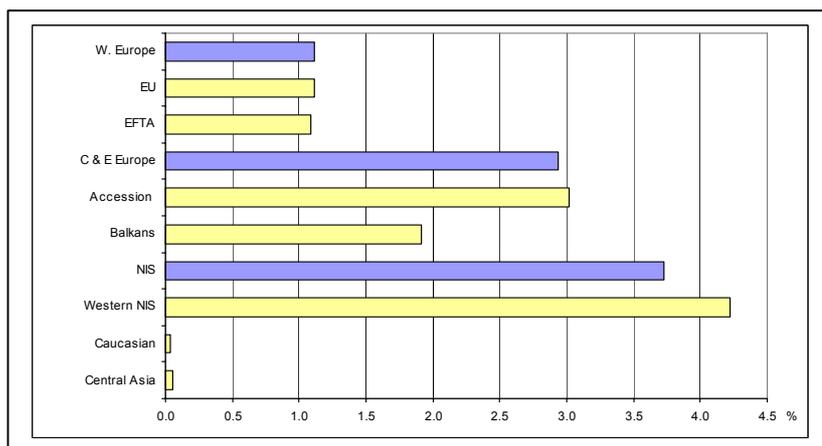
31. The possibilities for changing production forests into forested areas that are able to satisfy a number of functions, including recreation, education, nature protection and buffer zones

between built-up areas, are dependent on the importance of forestry for the national economies. The most used indicator for assessing the role of the forest sector in the national economy is the ratio of the value added by the sector to the country's GDP.

☺ *The contribution of the forest sector to GDP is generally relatively low, below 2%, but substantially higher, typically more than 10%, in some Western European countries like Finland and Sweden and some Central and East European countries like Latvia, Estonia and Lithuania. Even in these countries, however, the ratio has decreased substantially - in Finland, for example, from about one third in the late 1980s to 12% in 2000.*

32. This decrease in relative importance is often the result of faster growth in other sectors, with the value added by the forest sector remaining stable. Forest industries in the EU typically invest 1 to 3% of their turnover in production, research and development, compared with 10% or more in faster-growing industries. This may reflect the economic maturity of the sector and changes in the geographical distribution of investment following the estimated future consumption of forest products, but may also reflect the availability of raw materials or energy for the processing industries in Europe.

Figure 6. Forest sector share of gross domestic product



Source: FAOSTAT, 2002; World Bank, 2000.

33. Most trade in forest products in Europe is internal but many European countries are important exporters, the five largest being Finland, Sweden, Germany, France and Austria (Peck 2001, EFI/WFSE 2002). The revealed '*comparative advantage index*' (Figure 7) shows the ratio of net exports of forest products to national GDP. The index follows the logic that if a country devotes more of its total resources to the production of a good than its domestic demand, it will have a comparative advantage with respect to this product in international trade. Thus, the comparative advantage index illustrates the country's position in international markets (Palo and Lehto 2001). In Europe, the index was highest (in 2000) in Latvia, Finland, Estonia and Sweden, with forest product export at 50 to 90% of domestic consumption.

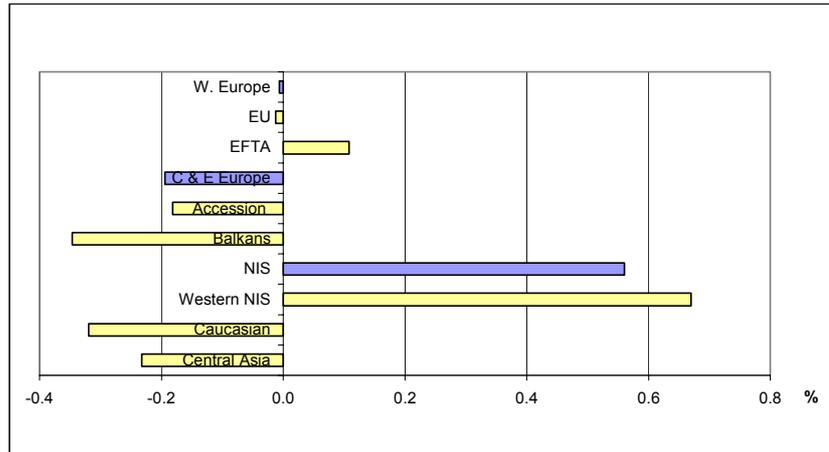
34. Three categories of countries can be identified on the basis of trade indicators:

(a) Countries where the forest sector has a high comparative advantage, a high share of exports and a clearly positive net trade value, e.g. Finland, Sweden, Austria and Norway; Latvia, Estonia, Lithuania, Slovenia, Slovakia and the Czech Republic; and the Russian Federation;

(b) Countries with a low comparative advantage and a relatively high share of import of forest products, e.g. Germany, France, Spain, the Netherlands and Italy; Poland, Turkey and Yugoslavia;

(c) Countries with little forest product production and nearly total dependency on imports, e.g. Uzbekistan, Turkmenistan, Armenia and Azerbaijan.

Figure 7. Revealed comparative advantage index



Source: FAOSTAT, 2002; World Bank, 2000.

35. The relatively low exploitation of Europe's timber resources and the limited contribution to GDP and export earnings in many countries, provide opportunities for diversifying the functions of Europe's forests. In the large forests of Northern Europe and the Russian Federation, generally far from human settlements, current exploitation could generally continue to protect biodiversity, soil and water catchments. The generally smaller forests in countries not highly dependent on forestry or where opportunities for commercial exploitation are more limited could increasingly satisfy functions other than production, including recreation, education, nature protection and buffer zones between built-up areas.