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## GENEVA TIMBER AND FOREST DISCUSSION PAPERS

# Employment Trends and Prospects in the European Forest Sector

*A study prepared for the European Forest Sector Outlook Study (EFSOS)*

*by*

*Peter Blombäck, Peter Poschen, Mattias Lövgren*

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**UNITED NATIONS**  
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## **Abstract**

Beside an analysis of structural changes in the past, this paper focuses on an analysis of recent trends of productivity and labour resources in the European forest sector. The paper provides information about wages, safety and health of working places, as well as training and skills of workers. Based on these trends, the paper gives an outlook for social issues in European forestry, wood processing industry and pulp and paper industry. The analysis is linked to a discussion about possible future changes in the policy and market framework of the sector.

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## Preface

Analysing social issues is a new feature of the European Forest Sector Outlook Study (EFSOS) activities, which are traditionally focussed on production, trade and consumption of forest products. Forest sector outlook studies are jointly implemented under the UNECE Timber Committee and the FAO European Forestry Commission. The study carried out in the framework of EFSOS contributes to a sustainable integrated economic and social development in ECE. It provides an input to the global forest sector outlook study activities of FAO.

In Nordic countries the forest sector and its multiplier branches, such as production of forest machinery, plays an important role in the general economic and social development. Social issues are of increasing importance in rural regions, where forestry and small-scale forest industry is often the major employer and the forest cluster, with the people working in this sector, has an impact on public life in general. This is a remarkable issue for Western Europe, where urbanisation has led over the past decades to a significant migration from rural to urban areas. At the same time social aspects of the forest sector are meaningful also for Eastern European countries, where the forest sector contributed to the overall economic growth during the transition period, notably both in terms of an easily developable resource and in terms of jobs, with the positive implication for domestic demand.

The current study analyses the main social aspects of the forest sector: development of productivity, employment in the forest sector, wages for forest jobs and security issues of jobs in the forest sector. The study gives a rough outlook for future developments. Because of the productivity in the forest sector, the assumed increase of production would be accompanied by further declines of forest sector jobs, mainly in forestry and in pulp and paper industry, with possible consequences for the further visibility of the sector and its benefits to society.



Brigita Schmögnerova  
Executive Secretary  
UN Economic Commission for Europe

## Table of contents

SUMMARY .....	1
1. INTRODUCTION .....	3
2. METHODOLOGY .....	4
3. TRENDS .....	9
3.1 STATUS AND TRENDS IN FORESTRY .....	9
<i>Forest management</i> .....	9
<i>Wood harvesting</i> .....	9
<i>Silvicultural operations and forest protection</i> .....	10
<i>Contract work</i> .....	10
<i>Status and trends of employment and productivity in forestry</i> .....	11
<i>Wages</i> .....	12
<i>Occupational safety and health</i> .....	12
3.2 STATUS AND TRENDS IN THE WOOD PROCESSING INDUSTRY .....	15
<i>Structural change and technical innovations in wood processing</i> .....	15
<i>Employment and productivity in the wood industry</i> .....	15
<i>Wages</i> .....	15
<i>Safety and working conditions in the wood industry</i> .....	15
3.3 STATUS AND TRENDS IN THE PULP AND PAPER INDUSTRY .....	16
<i>Structural change and technical innovations in the pulp and paper industry</i> .....	16
<i>Employment</i> .....	16
<i>Productivity</i> .....	18
<i>Wages</i> .....	18
<i>Safety and health</i> .....	18
4. OUTLOOK .....	19
4.1 THE OUTLOOK FOR EMPLOYMENT .....	19
<i>General outlook for the forest industry</i> .....	19
<i>The Russian Federation and CIS</i> .....	19
<i>Central and Eastern European countries</i> .....	19
<i>The Western European countries and EU</i> .....	21
4.2 SOCIO-ECONOMIC IMPACTS .....	21
4.3 OCCUPATIONAL SAFETY AND HEALTH OUTLOOK .....	21
4.4 THE FUTURE HUMAN RESOURCE AND TRAINING .....	22
<i>New roles for forest workers</i> .....	22
<i>Technological/organizational change in the forest sector</i> .....	22
<i>Is lack of a qualified workforce an emerging problem?</i> .....	22
REFERENCES.....	23
ANNEX 1 .....	24
<i>Annex table A</i> .....	24
<i>Annex table B</i> .....	26
<i>Annex table C</i> .....	27
ANNEX 2: Questionnaire .....	28





## SUMMARY

### *Purpose and scope*

The present report is an ILO contribution to the European Forestry Sector Outlook Study (EFSOS) to 2020 currently being prepared by UNECE/FAO. The study was undertaken in an effort to broaden the scope of EFSOS so as to pay more attention to social aspects of sector development. The present study deals with employment derived from forests, which even in the highly industrialized and economically affluent countries of Europe continue to provide key benefits for society. The report provides an analysis of trends in the volume and quality of employment in the forest-based industries of Europe and the Commonwealth of Independent States (CIS). Sub-sectors of the forest industry covered by the study are forestry (ISIC 02), wood industries (ISIC 20) and the pulp and paper industry (ISIC 21). Each of these sectors may be linked to the production data in the Timber Statistical Database of UNECE/FAO.

### *Methodology and interpretation*

Employment volumes are analysed over time by country and sub-sector in terms of full-time jobs available. An outlook for employment volumes is provided to the year 2010 based on a regression analysis of historical trends in labour productivity. EFSOS forecasts for production of the corresponding product group are then used to generate an estimate of employment by country and sub-sector for 2010.

Trends in the quality of employment are considered on the basis of data for two proxies: wages and accident frequencies. No projections are offered for these, but the track record provides important insights into the attractiveness of forest-based employment and identifies areas requiring attention by policy makers and industry.

The data underlying this analysis are sometimes incomplete and/or inaccurate in spite of considerable efforts invested in the collection of information. Estimates provided are therefore not always as robust as one might wish. Results have been examined individually for plausibility. Where doubts could not be removed these are highlighted. The results presented are believed to be reflections of actual trends. None the less, care should be taken with the interpretation. Direct comparisons between indicators for countries are often not possible because data sets are coherent for a country over time but not comparable with other series. Underlying data and computations are available from UNECE/FAO or ILO in a database for corrections, improvement and future studies.

### *Main findings*

As can be seen in table 1, the current labour force in the forest industry cluster in Europe is about 3.9 million full-time equivalents<sup>1</sup>. Pulp and paper is the smallest sub-sector in employment terms with just 27% of the total. Forestry and the wood industries share the balance about equally between them.

Gains in labour productivity have varied by sub-sector and country as well as over time. On the whole, they have been substantial and exceeded increases in the volume of output. Productivity increases in forestry have ranged from negative to 10 per cent per year with many countries around 3-4 %/worker/year. The equivalent values for the wood industries are -3 to 6 and 3 %/w/y. In the pulp and paper industry they are 1 to 6 and 4%/w/y. High rates of increase have been sustained over rather long periods of time in some countries. This is expected to continue.

As a result, employment has been declining substantially. In the 1980s and 1990s this decline has mostly affected the countries of northern and western Europe. In the future, assuming continued increases in labour productivity, reductions in employment levels are expected to be largest in Central and Eastern Europe as well as in the CIS. As can be seen in table 2, the total workforce is expected to shrink by 6.9 per cent. It should be noted that values for individual countries and sub-sectors vary widely around this average.

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<sup>1</sup> Full-time Equivalents (FTEs). One FTE is equal to one work year or 2,080 non-overtime hours. For example, one full-time employee counts as one FTE, and two half-time employees also count as one FTE.

Table 1  
**Current employment in the forest industry in Europe and the Commonwealth of Independent States**

(latest years available)

Sub-sector	Employment (1,000 full-time equivalents)	%
Forestry (ISIC 02)	1 397	36
Wood industries (ISIC 20)	1 470	37
Pulp and paper (ISIC 21)	1 054	27
<b>Total forest industry</b>	<b>3 921</b>	<b>100</b>

Table 2  
**Employment in the forest industry in Europe and the Commonwealth of Independent States in 2010**

Sub-sector	Employment in 2010 (1,000 full-time equivalents)	Reduction relative to 2000	Per cent reduction 2000/2010
Forestry (ISIC 02)	1 277	- 120 000	- 8.6
Wood industries (ISIC 20)	1 410	- 60 000	- 4.1
Pulp and paper (ISIC 21)	827	-90 000	- 8.5
<b>Total forest industry</b>	<b>3 544</b>	<b>- 270 000</b>	<b>- 6.9</b>

Regarding employment quality, wage levels in the pulp and paper industry compare favourably with those in the other two sub-sectors and with manufacturing wages at large. Remuneration is typically significantly lower in wood industries and forestry. Female wages continue to be significantly lower than male ones (in the pulp and paper industry 30-39 percent lower), a situation that needs to be remedied if the sector is to attract more women workers in the future.

Similarly, the safety and health situation has improved in the manufacturing industries, but continues to be a major concern in forestry in many countries. In some regions and for some groups the situation has actually deteriorated significantly over the past decade, most notably for self-employed and private forest owners in Central and Eastern Europe.

### ***Policy implications***

The continued decline in employment will further reduce the visibility of the sector and partly its direct benefits to society. Rural livelihoods will be most affected as the losses are concentrated in forestry and in small firms in the other sub-sectors. If the forest industry is to make a contribution to rural development in Europe, growth patterns need to be reviewed and altered. Small enterprise development, including of forestry contractors, pursuing a strategy of quality and higher value added in addition to the provision and marketing of non-traditional goods and services will be important elements of any strategy to address the withdrawal of the forest sector from rural areas and the continued shift to capital intensive modes of production.

Key players in the forest sector (in particular from Nordic countries) are acting more and more globally, shifting capacities toward eastern Europe because of lower production costs and expected increases in the demand of forest products. This process depends on further stabilization in the policy framework as well as on the economic growth in these countries. This will have an additional impact on employment in the traditional producer countries.

In spite of the decline in employment volumes, the sector is likely to be faced with difficulties in finding adequate employees with related timber qualifications in the future, not the least because of demographic trends in Europe. These shortages may only concern the inability to attract new entrants with good qualifications and potential, or it can translate into absolute shortages. In some major producer countries, these are expected to limit the potential for growth in output. This issue would appear to merit closer scrutiny at the

national and local level. Improvements in employment quality such as wages, training and career prospects, as well as working environment and safety, will be critical to maintain adequate levels of new workers, in particular women.

The detailed policy suggestions which have been submitted in preparation for the 4<sup>th</sup> Ministerial Conference on the Protection of Forests in Europe provide important pointers for strategies to buttress employment volumes and to improve the quality of jobs. Likewise, a number of the recommendations addressed to stakeholders in the forest industry that were adopted at the Tripartite Meeting for the Forestry and Wood Industry in September 2001 contain useful and constructive advice (see ILO 2001b).

## 1 INTRODUCTION

Social aspects are increasingly recognized as an integral part of sustainable development and therefore of sustainable management of forests and other natural resources. Social aspects comprise, among others, the functions of the forest and the benefits, which people derive from them. Forest-based employment, along with income for private forest owners, is the key material benefit from forestry to society. It should be noted that many owners of family and farm forests derive as much or more income from self-employment in their forest as from ownership per se. Employment is both a benefit from and an indispensable input into forestry. The management and protection of intact forests and, even more so, the restoration and rehabilitation of degraded forests would not be possible without human input, including labour.

All forest workers, whether salaried workers, contractors, self-employed workers or forest farmers, are obvious stakeholders in forest management as contributors, potential beneficiaries and those whose livelihood hinges on the sustainability of forest management. Hence policies for strengthening the economic development of the forest sector are unlikely to be successful in the long run unless they take account of the social impacts of developments and the concerns of these groups and can also ensure that human inputs to management and use of forest products are forthcoming.

The relevance of social aspects and of labour for European forestry and forest industry has been explicitly acknowledged and addressed in the declarations and resolutions adopted at the Ministerial Conferences for the Protection of Forests in Europe in Helsinki in 1995 and in Lisbon in 1998. It is also increasingly reflected in criteria and indicators for forest management adopted by governments and voluntary certification schemes like the Pan-European Forest Certification and the Forest Stewardship Council. For a more detailed discussion of social aspects of forestry in Europe and elsewhere see ILO (1998) and Poschen (2000).

It is against this background that sector outlook studies have started to include information on the workforce. This report is an ILO contribution to the European Forestry Sector Outlook Study (EFSOS) to 2020. EFSOS is designed to provide a comprehensive analysis of structural trends and a prognosis of future developments in the sector. The aim is to assist decision-making on policy and investment in the sector. The main target groups of EFSOS are policy makers, entrepreneurs and the academic community of the forest and forest products sector and the public as well. Its scope comprises geographical Europe and the countries of the Commonwealth of Independent States (CIS).

This EFSOS report attempts to estimate an order of magnitude of the direct employment provided by forests and forest-based industries in Europe and the CIS. For the purposes of this study, forest-based industry has been defined as forestry proper plus mechanical and chemical wood processing, i.e. sawmilling, manufacture of wood-based panels, wooden parts and components, pulp and paper manufacturing and processing. It does not include furniture making. The report concentrates mainly on the industries' formal sectors and deals only in passing with the informal and subsistence sectors, which are sizeable in some countries.

The benefits from employment hinge not only on the volume, i.e. the sheer availability of jobs, but also on its quality. The study uses two proxies to assess quality, namely wages and occupational safety and health. Wage levels and working conditions relative to other sectors competing for workers are crucial for the ability to attract good personnel in sufficient numbers.

To our knowledge, the study is the first of its kind. It offers a number of important insights but also suffers from a number of constraints and limitations, mostly related to data availability. Future work on EFSOS should be able to improve the situation. Efforts to improve the data situation should benefit from the current

review of indicators for SFM adopted by the third Ministerial Conference on the Protection of Forests in Europe in Lisbon 1998, in particular those falling under Pan-European Criterion 6 (Maintenance of Other Socio-economic Functions and Conditions) and reporting against the revised set. Data collected for the present study have been stored in a database which lends itself to continuing improvement and updating. Data collected and generated for the study can be made available by the EFSOS Secretariat or by the ILO, upon request.

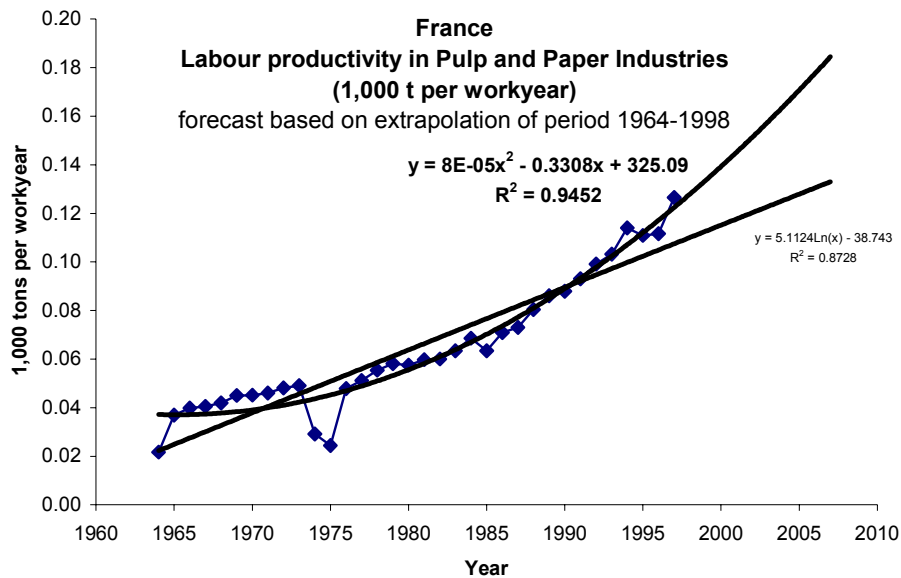
It is hoped that the results of this study will contribute to the drive to broaden the debate on the outlook for the forestry sector to go beyond fibre availability and product markets and to encompass other dimensions and policy fields that play a major role in shaping the future of the sector.

## 2 METHODOLOGY

### *Hypothesis and procedure*

Volume of employment: The underlying hypothesis is that future employment levels can be predicted from past and current trends in labour productivity. Labour productivity is expressed as physical output per worker per year, in cubic meters or in tons. Productivity is calculated by dividing time series production data for sub-sectors by the corresponding series of employment data. A regression function is fitted to the productivity index over time and extrapolated for future years. The figure below showing two regression functions applied to the productivity figures for the pulp and paper industry in France illustrates the method. The future values for productivity per worker per year are then multiplied with EFSOS forecast of production in the respective country and sub-sector to provide an estimate of the number of workers needed.

Figure 1  
Productivity in the French pulp & paper industry



Unlike trees and forests, which have relatively low, continuous and well-understood patterns of growth, changes in employment have been rather fast, sometimes inconsistent and are less well understood and documented. The reliability of an extrapolation depends on the length of the time series on which it can be based, on the consistency of change and of the closeness of the resulting fit for the regression. As will be seen below, all of these elements leave something to be desired. This is particularly true for Central and Eastern European countries as well as the CIS where the sector has been exposed to disruptive change and where data

may not go back further than 1993. It was therefore deemed unreasonable to extrapolate employment figures to the 2020 time horizon of EFSOS. Instead, the forecast for employment goes to 2010.

Quality of employment: Wages and indicators for occupational safety and health do not follow consistent trends over time. Rather than attempt to predict future values for these proxy measures of the quality of employment, wage levels are compared within the forestry sector and with neighbouring sectors in the country. Similarly, trends for accident frequencies, in particular for fatal accidents, are traced by sub-sector over time to allow comparisons as for wage levels. For both parameters, some comparisons between countries are attempted, but these have to be interpreted with caution (as explained in respective sections of the text).

### ***Scope of the study***

Ideally, the study would have covered the four major sub-sectors that fall under a core definition of forest-based industries: forestry, wood industries, pulp and paper, and wooden furniture. The latter was not included in this study because it falls outside of the scope of EFSOS. The other sectors have been defined as per the International Standard Industrial Classification (ISIC): ISIC 02 forestry; ISIC 20 wood industries; ISIC 21 pulp and paper.

### ***Data sources, gaps and quality***

Information for this study has been gathered from a wide range of sources. An attempt has been made to collect long time series for employment and production, which would allow for reasonably robust estimates of future productivity trends.

The historical production figures for all sub-sectors come from the FAO Yearbook. Employment data for the forestry sub-sector has been collected from EUROSTAT (European Union member countries), national statistical yearbooks and other national reports. Employment data for the wood and pulp & paper sub-sectors are derived from the UNIDO Database.

Reliable employment data proved difficult to find for many countries. The statistical search was therefore supplemented by a labour force enquiry, which was sent to all countries included in the study. The questionnaire (see annex 2) covered all sub-sectors and respondents were requested to provide data on employment, wages and accidents. Almost all countries replied, although many replies were only partial or incomplete. This information has also been used for cross-checking other data sources.

The employment figures recorded are full-time equivalents in industrial forestry. This excludes some groups that are directly employed in forestry, such as government services. Self-employed forest farmers and contractors are covered to a varying extent depending on countries. The data also excludes those responsible for essential services such as transport or involved in the marketing and trade of forest products, but not employed by the forest industry firms. Likewise, small businesses, such as craftsmen, form a substantial part of the total wood industry, but are not covered by industrial statistics, which include only establishments with more than 20 employees.

Most countries provided only incomplete information on wages. It is still possible to make some comparisons within the sector and with neighbouring countries. The wages presented in the report represent industry averages that have been converted using purchasing power parities to eliminate the influence of fluctuating exchange rates.

It has proved difficult to compare statistical data on occupational accidents and diseases because there are significant differences in definition, classification and reporting systems. However, as long as the data are consistent between different years, trends can be established showing whether accidents increase or decrease. For some countries, data were available to establish trends in accident and fatal accident frequencies.

For a more extensive discussion of the limitations of employment, wage and accidents statistics in the forestry sector see:

- ILO (2001b)
- Poschen (1997)
- ILO (1991)
- Freeman R. B., Oostendorp R. H. (2000)

### ***Other limitations and potential problems with the methodology***

In addition to the limitations induced by the incompleteness and inaccuracy of data discussed in the foregoing, some other potential sources of error have to be considered.

Classification of workers by sector and statistical drift: The changes in work organization in the forest industries over the past several decades have meant that many workers who used to be counted under forestry sector are now classified differently. Typical examples are transport workers who are no longer directly employed by the forest industry but by transport businesses providing services to a wide range of clients. Other work areas that have been outsourced are cleaning and maintenance, catering, computing, accounting, guarding etc. This reclassification tends to inflate apparent productivity. It is difficult to determine the size of this effect, which varies over time, between sub-sectors and from country to country.

A related phenomenon is the increase in recycling of forest products, most importantly for paper. Engel (1997) for example has suggested that employment losses in the US pulp and paper industry may have been more than offset by increases in recycling. How much of that increase was actually attributable to the use of recycled fibre could not be established though.

On balance, it is safe to assume that actual direct forest-based employment is in most cases higher than the figures used for the present study. In some cases, this error can be substantial. A study in British Columbia, Canada, found a 20 per cent underestimate from a limitation of the ISIC categories (NRRC, 1997). While the problem of underestimates is real, it will not be resolved by resorting to inflated notions of a 'forestry cluster' that is ill defined and introduces new areas of uncertainty and the need for extrapolation or downright guesswork. The concept of "employment multiplier effects" is beset by similar problems. For the validity of the present study, a somewhat deflated base figure would not seem to be a major problem as long as the same classification is used and the trend (outsourcing, recycling, etc.) inducing an error is in the same direction.

Working time: In this study, productivity is measured per work year rather than per work hour. This induces a bias because the number of work hours has not been constant in most countries and is likely to continue to change. For most of the industry sector, the number of working hours per year has declined, sometimes quite substantially. Actual productivity increases are thus likely to be higher than those reflected in the study. As a further shortening of the working year seems likely, if only because of an ageing workforce, the extrapolation for employment should still be quite accurate.

In forestry, the situation would appear to be different in many countries. As part of a drive to outsourcing and use of contractors, the number of working hours per year has often increased. Particularly small contracting businesses and self-employed routinely work 50-60 hours per week. It is unlikely that further increases are feasible. Where this has been the case, productivity gains per hour have thus probably been smaller than those reflected in the regression curve and there may be a tendency to underestimate future levels of employment in forestry.

Changing composition of products: It has been argued (Johnstone 1996) that changes in aggregate output per worker for broad sub-sectors such as forestry, wood products and pulp and paper may be very misleading. Increases in physical productivity could reflect a change in composition of products and specialization rather than higher efficiency in making a given product. This may indeed be the case and can distort the picture when direct comparisons of productivity levels between countries are attempted. For the purposes of this study, i.e. to provide an estimate of future employment levels, this does not matter as long as the changes are in the same direction and roughly at the same pace. This is quite likely as investment cycles in the forest industry are rather long and new technology and specialization are phased in gradually, a phenomenon observed in an earlier study on the pulp and paper industry (ILO 1992) and also illustrated by productivity development in Swedish forestry, as will be seen below.

Direct comparisons between productivity data in countries are indeed treacherous, even if the composition of output and other conditions appear to be very similar. Two figures (figure 2 and 3) below show productivity development in forestry for Sweden and Finland. The shape of the curve is very similar. There are however rather large differences in the absolute level of productivity attained. It would appear to be almost 50 % higher in Sweden than in Finland. This may be due to differences in data or to a higher share of manual logging in Finland due to a higher share of farm forests and to rural employment promotion programmes and other factors or a combination of these. Data generated by the present study should not be used for such comparisons without prior checking that they are actually comparable.

Figure 2  
Productivity in the Swedish forestry sub-sector

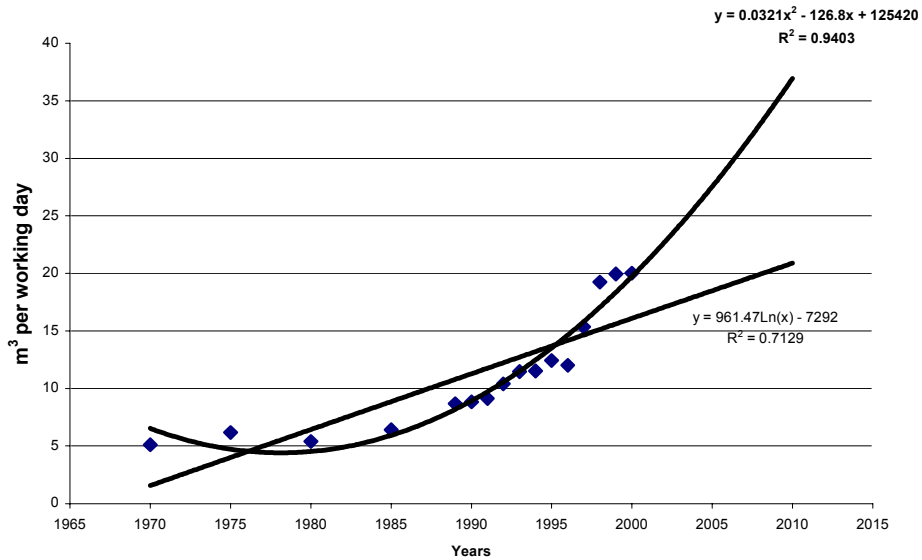
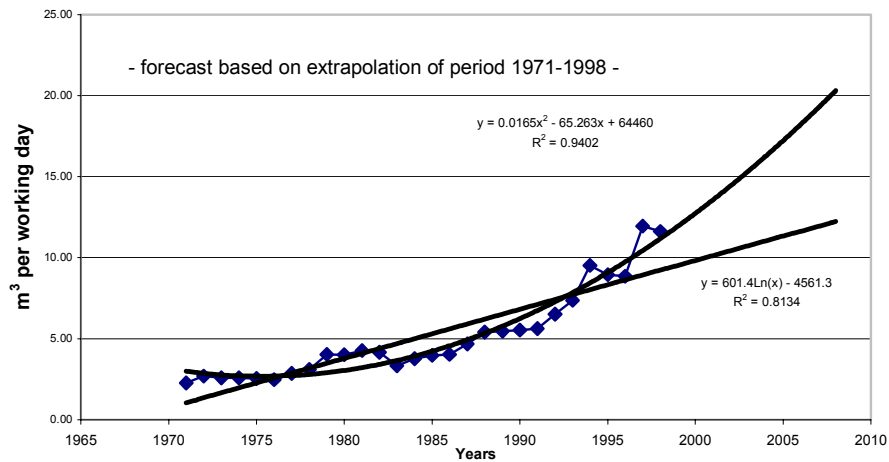


Figure 3  
Productivity in the Finnish forestry sub-sector



Inter-dependence of variables: A final consideration is the inter-relation between production and productivity figures. EFSOS projections for production include an estimate of the price of the product relative to imports and potential substitutes. Labour productivity is one of the determinant factors for production cost. Its actual impact on price is however limited, because labour cost is no longer a dominant component of total cost and because unit labour cost of products depends not only on productivity but also on wage levels. Covariance between the two variables should therefore be limited.

Discontinuity of change: For many countries and sub-sectors there are fairly stable trends. In some cases, however, extrapolation is very difficult. This is illustrated by the figures 4 and 5 for the wood industries in Bulgaria and the pulp and paper industry in Hungary below. In Bulgaria, stagnating productivity turned into decline after 1990. An extrapolation would lead to the, impossible, result of negative labour productivity after 2002. In Hungary it looks more plausible to assume that a stable growth trend has been briefly interrupted in the late 1980s and early 1990s and resumed after that. Interpretation can thus not be mechanical and each case needs to be considered separately.

Figure 4  
**Productivity in the Bulgarian wood industry**  
*(1,000 m<sup>3</sup> per working year)*

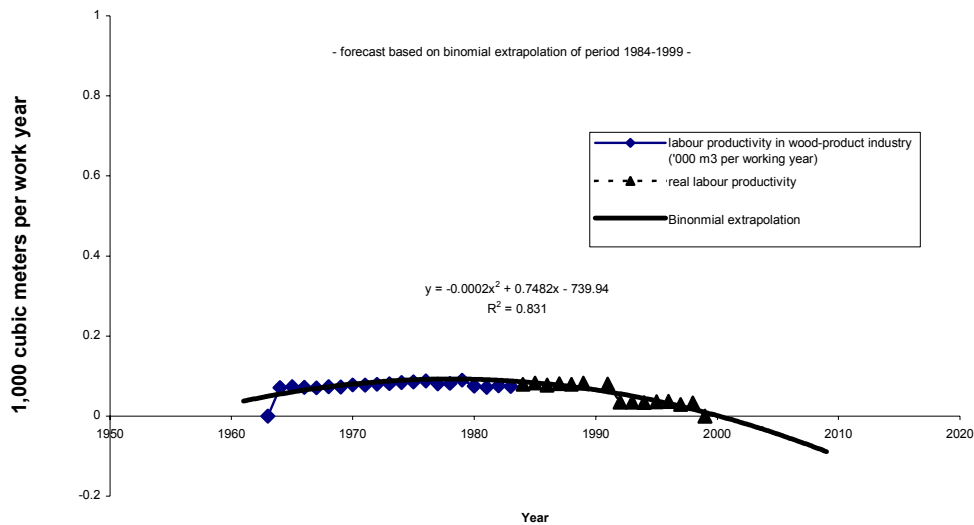
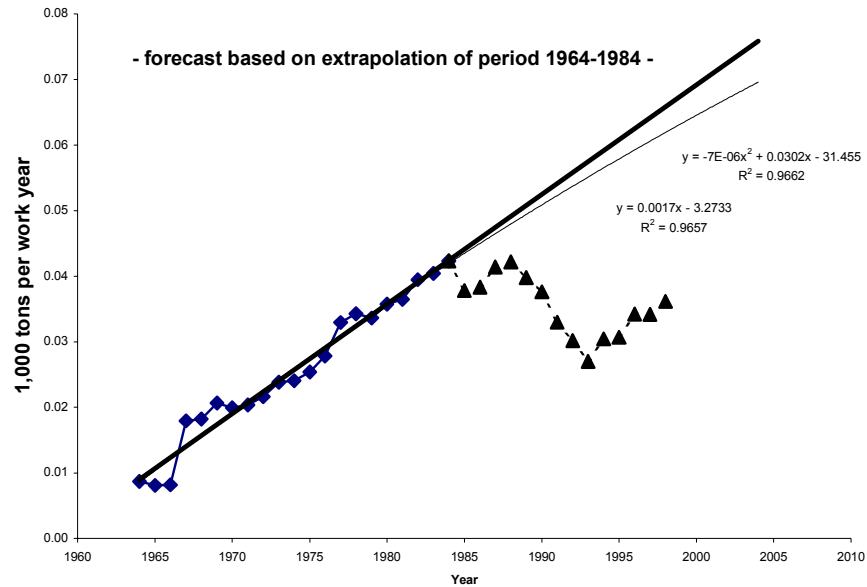




Figure 5  
**Productivity in the Hungarian pulp and paper industry**  
*(1,000 tons per working year)*



### 3 TRENDS

#### 3.1 Status and trends in forestry

##### *Forest management*

Traditionally forestry has primarily been seen as an economic activity and most forests have been managed or established to supply wood and timber. However, the role of forestry as a provider of a wide range of other goods and services has become more pronounced during the past decade (FAO/ECE/ILO 1997). This has of course had a big impact on forest management objectives with more emphasis on multipurpose forestry, especially in countries with relatively high population density and limited forest resources. Forest managers are being called upon to provide a widening range of products and services for which they often have no means to obtain remuneration. This has had a negative effect on unit cost for wood production, which is higher in Europe (excluding the CIS) than in most other parts of the world.

Forest ownership patterns vary considerably from country to country. In Europe as a whole, excluding the CIS countries, half the forest is privately owned. Ownership by forest companies is significant only in Finland and Sweden. In many former planned economies such as the Czech Republic, Slovakia, Slovenia and Hungary there is a drive towards the restitution of land and other agricultural property to their original owners. In most cases, these are very small landholdings that are taken over by people with limited knowledge or interest in forest management. In Slovakia the average size of holdings is less than 3 ha (ILO and Dresden University of Technology 1999). Its consequence for the timber supply in these countries is therefore uncertain.

##### *Wood harvesting*

In the industrialized countries, mechanization of wood harvesting has been advancing at a rapid pace in the large-scale conifer forests of the northern hemisphere, especially in countries where tree size is moderate and terrain easy. In the Nordic countries, where such conditions are widespread, the forestry industry has been in the forefront of mechanization both in Europe and the rest of the world. However, after the rapid development of the 1980s there has not been much radically new technology. While progress has been made

with the use of harvesters in bigger coniferous timber, on steeper terrain and to some extent in hardwoods and mixed stands, tree harvesters and forwarders have basically not changed since the early 1990s. Rather, they have been improved further through incorporation of information technology as a way of linking the supply chain, from the forest to the mill (ILO 2001b).

In many Central and Eastern European countries, chainsaws are still widely used and motor-manual wood harvesting is giving way only slowly to mechanized wood harvesting. However, in the latter part of the 1990s many countries had a revival of investment in forestry and a large number of technically obsolete machines are currently being replaced by a smaller number of technically more advanced machinery aimed at increasing productivity and reducing the need for manual labour. In a number of Eastern European countries mechanization appears to be mostly in skidding, involving adapted agricultural tractors.

### ***Silvicultural operations and forest protection***

The scope for mechanization of silvicultural operations is more limited than in wood harvesting. To some extent, machines are employed for site preparation, e.g. skidder or forwarder drawn scarifiers. In some countries in locations where ground cover and slopes are not excessive, such as the Nordic countries or the “Landes” in France, plant machines have been used to some extent. However, most of the tree planting in all countries is still done manually. A move to “biological automation” relying on natural regeneration has reduced planting and maintenance work in the region, particularly in Central European countries.

In many countries, the scope of silviculture work has been expanded in response to the changing pattern of demands of the forests. Some new jobs have been created and new skills have to be acquired, for example in the areas of recreation and of environmental education. The role of protection forests in mountainous areas has also received increasing attention.

Forest fire control has turned into a major concern in the drier countries, notably the Mediterranean region.

### ***Contract work***

Since the 1970s, forestry throughout North America and Europe has undergone a massive structural change, heralded by the spread of advanced mechanization and outsourcing of forest work as the standard mode of operation in more and more enterprises and countries. The combined effect has been a dramatic fall in the number of forest workers and the emergence of contractors. Contractors are most extensively used in logging operations. In Finland, the UK and Sweden, practically all logging machines are operated by contractors. In absolute terms however, the number of contractor-owned machines has remained approximately the same, since the total number of machines used in logging operations is declining (ILO 1997).

In other European countries, where contract work evolved later, the pattern is similar. In some Central and Eastern European countries, the rapid shift into contractor work and self-employment in reinstated forests has sometimes led to deteriorating standards, notably as regards safety.

In many countries throughout Europe the forestry sector has been moving backwards in terms of skill levels, work safety and health, working conditions and work quality. Forestry contractors are usually hired only for a specific job of relatively short duration. They have to change worksites frequently, often over long distances (ILO 2001a and Poschen P. 1997).

A positive trend is the creation of forest contractors associations. Today there are forestry contractor associations in more than 20 European countries. They provide a platform for a better bargaining position vis-à-vis the big forestry companies and/or forest owners and for influencing forest policy making, not only on national but also on the European level as well. For the latter, the European Network of Forest Entrepreneurs (ENFE) was created in 2000 as an umbrella organization for the national forestry contractor associations. Some contractor organizations, for example the Forestry Contracting Association in the UK, have also introduced voluntary registration systems for which safety and skill certification are prerequisites (see ILO 2001b). Most likely, the spread of certification schemes such as the FSC and PEFC standards will be an effective way to increase demand for a qualified workforce.

### ***Status and trends of employment and productivity in forestry***

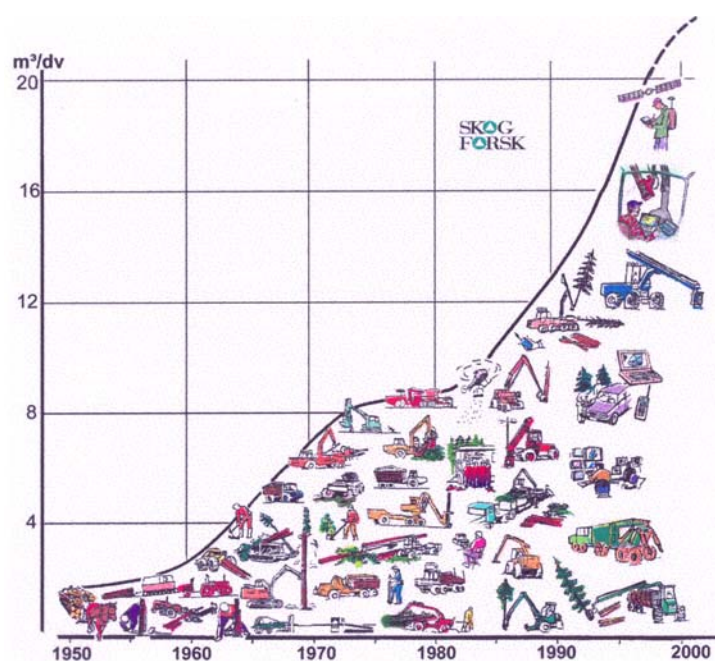
Total employment in the forestry sub-sector in EFSOS countries amounts to some 1.4 million workers (full-time equivalents). This excludes Bosnia and Herzegovina from where no data were available. It could, however, be assumed that the real figure is considerably higher as many countries fail to account for seasonal workers or self-employed such as contractors.

There is also some inconsistency in the definitions of employment. A striking example is Turkey, which reports a workforce, which is twice that of the Russian Federation. The figures from Turkey are most likely not converted into full-time equivalents, and also include non-industrial use of wood such as fuelwood production.

Almost all countries report a drop in employment over the past two decades (see annex table A). In the EU countries, 170,000 jobs have been lost over the past decade. The biggest shedding of labour occurred during the early 1990s and has since levelled out. The general trend is however still negative.

Productivity has been on the rise in almost all countries. A good example is Sweden where employment fell by 60% from 1980 to 2000 despite an almost 30% increase in industry round wood production over the same period. The productivity increase was bigger towards the end of the period. Between 1995 and 2000, productivity in forestry in Sweden increased by 60%. In Finland, productivity increased by 26 % during the same period. Figure 6 illustrates very well the development in Sweden from 1950s and takes good account of the technological development during this period.

Figure 6  
**Productivity and technological development in Sweden 1950-2000**  
*(m<sup>3</sup> per worker day)*



Source: Skogforsk

Note: m<sup>3</sup>/dv = m<sup>3</sup>/worker day

In the EU countries, the average increase in productivity between 1990 and 2000 has been around 3-4% per year. In the former planned economies, productivity development is less uniform than in the EU countries. While some countries such as Belarus, Kyrgyzstan and Moldova have seen negative trends during the past decade, others such as Poland, Czech Republic and the Baltic countries registered dramatic increases in productivity (up to 10% per year). The continuity of these trends is however questionable since they are in some cases based on very short time data series.

The share of women in forestry is low in all countries. Only in 4 countries of the 20 providing data does it reach or exceed 20%. The highest share of women employees (26%) was reported from Latvia. In most occupations the proportion of women is on the rise. The only group in the forestry sector in which the share of women has probably stagnated or even declined are the forest workers. This is partly a result of reduced investment in silviculture. The biggest fall has, however, been caused by the transition to market economies in central and eastern Europe. Women were particularly affected by large cuts in the public sector where many of them had service jobs. A general trend in all countries is that women are still strongly under-represented in management and decision-making (FAO/ECE/ILO 2001).

### ***Wages***

In a global comparison, forestry wages are generally below the average for other industries, including wood and pulp & paper. In industrialized countries where the level of mechanization is higher, forestry wages seem to be more in parity with the wood industry or in some cases even higher. Figure 7 shows the annual wages for selected countries in 1998 in forestry and the manufacturing sub-sectors. Wages represent industry averages (gross wages) that have been converted using purchasing power parities (PPP) to eliminate the distortion from fluctuating exchange rates and to better reflect the domestic purchasing power of the wage. In forestry, the range is from about \$7,000 in Latvia to over \$23,000 in the United Kingdom. Direct comparison between countries using PPP adjusted wages is precarious as the conversion factor for some of the countries is relatively high, notably Belarus and the Eastern European countries. Also, comparisons between the forestry and the manufacturing sub-sectors must be done with caution, since the wage statistics come from different sources.

In most countries, female employees receive a lower wage than their male counterparts. The situation in a selected number of European countries is presented in figure 8. In the transitional economies, women's salary is estimated to be on average 25% lower than men's (UNICEF 1999). Forestry wage statistics from a number of countries suggest that this difference is slightly smaller in this sector, ranging from 2 to 33%.

Because of the substantial rationalization in forestry over the past two decades, wages have been falling as a proportion of total costs in most countries (ILO 2001b).

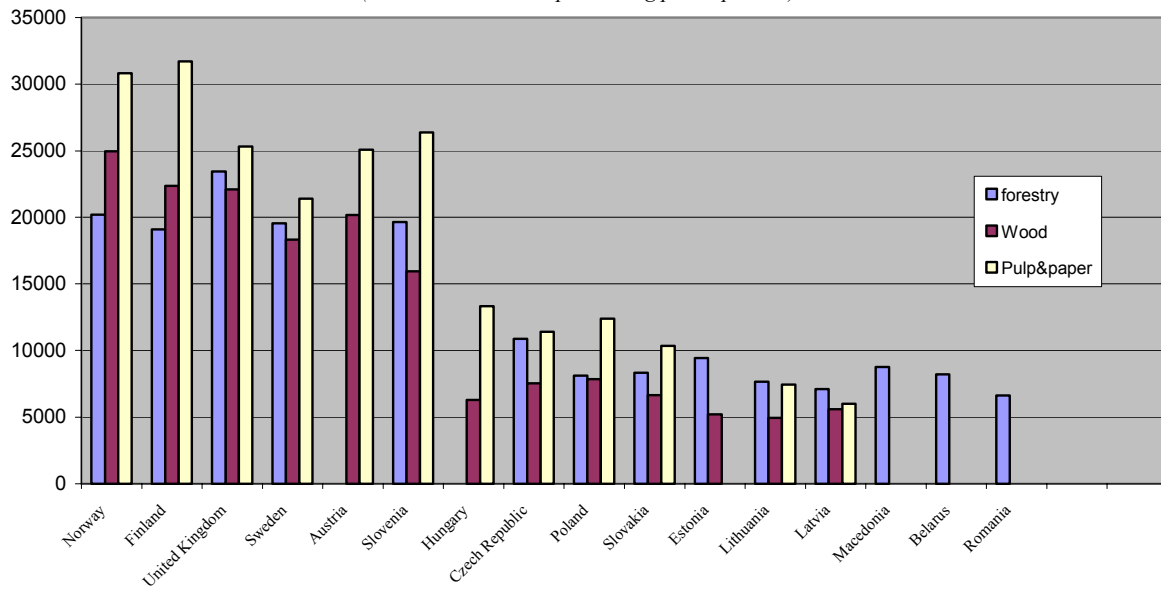
### ***Occupational safety and health***

The worst working conditions are usually found in forestry. Forestry in general and logging in particular continue to be among the three most hazardous sectors even in European countries. Forestry workers are also beset by serious health problems, few reaching normal retirement age (ILO 1997).

It is difficult to make comparisons between countries since definitions and quality of accident reporting differ widely from one country to another. Most countries report that working conditions have improved (often as a result of new improved technology), although the extent of the improvement varies greatly. In some countries (especially in Central and Eastern Europe), however, accident levels remain relatively high. An increasing trend in accident frequency has been reported from some countries where the restitution of land brought many new and inexperienced forest farmers to the forest. In Slovenia, the frequency of fatal accidents in non-professional forest work increased from 5 fatalities per million m<sup>3</sup> to 16 fatalities per million m<sup>3</sup> between 1988 and 1991 (see figure 9). It has since levelled out to 10-12 fatalities per million m<sup>3</sup>, but is still significantly higher than before 1988 (Begus J. 2002). This is several times worse than the average in Europe and ten times worse than in Sweden.

Figure 7  
**Annual average wages in forestry, wood products and pulp and paper manufacturing in selected European countries in 1998**

(US dollars, based on purchasing power parities)



Note: Purchasing Power Parities factor is the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a U.S. dollar would buy in the United States. It is an alternative to exchange rate but it is precarious to use it for straight comparisons between countries. Also comparisons between forestry and the manufacturing sub-sectors must be done with caution as these data come from different sources (Wage statistics for the manufacturing sectors come from the UNIDO Industrial Database 2002. Wage statistics for the forestry sub-sector are retrieved from the ILO 2002 labour force survey). Conformity of the two data sources has been established for Norway, Finland, United Kingdom and Sweden.

Figure 8  
**Women's share of men's wages in the forest industry**

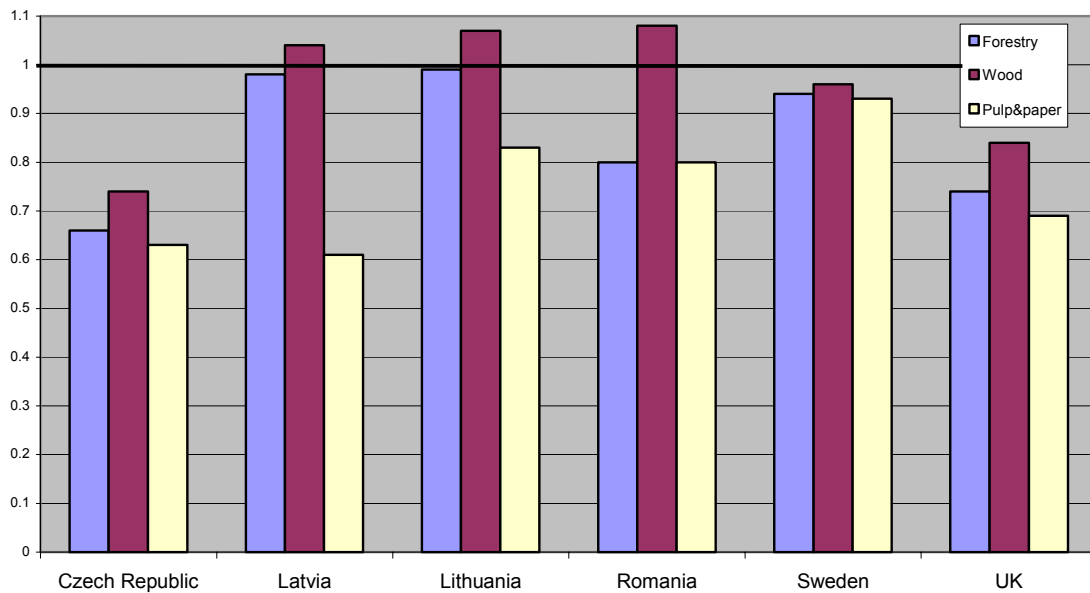
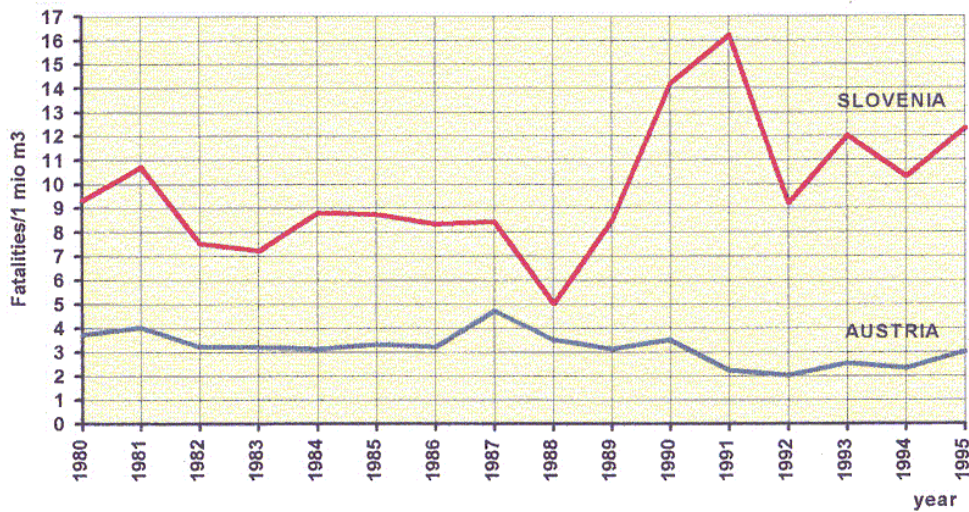
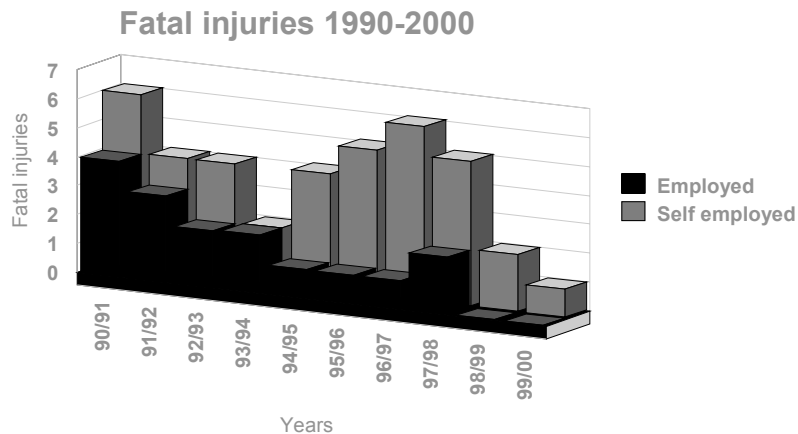


Figure 9  
The frequency of deadly accidents in forestry companies in Austria and Slovenia



The safety and health situation is most problematic among the self-employed, farmers and contractors (see Poschen 1997). As shown in figure 10, in the UK the number of fatal accidents among directly employed forest workers fell between 1990 and 1997, while the number of fatalities among contractors increased (ILO 2001a). Following a nation-wide campaign which promoted health and safety in forest contracting businesses, this trend was eventually broken.

Figure 10  
Fatal accidents of employed and self-employed forest workers in the United Kingdom from 1990 to 2000



Source: The Health & Safety Executive, UK

In sum, the trend is positive for well-trained forest workers under stable employment conditions and negative for poorly trained and equipped occasional wood-cutters, such as farmers. In general, the main factors with significant influence on the risk level are the degree of mechanization and the quality of the safety organization.

A positive trend is the decline of vibration-induced disorders as a result of improvement in chainsaws. However, new risks have emerged with mechanization, such as the musculo-skeletal complaints and injuries to the neck/shoulder/arm region among logging- machine operators (Axelsson S.A. 1995).

### **3.2 Status and trends in the wood processing industry**

#### ***Structural change and technical innovations in wood processing***

In Europe, intensified competition has been a major driving force behind technology innovation and structural change in the wood industry. The gradual removal of trade barriers has exposed the industry to further competition from neighbours and overseas manufacturers of wood and substitute products and materials.

In the wood processing industry, the structural change has been of a similar nature to that of the pulp and paper industry but involving many more, albeit smaller, enterprises. In the EU, many non-profitable sawmills have closed down, giving way to larger production units with increased vertical and horizontal integration. Through mergers and acquisitions, the number of sawmills has fallen dramatically over the past two decades. In Germany, for example, it declined from 12,000 in 1945 to 2,300 in 2000 (ILO 2001b).

#### ***Employment and productivity in the wood industry***

Employment in the wood industry amounts to some 1.47 million workers (excluding Armenia, Azerbaijan, Georgia, Tajikistan and Uzbekistan from where no data were available), equivalent to 3.4 % of total employment in manufacturing in the region.

Annex table B illustrates trends in wood products industry employment in the 1975-1999 period in the European plus CIS countries. In many countries, there was a significant drop in wood products industry employment in the early 1980s and 1990s as recession and industrial restructuring took their toll of economic activity and jobs. The decreasing trend has since levelled off and employment remained quite stable for most countries. In some countries such as Austria, Denmark, Estonia, Ireland, Latvia, and Spain there has even been a slight increase of employment due to the upturn in economic activity in the second half of the past decade. The most dramatic increase is Estonia, where employment increased by 53% (7,228 persons) from 1995 to 1999.

Productivity varies widely between different countries but also between companies. New sawmills with state-of-the-art technology have a very high productivity compared to older small-scale sawmills. In many Eastern and central European countries, the structural change has only begun. Productivity in Polish sawmilling in 1999 was only one-third of Scandinavian levels.

#### ***Wages***

Figure 7 shows annual wages for selected countries in 1998 in US dollars. The range is from about \$ 5,000 in Lithuania to \$ 25,000 in Norway. As can be seen from the figure, a woodworker receives a much lower wage than a worker in the pulp & paper sub-sector.

#### ***Safety and working conditions in the wood industry***

In many countries the wood products industry has a poor image and often faces an uphill struggle in attracting new entrants. Noise, dust, injuries, exposure to chemicals and high labour turnover are still features of many woodworking enterprises. However, the recent modernization of sawmilling and wood processing plants has improved the safety and health conditions in the industry. The new technology has also brought improvements in the physical environment in woodworking factories.

In big firms, particularly in multinationals, working conditions are now fairly good. Smaller enterprises tend to have higher accident rates (ILO 2001b).

### ***3.3 Status and trends in the pulp and paper industry***

#### ***Structural change and technical innovations in the pulp and paper industry***

Pulp, paper and paperboard manufacturing continue to be much more prone to concentration than the wood primary product industries, especially in the European Community and Northern Europe. Mergers and acquisition in the pulp and paper segment have been on the rise for at least two decades. Recently, they accelerated further as these consolidations involved multinational companies that were already big (companies with an annual output of a million tons or more).

As is the case in the wood processing industry, the pulp and paper industry is also seeing a shift of capacities from the traditional geographic regions (in particular Scandinavia) towards the CEEC and CIS countries

During the past two decades, the pulp and paper industry has developed into a high tech sector. This progress is evident at all stages of the production chain, from handling of incoming raw material delivered at the mill “just in time”, to the automated operations of packing, storage and preparation for shipment of finished products.

Mills and companies are also becoming increasingly specialized allowing them to run bigger batches of products on fewer and better equipped lines (ILO 2001b).

#### ***Employment***

In Europe and the CIS an estimated 1,047,000 people are directly employed in pulp, paper and paperboard production and conversion. As can be seen from table 3, the relative importance of the sector as a source of employment is highest in traditional wood fibre-rich countries like Sweden and Finland. In these countries the pulp and paper sector provides between 6 and 9% of manufacturing employment. In most other European countries its share of manufacturing is normally much less (around 1-3%) which still makes it a substantial employer in the region’s major industrialized countries such as France, Germany and the United Kingdom.



Table 3  
**Employment in pulp and paper manufacturing and conversion and  
share of total employment in manufacturing**

<i>Country</i>	<i>Employment in pulp and paper</i>	<i>Year</i>	<i>Share of pulp and paper as a percentage of the manufacturing employment</i>
Albania	10	1995	<0.1
Armenia	527	1991	0.2
Austria	20 024	1999	3.3
Azerbaijan	412	1994	0.2
Belgium	17 300	1992	2.5
Bosnia and Herzegovina	2 209	1996	4.4
Bulgaria	14 900	2000	2.2
Croatia	5 604	1997	1.9
Czech Republic	22 000	1993	1.8
Denmark	10 125	1998	2.0
Estonia	2 500	1992	2.0
Finland	38 225	1998	9.2
France	98 000	1996	2.6
Germany	159 009	1994	2.4
Greece	7 200	1999	2.5
Hungary	12 000	1999	1.4
Ireland	4 164	1998	1.0
Italy	61 170	1999	2.2
Kyrgyzstan	82	1994	<0.1
Latvia	1 360	1996	1.2
Lithuania	3 722	1998	1.8
The fYR of Macedonia	1 208	1996	0.9
Moldova	1 338	1995	1.1
Netherlands	22 349	1999	3.4
Norway	9 826	1998	3.3
Poland	26 080	1999	1.0
Portugal	15 094	1998	1.5
Romania	28 300	1994	1.2
Slovakia	11 467	1998	3.1
Slovenia	14 847	1998	6.5
Spain	48 476	1999	2.0
Russian Federation	169 500	1998	1.6
Sweden	43 887	1999	6.3
Switzerland	14 900	1996	2.0
Turkey	20 230	1998	1.8
Ukraine	20 000	1998	0.6
United Kingdom	114 770	1999	3.0
<b>Total</b>	<b>1 042 815</b>	<b>-</b>	<b>2.1</b>

*Source:* Unido Database 2001/2002

Annex table C shows that there is a general trend towards fewer employees in the pulp and paper industry in Europe. In 29 countries substantial reductions in employment have taken place over the past five to ten years, ranging from -6.2% in Turkey to over -90% in Albania (though the sector is very marginal in that country). More critical is the fact that countries with a major pulp and paper industry (more than 10,000 employees) have experienced a dramatic reduction in employment: Poland (-38%), Romania (-35%), Ukraine (-31%), UK (-21%), Czech Republic (-19%), Portugal (-18%), Slovakia (-17%), Norway (-17%), Germany (16%), Estonia (-15%), Sweden (-15%), Finland (-15%), France (-14%). In the member States of the EU, 214,000 jobs have disappeared over the past five years.

### ***Productivity***

In line with the general trend in many industrialized countries, the duration of the average working week in the pulp and paper industry has become shorter over the past two decades. The data presented in this section are in terms of physical productivity per work year.

As expected, the highest increase in productivity is found in countries where there used to be a larger workforce relative to output. The increase in productivity has been particularly high in countries in transition such as Slovakia and Poland (about 10% per year). However, these trends are based on short time series and therefore continuity is uncertain. A probable explanation for this big leap in productivity is that available machine capacities in many Eastern European countries and the former Soviet Union were greatly under-utilised in the centrally planned economies (Lilja et al., 1989). Central planning forced mills to produce a vast variety of grades resulting in inefficient scheduling and frequent grade changes on the machines. The increase in productivity has not been met by increased production and as a consequence, employment continues to fall. Eventual increase in domestic demand is often matched by increasing imports.

The same trends hold true for the industrialized countries. Several countries such as Norway (+5.8%), United Kingdom (+5.6% per year), Finland (+4.8% per year), France (+4.1% per year) and Germany (+3.9% per year) recorded a significant increase in productivity. While the industry in the European Union has reduced the number of paper machines by 60 per cent over the past 25 years, capacity has almost doubled over the same period (Hazley, 2000). However, high productivity increase and modest growth in production has resulted in declining employment.

### ***Wages***

Wages in pulp, paper and board manufacture are considerably higher than those in other wood converting sectors (see figure 7). In Hungary, the wage of a pulp & paper worker is more than double the wage of a wood industry worker. Compared to other manufacturing sectors, pulp and paper tends to offer at or above average wages. In Finland, for example, pulp and paper workers earn 17% per cent more than average manufacturing industry workers, and the gap seems to be widening (FSYF, 2001).

Female employees on average still have far lower incomes than their male counterparts. A comparison for a number of European countries is provided in figure 8. In many countries the incomes of women are 30-39% lower than those of their male colleagues. The big gap is often the result of factors such as part-time or temporary work and concentration of women in the converting sub-sector and in low-paid jobs (ILO 1992).

The change of wages to a large extent follows the same pattern as productivity. Over the past 5 years, the most dramatic increases are found in the Eastern European countries such as Poland (+16% per year), Slovenia (+11% per year). However, one has to keep in mind that inflation has taken its toll of these rises in earnings. During the same period the consumer price index rose by 13% per year in Poland and 6% per year in Slovakia.

The wage increase for the same period has been more moderate in the industrialized West European countries such as Finland (+3.3% per year) and the UK (+2.8% per year). The rise in the consumer price index in these countries has been 1.3% and 2.2% per year respectively.

### ***Safety and health***

In most countries, the absolute number of accidents has decreased, but given the decrease in the number of employees, a consequent downward trend in accident rates is not always forthcoming. The more general pattern is fluctuation.

General mortality rates and the occurrence of occupational diseases among workers in the pulp and paper industry do not appear to be significantly higher than in the population at large. The main causes for concern are biological agents and chemical compounds in the form of dust or gases. Also, troubles related to shift work, such as reduced attentiveness or inadequate supply of blood to the heart, have come into focus (ILO 1992)

## 4 OUTLOOK

### 4.1 *The outlook for employment*

#### *General outlook for the forest industry*

The overall fall in employment has been most pronounced in the technically most advanced countries in northern Europe. High productivity increases and modest growth in production have resulted in declining employment.

At least four factors will have a direct bearing on future employment levels in the sector: (i) demand of the products; (ii) technological change; (iii) the balance between production factors and (iv) working time.

Many outlook studies, including the European Forest Sector Outlook Studies (EFSOS), agree that demand for forest products is set to continue growing over the next decade. Overall growth is, however, expected to be slower than in the past. The short-term outlook for employment is, thus gloomy for all sub-sectors (see table 3).

Technological change has and will continue to play a central role in the development of the industry over the next decade, with far reaching consequences for its structure, employment, work organization and human resources. In some instances, it will lead to reduced employment levels.

For most of the industry sector, the number of working hours per year has declined, sometimes quite substantially. Actual productivity increases are thus likely to be higher than those reflected in this outlook.

#### *The Russian Federation and CIS*

The Russian Federation is expected to lose over 104,000 jobs in the forest sector during the period 2000 to 2010. The reduction is mainly in the pulp & paper sub-sector (-62,000 jobs). In contrast to the pulp & paper sub-sector, the forestry and wood sub-sectors seems to stabilize around present employment levels. The reduction in the wood sub-sector is only 14,000 fewer jobs over the ten-year period and the forestry will have an average workforce of 210,000 persons in 2010. The reason for this is that these sub-sectors have had a much lower growth in productivity than the pulp & paper. This situation is even more pronounced in other CIS countries such as Belarus and Ukraine, which even had a negative trend in productivity in forestry. However, in the long term, productivity is likely to pick up, as unproductive enterprises will be replaced with productive enterprises.

#### *Central and Eastern European countries*

As can be seen in table 4, the biggest drop in employment is yet to come in many former planned economies where structural change in the industry has only just begun. The biggest fall is expected to be found in countries in transition, where the restructuring process has come some way, for example Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. These countries all rank high on growth in productivity, a trend likely to continue for the next ten years. For the forest industry as a whole, they represent a drop in employment of over 100,000 persons by 2010.

In the forestry sub-sector alone, these countries are estimated to reduce their workforce by over 70,000 people (40%). Poland takes a leading position with an estimated reduction of its workforce by 23,000 people (38%). The trend in the manufacturing sub-sectors is similar, but not as dramatic.

In the wood sub-sector, Estonia has the highest forecast reduction in employment with about 13,000 workers. Latvia, the Czech Republic and Slovenia show more moderate levels ranging from 4,000 to 7,000 fewer workers by 2010. The outlook for Croatia, Lithuania and Hungary suggests stable or even slightly increasing levels.

Looking at the development of employment in pulp and paper for these countries, the picture is more mixed. While Croatia is expected to reduce its workforce by 1,200 workers (32%), the Czech Republic could expect an increase in employment by 6,300 workers (33%). The increase in employment in the Czech Republic is due to a dramatic increase in pulp and paper production (a recent UNECE/FAO EFSOS study has forecast an increase of 108% between 2000 and 2010).

Table 4  
Employment Outlook to 2010 in the Forest Industry

	Forestry			Wood Industry			Pulp & paper		
	2000	2005	2010	2000	2005	2010	2000	2005	2010
Albania <i>rmk2</i>				798	704	651	982	920	876
Austria	7 851	7 538	7 304	15 965	15 526	14 873	16 081	16 424	16 482
Armenia <i>rmk1</i>									
Azerbaijan <i>rmk1</i>									
Belgium	2 997	3 130	3 256	13 019	12 990	12 968	17 696	17 353	17 028
Belarus	33 497	47 371	66 343						
Bosnia and Herzegovina <i>rmk1</i>									
Bulgaria <i>rmk2</i>				7 323	9 095	10 678	10 252	11 306	12 074
Croatia	9 991	7 227	5 215	15 540	15 911	16 040	3 631	2 876	2 466
Czech republic	29 670	20 591	15 174	21 087	17 937	16 064	19 014	23 181	25 350
Denmark	3 207	3 028	2 875	17 220	20 154	14 004	10 289	11 549	11 830
Estonia	8 949	6 358	5 026	22 345	14 369	9 745	13 333	8 261	6 169
Finland	26 927	24 346	22 367	32 534	31 079	29 303	36 506	34 046	32 298
France	31 231	27 685	25 075	86 437	79 744	73 685	89 842	82 555	75 953
Georgia <i>rmk1</i>									
Germany	53 702	48 524	44 548	122 098	118 033	114 347	159 467	150 391	142 245
Greece	6 755	5 728	4 856	5 167	5 115	5 078	5 529	5 611	5 673
Hungary	15 859	9 965	6 234	17 837	18 265	18 596	8 167	8 949	10 120
Ireland	2 190	1 905	1 714	7 232	6 271	5 513	3 139	3 127	3 014
Italy	39 023	32 393	28 284	41 648	41 939	42 190	66 593	66 245	65 193
Kazakhstan <i>rmk1</i>									
Kyrgyzstan <i>rmk1</i>									
Latvia	13 879	10 651	8 746	22 101	17 650	15 358	971	780	710
Lithuania	9 313	7 000	5 807	17 412	21 454	18 862	3 556	2 574	1 760
Macedonia	3 681	3 085	2 717	727	737	734	462	616	650
Moldova <i>rmk3</i>	3 200	2 187	1 174	350	359	350			
Netherlands	945	1 181	1 053	9 406	9 041	8 708	20 840	21 888	22 750
Norway	4 702	4 400	4 144	10 287	8 545	7 146	4 898	4 566	4 291
Poland	59 808	46 504	36 707	60 550	61 300	59 882	32 933	34 626	35 260
Portugal	11 429	11 104	10 839	22 225	22 142	21 529	14 740	15 069	15 226
Romania	54 585	41 164	36 584	88 750	92 054	98 077	9 783	12 352	14 215
Russia	238 245	209 438	210 864	408 283	453 572	393 958	221 620	200 116	158 736
Slovakia	20 448	16 960	13 935	8 000	6 466	5 653	11 144	9 309	8 602
Slovenia	3 807	3 817	3 226	7 973	5 539	4 050	14 075	12 908	12 695
Spain	30 022	32 541	33 988	93 125	103 550	97 469	43 829	43 740	43 525
Sweden	21 753	19 905	18 406	36 075	34 125	32 485	41 961	40 734	39 713
Switzerland	8 375	8 654	8 987	76 783	83 326	87 599	18 255	19 008	19 864
Tajikistan <i>rmk1</i>									
Turkey <i>rmk4</i>	376 234	379 198	375 496	13 702	15 743	17 503	22 188	29 002	35 214
Ukraine	54 366	56 612	56 957	39 693	39 942	40 116	21 838	36 468	46 206
United Kingdom	16 285	15 388	14 724	76 994	67 821	60 507	97 467	80 099	67 117
<b>Total</b>	<b>1 202 928</b>	<b>1 115 578</b>	<b>1 082 623</b>	<b>1 418 684</b>	<b>1 450 496</b>	<b>1 353 720</b>	<b>1 041 079</b>	<b>1 006 650</b>	<b>953 306</b>

rmk 1 No production data available for forestry, Wood industry and Pulp & paper

rmk 2 No production data available for forestry

rmk 3 no employment data available for forestry

rmk 4 no employment data available for pulp and paper

### ***The Western European countries and EU***

In the industrialized countries in western and northern Europe, future increases in productivity are expected to be less dramatic than in the past. Still, employment will continue to fall as a result of an even slower growth in production. The member countries of the European Union could expect a drop in employment of almost 160,000 jobs of which the pulp & paper sub-sector accounts for about 70,000 jobs. The forecast for the other sub-sectors propose more modest changes; about -50,000 in wood and -40,000 in forestry. The most affected countries are Germany, France and the United Kingdom, which will together lose over 125,000 jobs in the forest industry.

In the forestry sub-sector, the biggest fall in employment is expected in Italy and Germany where the labour force will be reduced by about 10,000 (27%) and 9,000 (17%) people respectively. Least affected seem to be the Nordic countries which will only have modest reductions in employment. In Finland employment will not lessen in the first half of the next decade due to a marked increase that is forecast to take place in the use of wood (METLA 1999). Even though the number of jobs will remain stable, Finland's labour resources will not be able to meet the demand once the large post-war age groups have retired. To maintain the fast growth curve, Finland will need to significantly increase immigration in the 2010s.

### ***4.2 Socio-economic impacts***

Rural areas amount to more than 80% of the European Union's land mass and an even greater portion of the total area of Europe and the CIS. In many countries, the drop in employment in the forestry sector will have a severe effect on employment in rural regions. This development is likely to continue especially in the supply end of the sector. There is however a political will to counter this development by launching strategies for diversification of economic and social activity in the rural areas and by increasing forest use through developing entrepreneurial skills.

Job security will continue to be a major social and labour issue for the next two decades especially in Eastern Europe and the CIS where the sector can expect a drastic drop in employment. The share of women, already low in most countries, will decline further as investment in silviculture operations will follow a negative trend. This swift change might cause serious social problems unless measures to manage the transition are in place. Intake of new entrants should gradually be adjusted to future needs and reduction in the workforce achieved through attrition or other socially acceptable means. Where possible redundant employees should be given the opportunity to become proficient contractors though the objective should be to ensure that the future forestry workforce benefits from an improved quality of employment, at least comparable working conditions and levels of safety and health to those of other economic sectors.

The transition from a workforce consisting mainly of directly and permanently employed workers and small forest owners to one predominantly of contractors and the self-employed will continue. The increasing reliance of contractors might put qualitative aspects of employment (skill levels, work safety, health, working conditions and work quality) at risk unless measures are taken to reverse the present trends in workforce development. Governments and the private sector should promote professionalism among contractors and discourage bad and illegal practices. The establishment of contractor associations as providers of services and extension among their members should be actively encouraged.

There have been numerous initiatives to promote small and medium-sized enterprises in downstream processing. Many have centred on the concept of the industrial districts and industry cluster. Both try to build on the synergies found in countries and regions where forest industry firms, specialized equipment manufacturers, suppliers and supporting institutions for extensive and closely interwoven networks exist (see ILO 2001b). The success of the networks of small, specialized firms operating in the same areas in Italy and Austria in forestry as well as in other sectors might warrant a closer look.

### ***4.3 Occupational safety and health outlook***

Efforts to improve occupational safety and health have increased in recent years and it is likely that this will be a continuing concern for the industry. While conditions in the manufacturing industry have improved considerably, the accident situation in forestry and in particular in harvesting give cause for concern. Countries that do not have effective safety regulations and worker training will tend to have accident rates several times higher than industrialized countries, whether work is done with hand tools or with machines.

Some countries in transition from planned to market economies will have to review their safety and health regulations and consider to what degree revisions are needed to cope with the swift changes in the forestry sector. In this context, it is important that governments and the industry attach the highest priority to integrated safety and health programmes and to the involvement of management in such programmes (ILO 1998a). Training should be given to all managers in order to raise awareness and to develop their capacity to integrate safety and health in overall management.

The strong trend towards outsourcing of forest work will continue, especially in the former planned economies. In the near future, contractors will be extensively used in logging operations in all countries. Contractors and self-employed are groups that need particular attention.

Voluntary certification of forest products is perhaps the most comprehensive attempt to translate the components of sustainable development into specific guidelines. Encouragingly, most existing schemes have significantly widened their coverage of social and labour aspects in recent years. Both the Pan-European Forest Certification Council (PEFC) and the Forestry Stewardship Council (FSC) have decided to include all Conventions covered by the ILO *Declaration on Fundamental Principles and Rights at Work* (ILO 1998b) in their respective standards and to recommend the use of the ILO Code of Practice on Safety and Health in Forestry Work (ILO 1998a) as a basis for the formulation of national standards. It is widely believed that certification will have a significant impact to improve practices although evidence to support this is still limited.

#### **4.4 The future human resource and training**

##### ***New roles for forest workers***

Sustainable forest management (SFM) can only be achieved if forest operations are planned and implemented by a trained and qualified workforce. The people most crucial for implementing SFM are those who work in the forest. This will be more apparent in the future as more and more of the decisions concerning planning and conservation will be left to the forest worker or the contractor.

The trend towards forestry becoming a service industry will remain. This will put new challenges to the forest companies with more emphasis on producing non-wood goods and services for the public.

##### ***Technological/organizational change in the forest sector***

Mechanization of forest operations will continue as a measure to reduce cost. Large-scale mechanization also means considerable investment of capital and the logging companies will require more from its employees in terms of qualifications, responsibility and reliability.

The same applies for the manufacturing industry where the move into more advanced technologies will increase skills and educational requirements of the workforce.

The workforce of the future is likely to be composed of fewer unskilled and manual workers. At all grades, the range of skills will be broader and skills levels considerably higher. Training must therefore receive more attention, even in countries with well-established training traditions. Coordination and coherent training strategies for the industry will be vital for a systematic, up-to-date and cost-effective training.

##### ***Is lack of a qualified workforce an emerging problem?***

Even if the world market demand for forest industry products were to grow, for example according to the EFSOS projections, increased capacity would not be a viable option due to a general shortage of labour, especially in the industrialized western European countries.

Physically very demanding or dangerous work is becoming less attractive for young people. In the near future, there will be a lack of up and coming young persons. In a number of countries such as Austria, Finland, France and Sweden forestry companies are already complaining of this.

The number of unemployed workers remains relatively high in many eastern European countries. This imbalance has spurred work migration. In countries like Germany and France this has led to an increase in the number of foreign workers, particularly in forestry, who are often prepared to work for wages below the minimum wage level.

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# Annex 1

Annex Table A  
Employment in forestry

	1955	1965	1970	1975	1979	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Albania <i>rmk17</i>																		
Austria <i>rmk 2</i>		21 100					12 204	9 960					9 362	9 000	10 000	9 000	8 000	7 968
Armenia <i>rmk16</i>								5 300					2 300					2 100
Azerbaijan <i>rmk 30</i>							4 500						3 800					
Belgium <i>rmk 12</i>								4 060	2 610		2 720	3 380	3 090	2 250	2 760	3 190	2 700	
Belarus <i>rmk18</i>							43 100						44 100		32 819			32 685
Bosnia and Herzegovina <i>rmk 26</i>							25 500						2 248					
Bulgaria, <i>rmk 12</i>																		23 180
Croatia <i>rmk 27</i>							15 033						10 888					10 076
Czech Republic, <i>rmk 29</i>							54 338	57 700	50 400	46 500	44 758	45 353	44 616	41 549	36 652	33 985		
Denmark <i>rmk 28</i>							4 532				4 306	4 002	4 186	4 300	4 419	4 221	4 140	4 244
Estonia <i>rmk 7</i>								11 700				11 600	7 500	7 600	8 800			
Finland <i>rmk 9</i>			90 000	66 000	58 000	63 000	52 000	39 000	33 000	31 000	29 000	25 000	28 000	26 000	23 000	24 000	23 000	24 000
France <i>rmk 12</i>								48 440	47 200	45 150	41 590	42 160	37 190	39 710	35 730	29 620	32 300	37 190
Germany <i>rmk 3</i>						142 009			69 010	76 250	65 290	53 640	64 970	58 530	54 970	55 500	61 520	
Georgia <i>rmk16</i>								11 700					3 500					
Greece <i>rmk 12</i>							22 521	10 350	13 500	11 190	9 240	5 380	7 730	8 680	6 640	7 460	8 910	
Hungary, <i>rmk 7</i>												17 200	15 700	15 100	14 900	14 800		
Ireland, <i>rmk 12</i>								3 180	3 520	2 530	2 110	2 640	2 790	2 050	2 350	2 250	3 030	2 417
Italy <i>rmk 12</i>										56 440	65 170	54 600	51 150	56 050	49 650	43 440	40 970	36 050
Kazakhstan <i>rmk16</i>								13 500					10 300					13 500
Kyrgyzstan <i>rmk 4</i>							3 290	2 900					5 400	6 852				4 700
Latvia, <i>rmk 13</i>								15 000	17 000	13 000	12 000	15 000	13 000					15 900
Lithuania, <i>rmk 7</i>						13 400	13 900	14 600	14 000	15 500	15 100	14 800	16 100	15 900	14 200	12 000		
Macedonia <i>rmk 6</i>							4 248	4 031	3 916	3 690	3 849	3 592	3 385	3 767	3 528	3 401		
Moldova <i>rmk1</i>							3 015	4 600					4 000	4 547				3 200
Netherlands, <i>rmk 12</i>							2 700	4 510	3 330	1 760	2 800			1 250	2 260	1 450	1 230	
Norway, <i>rmk 10</i>						9 300	8 400	6 800	6 200	6 500	6 000	5 400	5 400	5 400	5 400	5 300	5 200	5 200
Poland, <i>rmk 14</i>							158 900						68 200	65 000	64 400			
Portugal, <i>rmk 12</i>											14 750			13 700	12 050	11 790	12 250	10 990
Romania <i>rmk 15</i>								107 000	99 000	93 000	88 000	91 000	83 000	78 000				57 670
Slovakia <i>rmk 8</i>								36 316			35 536		28 790	27 892		24 308		23 671
Slovenia <i>rmk 24</i>							6 550							3 200	3 660	4 010	3 380	4 090
Spain <i>rmk 12</i>								26 460	30 010	23 600	30 680	30 330	25 480	33 010	30 040	30 760	31 500	33 830
Russian Federation <i>rmk 5</i>								237 500					258 600					239 300
Sweden <i>rmk 20</i>			65 800	51 100		49 500	44 600	33 700				36 000	28 300		26 000	23 000	20 000	
Switzerland <i>rmk 25</i>	15 197	12 235		9 510			9 304						9 102					
Tajikistan <i>rmk16</i>								1 800										
Turkey <i>rmk 11</i>							498 715							472 408				
Turkmenistan <i>rmk 16</i>								1 500					3 500					
Ukraine <i>mk7</i>										42 700	43 500	44 800	53 600					
United Kingdom <i>rmk 19</i>								24 000				19 170	17 000		19 000	18 000	18 000	
Uzbekistan <i>rmk 16</i>								4 900										



**Remarks to Annex Table A: Employment in Forestry**

- rmk 1 Forestry figures, source: Department of Statistics of the Republic Moldova
- rmk 2 Forestry figure for 1965, source: Schwarzbauer (2000) other forestry figures, source see rmk 12
- rmk 3 Forestry figure for 1998, source HDH/VDM Geschäftsbericht 1998/99; other forestry figures, see rmk 12
- rmk 4 Forestry figures, source National Statistical Committee of Kyrgyz Republic
- rmk 5 USSR for 1990, Forestry figures, source A. Petrov 2000 (country study)
- rmk 6 Forestry figures, source: Statistical Office of Macedonia
- rmk 7 Forestry figures, source: Dynamics in the forestry and timber industry in countries of middle & eastern Europe
- rmk 8 Forestry figures for 1996,1998: source: see rmk 7; other forestry figures, source: Statistical Office of the Slovak Republic
- rmk 9 Forestry figure, source: Finnish statistical yearbook of Forestry 2001, ISBN 951-40-1798-6
- rmk 10 Forestry figures, source: Statistics Norway
- rmk 11 Forestry figures, source: State Institute of Statistics, Turkey
- rmk 12 Forestry figure, source: Eurostat, by NACE2D: 02
- rmk 13 Forestry figure for 2000, source: Survey on occupations in Latvia in October 2000, Labour Statistics Division; Other forestry figures, source: see rmk 7
- rmk 14 Forestry figures for 1985-96, source: Central Statistical Office, Republic of Poland; figure for 1997, source: see rmk 7
- rmk 15 Forestry figure 2000, source: Eurostat; Other forestry figures, see rmk 7
- rmk 16 Forestry figure, source: International Statistical Committee of the Commonwealth of independent States
- rmk 17 Forestry figure, source: Department of Labour, Albania
- rmk 18 Figures for 85-97, source: 'Human resources development in Belarussian forestry work' - Mr Strömquist and Mr. Fedorenchik; figure for 2000, Source: Ministry of Statistics of the Republic of Belarus
- rmk 19 Forestry figures for 1986 & -89 - Source: Forest employment survey, 1993-94, Forestry Commission UK; Forestry figures from 1990 and onwards, see rmk 12
- rmk 20 Forestry figures, source: Statistics Sweden
- rmk 21 Forestry figures - Source: Annual survey of branch and annual company survey, "Les industries du bois, 1995"
- rmk 22 Forestry figures - Source: The forestry of the Slovak Republic, Novotny/Fillo
- rmk 23 Forestry figures - Source: Directorate of Forest Resource Development, Ministry of Agriculture
- rmk 24 Forestry figure 1986 - Source: forestry Department, University Lubjana; Other forestry figures see rmk 12
- rmk 25 Forestry figures - Source: Forststatistik 85 & Betriebszählung 95, Switzerland
- rmk 26 Forestry figures - Source: Employment Department, Bosnia and Herzogovina
- rmk 27 Forestry figures - Source: Central Bureau of Statistics
- rmk 28 Forestry figures - Source: National Working Environment Authority & Statistics Denmark
- rmk 29 Forestry figures 1989-94 Source: Mendel University of Agriculture and Forestry, Mr. Simanov, Brno; Forestry figures 1995-98 1, source: see rmk 7
- rmk 30 Forestry figure, source: State Statistical Committee of Azerbaijan Republic

**Annex Table B**  
**Employment in the wood industry**

	1975	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Albania						22 696	23 420	23 666	1 624	1 784	756	567						
Austria	9 400	8 700	16 700	16 100	15 700	15 900	16 400	19 300	17 000	17 000	15 698	15 526	17 912	18 002	17 631	18 285	19 260	
Azerbaijan																		
Belgium	16 100	14 000	12 200	12 200	12 200	12 200	12 300	12 800	12 800	12 600								
Belarus																		19 382
Bosnia and Herzegovina								33 555	31 271	623	1 397	4 749						
Bulgaria	26 300	26 900	25 500	24 800	24 900	25 000	23 200	24 300	18 300	16 000	13 900	14 600	13 600	13 400	16 905	14 900		
Croatia				26 812	26 289	26 547	23 936	22 190	16 680	16 280	16 200	15 800	14 850	13 307	13 828			
Czech republic					34 000	34 000	34 000	30 000	27 000	30 000	30 000							
Denmark	9 000	9 600	10 162	10 799	10 597	10 400	10 900	14 328	14 104	13 988	13 768	15 853	15 711	16 367	16 486	16 821		
Estonia													13 745		20 400	22 066	20 973	24 089
Finland	38 700	47 000	35 525	33 632	31 821	30 700	32 200	30 400	27 300	24 100	22 700	24 000	26 628	25 586	26 292	27 642	27 426	
France	124 417	114 700	91 600	89 100	87 300	87 900	90 600	93 200	94 800	88 100	82 200	80 100	79 600	78 200				
Germany									129 120	121 834	111 829	111 829	130 432	124 094	119 364	112 932	111 211	
Greece	9 870	9 580	7 140	7 280	6 960	7 250	6 921	7 413	7 054	6 920	6 571	6 210	6 834	6 747	6 256	5 930	5 300	
Hungary	22 000	17 000	12 000	12 000	12 000	12 000	13 000	15 000	18 000	19 000	18 000	18 240	18 200	18 210	18 290	18 360	18 300	
Ireland	4 500	5 400	4 300	4 100	3 928	4 000	4 300	4 500	4 600	4 768	4 849	5 328	5 790	6 221	7 485	7 836		
Italy	57 000	49 000	42 000	38 000	39 000	35 296	37 176	37 127	37 343	40 977	40 279	41 285	41 525	39 826	39 580	41 285		
Kyrgyzstan					4 305	4 629	4 478	4 119	3 629	2 446	2 575	1 479						
Latvia				16 078	16 859	17 161	16 703	14 577	15 550	15 421	12 620	13 948	15 698	18 232	19 942	23 284		
Lithuania										8 264	7 263	18 600			15 283	14 468		
Macedonia					1 883	1 813	1 734	2 191	1 456	1 858	1 392	1 456	1 463	1 079				
Moldova				10 123	10 494	11 034	14 591	11 685	5 729	6 090	3 815	1 504	1 501					
Netherlands	26 000	23 000	14 000	14 000	13 967	11 954	12 374	12 592	13 021	13 213	11 954	11 665	11 524	11 142	10 910	10 909	10 752	
Norway	22 400	22 000	17 855	17 464	18 100	17 200	15 900	15 239	13 934	11 013	10 289	13 842	14 224	14 326	14 970	15 266		
Poland	114 000	97 000	83 000	82 000	80 000	76 000	73 000	65 000	58 000	57 000	55 000	63 800	63 660	60 150	56 120	53 900	49 820	
Portugal	43 000	41 800	35 418	35 300	34 709	33 187	31 814	54 890	58 108	51 721	51 330	51 123	50 628	54 622	54 314	53 546		
Romania	188 000	163 000	168 000	169 000	176 000	171 000	183 000	94 000	87 200	88 600	79 500	82 500						
Slovakia									20 314	18 458	14 521	14 891			13 909	12 062		
Slovenia					17 930	18 342	18 307	19 600	15 647	14 838	13 905	12 595	11 919	13 168	11 491	11 035		
Spain		86 000	59 784	56 240	62 377	68 112	68 459	73 760	71 654	67 926	77 998	74 219	77 175	79 777	79 226	83 768	93 814	
Russian Federation											515 300	469 800	451 500	424 000	388 700	372 900		
Sweden	60 100	54 400	44 300	43 700	43 800	44 300	44 700	44 000	40 555	37 214	30 036	30 903	32 068	31 325	33 359	34 247	34 429	
Switzerland				89 400	91 000	92 000	93 400	95 200	92 000	83 800	78 100	79 500	79 000	75 300				
Turkey	10 590	12 200	13 500	12 500	12 400	12 887	12 827	13 349	13 720	13 710	13 631	12 202	15 145	14 133	13 352	11 588	12 360	13 492
Ukraine						87 000	86 000	83 000	80 000	73 000	68 000	61 000	52 000	48 000	48 000	76 000		
United Kingdom	122 000	105 000	80 000	82 000	80 000	84 000	81 000	78 000	68 000	66 000	70 000	82 000	85 000	86 000	85 000	85 540	81 270	
USSR	793 000	791 000	738 000	745 000	748 000	743 000	718 000	680 000										

Source: UNIDO Industrial Statistics Database 2000

Annex Table C  
Employment in the Pulp & paper Industry

	1975	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Albania						2 346	2 426	2 486	463	46	10							
Austria	24 400	22 500	19 300	19 600	20 400	20 400	20 500	20 000	20 000	20 000	18 860	18 306	20 827	19 493	20 283	20 251	20 024	
Azerbaijan												412						
Belarus																		12 711
Belgium	19 300	14 000	17 700	17 400	17 500	17 400	17 700	17 900	18 000	17 300								
Bosnia and Herzegovina								9 339	9 498	345	468	2 209						
Bulgaria	14 000	14 300	16 000	16 100	15 900	16 100	15 700	14 900	13 400	12 000	10 700	13 700	14 300	13 500	14 918	14 900		
Croatia			9 074	10 198	10 198	10 196	10 333	9 790	8 320	7 410	6 740	6 340	6 620	5 918	5 604			
Czech republic					27 000	27 000	28 000	25 000	23 000	25 000	22 000							
Denmark	9 200	8 800	9 184	9 417	9 569	9 600	9 700	10 963	11 012	10 272	9 578	10 039	10 304	9 992	10 354	10 125		
Estonia															18 053	17 624	13 449	15 289
Finland	51 700	50 800	43 751	41 803	40 669	41 200	45 500	44 400	41 800	40 100	39 000	38 700	38 943	38 582	38 700	38 255	37 771	
France	134 962	121 100	109 100	107 200	105 100	104 100	106 200	107 400	106 100	105 100	101 900	100 800	100 300	98 000	92 460			
Germany										180 367	167 043	159 009	154 748	132 672	148 304	149 932	150 931	
Greece	7 470	8 520	8 490	8 440	9 000	8 810	9 130	9 141	8 220	7 889	7 812	7 880	7 917	7 870	7 812	7 781	7 200	
Hungary	16 000	15 000	15 000	15 000	14 000	14 000	14 000	13 000	12 000	12 000	11 000	10 930	10 630	10 750	12 000	12 000	12 000	
Ireland	5 500	5 000	3 200	3 400	3 253	3 300	3 400	3 400	3 600	3 668	3 699	3 772	3 922	3 822	4 049	4 164		
Italy	77 000	66 000	63 000	58 000	60 000	59 533	62 125	61 863	61 790	63 131	62 159	62 625	62 625	63 396	61 884	61 170		
Kyrgyzstan					166	169	154	142	120	133	102	82						
Latvia				6 033	5 854	5 357	4 515	3 738	4 051	3 983	2 418	1 887	1 637	1 810	1 452	1 360		
Lithuania										6 735	5 837	5 000			4 070	3 722		
Macedonia					2 200	2 100	1 877	1 809	1 605	1 767	1 541	1 694	1 750	1 208				
Moldova			847	828	783	1 256	1 427	1 359	1 504	1 470	1 348	1 338						
Netherlands	31 000	27 000	23 000	24 000	24 588	23 935	24 330	24 429	25 383	25 254	23 946	23 029	22 821	21 679	22 052	22 272	22 349	
Norway	20 400	17 400	13 630	13 266	13 000	12 300	11 900	11 829	11 434	10 639	10 150	10 366	10 684	10 550	10 250	9 826		
Poland	60 000	54 000	48 000	48 000	48 000	47 000	46 000	42 000	39 000	33 000	31 000	34 780	34 000	32 340	29 210	28 200	26 080	
Portugal	15 700	17 900	17 621	17 300	16 728	16 523	16 666	18 508	17 051	16 831	17 078	14 768	14 439	15 467	15 318	15 094		
Romania	35 000	32 000	33 000	33 000	33 000	34 000	32 000	43 300	38 400	35 800	32 100	28 300						
Russian Federation											184 700	164 800	171 600	165 600	156 700	169 500		
Slovakia									13 865	12 853	14 601	14 025			12 308	11 467		
Slovenia					9 820	10 634	19 731	16 600	18 617	17 331	16 670	16 783	17 103	17 079	16 859	14 847		
Spain	55 000	51 000	39 108	40 211	40 179	40 354	41 584	41 263	42 178	40 080	47 333	46 648	45 508	48 983	49 897	48 834	48 476	
Sweden	60 300	61 000	53 900	54 300	54 300	53 700	53 900	51 600	50 634	47 089	41 907	42 490	40 784	40 134	42 786	42 740	43 887	
Switzerland				16 700	16 700	16 800	16 900	16 900	16 800	16 100	15 700	15 200	15 300	14 900				
Turkey	15 800	17 900	20 810	20 959	21 894	21 086	20 669	21 556	20 901	20 196	19 586	19 513	20 663	19 440	20 195	20 230		
Ukraine						29 000	28 000	29 000	29 000	28 000	26 000	24 000	23 000	23 000	21 000	20 000		
United Kingdom	220 000	199 000	152 000	150 000	152 000	154 000	155 000	148 000	142 000	136 000	126 000	129 000	126 000	122 000	116 000	117 080	114 770	
USSR	269 000	291 000	295 000	295 000	289 000	272 000	258 000	254 000										

Source: UNIDO Industrial Statistics Database 2000



Unit used if different .....

Are farmers and self-employed forest owners included in the above table? Yes / No

If not, how many should be added? .....

Is the government forest service included in the above data? Yes / No

If not, how many should be added? .....

Please indicate below the share of contractors in the workforce.

	1980	1985	1990	1995	2000
Forest workers:					
Technical staff:					
Administrative staff:					
Managerial staff:					
Total:					

What is the source of these data?

## 2. Wages

Average level of income in forestry work

Please specify: period worked .....

net / gross benefits included / not included

currency .....

Employment status	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Directly employed forestry worker:										
Forestry contractors:										

What is the source of these data? .....

### 3. Accidents

#### Reported occupational accidents and fatalities among forestry workers, directly employed and contractors

Please express accidents as frequencies: accidents/million work hours or accidents/100 workers, and fatalities/100 workers or fatalities/million m<sup>3</sup>, indicating which used

Employment status	1980		1985		1990		1995		2000	
	Accident	Fatality	Accident	Fatality	Accident	Fatality	Accident	Fatality	Accident	Fatality
Directly employed forestry workers										
Forestry contractors										
Forest farmers										
<b>Total</b>										

What is the source of these data? .....

#### Reported occupational accidents and fatalities among forestry workers, by type of work

Please express accidents as frequencies: accidents/million work hours or accidents/100 workers, and fatalities/100 workers or fatalities/million m<sup>3</sup>, indicating which used

Type of work	1980		1985		1990		1995		2000	
	Accident	Fatality	Accident	Fatality	Accident	Fatality	Accident	Fatality	Accident	Fatality
Felling of trees										
Other motor-manual logging										
Transport and work with machines and vehicles										
Other										
<b>Total</b>										

What is the source of these data? .....

## C. Wood industry workforce (ISIC 20)

### 1. Total workforce

Please indicate data in full-time equivalents or note if different unit used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

Unit used if different .....

Are establishments with <20 employees included? Yes / No

If not, how many person-years would have to be added? .....

What is the source of these data? .....

### 2. Wages

Average level of income

Please specify: period worked .....

net / gross benefits included / not included

currency .....

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data? .....

### 3. Accidents

Please express accidents as frequencies: accidents/million work hours or accidents/100 workers, indicating which used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data? .....

## D. Paper and Pulp industry workforce (ISIC 21)

### 1. Total workforce

Please indicate data in full-time equivalents or note if different unit used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

Unit used if different .....

Are establishments with <20 employees included? Yes / No

If not, how many person-years would have to be added? .....

What is the source of these data? .....

### 2. Wages

Average level of income

Please specify: period worked .....

net / gross benefits included / not included

currency .....

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data? .....

### 3. Accidents

Please express accidents as frequencies: accidents/million work hours or accidents/100 workers, indicating which used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data?



## E. Wooden furniture (ISIC 361)

### 1. Total workforce

Please indicate data in full-time equivalents or note if different unit used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

Unit used if different .....

Are establishments with <20 employees included? Yes / No

If not, how many person-years would have to be added? .....

What is the source of these data? .....

### 2. Wages

Average level of income

Please specify: period worked .....

net / gross benefits included / not included

currency .....

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data? .....

### 3. Accidents

Please express accidents as frequencies: accidents/million work hours or accidents/100 workers, indicating which used

Occupations	1980		1985		1990		1995		2000	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All categories										

What is the source of these data? .....

*Thank you for completing the questionnaire. Please return it to:*

**Peter Poschen**

**SECTOR**

**International Labour Office**

**CH-1211 GENEVA 22, Switzerland**

**Tel: +41-22-79 6188, fax: +41-22-799 7967**

**E-mail: [poschen@ilo.org](mailto:poschen@ilo.org)**

## Some facts about the Timber Committee

The Timber Committee is a principal subsidiary body of the UNECE (United Nations Economic Commission for Europe) based in Geneva. It constitutes a forum for cooperation and consultation between member countries on forestry, forest industry and forest product matters. All countries of Europe; the former USSR; United States, of America, Canada and Israel are members of the UNECE and participate in its work.

The UNECE Timber Committee shall, within the context of sustainable development, provide member countries with the information and services needed for policy- and decision-making regarding their forest and forest industry sector ("the sector"), including the trade and use of forest products and, when appropriate, formulate recommendations addressed to member Governments and interested organizations. To this end, it shall:

1. With the active participation of member countries, undertake short-, medium- and long-term analyses of developments in, and having an impact on, the sector, including those offering possibilities for the facilitation of international trade and for enhancing the protection of the environment;
2. In support of these analyses, collect, store and disseminate statistics relating to the sector, and carry out activities to improve their quality and comparability;
3. Provide the framework for cooperation e.g. by organizing seminars, workshops and ad hoc meetings and setting up time-limited ad hoc groups, for the exchange of economic, environmental and technical information between governments and other institutions of member countries that is needed for the development and implementation of policies leading to the sustainable development of the sector and to the protection of the environment in their respective countries;
4. Carry out tasks identified by the UNECE or the Timber Committee as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe and of the countries of the region that are developing from an economic point of view;
5. It should also keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with the FAO (Food and Agriculture Organization of the United Nations) and its European Forestry Commission and with the ILO (International Labour Organisation), in order to ensure complementarities and to avoid duplication, thereby optimising the use of resources.

More information about the Committee's work may be obtained by writing to:

Timber Section  
Trade Development and Timber Division  
UN Economic Commission for Europe  
Palais des Nations  
CH - 1211 Geneva 10, Switzerland  
Fax: + 41 22 917 0041  
E-mail: [info.timber@unece.org](mailto:info.timber@unece.org)  
<http://www.unece.org/trade/timber>

### UNECE/FAO Publications

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1. Forest Products Prices, 1998-2000
2. Forest Products Statistics, 1997-2001 (database since 1964 on website)
3. Forest Products Annual Market Review, 2001-2002
4. Forest Fire Statistics, 1999-2001
5. Forest Products Trade Flow Data, 1999-2000
6. Forest Products Markets in 2002 and Prospects for 2003

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