

## **LABOUR MARKETS FOR UNIVERSITY EDUCATED FORESTERS: RECENT DEVELOPMENTS AND NEW PERSPECTIVES**

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### **1 INTRODUCTION**

"An academic degree, a work in a leading position with its status, high salaries and safe posts, used to be a symbol of success. Now the professionals have been compelled to come down from their ivory towers, and their collective image is shadowed by the ordinary threads of working life: many are overworking, become stressed, frustrated, come into accidents and get fired. The professionals have experienced their future becoming more vulnerable and unstable than the other groups." (Fromont, 1995).

Although the position of the university graduates hardly has become worse than the one of other sections of the working society, it is true that in the industrial societies the professionals nowadays may share many of the problems that mostly used to be the problems of the ordinary workers. However, one should not forget that a university degree still continues to be highly appreciated by the society, and still provides access to numerous possibilities not available for those educated on a lower level.

The purpose of this paper is to provide some general background on the changes in labour markets for professionals in Europe, and then discuss in more detail the present situation and perspectives from the point of view of university educated professional foresters.

The paper is organised in three sections. The first will present a general introduction to the analysis of labour market development for professionals, while section two will try to describe the main features of regional markets for forestry graduates in the European Union (EU) with reference to three areas (Nordic countries, Central Europe and Mediterranean countries). In the last section some concluding remarks are briefly presented.

### **2 RECENT DEVELOPMENTS OF LABOUR MARKETS FOR PROFESSIONALS**

At least six major trends, some of them affecting all professionals and some more specifically forestry professionals, are behind the recent changes in the labour markets for forestry professionals (table 1):

- globalization of markets and policies;
- new EU policies for rural development;

- reduced involvement of the public sector in forestry;
- organizational changes in industrial and commercial companies towards leaner and more flexible models;
- development of "green" markets;
- expansion of university education in the public and private sectors.

The **globalization process** is increasingly involving both the wood-working industries and the policies carried out to prevent the misuse of forests and to stimulate the sustainable management of forest resources (UNCED Forest Principles and Agenda 21 - chap. 11; the Convention on Biological Diversity; the Inter-Governmental Convention on Climate Change; the Helsinki, Montreal, Tarapoto, Dry Zone Africa, Near East, Central American Processes, etc.). Internationalization of wood products market and advanced integration in the industrial sector will probably favour employment only in countries with competitive advantages in forestry activities. On the other hand, an enlarged participation of people and institutions in the decision-making process in forestry should bring about more attention given by public and non-governmental organizations to the forestry sector. As a consequence, in theory job numbers for forestry professionals should grow. Practical evidence to prove these positive effects is available only on a limited scale.

The **new policies for rural development in the European Union** and, more specifically, the Common Agricultural Policy reform, are directly financing and indirectly (through a reduction of the revenues from farming in marginal areas) stimulating the conversion of agricultural land to forests. A parallel but contrasting trend is the abandonment of small private forest properties in marginal rural areas, with the consequent need to develop new management agreements between forest owners or forest owners' associations and contractors. Some new - although marginal - perspectives are thus opened for the private forestry especially in the Northern countries, while in Mediterranean countries the abandonment often brings up forest fires, illegal grazing and a general change for the worsening of the quality of the forest resources. Fire fighting has recently created seasonal, unstable jobs for many foresters, especially with lower and medium level of education.

The **reduced involvement of the public sector** in forestry can be characterised by various inter-linked elements: a decrease in public expenditures, a process of privatisation of many state forest enterprises (in some cases also of wood-working public companies), the reform of forest administrations combined, in some countries, with a process of de-regulation of forest law. The budget cuts in the public sector started in some countries already in '80s, in others in the '90s. The present need of most EU countries to comply with European Monetary Union criteria will lead up to a further reduction of the budget deficits - which often imply less employment by the public sector.

The general negative short-term effects of these developments on job chances for foresters directly employed by public agencies are evident, even if there are possible substitution effects between the public and the private sector.

Through the ongoing **organisational changes in industrial and commercial companies** organisational structures are becoming leaner and leaner mainly at the cost of middle level professionals. It has been said that the professionals paid the high costs of the organisational cuts of the '80s. These changes are continuing and the FIET study draws a vision where "ground floor production powers and top level strategists run the whole of the future business". Next to the sliming down of the organisation an increasing need for flexible employment came

into being. Labour flexibility is now a major issue in all developed countries: forty percent of the labour force in Japan and the United Kingdom are self, part-time or temporary-employed. Flexible employment gives the companies in the Silicon Valley a possibility to use temporary personnel to respond to market chances without increasing head account, to carry out project based work and develop new products, and ramp up for production at greater speed (Carnoy *et al.*, 1997). The study on the Silicon Valley indicated that the increasing competition in global economy and the economic downturn of 1985 have led to the increase in the use of temporary help service firms. While clerical and light industrial workers are still the largest groups, there has been a rapid expansion in the provision of technical and professional labour.

Next, the **development of "green" markets** for forest products and services could be mentioned as a notable factor behind the recent changes in the labour markets of forestry professionals. Some of the most important effects of this trend are the increased demand (and willingness to pay) for "clean", nature-oriented, ecolabelled and ecocertified products; the "commoditization" of some products and services that once used to be public goods (non-wood forest products, recreational outdoor activities, carbon sequestration); the request for more protected areas and for an improved life quality in the cities leading to a growing importance of urban forestry. The creation of many, diversified niche-jobs is a clear and already evident consequence of these developments.

The last process affecting the employment situation of the professionals, especially since the '60s, is the **substantial increase of numbers of university graduates**. Besides its positive impacts in opening the doors of higher education to larger groups, it has - especially during the recent years of structural changes in private industries and the public sector - also resulted in a worsening of the employment chances for university graduates. The situation is further complicated, as in many countries the new polytechnics have emerged or are emerging, their graduates competing for the same jobs.

**Table 1. Summary of effects of the recent developments of the forestry sector on the labour market**

<i>main trends</i>	<i>effects on employment chances for young forestry professionals in the</i>	
	<i>public sector</i>	<i>private sector</i>
globalization of markets and policies.	negligible	not of the same sign (see different environmental and socio-economic contexts)
new EU policies for rural development	negligible	not generally definable (see local environmental and socio-economic conditions)
reduced involvement of the public sector in the forestry economy	very negative	some positive effects of substitution public/private
organizational changes in industrial and commercial companies	not significant	a change not in the number of jobs but in their organization (instability/flexibility)
development of "green" markets	very limited	positive
substantial increase of numbers	negative (more	negative (more competition)

### 3 THE SITUATION ON REGIONAL MARKETS IN THE EU FOR FORESTRY PROFESSIONALS

In the following pages the main features of regional markets for forestry professionals in the EU will be presented making reference to the, often internally very differentiated situation of three groups of countries: the Nordic countries, Central Europe and Mediterranean countries.

Table 2 summarises information concerning the average numbers of students graduated recently by universities. Figures may refer to different years or be averages of some years.

**Table 2 - Number of forestry graduates from European universities**

Country	University	Number of graduates per year	Notes
<b><i>Nordic countries</i></b>			
DENMARK	Copenhagen	20	Increasing
FINLAND	Helsinki	55	Number of students stable
	Joensuu	33	Number of students slightly increasing
NORWAY	Ås	30	Stable
SWEDEN	Umeå and Uppsala	55	Number of students substantially increasing
<b><i>Central Europe</i></b>			
AUSTRIA	Vienna	60	Great variation between years; 50 % drop out
BELGIUM	Gembloux	19	PhD, MSc and Diploma courses 2 years agricultural sciences ( <i>candidatur</i> ), then forestry; 40 % stop forestry specialisation in first year
	Gent	11	
	Leuven	19	
	Louvain la Neuve	14	
GERMANY	Dresden	47	Number of students substantially increasing Number of students decreasing
	Freiburg	78	
	Göttingen	85	
	München	68	
IRELAND	Dublin	15	Increasing number of students (master and PhD)
NETHERLANDS	Wageningen	30	
SCOTLAND	Aberdeen	35	Undergraduate; 15 postgraduate 6 Students of forestry group within interdisciplinary group of 60 students ; no trend of change
	Edinburgh	6	
SWITZERLAND	Zürich	30-35	
WALES	Bangor	24; 37	Undergraduate; master (different study programs)
<b><i>Mediterranean countries</i></b>			
FRANCE	Nancy	35; 10 and 7	3-years FIF course +27-months ENGREF course + 15- months Master course
GREECE	Thessaloniki	92; 30	5-years course; 3-years PhD (total number of

			undergraduates: 716; PhD students: 300)
ITALY	Bari	21	5-years course (total number of students : 241)
	Firenze	51	5-years course (994) +3-years Diploma course
	Padova	62	5-years course (1,020)+ 3-years Diploma course
	Palermo (Bivona)	15	5-years course (543)
	Potenza	13	5-years course (424)
	Reggio Calabria	4	5-years course (211)
	Sassari (Nuoro)	-	5-years new course with no graduates yet (126)
	Torino	36	5-years course (524)
	Viterbo	13	5-years course (503)+3 years Diploma course
SPAIN	Albacete	n.a.	3 years bachelor course in Forest Science and Silviculture
	Gandía (Valencia),	20	3 years bachelor course in Forest Science and Silviculture
	Huelva (La Rábida), Lleida	40 n.a.	3 years bachelor course in Forest Science and Silviculture (228 new students)
	Lugo (Santiago),	n.a.	3 years bachelor courses in Forest Science and Silviculture and in Wood-Working Industries (511) + MSc in Forest Science (354)
	Madrid	106	3 years bachelor course in Forest Science and Silviculture + MSc in Forest Science
	Palencia	150	3 years bachelor course in Forest Science and Silviculture (211) + MSc in Forest Science
	Santiago (Pontevedra) Córdoba	n.a. 3	3 years bachelor course in Forest Science and Silviculture (159 new students) + MSc in Forest Science
			3 years bachelor course in Wood-Working Industries
PORTUGAL	Lisbon	25	MSc in Forest Science (141 new students)
	Tras-os-Montes e Alto Douro	10	5-years undergraduate course (400 students)+2-years MSc course + PhD course (3-5 years)
			5-years undergraduate course + 2-years MSc course + PhD course (3-5 years)

(Sources: see text)

### 3.1 The Nordic countries

Of the four Nordic countries, Denmark, Finland, Norway and Sweden, the three latter belong mainly or mostly to the boreal coniferous zone, while Denmark has a temperate climate with agriculture dominating the landscape. The order of relative importance of forestry in the national economy is Finland, Sweden, Norway and Denmark, but even in Finland forestry (without forest industries) comes only to 3 % of GDP. The labour markets are looked upon in more detail for Finland (table 3) and on a more aggregate base for Denmark, Sweden and Finland (table 5 - similar statistics are not available for Norway). The recent changes and existing trends are first examined by comparing the "traditional" and "recent" employment patterns in Finland (table 4) and then discussing the ongoing and perhaps expected changes in all four countries including Norway.

The present (1997) employment distribution in **Finland** shows that public sector is still the

major employer, where forest research and education (all levels) and forest administration (public administration of private forestry and state forestry) play major roles. In the private sector wood, pulp and paper industries hold a decisive place (table 3).

**Table 3 - The distribution of professional foresters by employment sector in Finland in 1997**

	Persons	% of all	% of employed
<b>PUBLIC SECTOR</b>			
Forest and other research <sup>1</sup>	169	8.0	9.4
Private forest administration	155	7.3	8.6
Other education <sup>2</sup>	152	7.2	8.4
University education <sup>3</sup>	141	6.7	7.8
State forests	138	6.5	7.7
Other state institutions	123	5.8	6.8
Communes, church	26	1.2	1.4
<i>Total</i>	<i>904</i>	<i>42.8</i>	<i>50.2</i>
<b>PRIVATE SECTOR</b>			
Forest industries <sup>4</sup>	457	21.7	25.4
Consulting, computer services	74	3.5	4.1
Financial institutions	56	2.7	3.1
Private forestry	53	2.5	2.9
Organisations, journals, funds	16	0.8	0.9
<i>Total</i>	<i>656</i>	<i>31.1</i>	<i>36.4</i>
<b>OTHER</b>			
Organisations outside forestry	119	5.6	6.6
Abroad	122	5.8	6.8
Doctoral or other studies <sup>5</sup>	21	1.0	
Home, maternal leave	20	0.9	
Unknown	148	7.0	
Unemployed	120	5.7	
<i>Total</i>	<i>550</i>	<i>26.1</i>	
<b>TOTAL IN WORKING AGE</b>	<b>2110</b>	<b>100.0</b>	
<b>TOTAL EMPLOYED</b>	<b>1801</b>		<b>100.0</b>

1 □ Source: The Union of Professional Foresters in Finland (1997)

2 □ Finnish Forest Research Institute and other research organisations excluding research at the universities.

3 □ Polytechnics, vocational institutes, forestry teaching in agricultural institutes.

4 □ A major part of this figure are project researchers, of which most are doctoral students, cf. note 5.

5 □ Includes the forest departments, sawmills, trade and marketing (the latter perhaps 1/3 of all) etc.

6 □ Probably doctoral or other studies without project funding as in note 3.

Differences between "traditional" (foresters aged 45-54 years) and "recent" (foresters younger than 35 years) employment pattern in Finland is quite clear (table 4). Forest industries, private forestry and state forestry have clearly lost their employment share while university education is the only sector strongly increasing its share. This is mainly due to an increased emphasis presently given to doctoral studies at Finnish universities, but also reflects strongly the labour market situation - as traditional labour markets do not offer jobs, doctoral studies have become a more attractive alternative. This only postpones difficulties with finding a final job, even if doctors may have a totally different job market. An increased share of those employed abroad can be observed, mainly due to the private sector, as the decrease of development funds in the '90s has made it more difficult to start a career in the public development sector. The number of "unknown" positions increased too. Both last mentioned trends can be seen as indicators of an increased toughness of traditional labour markets.

**Table 4 - Comparisons between the traditional (foresters 44-54 years) and recent (foresters < 35 years) labour market for forestry professionals in Finland**

	Traditional %	Recent %
Forest industries <sup>5</sup>	28.6	21.0
Forest research <sup>1</sup>	14.8	10.4
Private forestry <sup>6</sup>	16.6	4.2
State forests <sup>4</sup>	8.5	4.2
University education <sup>3</sup>	2.7	19.6
Other education <sup>7</sup>	5.8	4.2
Abroad	5.6	8.7
Other state institutions	5.4	5.0
Organisations outside forestry	2.9	4.5
Consulting, computer services	3.1	4.5
Financial institutions	1.8	2.0
Communes, church	1.3	1.1
Associations, journals, funds	0.9	1.4
Unknow	2.0	9.2
n		
<b>TOTAL</b>	<b>100,0</b>	<b>100,0</b>

Source: The Union of Professional Foresters in Finland (1997). Data only concern union members. The classification is a little different from that in Table 3.1.

- 1  Mainly because the Finnish Forest Research Institute has not been able to employ young researchers due to budget cuts in 1990s.
- 2  Private forestry administration has been under severe budget cuts in 1990s.
- 3  Increase is mainly due to a growing number of doctoral students and other project researchers; also the establishment of a forestry faculty at the University of Joensuu is reflected.
- 4  Due to budget limits and business orientation there has been no replacement of retired foresters.
- 5  The decrease has mainly concerned traditional forest departments while marketing and trade personnel has been more stable or increasing.
- 6  Include private forestry administration (public sector) and private forestry (private sector).

Forestry education at non-university (polytechnic, technical and vocational) level has been quite large till the recent past but is now diminishing due to rationalisation and mechanisation of the forest sector **decreasing the need of** labour force and **technicians**.

In **Sweden**, the recent privatisation of the state forest enterprise has increased the role of the private sector at the cost of the public sector. This change also demonstrates the difficulties of comparing statistical data (table 5). Many Swedish foresters are self-employed, independent entrepreneurs, most of them probably being forest owners.

In **Denmark** the public sector is the largest employer. Moreover the percentage of foresters working abroad, which in all three countries vary between 5-7%, is here the largest one. It is also believed to be a growth sector as Denmark recently created a new MSc program for forestry in developing countries. The role of consulting and related activities seem to be in all countries between 3-4%. Unemployment among foresters in Finland and Sweden has been 5-7%, in Finland this unemployment rate has been about the same as the average of all professionals. Although similar detailed statistics is not available for **Norway**, the distribution of foresters probably is closest to that of Denmark. However, more foresters are probably employed in communes (rural forestry administration), perhaps 15 - 20%, and in the private sector, more in industry and less in private forestry, depending on the definition used (Riise, 1998).

In **Sweden**, the number of new forest students (with a new title, called "*skogsvetare*" which might be translated as "forest **scientist** or expert" ) has recently been doubled. Johansson (1996) believes that only a half of them will get job in the traditional forestry and in the public sector. His other conclusions are that the employers have a "*smörgås bord*" to choose people from and that a danger for status decrease for foresters exists if unemployment will increase. Johansson (1996) also points out the most probable "new niches" for foresters in Sweden: ecological and environmental research, borderline areas of forest-industry-market, information/media and development work.

In **Norway** the chances for foresters on the labour market have been perhaps somewhat better than in the other Nordic countries and the need to penetrate to new areas has not yet been urgent. However, the student intake increased and also a growing competition has been felt: e.g. graduates of general business economics are competing partly in the same field with graduates of forestry and nature conservation education from the same university. A new specialisation into wood industry is regarded as positive and it is also felt that graduates in forest economics and planning have (despite increasing competition of general economists) done quite well (Solberg, 1997). Also, a new type of foresters emerged on the Norwegian labour markets: high school foresters with an education of three years after grammar school. They are meant to replace the forestry technicians in a little less than one generation (Riise, 1998).



**Table 5. Tentative statistics<sup>1</sup> on employment of professional foresters in 1996-97 in Denmark, Sweden and Finland**

	Denmark %	Sweden %	Finland %
<b>PUBLIC SECTOR</b>			
Forest administration	27.9	11.2	14.2
Forest research and education	21.7	16.6	22.4
Communes and church	7.0	1.0	1.3
Other forestry related	1.9	5.2	6.0
Other public non-forestry	1.9	1.3	3.3
<i>TOTAL</i>	<i>60.4</i>	<i>35.3</i>	<i>47.2</i>
<b>PRIVATE SECTOR</b>			
Forest industry	1.9	21.0	22.2
Private forestry	20.1	14.4	2.6
Consulting & computers	3.3	3.4	3.6
Other forestry related	1.7	10.1	3.5
Other non-forestry	2.8	3.2	2.4
<i>TOTAL</i>	<i>29.8</i>	<i>52.2</i>	<i>34.2</i>
<b>OTHER</b>			
Abroad	6.7	5.0	5.9
Unknown	3.1	0.0	6.9
Unemployed		7.5	5.8
<b>GRAND TOTAL</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<i>N=</i>	<i>359</i>	<i>1545</i>	<i>2063</i>

Sources: Compiled from the more detailed statistics provided by the Danish Association of Graduates in Forestry, Sveriges Jägmästares och Forstmästarers Förbund (Sweden) and the Union of Professional Foresters in Finland

On the other hand, in **Denmark**, the conventional forestry sector has always been smaller than in other Nordic countries and orientations towards nature conservation, landscape management and recreation can already be regarded traditional rather than "new" niches.

In **Finland**, it is believed that the strongest decrease in the traditional forest sector jobs is past now and that the development may be more stable in future (Hankala, 1997). However, although the unemployment has been around 5-6 % and considerably less than the other personnel groups in forestry, it nevertheless touches annually about 15% all foresters. Graduates with specialisation in forest products marketing (University of Helsinki) have had better access to jobs than those with more traditional orientation. This was also predicted in the demand and supply survey of foresters in Finland targeting until the year 2010. Generally the study predicted a decreasing need of "traditional" foresters (Onttinen, 1993).

<sup>1</sup> Notice that the figures may not be strictly comparable due to different classifications in each country and combinations thereof. Denmark: "Public other" assumed to be 50:50 between forestry – non-forestry. Unemployed data not available. Sweden: Forest industries include also wood trade and sawmilling branch. Private forestry include 154 own entrepreneurs all of which not necessarily in private forestry. In private sector other forestry include 59 persons in research and education. Finland: Forest administration include forestry centres (mainly private forestry) and state forests.

A satisfactory balance in future requires essentially much broader recruitment both within present employers as well as to entirely new areas (Onttinen, 1993; Hankala, 1997). There are hardly universal answers on what the new areas can be - most often rather than areas one only can find small niches. Some of the small market niches at least marginally felt or believed in include biodiversity conservation, environmental and multiple use management, non-wood forest products, projects in Russia, information technology and GIS, nature based tourism and wood technology.

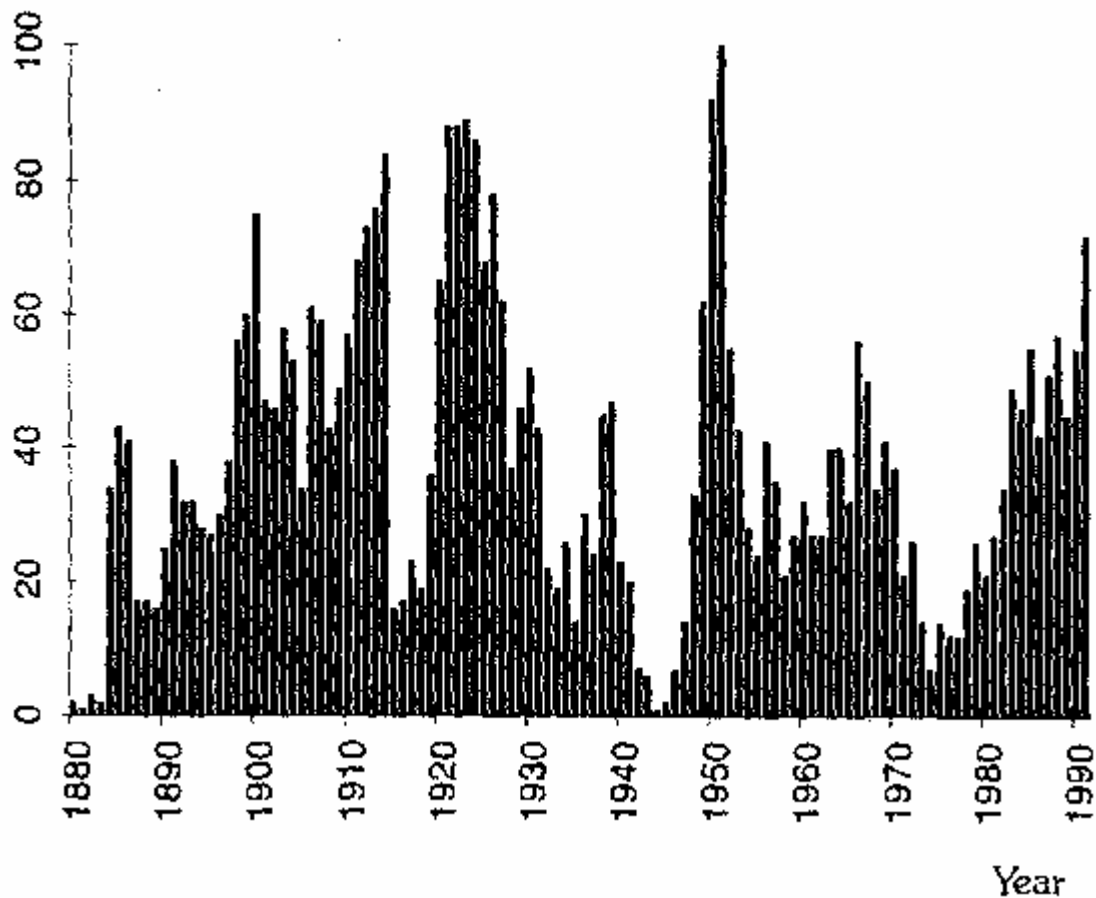
### 3.2 Central Europe

The **scope** of this section is the analysis of the labour market for forestry university graduates in Central Europe in a broad sense, including some, but not all universities from Western European countries. Fifteen university forestry units from eight countries could be covered. Between and also within the countries natural site conditions as well as forest stand and forestry practices and traditions are extremely diverse. The variety of traditions and size of the educating institutions is correspondingly great.

The information about the situation in Germany has been evaluated most thoroughly, where a comprehensive study of the whereabouts of graduates from all four faculties of forestry has been completed in 1996 (Gerecke, 1997; Gerecke & Ihwe, 1997); there have been surveys for Freiburg before. But more systematic are the surveys carried out every five years in the Netherlands for all graduates from Wageningen (Evers & Bos-Boers, 1993), which allow to look for trends since 1973 already. For Vienna (Glatzel & Berger, 1993) one single analysis and for Zürich (Lanfranchi *et al.*, 1994) several analyses including time trends have been published.

The **numbers of graduates** per year of the different schools and faculties differ widely (table 2), the numbers given are based on different years. Smaller numbers up to 20 graduates per year are listed for each of the four Belgian universities, Dublin and Edinburgh, numbers between 20 and 50 in Bangor, Dresden, Wageningen and Zürich, and higher numbers, up to 85, in Vienna and the German faculties of Freiburg, Göttingen and München. The numbers are for single years or average numbers for several years, coming from statistics or estimates. Figure 1 shows the big variation between different years, with a clear increase during the last twenty years, for Vienna for a remarkable period of more than hundred years. Data only from single years in table 2 may also hide such differences.

## Number of graduates per year



**Figure 1 - Number of graduates in forestry per year since 1880 at the University of Bodenkultur, Vienna (Glatzel & Berger, 1993)**

The total number of forestry graduates leaving university of the 15 universities included in the analysis sums up to more than 500 annually, with a growing tendency in many cases over the last years. The intake numbers of students have been growing correspondingly, but very likely in most cases are not growing any more - some information about intake and total enrolment is included in part II of these proceedings for the single universities. There is nearly no information about numbers of drop out, reasons for it and actions taken to influence it.

A tendency of extending the course length is reported for Germany and Wageningen, interpreted as a consequence of lower chances on the labour market. The resulting search for further qualification is also reflected by the growing numbers of PhD-students, as also reported for the Nordic countries.

The employment situation is summarised in table 6, giving the complementary unemployment rate. Depending on the specific education and degree systems in the different countries, in some cases differences are indicated for undergraduates and postgraduates. The known figures reveal no separate information for graduates holding PhD degrees. Except for Austria, the reported **unemployment rate** does not exceed 10% and equals zero in some cases. The time

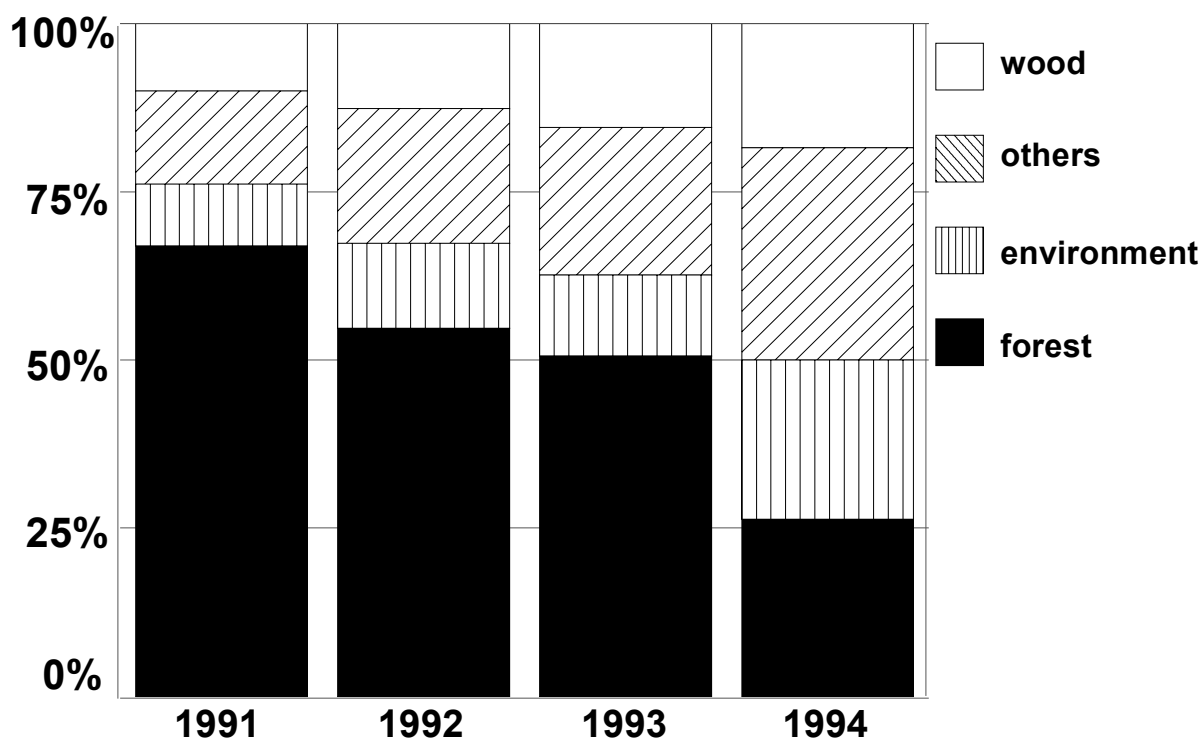
lag between graduation and the survey is a decisive factor for valuation and comparisons, but it is not always commented upon. Generally there is a strong tendency towards temporary and in some cases part time employment. Especially immediately after graduation underpayment has to be accepted more often now, but this of course is a question of standards, which are not discussed in detail. Certainly these aspects, in general the quality of the first jobs, influence the growing readiness to shift and the necessity to look for a new job (reported for Germany, Netherlands).

**Table 6 - Employment of graduates from Central European universities**

Country	University	Year	Unemployment rate (%)	Trends and remarks
AUSTRIA	Vienna	1992	20	
BELGIUM	Gembloux	1995-96	10	Growing unemployment after abolition of military service
	Gent			Undergraduates: no chance
	Leuven	1997	few	Much temporary employment
	Louvaine la Neuve		10	Association of faculty for placement
GERMANY	all 4 faculties	1991-94	10	Because of temporary employment more than 10 % experience unemployment
IRELAND	Dublin	1987...	0	N of employment growing, no problems for graduates, dynamic labour market; overqualification, underpayment
NETHERLANDS	Wageningen		6	1 year after graduation
SCOTLAND	Aberdeen		0	2-3 years after graduation: 75 % employed in forestry, 25 % outside employers want practical experience 23 % of graduates go back overseas
	Edinburgh	1986-96	10	
SWITZERLAND	Zürich	1986-92	2	Temporary employment 43 %
WALES	Bangor	1990-95	24	Undergr.; temporary employment 9 %; 40 % of graduates go back overseas
		1992-96	Uncertain: 36	Master (different study programs)

The **fields of employment** have been summarised in table 7. Lanfranchi *et al.* (1994) comment upon the attractiveness of different activities for the graduates asked. They and Gerecke (1997) also give detailed **recommendations** to graduates, educating institutions and employers.

## Fields of work (employees) (n=354 answers)



*Figure 2 - Fields of employment 1996 for employed German graduates of 1991 to 1994 from all four faculties (413 out of 1125, not including traineeships, research and further education, comp. fig. 3, Lewark, part II in this vol.) after Gerecke (1997)*

Table 7 - Fields of employment of graduates from Central European universities

country	university	year	fields of employment
AUSTRIA	Vienna	1992	Forest services, agriculture and rural development dominant; 19 % private forestry, 2 % state and communal forestry, 15 % Austrian Federal Forests, 19 % Federal Forest Agencies, 10 % Extension Service, 10 % BOKU, Res.Inst., 9 % Consultancy, 9 % avalanche
BELGIUM	Gembloux	1995-96	70 % in Belgium and neighbouring countries; 14 % in research and teaching, 17 % in administration, 15 % in private forestry, 6 % consultants, 30 % in applied research and development, 4 % in wood industry, 2 % in European agencies, rest 12 %

	Gent		All undergraduates continue to grade of bio-engineer looking for field officer in forestry or employment in wood processing industry general tendency: older graduates in forestry practice, younger more in research
			17 % minist., government 17 % teaching at highschool, polytechnical school 50 % in private business 7 % self employed, 5 % in development agencies
	Leuven	1997	Employment outside of forestry: agriculture, GIS, nature conservation, research
	Louvaine la Neuve		In Belgium, in and outside of Europe: forest service, private forestry, wood processing industry, environment protection, research, teaching, development agencies
GERMANY	all 4 faculties	1991-94	(Figure 2); rate of self employment increasing; special role of 2-years traineeship in state forest service (Referendariat) München: 10 % continue as PhD-students
IRELAND	Dublin	1987...	Till 1987 state forest service, after private sector, growing importance of self employment: wood processing industry, consulting, management, environment protection, extension, financial services, research; few in development agencies employment in GB or USA
NETHERLANDS	Wageningen		Activities: 31 % in practical forestry, 15 % in policy preparation, 14 % in research; fields: 13 % ministry of agriculture, 10 % university, 7 % consulting firms, 6 % forestry enterprises
SCOTLAND	Aberdeen		16 % state forest, 15 % research and continued education, 11 % forest contracting, 5 % wood trade, nurseries and other strong competition with college graduates more flexibility required
	Edinburgh	1986-96	8 % continued with postgraduate work; 6 half of employment in private or state forestry competition with graduates from other fields
SWITZERLAND	Zürich	1975-94	One third in the forest service, one third in teaching and research, one third in activities connected to natural environment and social environment; 19 % self employed (rate decreasing)
WALES	Bangor		21 % government resources sector; 19 % research; 6 % university & professional teaching; 6 % private enterprise; 5 % development NGO

There is limited documented information of the rate of self employment, which is often reported as growing, and even less about the degree of occupation for the self employed (entrepreneurs), which probably is a field of hidden unemployment.

Information about the ways and fields as well as the success of **application** is given by Gerecke (1997). The patterns of transition from education system into employment system illustrate the importance of single features such as practical training in the profession and activity abroad, for the chances of the beginners.

### 3.3 The Mediterranean countries

Notwithstanding rather similar environmental conditions, the structures of university educational systems, the numbers of universities offering forest courses in each country, the numbers of professional foresters and their employment chances differ greatly among the Mediterranean countries.

In **France**<sup>2</sup> the only specialised university institution is the *Ecole Nationale du Génie Rural, des Eaux et des Forêts* (ENGREF) in Nancy<sup>3</sup> which is organising three courses: a 3-years course (*Formation des Ingénieurs Forestiers - FIF*), a 27-months course for forest engineers and a 15-months post-graduate programme (*Mastères spécialisés* with 6 different fields of specialisation); PhD programmes lasting from 1 to 3 years are also organised. Actually the number of graduates in the three courses is respectively: 35, 10 and 7. The *Ecole* has the objective to graduate 45 FIF forest engineers by 2004. A large part of the students are already employed as civil servants in the forestry administration before entering ENGREF (11 out of 35 in 1997).

Employment problems for the young forestry professionals practically do not exist, as referred by Costa and Peyron (1997) in a recent survey on the total number of the "Ingénieurs Forestiers", who got a degree 1993-96. The survey does not consider those persons already employed by the public administration before graduation. The main results of this survey are presented in tables 8 and 9. The graduates can normally find a job in the year of graduation. The number of new professionals is equally distributed between the private sector (CRPF, *Organismes coopératifs, Sociétés de gestion forestière*, etc.) and the public one (*Office Nationale des Forêts*), with generally higher salaries in the second case. However, of the total number of graduates, who have found a job on a permanent or short-term basis, 13.9% are employed as teachers. As in Finland, the number of young foresters carrying out doctoral studies at research institutions, is quite high, reflecting higher job expectations after PhD among some graduates. Environmental organisations (*Parcs naturels régionaux, Réserves naturelles, Centre Permanents d'Initiation à l'Environnement - CPIE, Syndicats mixtes, Associations de développement régional*, etc.), mainly public, are becoming an important field of employment. Finally the large number of female graduates should be pointed out; their unemployment status is mostly dependent on recent motherhood.

**Table 8 - The distribution of forest engineers by employment status in France**

	persons	female	male	% of all	% of employed
Employed on a short-term basis	27.5	17.5	10	32.0	38.2
Employed	26.5	14.5	12	30.9	36.9

2. For the need of the presentation we have included France among the Mediterranean countries: it is clear that from an environmental and socio-economic point of view France could be as well considered in the group of Central Europe countries.

3. In Montpellier university specialised courses in Mediterranean and tropical forestry are given.

on a permanent basis					
Education	18	10	8	20.9	25.0
Military service	7	0	7	8.1	9.7
Unemployed	7	6	1	8.1	-
<b>TOTAL EMPLOYED<sup>1</sup></b>	<b>72</b>	<b>42</b>	<b>30</b>	<b>83.7</b>	<b>100.0</b>
<b>TOTAL NO. OF GRADUATES</b>	<b>86</b>	<b>48</b>	<b>38</b>	<b>100.0</b>	<b>-</b>

Source: Costa & Peyron, 1997

1 : employed on a short-term or permanent basis

**Table 9 - The distribution of forest engineers employed on permanent or short-term basis by employment sectors in France**

	persons	female	male	% of all	% of employed
Public forest administration	16.5	12.5	4	19.2	30.6
Private forests	10.5	4.5	6	12.2	19.4
Environmental agencies	8	5	3	9.3	14.8
Research	7.5	3.5	4	8.7	13.9
Teaching	7.5	4.5	3	8.7	13.9
Others	4	2	2	4.7	7.4
<b>TOTAL EMPLOYED ON PERMANENT OR SHORT-TERM BASIS</b>	<b>54</b>	<b>32</b>	<b>22</b>	<b>62.8</b>	<b>100</b>
<b>TOTAL NO. OF GRADUATES</b>	<b>86</b>	<b>48</b>	<b>38</b>	<b>100</b>	<b>-</b>

Source: Costa & Peyron, 1997

In Greece the School of Forestry and Natural Environment at the Aristotle University of Thessaloniki is organising a 5-years course<sup>4</sup> (Philippou, 1997). 716 students were attending

4. Forestry Departments have been established in the Technological Educational Institutes (TEI) of the Department of Karditsa (T.E.I.-Larisa), Karpenisi (T.E.I.-Lamia), and Drama (T.E.I.-Kavala). Their *curricula* tend to coincide with the respective *curricula* of the School of Forestry and Natural Environment at Thessaloniki. The course length is seven semesters from which one semester is exclusively for the practical training of students



the forest course in 1997-98 (97 in the first year; 300 completed their studies but they are still trying to pass some examinations); 92 got a degree (Stamou, 1997). Students and graduates are slightly decreasing in the last years (919 students and 126 graduates in 1993-94; 989 students and 146 graduates in 1990-91). A total number of 120 students are attending a 3-years PhD course in Thessaloniki. In the same university a 2-years Master of Science course will probably start in September 1998. A two-years postgraduate forest-environmental MSc programme is also organised by the Mediterranean Agronomic Institute of Chania in Crete, a branch of the International Centre of Advanced Mediterranean Agronomic Studies.

In the past the public sector represented the main source of employment for forest professionals. In recent times the process of privatisation in forest projects preparation and implementation by the public forest services has widened the employment potentials in the private sector. According to Stamou (1997) "a considerable relatively number of graduates is concerned with the research (...) either in the academic field or in the field of the two Forest Research Institutes". Job opportunities for the young foresters are also provided by the technical schools, the Ministry of Finance (custom offices), the Ministry of Environment, Land Planning and Public Works. A small number of graduate foresters is employed in the Agricultural Bank, in the large private and community forests, in the wood industries and in the wood trading enterprises. The relatively low number of graduates is reducing the problems of unemployment and labour instability even if "recently the graduates from the School of Forestry and Natural Environment face intense competition from biologists, civil engineers and architects on issues of flora and fauna, studies of environmental effects of projects and landscape architecture, respectively" (Stamou, 1997).

In **Italy**, as in **Spain**, the number of institutions offering university courses in forest science is rather high as a result of a decentralisation policy of the national university system. In Italy till the end of the '70s only Florence and Padova universities were organising forest science courses, with less than 20 graduates per year. Now seven other universities (table 2) are providing 5-years courses. The total number of new graduates in 1995 has been 215 and in recent time this number is still slightly increasing (the total number of forest students is 3,603; the new enrolment in 1995 has been 1,160).

The number of universities in Spain offering courses related to forest science is even larger than in Italy (table 2). Bachelor courses in Forest Science and Silviculture are organised by seven universities (Rojas, 1998). The University of León (located in Ponferrada) and Soria are planning to start new courses shortly. Two other universities are offering bachelor courses related to wood-working industries: Lleida and Santiago (located in Pontevedra). Finally, five universities are organising a MSc in Forest Science: Córdoba, Madrid, Lleida, Palencia and Santiago (located in Lugo). A private university in Ávila is planning to start a new course in forestry. Total number of bachelor students in the academic year 1995-96 was 5,742 (2,316 in 1991-92); students attending MSc courses numbered 2,405 (1,042 in 1991-92).

In both countries the number of student intake and the number of forestry graduates is obviously extremely high in comparison with the market chances and the relevance of the forestry sector in financial and social terms. According to Rojas (1998) until now, there is no significant unemployment problems for young forestry graduates, though there is an increasing number of foresters coming into unusual labour fields. Peraza (1997) has estimated that in

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in the Forest Service of the Ministry of Agriculture or in private forest enterprises (Stamou, 1997).

Spain 80-85% of the young graduates find a job in the central and regional administrations. No more than 1% are employed in the wood-working industrial sector. The remaining part became consultants, mainly depending from initiatives of public authorities in the forest sector. A period of 6-12 months is, on the average, needed by the young professionals to find the first job. There is no study about the labour market situation of young foresters. Nevertheless until now, there is no significant unemployment, though there is an increasing number of foresters coming into untraditional labour fields.

In **Italy** a survey carried out in 1992 (Fodde & Pettenella, 1993) on the graduates from Padova University gave the results presented in tables 10 and 11. Public forest administration is no more the prevailing field of jobs for the foresters, even though the work as consultants in Italy is strongly dependent from the initiatives by public organisations. The decreased demand for foresters by state and regional administrations has stimulated the search of new market niches as a source of employment for young foresters: environmental education, urban forestry, activity as consultants to farmers for afforestation programmes, planning and organisation of outdoor sport activities, non-wood forest products marketing, etc. Non-professional activities (i.e. in non-forest related fields) have become relevant, mainly since the demand for secondary schools teachers decreased. The university educational system has been able to react to these market developments only in a rather limited way: for example new courses have been organised related to the problems of park management, urban forestry, wood-working (Merlo *et al.*, 1996).

**Table 10 - The distribution of foresters from University of Padova (Italy) by employment status**

	persons	% of all	% of employed
Self-employed (normally: consultants)	28	19.5	23.1
Employed by public agencies	41	28.5	33.9
Employed by private firms	52	36.1	43.0
Education	13	9.0	-
Unemployed	10	6.9	-
<b>TOTAL EMPLOYED</b>	<b>121</b>	<b>84.0</b>	<b>100.0</b>
<b>TOTAL NO. OF GRADUATES</b>	<b>144</b>	<b>100.0</b>	<b>-</b>

Source: Fodde & Pettenella, 1993

**Table 11 - More frequent employment sectors for foresters from University of Padova (Italy)**

	persons	% of all	% of employed
Teaching	18	12.5	14.9
Consultants	18	12.5	14.9
State and Regional forest	14	9.7	11.6

administration			
Employed in the agricultural sector	13	9.0	10.7
Wood-working and -trading companies	8	5.6	6.6
Environmental agencies	3	2.1	2.5
Others	47	32.6	38.8
<b>TOTAL EMPLOYED</b>	<b>121</b>	<b>84.0</b>	<b>100.0</b>
<b>TOTAL NO. OF GRADUATES</b>	<b>86</b>	<b>100.0</b>	<b>-</b>

Source: Fodde & Pettenella, 1993

The data reported in the tables probably represent a market situation better than in the rest of the country due to the economic growth that has recently characterised North-east Italy, where Padova is located. A more recent survey published by De Francesco (1997) shows that the situation for the forestry graduates from University of Padova is worse now.

In **Portugal** (Borges, 1997) there are two schools that offer 5-years undergraduate degrees, MSc and PhD courses (not considering forestry 3-years baccalaureate courses): the Universidade Tecnica de Lisboa (UTL) which offers forestry undergraduate degrees since 1865 (the awarding college is *the Instituto Superior de Agronomia* de Lisboa - 400 students) and the Universidade de Tras-os-Montes e Alto Douro (UTAD), which offers forestry undergraduate degrees since 1979 (first degrees awarded in 1984). The number of foresters that on the average get a degree in forestry every year is 35 (reference period: 1980-94); this number is very slightly increasing. Three other institutions are providing for a 3-years course on forestry : the *Instituto Politecnico* of Braganca, Coimbra and Castelo Branco.

Oliveira *et al.* (1995) have published the result of a survey sent to the 338 students, who got their forestry undergraduate degree in the period 1980-1994 in Portugal. The main results from the 172 answers to questionnaires are presented in table 12.

**Table 12 - The distribution of forestry graduates by their first jobs in Portugal**

	% of total	% of total	% of the two groups
<b>First job in the forestry sector</b>	<b>74.0</b>	-	<b>100.0</b>
- public administration	-	17.6	23.8
- public firms	-	12.8	17.3
- private firms	-	15.2	20.5
- own firms	-	28.5	38.5

<b>First job outside the forestry sector</b>	<b>26.0</b>	-	<b>100.0</b>
- teachers (high school)	-	18.4	71.0
- other	-	7.5	29.0
<b>TOTAL EMPLOYED</b>	<b>100.0</b>	<b>100.0</b>	<b>-</b>

Source: Oliveira *et al.* (1995)

According to Oliveira *et al.* (1995) most students manage to find a job in the forest sector after leaving university. Nevertheless, the answers to the questionnaires show that about 1/4 of the students faced difficulties when looking for their first job. Moreover, many students who did find a job in the forest sector, did not have any strong bond to their employer. The public sector is the main employer of students who just graduated.

About 50% of students started working in or close (within 50 km) to the main Portuguese metropolitan areas (Lisboa, Porto and Coimbra); 72% of students had changed their employer in the period considered. About 41% started working in the public sector. In 1994, 48% were working in the public sector. Conversely, the percentage working in private firms decreased from about 21 to 11. 75% had a salary lower than the average salary of students just graduated from Law, Medicine or non-agronomic Engineering schools. 70% stated that the job they had corresponded to their first choice. 5% stated that the forestry degrees were not adequate to their level of education.

#### 4 CONCLUSIONS

In the EU market ('demand' side) trends for foresters and labour problems are characterised by similar patterns of development, while on the 'supply' side there are enormous differences in terms on number of universities, number of graduates in forestry each year in relation to the socio-economic role of the forestry sector and prevailing orientations of *curricula*.

The general adverse changes in private and public sectors from the point of view of the academic (and all) job seekers are only one part of the story. Other characteristics worth to be mentioned can be described as '**growing sectors of employment**' and '**niches**':

The demand for professionals by a few branches of industry has been stronger than the capacity of educational system to respond: information technology with its related sub-sectors has been the most brilliant, but perhaps the only large scale example of this phenomenon. Forestry for sure does not belong to this category.

Of great importance for all job seekers are the **niches**, which by their very nature are small. The 'tailoring' to meet the requirement for one of those niches depends more on the student him-/herself than on the educational institution. Tailoring might be, for example, the mastering of a rare language. Somewhat controversially, there has always been a head-hunting of talented students. In recruitment the capacity of the student rather than the area of education he/she attained matter most: a theologian or an engineer may be recruited by the financing sector. Related to that, an increasingly important feature of post-modern job markets has become the interest in the personal characteristics (skills) of the student. Such characteristics include initiative, communicational abilities and social interaction skills (Turtiainen, 1997).

The evaluation showed how difficult the qualification of employment and unemployment is: Unemployed could be (1) those graduates registered as looking for a job, or (2) those employed outside of the field of forestry and looking for a chance to enter the forestry profession in a narrow sense. A complete information about the labour market should include the categories of employers and the fields of employment as well as the respective trends of employment.

There is an obvious need of standardised employment analyses. Additional aspects, for instance referring to special groups and topics, are revealed especially by the more detailed enquiries of whereabouts of graduates, where in any case the time after graduation must be evaluated and stated.

Finally, it may be stated that the outcome of these and other studies regarding the careers of young foresters should be studied carefully by members of curriculum committees.

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