

Professions and Training in Forestry

Results of an Inquiry in Europe and northern america



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Publisher

Federal Office for the Environment (FOEN)
ECE United Nations Economic Commission for Europe
FAO Food and Agriculture Organisation of the United Nations
ILO International Labour Organisation

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Transport, Energy and Communications (DETEC).
ECE United Nations Economic Commission for Europe
FAO Food and Agriculture Organisation of the United Nations
ILO International Labour Organisation

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Abstracts

This study is based on an international survey on forestry training carried out in 2010 and 2011. A total of 23 countries participated in the survey. The International Standard Classification of Education (ISCED) developed by UNESCO provided a reference framework for the classification of the forestry training programmes. The background situation and general conditions in the individual countries differ significantly as do some of the assessments they make of their situations. The increasing expansion of the expected skills and, correspondingly, of the training programmes on offer emerged as a common trend. At the same time, the training institutions must survive in a strongly competitive training market with limited financial resources.

Keywords:
forestry training,
international survey,
forestry trends and changes

Die vorliegende Studie basiert auf einer Länderbefragung zur forstlichen Bildung, welche im Zeitraum 2010 bis 2011 durchgeführt wurde. An der Befragung wirkten insgesamt 23 Länder mit. Als Grundlage für die Einordnung der Ausbildungsprogramme diente die von der UNESCO entwickelte internationale Standard-Klassifikation (ISCED) als Referenzrahmen. Die Ausgangslage und Rahmenbedingungen in den einzelnen Ländern sind sehr unterschiedlich und die Einschätzungen differieren teilweise stark. Als gemeinsamer Trend zeigt sich eine zunehmende Ausweitung der erwarteten Kompetenzen und damit verbunden auch der angebotenen Bildungsprogramme. Gleichzeitig haben die Bildungsinstitutionen in einem stark umworbene(n) Bildungsmarkt mit beschränkten finanziellen Mitteln zu bestehen.

Stichwörter:
Forstliche Bildung,
internationale Länderbefragung,
forstliche Trends und
Veränderungen

La présente étude repose sur une enquête au sujet de la formation forestière menée entre 2010 et 2011 auprès de 23 pays. Les programmes de formation ont été évalués sur la base de la classification CITE de l'UNESCO. Le contexte et les conditions variant fortement d'un pays à l'autre, les résultats sont eux aussi très différents. L'étude permet toutefois de dégager une tendance commune: élargissement des compétences à acquérir et, partant, des programmes proposés. Parallèlement, les instituts de formation, qui disposent de moyens financiers limités, doivent survivre dans un marché très convoité par la concurrence.

Mots-clés:
formation forestière,
enquête internationale,
tendances et évolutions
dans le domaine forestier

Il presente studio si basa su un'inchiesta internazionale relativa alla formazione forestale svolta in 23 Paesi fra il 2010 e il 2011. La classificazione dei programmi didattici è avvenuta in base allo standard ISCED sviluppato dall'UNESCO. La situazione iniziale e le condizioni generali nei singoli Paesi sono molto diverse e le valutazioni variano in parte anche sostanzialmente. Una tendenza comune è tuttavia il crescente ampliamento delle competenze auspiccate e quindi dell'offerta di programmi formativi. Nel contempo, le istituzioni formative devono operare con risorse finanziarie ridotte in un mercato molto conteso.

Parole chiave:
formazione forestale,
inchiesta internazionale,
tendenze e cambiamenti
in ambito forestale

Foreword

Education systems throughout the world are in transition. Education is one of the key resources available to us to meet the challenges of the future. This applies to education, in general, and forestry training, in particular, and to guaranteeing the sustainable development of the forest and the inestimable services it provides for us. International mobility has increased significantly and, hence also, the demand for a basis on which professions and training can be compared at international level.

The FOEN already compiled an overview of the forestry professions in 1996 in cooperation with international organisations. However, forestry courses and the educational and training environment have undergone significant changes since then. Against this background it was decided to carry out a new study on the current international situation. The FOEN's partner in the study was the ICE/ILO/FAO Joint Experts Network.

The specific tasks and activities associated with a particular professional role are highly individual and virtually impossible to classify in terms of categories and sectors. Depending on the country, environment and employer, the skills required under one and the same job title can vary significantly. The understanding of what qualifies as training in the forestry sector, which courses are viewed as specialist qualifications and the direction in which they should be developed varies from one country to the next. The survey results presented in this report highlight the overlaps and different orientations that exist within forestry training in the different countries studied. Given the increasing complexity of forest management, it provides different answers to the questions "What constitutes the good management of the resource forest?" and "What are the core competences required to achieve it?" It is also important and helpful to know about planned training strategies and how the individual countries approach this issue. The report provides an invaluable information and orientation tool for all of those involved in the area of forestry training.

The demands on the forest and the experts that manage it are increasing. Taking a look across boundaries and borders at both associated disciplines and other countries helps us to see forest-related activities and plans in a somewhat broader context: training requires foresight and vision. This report aims to contribute to the development of a visionary training policy in the area of forestry.

Andreas Götz
Vice Director
Federal Office for the Environment (FOEN)

1 Introduction

1.1 Background

The report “Professions, Skills and Training in Forestry” was published in 1996. This report presented a comparison of the forestry training systems and professions in a total of 22 countries in Europe and North America. The comparison was based on a survey carried out in the corresponding European and North American countries.

1996 report

Numerous changes have occurred since then, both in the general education policy environment and in the specific context of forestry training. In particular, international mobility has increased and with it the demand for a basis, on which professions and training at international level can be compared.

Numerous changes

The current study was carried out against this background.

The research was supervised by an advisory group comprising experts from Switzerland. The research was supported at international level by the Joint Experts Network (FAO, ICE, ILO).

Supervision of research

1.2 Objectives

The study had the following three objectives:

Objectives

- To produce an overview of the most important forestry training programmes in Europe and in selected North American countries, and provide a characterisation of the corresponding forestry training systems.
- To develop a transnational reference framework for the classification of the graduates of forestry training programmes and hence establish a basis for the assessment of equivalence by the different countries.
- To identify international trends and changes in the forestry training systems.

1.3 Approach

The study started in mid-September 2010 and was completed in spring 2012. The tasks were completed in five stages (see Table 1 below).

Five stages

Tab. 1 The study was completed in five stages from September 2010 to March 2012

Stage	Period	Completed Tasks
I Preliminary clarification	September 2010	General clarification of the current background situation, information about the definition of forestry professions, definition of the target audience of the study findings and system boundary, and definition of the study plan and the methodology to be used.
II Background research and preparation	October 2010 to December 2010	Interviews with experts in Switzerland and abroad, basic research on occupational and university training programmes, on training institutions and training systems and on international actors and networks; analysis of the international nomenclature and classification (ISCED); implementation of a pilot study in Switzerland, Austria and France.
III Survey	January 2011 to September 2011	Acquisition of data on the educational institutions, translation of survey documentation, identification of contacts; sending of survey documents, ongoing support and telephone follow-up, checking and post-processing of replies, development of fact sheets, second telephone contact with country contacts and discussion of the survey results, checking of documents by the country contacts.
IV Evaluation	June 2011 to October 2011	Development of the detailed concept of the report, initial evaluation of core statements; organisation and evaluation of the Ossiach workshop, compilation of the project report.
V Conclusion	October 2011 to March 2012	Submission of the report and adjustments, translation of the report, publication of findings on the internet, dissemination of the results; product conclusion and handover of project documents to the contracting authority.

1.4 Methodology

The following remarks are based on literature and internet research, on interviews with experts and on the survey findings.

Data sources

The international survey was based on a written questionnaire and on additional oral contact with the responsible experts. The questionnaire contained a total of 11 questions and was divided into three sections:

International survey

- I Description of current forestry training (4 questions)
- II Additional information on the forestry training system (4 questions)
- III Challenges for the future and outlook (3 questions)

1.5 Participating countries

A total of 50 countries in Europe and North America were contacted. The replies from 23 countries were suitable for inclusion in the current study (cf. overview below). Hence, around the same number of countries could be included as were included in the previous study which was carried out 15 years ago.

**Participation by
23 countries**

Tab. 2 Countries recorded in the two surveys carried out in 1996 and 2011

Country	1996 Survey	2011 Survey
Austria	X	X
Belarus	X	-
Belgium	-	X
Bulgaria	X	-
Canada	X	X
Croatia	X	-
Czech Republic	X	X
Denmark	X	X
Finland	X	X
France	X	X
Germany	X	X
Greece	X	-
Hungary	X	-
Ireland	-	X
Italy	X	X
Liechtenstein	-	X
Lithuania	X	X
Luxemburg	-	X
Netherlands	X	X
Norway	X	X
Poland	X	-
Portugal	X	-
Slovak Republic	-	X
Slovenia	-	X
Spain	-	X
Sweden	X	X
Switzerland	X	X
Turkey	-	X
Ukraine	X	X
United Kingdom	X	X
Total	22	23

1.6 Participating experts

A total of 45 forestry training experts from the 23 participating countries provided comprehensive information on education and further training in forestry in their countries. The extensive cooperation of these experts was crucial to the successful completion of this study.

**Training experts
involved**

The authors would like to thank all of the participating experts sincerely for the interest they expressed in the project and for their willingness to support the work being carried out.

**Extensive support
for the project**

Tab. 3 Forestry training experts who participated in the study

Country	Experts surveyed, "Focal Points"
Austria	Martin Nöbauer and Michael Annerl, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft.
Belgium	Alexandra Mannaert and Tom Embo, Inverde: forestry training centre; Jacques Rondeux, Université de Liège, Gembloux; J. Fagot, Haute Ecole de la Province de Liège.
Canada	Ed Banfield, Canadian Forest Service; Robert Beauregard, Université Laval; John F. Pineau, Canadian Institute of Forestry.
Czech Republic	Klement Rejšek and David Sís, Mendel University in Brno; Pavlína Vašičková, Ministry of Agriculture.
Denmark	Tove Enggrob Boon and Mette Rask Jensen, University of Copenhagen.
Finland	Helena Koskinen, Tampere College.
France	Christian Salvignol, Président de l'Association Nationale pour la Formation aux Métiers de la Forêt.
Germany	Alexander Bernet, Referat 533, Nationale Forstpolitik, Jagd (BMELV); Ute Seeling, Kuratorium für Waldarbeit und Forsttechnik GmbH.
Ireland	Nora Flynn, Forestry Training and Education Ireland Limited; Tom Kent, Waterford Institute of Technology; Marianne Lyons, Teagasc Ballyhaise Agricultural College.
Italy	Raffaele Cavalli; University of Padua.
Liechtenstein	Roland Jehle, Amt für Wald, Natur und Landschaft.
Lithuania	Remigijus Zalkauskas, Aleksandras Stulginskis University; Albinas Tebera, Kaunas College of Forestry and Environmental Engineering.
Luxemburg	Martine Neuberg, Administration de la nature et des forêts.
Netherlands	Busink Rob, Department of Nature, Landscape and Rural Affairs; Ministry of Economic Affairs, Agriculture and Innovation; John Riggers, Van Hall Larenstein University of Professional Science.
Norway	Benthe Løvenskiold Kveseth, NHO Mat og Bio; Håvard Sagvolden, Fagkoordinator Naturbruk.
Slovak Republic	Valéria Messingerová, Michal Ferenčík and Viliam Pichler, Technickej univerzity vo Zvolene.
Slovenia	Golob Aleksander and Andrej Breznikar, Ministry of Agriculture, Forestry and Food.
Spain	Rosa Florensa und Isabel Rodríguez, Centre Tecnològic Forestal de Catalunya.
Sweden	Hakan Hulebo, Stora Segerstad och Värnamo Naturbruksgymnasium.
Switzerland	Rolf Dürig, CODOC.
Turkey	Kenan Kiliç, General Directorate of Forestry; Turgay AKBULUT, Istanbul University.
Ukraine	Chaskowkiy Oleg, Technical college of UNFU; Stepan Myklush, National Forestry University of Ukraine.
United Kingdom	David Robson and Andreas Ottisch, University of Cumbria.

2 Reference System

2.1 International networks

2.1.1 General information

As a rule, countries have national bodies which provide information on professional qualifications. The following table provides an overview of selected networks and programmes which deal comprehensively with qualifications and training courses in the international environment.

**National information
bodies**

Tab. 4 Selected international networks in the general area of education

Networks/Institutions	Description
National bodies which provide information on professional qualifications (http://ec.europa.eu/internal_market/qualifications/links_de.htm)	Official website of the European Commission, the executive body of the EU, which provides a list with the full addresses of all national contact bodies in relation to the recognition of professional qualifications.
ENIC Network (www.enic-naric.net/index.aspx?s=n&r=g&d=about)	ENIC Network (European Network of National Information Centres on academic recognition and mobility) contains clearly presented information and addresses relating to different aspects of education on all levels which is structured on a country level.
NARIC Network (www.enic-naric.net/documents/Charter.en.pdf)	NARIC (National Academic Recognition Information Centres); this network aims to achieve the recognition of university qualifications in Europe and works in close cooperation with the ENIC.
Leonardo Da Vinci programme (http://ec.europa.eu/education/lifelong-learning-programme/doc78_de.htm)	Leonardo Da Vinci is a European programme for vocational training.

2.1.2 Forestry-specific information

A series of networks and programmes also exists in the forestry sector which deals with forestry training content, courses and qualifications.

**Networks and
programmes**

Tab. 5 Selected networks and programmes in the area of forestry training in Europe

Networks/Institutions	Description
Eduforest (www.eduforest.eu/)	Eduforest is an internet platform which aims to promote forestry education, training and further training in Europe and to facilitate the networking of actors.
The European Forest Institute (www.efi.int/)	The European Forest Institute (EFI) is the leading forestry research network in Europe.
Union of European Foresters (www.european-foresters.org/)	The UEF is a network of private and public forestry organisations; the network also provides overviews of third-level training courses.
ENQuaFor (http://87.192.2.59/Enquafor/DesktopDefault.aspx?)	ENQuaFor is the European Network for Qualification in Forestry.
ENFE (www.enfe.net)	The ENFE (European Network of Forest Entrepreneurs) runs various programmes dealing with the issues surrounding forestry education and training.

2.2 The ISCED classification system as framework

Education systems throughout the world differ significantly in relation to both their structure and content. Hence it is often difficult to compare individual education systems with other countries and to learn lessons from their experience. The International Standard Classification of Education (ISCED) developed by UNESCO was used as a reference framework for this study (*OECD 1999*). The ISCED enabled the comparison of education statistics and indicators based on standard definitions. The first version of the ISCED was developed around 1970; it was revised and updated in 1997.

International Standard Classification of Education (ISCED)

In the ISCED, the classification of education and training courses and qualification certificates is undertaken by experts in education statistics on the basis of formal rules. The European Qualifications Framework is similar in structure, however it is based on a different process: the aim here is to trigger a broader debate and ensure acceptance through the involvement of all education and labour market policy stakeholders (*Schneeberger 2009*).

European Qualifications Framework (EQF)

The ISCED framework incorporates a total of six levels of education. For the current study, the authors limited their considerations to levels 3 to 5 (cf. overview below). Levels 0 (pre-primary education), 1 (primary education), 2 (lower secondary education) and 6 (second stage of tertiary education) are excluded.

Levels of education

Tab. 6 Levels of education 3 to 5 in accordance with ISCED classification

The examples presented (right-hand column) are taken from the fact sheets of the countries in question.

Levels of education	Description	Selected examples
ISCED Level 3: (upper) secondary education	The programmes provide education following completion of basic primary education, they begin approximately 9 years after the commencement of primary education. Their minimum admission requirement is the skills acquired at the end of lower secondary education (Level 2).	<ul style="list-style-type: none"> • Forstfacharbeiter/in (A) • Forstwart/in (CH) • Forstwirte/Forstwirtinnen (D) • Forest worker (LT) • Forest worker and forest machine operator (S)
ISCED Level 4: post-secondary non-tertiary education	These programmes provide education and training following completion of lower secondary education (level 2) without “tertiary” content; their minimum admission requirement is the successful completion of at least 3-year programmes of ISCED level 3. ISCED level 4 does not have to be completed by all students who aim to access the tertiary sector.	<ul style="list-style-type: none"> • Zertifizierte/r Harvester- und Forwarderfahrer / in” (A) • Conduite d’engins, bucheronnage, grimpeur-élagueur (B, partie wallonne) • Forstwirtschaftsmeister/in (D) • Forest worker (LT) • Harvester operator (S)
ISCED Level 5: first stage of tertiary education	The programmes provide education with “tertiary” – that is clearly advanced – content; their admission requirement is the successful completion of ISCED 3A or 3B, or 4A or 4B; their theoretical duration from the beginning of level 5 is at least 2 years. A distinction is made between:	<ul style="list-style-type: none"> • MSc in Umweltnaturwissenschaften, ETH (CH) • BSc in Forestry (CZ) • Technical Forest Engineer in Forestry Management (E) • “Taught” M.Sc. in Forestry / Forest Management / Arboriculture (UK) • MSc in Forestry Engineering (TR)
	<p>5A: The substantive orientation of the programmes is science-based, provides access to Level 6,</p> <p>5B: Programme is practical/vocationally oriented</p>	<ul style="list-style-type: none"> • Forstwirtschaftsmeister/in m. Meisterprüfung (A) • Dipl. Förster/in (CH) • Forsttechniker/-in (D) • BTS Gestion Forestière (F) • Professional Bachelor of Forestry (LT)

BFS 2008

The following table shows the relevant official titles of forestry training programmes based on the example of Switzerland. They are classified in accordance with the ISCED levels of education.

Example of training programme titles: Switzerland

Tab. 7 Titles of forestry training programmes based on the example of Switzerland

Level	Programmbezeichnung (D)	Titre du programme (F)	Title of programme (E)
3B	Berufslehre, Berufsbildung	Aprentissage, formation professionnelle	Vocational education in school und in the dual system
4B	Berufliche Zweitausbildung auf Sekundarstufe II (1 Jahr)		Second vocational programmes at upper secondary level (1 year)
5A	Fachhochschule	Haute école spécialisée	University of applied science
5A	Hochschulen, Diplom	Hautes écoles	University diploma
5A	Fachhochschule Nachdiplom	Haute école spécialisée diplôme postgrade	“Fachhochschule” postgraduate
5A	Universität Nachdiplom	Troisième cycle, diplôme postgrade	University post-graduate
5B	Berufsprüfung	Examen professionnel	Higher vocational education, stage I
5B	Höhere Fachschule	Ecole technique	Technical school
5B	Höhere Fachschule	Ecole professionnelle supérieure	Higher vocational college
5B	Höhere Fachprüfung	Examen professionnel supérieur	Higher vocational education, stage II

2.3 Terminology

The following terms elucidate the details of the framework, on which the study was based.

- The aim of the Bologna Process is to create a competitive and dynamic higher education and research area in Europe. The key elements of the associated reform are the two-level bachelor’s and master’s tertiary degree system and the introduction of a credit point system that promotes transparency and mobility in tertiary education. **Bologna Process**
- Competence refers to the capacity to apply information, skills and expertise in a familiar or new work environment. A competence is composed of knowledge (*savoir*), expertise (*savoir-faire*) and behaviour (*savoir-être*). It is defined by goal-orientedness, independence, initiative-taking, responsibility, the relationship or co-operation environment, the means used and the profile of requirements. Competence includes: 1) cognitive competence which incorporates the use of theories/concepts but also tacit knowledge gained by experience; 2) functional competence (skills, expertise), which is necessary for the fulfilment of a concrete activity; 3) personal competency which concerns behaviour in/management of a given situation; 4) ethical competency, which includes certain personal/social values. (*BBT 2006*) **Competences**
- The Copenhagen Process is based on the Copenhagen Declaration of 2002. It constitutes an education-policy and labour-market-oriented strategy for the improvement of the performance, quality and attractiveness of vocational education and training. It aims to promote greater international cooperation in vocational education and training and in the mobility, permeability, comparability and transparency of general and vocational education and training. These measures also incorporate life-long learning and support the labour market. (*BBT 2009*) **Copenhagen Process**

- The EQF is a “meta framework” which establishes a link between different qualification frameworks and hence facilitates the international comparison of qualifications (*BBT 2006*).

European Qualifications Framework (EQF)
- Further training includes all educational processes following basic school and/or vocational education and training (*SVEB 2010*).

Further training
- International Standard Classification of Education – a system for the classification of the education sector defined by UNESCO and applied internationally (*BFS 2011*).

ISCED
- Structured and coherent composite of teaching and learning units for the achievement of learning objectives. A module can be described in both qualitative and quantitative terms and must be assessable (*KFH 2004*).

Module
- A qualification framework is an instrument for the development and classification of qualifications in accordance with a set of criteria for the ascertainment of the corresponding level of learning. This set of criteria can be implicit, i.e. lie within the qualification descriptors, or are made explicit in a series of level descriptors. A qualification framework can incorporate all learning outcomes and learning pathways or relate to a specific educational/vocational sector. (*BBT 2006*)

Qualification framework
- A qualification is obtained when a responsible body decides that a person’s learning status meets the requirements in relation to knowledge, skills and competencies; the fulfilment of the targeted results is confirmed by an evaluation process or a successfully completed educational course. Learning and the assessment of knowledge in relation to a qualification can take place in the context of an educational course and/or work experience. A qualification involves official recognition which is valid on the labour market and also enables the continuation of the educational or training path. A qualification can legally entitle the holder to practise a particular profession (*BBT 2006*).

Qualifications
- Skills are processes, procedures and abilities that are implemented in practice and can be applied in the management of corresponding action situations (*SVEB 2010*).

Skills
- Course that culminates in a qualification (*SVEB 2010*).

Training

3 Current Situation and Main Changes

3.1 Requirements and framework conditions of forestry training

3.1.1 Changes in the forestry training environment

The requirements and framework conditions of forestry training in Europe changed significantly over the past 15 years. Three main areas of change can be observed: (a) changes in the socio-economic environment with impacts on the content of training; (b) changes in the technological environment with impacts on the use of resources and subject specialisations; and (c) changes in the training systems through fundamental reforms as implemented, for example, in the course of the Bologna and Copenhagen Processes.

Three main areas of change

A progressive process of internationalisation and globalisation also took place simultaneous to these changes. In this context globalisation refers to the orientation of the product, labour and education markets and the organisation and control of integral value beyond national borders (Avenir Suisse 2010). This also involved the stronger orientation of small and medium-sized businesses towards global markets. The education landscape is particularly strongly affected by globalisation.

Progressive internationalisation

In terms of the content of forestry training, reorientation took place – on all levels – in accordance with the comprehensive understanding of sustainable forest management. In addition to economic issues, ecological and social aspects were also associated with this development. The range of topics has been extended and the focus has shifted in some training courses (on this point, cf. also Chapter 3.5). Simultaneous to the reforms in the area of training, reorganisation and restructuring also took place in the forestry organisations and in the forestry administrations.

Reorientation of training content

3.1.2 Changes in education and training systems (general)

Changes occurred in individual countries in relation to responsibilities for the implementation of education. In Switzerland, for example, vocational education and training and professional education and training were regulated under the Vocational and Professional Education and Training Act.

Changes in responsibilities

In most countries, quality management systems and the systematic further training of teaching personnel was introduced in the training institutions and this enabled, among other things, the completion of individual modules by interested experts. At the same time, the transparency and permeability of the education systems were improved both at national and transnational levels.

Quality management

The Bologna Process and the Copenhagen Process also had a significant influence on the forestry training programmes. The status of the implementation of the associated changes varies considerably in the different countries. With respect to international development in the education sector, the Bologna reform led to far-reaching change in national education systems. The most important change consisted in the introduction of a two-level system with the Bachelor (BSc) and Master (MSc) cycles. As intended, the aftermath of Bologna gave rise to far greater mobility of students and international

Bologna and Copenhagen Processes

networking also increased significantly. The Copenhagen Declaration aimed to achieve in the area of vocational training what the Bologna Declaration set out to achieve in the higher education sector. Because the Copenhagen Process is located in the context of life-long learning, it also covers other areas of the education system, for example further training (*BBT 2009*).

The international comparability of qualifications in higher education has now been formally established. However, transparency is still lacking with regard to qualifications in the area of higher vocational training. In addition, demarcation problems still exist in the comparison of tertiary further training courses.

Formal comparability of higher education qualifications

The validation of informally acquired skills is increasing in importance. Processes are being established at both at national and international levels which enable the accreditation of individually acquired skills.

Validation of informally acquired skills

In many of the surveyed countries, the forestry training programmes underwent fundamental revision and updating, both on the vocational training (cf. 3.1.3) and tertiary (cf. 3.1.4) levels.

Revision of forestry training programmes

3.1.3 Changes and reforms in vocational training in forestry

Particularly worthy of mention in the context of vocational training are the modularisation of training and the introduction of specialisations. Course content was adapted to social and technical developments, including, for example, through the increased emphasis on language skills, the improvement of business qualifications, the increasing of competences in the area of mechanisation and logistics, and expansion of methodological competences.

Modularisation

In Germany, the old *Waldarbeiterschulen* (forestry schools) were developed into forestry training centres. In France, the duration of forestry training was reduced from four to three years and some qualifications are disappearing. Professional licenses (professional education and training certificates) were also introduced, for example in France.

Forestry training centres

In many countries, the permeability of forestry training was improved across all levels (e.g. in Ireland, Belgium, Switzerland Germany, for example, where master tradesmen/foremen are now allowed access to academic programmes for further training). The modularisation of training content meant that individual courses in different countries could also be attended by third-parties.

Permeability of forestry training

Greater regionalisation and increased cooperation with regional actors from forestry practice on the level of the forestry training centres can be observed in some countries, for example France and Belgium.

Regionalisation

3.1.4 Changes and reforms at tertiary level

The introduction of Bachelor and Masters qualifications as part of the Bologna Process, the integration of forestry courses into more comprehensive courses (for example in Switzerland and Denmark) and thematic expansion and specialisation are often mentioned in terms of the developments at tertiary level. Priorities were identified and established at tertiary level and some training programmes were even eliminated (e.g. Ireland and Italy). The old work placements were also discontinued in some countries

Introduction of Bachelor and Masters qualifications

(e.g. Denmark). On the other hand, the thematic extension of courses in conjunction with a specialisation (different countries, 12 different master's programmes are offered in the Ukraine), the creation new courses (see below) and the establishment of new forestry faculties (e.g. in Turkey) also arose in some countries.

Typical examples of newly created training programmes which indicate the broad thematic spectrum covered, include:

Newly created training programmes

- Sustainable tropical forestry (Denmark, Italy)
- Mediterranean forestry and natural resources management (Italy)
- Recreational and urban forestry (Lithuania)
- Sustainable forest and nature management (Denmark, Italy)
- Forest inventory and management (Lithuania)
- Hunting and wildlife management (Turkey)
- Forest and landscape management (Switzerland)
- Environment sciences and natural resource conservation (Canada)

Frequent reference was also made to the increasing importance of the social functions of the forest and, in association with this, corresponding basic disciplines (e.g. the introduction of social forestry in the Ukraine). In certain training programmes, there was a shift to more basic studies in the area of social science and ecosystem management at the expense of silviculture and wood technology (e.g. Denmark). In addition, in some countries there was a withdrawal from traditional forestry training and a shift to more training in the area of nature and landscape conservation and in social areas. The following comment from Canada is typical of this development: *“Over the last ten years a common development in all forestry schools of Canada is the creation of new programs in areas such as: Environment sciences, Natural Resource Conservation, etc. The creation of such programs followed the relative decline in traditional forestry programs”*.

Shift in training content

In addition to the above, the examination systems were also reformed (e.g. reform of state examinations for management positions in the forestry service in Austria).

Reform of examination systems

3.1.5 Further-training courses and forestry specialisations

Numerous new further-training courses were established at tertiary level both as MAS programmes (Master of Advanced Studies), DAS programmes (Diploma of Advanced Studies) and CAS programmes (Certificate of Advanced Studies). A list of the courses on offer in the different countries can be found in Chapter 3.3.

New further-training courses

Over the past two decades, specialised training courses were also created in many countries (cf. overview in Chapter 3.3.2). Forest operators and machine operators represent an important and frequently mentioned target group for such specialisation. Greater consideration was also given to business perspectives and economics in the design of training courses.

Specialised training courses

The need for the certification of courses and, hence also, the examination of the skills acquired at the courses also gained in significance (e.g. in Belgium).

Certification

3.2 Education and training systems

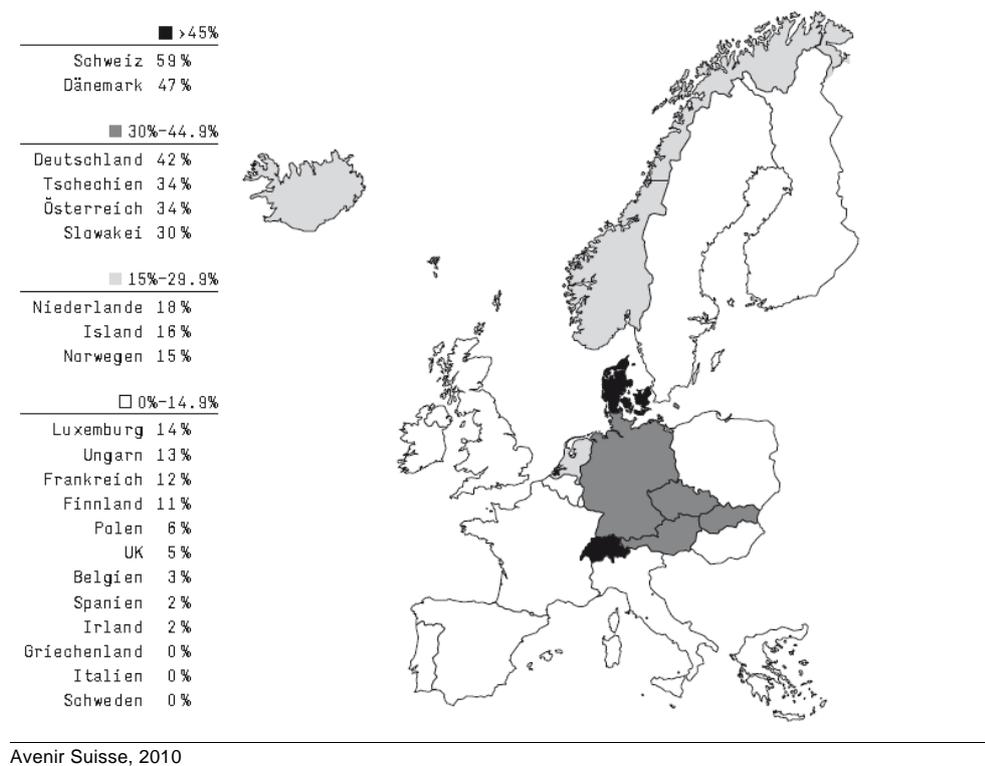
3.2.1 Two different education and training systems

The world's education and training systems differ significantly in relation to their structure and content. In principle, it is possible to identify two types of education and training systems: first, the dual system (cf. Chapter 3.2.2), comprises combined vocational and school education and training, and the second exclusively involves school-based education and training (cf. Chapter 3.2.3).

Two types of education and training systems

Fig. 1 Distribution of the dual and school-based education systems in Europe

percentages of pupils who undertake dual vocational education and training at Level II (lower secondary) in Europe.



3.2.2 The dual system

The dual vocational training system is a particular form of vocational education and training that became established in some countries over the course of time. This form of education and training is understood as combining theoretical and general education with practical training. The theoretical education takes place in the vocational school in parallel to practical training which is carried out at the workplace. The advantages of dual vocational training are seen as lying mainly in the way in which it combines practical and theoretical dimensions.

Dual vocational training system

The dual system is found mainly in Switzerland, Denmark, Germany, the Czech Republic, Austria and Slovakia, and to a lesser extent in Holland, Iceland and Norway. Switzerland is the country with the highest percentage of young people in the world who complete an apprenticeship in the course of their educational careers. Almost two

Distribution of the dual system

thirds of all pupils who leave the mandatory schools select this option (*Avenir Suisse 2010*).

3.2.3 The school-based system

In the majority of countries in the world, in contrast, a form of education became established which is based on a uniform organisational principle – i.e. school-based instruction – from primary school level through to university (*Avenir Suisse 2010*). In Europe, workplace apprenticeships (dual system) are not available in the southern countries like France, Italy, Spain and Portugal, the Balkans or in the Anglo-Saxon countries. Instead, in these country, upper secondary education, that is education between 15 and 20 years, is focused on full-time school with school-leaving qualification. In France, 52 percent of pupils complete the school-leaving qualification; the corresponding percentages for Italy and Finland are 77 and 97 respectively. This figure is considerably lower in countries with the dual system, i.e. 41 % in Germany, and only 26 % in Switzerland (*gymnasiale Maturität* (academic school-leaving examination) and *Berufsmaturität* (vocational school-leaving examination) combined) (*Strahm 2008*). This also has consequences also for the forestry sector and explains the differences and different professions that exist in Europe.

Distribution of the school-based system

3.2.4 The question of comparability

In view of the high level of mobility on the labour market, the comparability of training is gaining in significance. Due to the considerable variances in the training and qualification systems in the different countries (cf. 3.2.1), suitable comparative criteria are required and, based on these, a classification system for training in the form of a formal qualification.

Comparability

The study reported here is based on the ISCED system which was developed by UNESCO (cf. 2.2). The ISCED framework is not unproblematic as the boundaries it uses are formal and are not based on the content of the different training courses (cf. for example *Schneeberger 2009*). Hence the actual comparison of the qualifications would require the inclusion of vocational and professional positions. It was not possible to do this in the context of the current study. Hence, the overviews provided below merely correspond to the formal allocation of the training courses to the different educational levels and do not provide any basis for the assessment of the equivalence of graduates. The allocation of the training courses to the levels was carried out by the individual countries.

Criticism of ISCED framework

The European Qualifications Framework (EQF) aims to ensure greater transparency in Europe in this area. The EQF shifts the focus from education and training input (duration of the learning experience, type of institution) to what a person with a specific qualification actually knows and is capable of doing. The main difference between the EQF and the ISCED is procedural. In addition, it is aimed to involve all stakeholders from education and labour market policy in the EQF process.

Difference between EQF and ISCED

With respect to the equivalence of professions and titles, it would not be advisable to provide a list for the purpose of assessment. Both the training courses and the professions change constantly. Hence it would not be feasible to constantly revise and update such a list as a reference for the comprehensive assessment of equivalence.

Equivalence of professions and titles

3.3 Forestry training courses

3.3.1 Basic training courses (Level 3, (upper) secondary education)

Tab. 8 Level 3 courses, institutions and graduate numbers by country (basic training)

The allocation of the programmes to the levels was carried out by the individual countries; the overview does not provide any qualitative comparison of the training courses.

Country	Courses/Programmes	Institutions (number)	Graduates (number/year)
Austria	Forstfacharbeiter/-in	2	400
	Forstwart/-in	1	40
Belgium	Skilled forestry worker	2	100–200
	Forest warden	1	70 / 2years
	Technicien qualifié en environnement	2	18–25
	Agent technique de la nature et des forêts	4	50–65
	Ouvrier qualifié en sylviculture	2	15–20
Canada	-	0	0
Czech Republic	Upper secondary education in Forestry, Mechanization, Forest Ecology and Environment, Wood harvesting, including practical training	3	180
Denmark	“Skilled forest and landscape craftsman” (Vocational education and training with a job profile)	1	11–30
Finland	Study programme for Forest Machinery Operator	8	Total 450 for the 4 study programmes
	Study programme for Forest Machine Mechanic	3	
	Study programme for Forest Worker	19	
	Study programme for Forest Energy Producer	7	
	Further qualification in Forest Energy Producer	2	10
	Further qualification in Forest Machinery Operator	8	295
France	CAPA travaux forestiers (sylviculture ou bûcheronnage)	>30	121–300
	BPA Conducteur de machines forestières	>10	61–120
	BPA travaux forestiers bûcheronnage	>10	121–300
	BAC PRO FORET	>10	301–600
Germany	Forstwirte/Forstwirtinnen	16	About 1900
Ireland	-	0	0
Italy	Expert in environmental-forestry sector	1	31–60
	Technician for agricultural and rural development; monitoring and conservation of the equilibrium in the mountain land	1	31–60
	Technician of the forestry environment	1	31–60
	Environmental-forestry technician	1	31–60
	Expert in ecological-forestry sector	1	31–60
Liechtenstein	Forstwart/-in	0	1–2
Lithuania	Forest worker (Vocational qualification)	3	87
	Forester (Vocational qualification)	2	50
	Forestry employee (Vocational qualification)	2	13–25
Luxemburg	Opérateur de la forêt et de l'environnement (=Umweltfacharbeiter; DAP, Diplôme d'aptitude professionnelle);	1	15
	Technicien de l'environnement naturel (=Umwelttechniker, Diplôme de technicien)	1	20
Netherlands	Skilled forest worker (professional training qualification)	1	31–60
	Skilled forest worker (middle management training qualification)	1	11–30
Norway	Forest workers and forest machine operators (“Skogsoperatør”)	3	45
Slovak Republic	Secondary education in Forestry, Mechanization, Forest Ecology and Environment, Wood harvesting, including practical training	3	180
Slovenia	Forester	1	10
	Forestry technician	1	35
Spain	Vocational training middle level cycle in Forest works and environmental conservation- TÉCNICO MEDIO	52	1000–1200
Sweden	Forest worker and forest machine operator	20	316
Switzerland	Forstwart/-in	16	298
Turkey	-	0	0
Ukraine	Forester (Basic vocational education and training)	2	140
United Kingdom	“City and Guilds” NVQ / SVQ levels 1, 2 / First Diploma, BTEC ND	>20	61–120

3.3.2 Secondary training (Level 4, non-tertiary education)

Tab. 9 Level 4 courses, institutions and graduate numbers by country (non-tertiary secondary training)

The allocation of the programmes to the levels was carried out by the individual countries; the overview does not provide any qualitative comparison of the training courses.

Country	Courses/Programmes	Institutions (number)	Graduates (number/year)
Austria	Zertifizierte/r Harvester- und Forwarderfahrer/in"	2	35
Belgium	Conduite d'engins, bucheronnage, grimpeur-élagueur	2	5–10
Canada	Forest Ecosystem Technology diploma; Integrated Resource Management; Forestry Technician	2	61–120
Czech Republic	Post secondary non tertiary education in Forestry Specialities: Forest Management, Wood Processing, Economy, including training course in timber harvesting	2	70
Denmark	-	0	0
Finland	Forest Machinery Operator Forestry Special Degree – "Metsämestari" (Forestry Expert); Specialization in forestry knowledge leading to a higher 'skilled' forest owner/worker.	1 5	8 170
France	Certificats de spécialisation	>10	61–120
Germany	Forstwirtschaftsmeister/-in Staatl. Gepr. Forstmaschinenführer/-in	4 4	20–25 10–15
Ireland	Certificate in Forestry (FETAC Level 5) Advanced Certificate in Forestry (FETAC Level 6)	1 1	16 6
Italy	-	0	0
Liechtenstein	-	0	0
Lithuania	Forest worker (Vocational qualification)	1	25
Luxemburg	none	0	0
Netherlands	-	0	0
Norway	Forest Machine Operator Forest Ecology and Management	3 5	30 20
Slovak Republic	-	0	0
Slovenia	-	0	0
Spain	-	0	0
Sweden	Harvester operator Forest management	5 3	80 44
Switzerland	-	0	0
Turkey	-	0	0
Ukraine	Younger specialist (Basic vocational education and training; after 9 years of schooling) Younger specialist, (Basic vocational education and training; after 11 classes of school)	11 11	250 200
United Kingdom	"City and Guilds" NVQ / SVQ level 3, BTEC level 3 Certificate in Forestry/Arboriculture BTEC National Diploma in Forestry/Arboriculture, SCOVTEC National Certificate in Forestry BTEC Higher Diploma in Forestry, SCOVTEC Higher National Diploma in Forestry	>20 >10 >10	61–120 31–60 31–60

3.3.3 Tertiary level, vocationally oriented (Level 5B)

Tab. 10 Level 5B courses, institutions and graduate numbers by country (vocationally oriented tertiary education)

The allocation of the programmes to the levels was carried out by the individual countries; the overview does not provide any qualitative comparison of the training courses.

Country	Courses/Programmes	Institutions (number)	Graduates (number/year)
Austria	Forstwirtschaftsmeister/in mit Meisterprüfung	2	70
	Forstadjunkt/in	1	75
	Förster/in mit Staatsprüfung	1	35
Belgium	Professional Bachelor in Agriculture and Biotechnology	5	31–60
	Applied MSc in Agriculture and Biotechnology	2	31–60
	BSc en Agronomie		
	- Finalité Environnement	3	30–45
	- Finalité Forêt et Nature	2	40–60
	BSc – Construction – option” technologie du bois”	1	20–25
Canada	Diploma in forest technology; Natural Resources and Environmental Technology Diploma (NRET); Resource Management, Officer Technology and Forest Resources Technology Diploma; Natural Resources Management Technology Diploma; Forest Ecosystem Management Technician; Forest Conservation Technician diploma; Forestry Technician; Forest Technologist	10	121–300
	Forest resource Technician; Programme Technologie forestière; Programme Aménagement forestier – forest management; Programme Aménagement de la ressource forestière	7	61–120
Czech Republic	-	0	0
Denmark	BSc in Forestry and Landscape Engineering	1	30
Finland	-	0	0
France	BTS Gestion Forestière	>10	121–300
Germany	Forsttechniker/-in	1	20
Ireland	-	0	0
Italy	-	0	0
Liechtenstein	-	0	0
Lithuania	Professional Bachelor of Forestry	1	35–50
Luxemburg	-	0	0
Netherlands	Forest and landscape Engineer with technical training	1	11–30
Norway	-	0	0
Slovak Republic	-	0	0
Slovenia	Forestry and hunting engineer	1	10
	First grade high professional study forestry programme	1	20
Spain	Advanced level of vocation training. Management and organisation of natural landscape areas TECNICO SUPERIOR	60	1800–1950
Sweden	Forestry technician	1	18
Switzerland	Dipl. Förster/-in HF	2	21
	Seilkranzeinsatzleiter/-in	1	2
	Forstmaschinenführer/-in	2	7
	Forstwartvorarbeiter/-in	2	13
	Baumpflugespezialist/-in	1	15 (every 2 years)
Turkey	Technician on Wildlife	3	86
	Technician on Arboriculture	1	80
	Technician on Forestry	2	400
Ukraine	-	0	0
United Kingdom	Higher National Diploma / Higher National Certificate/Foundation Degree (FdSc) in Forestry or Arboriculture (exact names differ between institutions)	11	145

3.3.4 Tertiary level, academically-oriented (Level 5A)

Tab. 11 Level 5A courses, institutions and graduate numbers by country (academically-oriented tertiary education)

The allocation of the programmes to the levels was carried out by the individual countries; the overview does not provide any qualitative comparison of the training courses.

Country	Courses/Programmes	Institutions (number)	Graduates (number/year)
Austria	• Bakk. techn. der "Forstwirtschaft"	1	50
	• Diplomingenieur/in der "Forstwissenschaften" oder "Mountain Forestry" oder "Mountain Risk Engineering" oder "Alpine Naturgefahren – Wildbach- und Lawinerverbauung" (= Forstassistent/in)	1	25
	• Forstwirt/in mit Staatsprüfung	1	12
Belgium	• BSc Bioingénieur	6	261–370
	• MSc Bioingénieur: Gestion des Forêts et des Espaces naturels	2	30–35
	• MSc Bioingénieur: sciences et technologies de l'environnement	3	50–60
	• Master of Science in Bio-Engineering Sciences: Forest and Nature Management (f)	2	31–60
	• Agronomie et gestion du territoire: orientation environnement	2	40–60
Canada	• BSc in Forestry: BSc Forestry program; BSc in Forestry (Forest Resources Management); Bachelor of Science in Forestry Forest Operations (B.S.F.), Honours Bachelor of Science in Forestry (HBScF); Honours Bachelor of Environmental Management (HBEM); Baccalauréat en aménagement et environnement forestiers (B. Sc. A.); Baccalauréat coopératif en opérations forestières; baccalauréat en sciences forestières (B. Sc. F); baccalauréat en sciences forestières – régime coopératif (B. Sc. F. régime coopératif); BSc in Forest ecosystem management (BScF program);	6	Estimate: 301–600 for all of 5A
	• Professional Masters: Master of Forestry (MF); MBA/Masters of Forestry Joint Degree; Maîtrise en agroforesterie; Maîtrise en sciences forestières; Master of Environmental Management (MEM); Master of Forest Engineering (MFE); Master of Natural Resources and Environmental Studies (MNRES); Master of Forest Conservation (MFC)	7	
	• Thesis – based Masters: Master of Science in Forestry (MScF); Maîtrise en agroforesterie (MSc); Maîtrise en sciences forestières (MSc); Maîtrise en sciences du bois (MSc); Master of Science in Forest Engineering (MScFE)	6	
	• BSc in Forestry, Specialities: Arboriculture, Forestry, Management of Natural Resources in the tropics and subtropics	2	
	• Master (MSc) in Forestry Specialities: European Forestry (EN), Forest Engineering	2	
	• MSc in Forest and Nature Management	1	
Denmark	• MSc in Sustainable Forest and Nature Management – SUFONAMA	1	Approx. 15
	• MSc in Sustainable Tropical Forestry – SUTROFOR	1	Approx. 5
	• MSc in Sustainable Tropical Forestry – SUTROFOR	1	6–10
Finland	• Forestry Engineers (Polytechnic degrees)	6	261
	• Master and Higher University degrees	2	91
France	• Différentes licences forestières	>10	61–120
	• Ingénieur forestier	1	31–60
	• MASTER Gestion environnementale des écosystèmes et forêts tropicales	1	11–30
Germany	• BSc in Forstwirtschaft / Waldökologie	8	Approx. 600
	• MSc in Forstwissenschaften / Waldökologie / Nachh. Ressourcenmanagement	4	Approx. 300
	• Forstinspektor/-in (Forstorganisationen aller Bundesländer, sind nicht als Ausbildungsstandorte in Karte aufgeführt)	13	50–130 (both together, varying each year)
	• Forstrat/-in (Forstorganisationen aller Bundesländer, sind nicht als Ausbildungsstandorte in Karte aufgeführt)		
Ireland	• B. Agr. Sc. (Honours) [Forestry]	1	8
	• BSc in Forestry	1	15
	• BSc (Honours add-on) in Land Management (Forestry)	1	5
Italy	• BSc Forest and environmental sciences	9	12–44 tot: 227
	• MSc Forest and environmental sciences	9	3–57 tot: 135
	• BSc Enhancement and protection of the mountain environment and land	1	18
	• Curriculum Mountain agriculture under the BSc Agricultural Science & Technologies	1	7
	• BSc Forest and environmental technologies	2	15–73; Tot: 88
	• MSc SUFONAMA	1	10
	• MSc SUTROFOR	1	6
	• Curriculum Mountain forest and agriculture under the BSc Sciences for the environment and the nature	1	41
	• BSc Land and agro-forestry sciences	1	28

Country	Courses/Programmes	Institutions (number)	Graduates (number/year)
	<ul style="list-style-type: none"> • MSc Planning and management of agro-territorial, forest and landscape • MSc Science and technology of forest systems • BSc Science and technology for forest and nature conservation • MSc Conservation and restoration of forest and nature • BSc Protection and Management of Land and Agro-Forest Landscape 	1 1 1 1 1	15 14 7 9 10 Total: 615
Liechtenstein	• -	0	0
Lithuania	<ul style="list-style-type: none"> • Bachelor of Forestry (Study program "Forestry"), Specializations "Forest growing", "Wildlife and game management", "Recreational and urban forestry", "Forest inventory and management", "Wood science" • Master of Forestry 	1 1	70 22
Luxemburg	• -	0	0
Netherlands	<ul style="list-style-type: none"> • Bachelor in Forest and Nature Management with Majors in Tropical Forestry, European Forestry and International Timber trade (Professional skills on a BSc level, education finishes here) • BSc in Forest and Nature Management (most BSc continue with the MSc) • MSc Forest and Nature Conservation • MSc in European Forestry Erasmus Mundus (MSc EF) 	1 1 1 1	120 31–60 31–60 6–10
Norway	<ul style="list-style-type: none"> • Bachelor in Forest Sciences • Bachelor in Ecology and Management of Natural Resources • Master in Forest Sciences • Master in Environment and Natural Resources 	2 1 1 2	30 35 15 20
Slovak Republic	<ul style="list-style-type: none"> • BSc in Forestry, Specializations: Forestry, Applied zoology and game management • Master (MSc) in Forestry, Specializations: Forest engineering, Applied zoology and game management 	1 1	100–120 60–80
Slovenia	<ul style="list-style-type: none"> • First grade university study programme Forestry and renewable forest resources (BSc Degree) • Second grade master study, programme in Forestry and management of forest ecosystems (MSc Degree) 	1 1	22 5
Spain	<ul style="list-style-type: none"> • Technical Forest Engineer in Forestry Management (1st cycle degree; INGENIERO TECNICO), Specialities: <ul style="list-style-type: none"> - "Forest exploitations" - "Forest Industries" • Forest Engineer in Forestry Management (2nd cycle degree; INGENIERO) 	13 4 7	450–550 250–350
Sweden	<ul style="list-style-type: none"> • BSc in forest management • MSc in forestry 	1 1	80 50
Switzerland	<ul style="list-style-type: none"> • Bachelor in Forstwirtschaft BFH, 3 Vertiefungen: Wald & Gesellschaft; Wald- & Holzwirtschaft; Gebirgswald & Naturgefahren, 2 Minors: Unterricht und Beratung; Management und Leadership • Master of Science BFH in Life Sciences, 3 Majors: Management of Value Chains in Agriculture and Forestry; Sustainable Agricultural and Forestry Production Systems; Agriculture and Forestry in Transition; • BSc in Umweltnaturwissenschaften, 1 von 5 Vertiefungen: Wald und Landschaft • MSc in Umweltnaturwissenschaften, 1 von 6 Majors: Wald- und Landschaftsmanagement 	1 1 1 1	ca. 20 new 15–40 ca. 20
Turkey	<ul style="list-style-type: none"> • BSc in Forestry Engineering • BSc in Forest Industry Engineering • MSc in Forestry Engineering • MSc in Forest Industry Engineering 	9 8 8 6	1000 650 60 20
Ukraine	<ul style="list-style-type: none"> • Bachelor of forestry (university studies) • Specialist of Forestry (university studies) • Master of Forestry (university studies) 	11 9 7	365 340 160
United Kingdom	<ul style="list-style-type: none"> • BSc (Hons) in Forestry / Forest and Woodland Management / Woodland Conservation / Arboriculture etc. (detailed names of programmes differ between institutions) • "Taught" M.Sc. in Forestry / Forest Management / Arboriculture (detailed names of programmes differ between institutions) • "Research" M.Sc. in Forestry / Forest Management / Arboriculture (detailed names of programmes differ between institutions) 	8 6 4	80 65 ("Taught" and "Research" M.Sc. together)

3.4 International overview of forestry training and further training

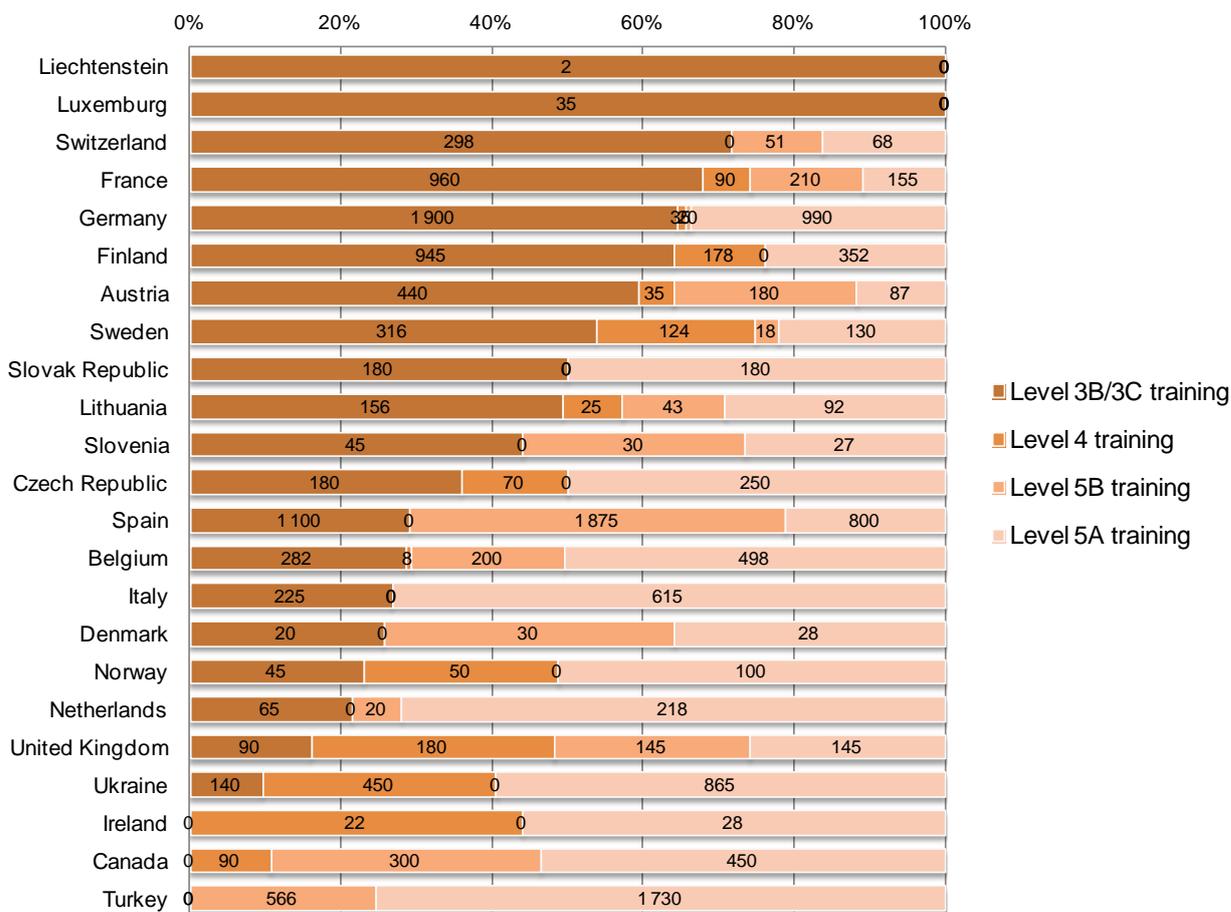
The background situation and formal training systems vary significantly from country to country. The courses offered and number of graduates on each level vary correspondingly. The following table provides an overview of selected indicators for the surveyed countries.

Different background situations

Tab. 12 Overview of selected indicators for the surveyed countries

Country	Forest area (in 1000 ha)	Employment forestry sector (1000 p.)	Number graduates Level 3	Number graduates Level 4	Number graduates Level 5B	Number graduates Level 5A	Number graduates total	Number of training prog.
Austria	3,980	59	440	35	180	87	742	9
Belgium	698	32	218–345	5–10	152–250	412–585	787–1,190	16
Canada	347,710	222.5	0	61–120	182–420	301–600	544–1,140	>25
Czech Republic	2,647	115	180	70	0	250	500	4
Denmark	636	25	11–30	0	30	26–30	67–90	5
Finland	23,311	83	945	178	0	352	1,475	11
France	17,262	214	604–1,320	61–120	121–300	103–210	889–1,950	9
Germany	11,076	344	1,900	30–40	20	950–1,030	2,900–2,990	8
Ireland	710	15	0	22	0	28	50	5
Italy	11,026	297	155–300	0	0	615	770–915	19
Liechtenstein	7.4	1	1–2	0	0	0	1–2	1
Lithuania	2,198	34	150–162	25	35–50	92	302–329	7
Luxemburg	88	1	35	0	0	0	35	2
Netherlands	365	40	42–90	0	11–30	188–250	241–370	7
Norway	12,000	27	45	50	0	100	195	7
Slovak Republic	1,932	58	180	0	0	160–200	340–380	3
Slovenia	1,308	22	45	0	30	27	102	6
Spain	28,214	197	1,000–1,200	0	1,800–1,950	700–900	3,500–4,050	5
Sweden	30,929	94	316	124	18	130	588	6
Switzerland	1,286	52	298	0	51	55–80	404–429	10
Turkey	21,500	500	0	0	566	1,730	2,296	7
Ukraine	9,616	185	140	450	0	865	1,455	6
United Kingdom	2,865	190	61–120	122–240	145	145	473–650	>15

Fig. 2 Number of qualifications completed on each level (international comparison)



Based on the available information and statistics (cf. also fact sheets in the annexe), the countries were examined in detail on the basis of three criteria: (a) ratio of graduates to forest area; (b) number of tertiary level graduates; and (c) number of forestry training programmes.

Study criteria

How big is the forest area available per graduate? The responses to this question provides an indication as to how many newly trained forestry experts are potentially available per ha of forest area. Switzerland, Germany and the Benelux countries have a lot of graduates per ha of forest area. Canada, Norway and Sweden have very large forest areas per graduate. In Belgium, there are only around 706 ha of forest for each graduate while in Sweden, in contrast, there are 52,600 ha and in Canada around 414,000 ha.

Forest area per graduate

Tab. 13 Average forest area per graduate of forestry-specific training

classification of countries according to forest area (in ha) per graduate.

Category	Description	Countries
A	Forest area up to 4,000 ha per graduate	B, CH, D, L, NL
B	Forest area between 4,000 and 7,000 ha per graduate	A, CZ, GB, FL, LT, SK, UA
C	Forest area between 7,000 and 12,000 ha per graduate	DK, E, TR
D	Forest area between 12,000 and 20,000 ha per graduate	F, FIN, IRL, I, SLO
E	Forest area between 20,000 and 30,000 ha per graduate	-
F	Forest area over 30,000 ha per graduate	CDN, N, S

How big is the ratio of the tertiary level graduates to the total number of graduates of forestry training programmes per year? Considerable differences exist here too. Small countries like Luxemburg and Liechtenstein which do not have universities of applied sciences and universities have no tertiary level graduates who are trained in the country itself. In Turkey, there is no forestry training at secondary level.

Percentage of forestry graduates who complete tertiary-level training

Tab. 14 Classification of countries according to the percentage of the total number of graduates of forestry training programmes who complete training at levels 5 A and 5 B

Category	Description	Countries
A	Fewer than 20% of graduates at Level 5 A or 5 B	FL, L
B	20 to 40% of graduates at Level 5 A and 5 B	A, D, CH, F, FIN, S
C	40 to 60% of graduates at Level 5 A and 5 B	CZ, GB, IRL, LT, N, SLO, SK, UA
D	Over 60% of graduates at Level 5 A and 5 B	B, CDN, DK, E, I, NL, TR

The number of training programmes provided is an indication of the variety of the training offered in a country. Enormous differences also exist in this regard. Belgium (two linguistic regions), Canada, Italy and the United Kingdom have a large number of forestry training programmes.

Number of training programmes

Tab. 15 Classification of the countries according to the number of forestry training programmes offered

Category	Description	Countries
A	Countries with 1 to 4 training programmes	CZ, FL, L, SK
B	Countries with 5 to 8 different training programmes	D, DK, E, IRL, LT, N, NL, S, SLO, TR, UA
C	Countries with 9 to 12 different training programmes	A, CH, F, FIN
D	Countries with over 12 different training programmes	B, CDN, GB, I

3.5 Assessment of the main trends

In general the countries that participated in the survey observed an increase in the influence of society's demands and expectations on the forest and its management. It is assumed that this trend will continue to increase in the future as it will have a particularly strong impact in areas with a high level of urbanisation.

Increased societal expectations

At the same time, the view is expressed in the survey that it is assumed that globalisation will endure and economic pressure will remain elevated or increase further. Labour market mobility will continue to grow. It is expected that employees will also change jobs frequently in future.

Globalisation and economic pressure

Many of the respondents expressed the view that the technological changes have a direct impact on a very wide range of areas and that the possibilities for the mechanisation of forest maintenance and the wood harvest will increase further. Also included here are the new technologies available in the IT and social media sectors.

Technological changes

The respondents also referred to the importance of biomass as a fuel, a development that is likely to have a direct effect on the management and use of the forest.

Biomasse as a fuel

It is assumed that the changes to the climate will have a very profound impact on the forest and forestry organisations.

Climate change

The following frequently mentioned trends can be identified in summary (not listed in any order of priority):

Frequently mentioned trends

- Climate change and the need for adaptation strategies in the forestry sector
- Natural hazards, management of natural disasters, storms and other damage
- Water resources, forests and water (e.g. erosion processes); significance of the forest for drinking-water quality
- Economic changes; oil price; chain of custody
- Biodiversity (species changes); management of new and invasive species; management of protected forest areas
- Bioenergy, biomass as fuel; green economy
- Wood innovations, new wood products (plastic wood, NanoPulp), bio-architecture
- Ergonomics, new working methods; internet, societal change, social media
- Ecosystem services and their financing, non-wood products like carbon sequestration,
- Recreation and near-natural tourism; importance of the forest for the health of the population
- Globalisation, open markets; urbanisation
- Land and forest management; governance of forest conservation; private forest management
- Entrepreneurship, labour market, labour shortage

In relation to the forestry training structures, the Bologna Process is expected to have an impact on developments over the next decade. The mobility of trainers and students will increase further – on all levels. As a result, considerable potential arises for inter-regional and international cooperation.

Increasing mobility

3.6 Insights from the international conference in Ossiach

3.6.1 The third international conference of forestry training institutions

The third international conference of forestry training centres took place from 6 to 8 June 2011 in Ossiach (Austria). Around 60 delegates from 18 countries took part in the conference. It was devoted to the very latest trends and challenges facing forestry training institutions and focused in particular on the questions of the certification of competences and increased international collaboration between the training institutions.

Theme of the conference

It was possible to present this study at the conference and explore various aspects of it in greater detail at workshops. Selected findings of the conference are summarised below.

Findings

3.6.2 Issues for the future and impacts on the forestry professions

With regard to international forest policy, it should be noted that around 500 international agreements exist that deal in some way with the forest, however a global forest convention has yet to be established. The orientation of forestry training content should also be viewed in the context of international forest policy. One important insight from the international debates is that the forestry sector must present and position itself in a wider context (cf. also Chapter 3.5). In order to be able to make effective use of the enormous potential of the forestry sector, a shift is needed in Europe in the direction of a so-called “green economy” (sustainable production of goods and services, renewable energies, financing of ecosystem services etc.). The precondition for this transition would be the availability a sufficient number of forestry experts on all levels who would have the necessary skills and competences.

International forest policy

Based on current trends and the changes arising in the forestry environment, several of the presentations focused on expected future developments and their effects on the forestry training sector. One of the central challenges was identified as ensuring sustainable forest management in the context of a simultaneous increase in the demand for wood and the growing expectations and demands of society in relation to the forest.

Expected topics for the future

The presentations showed that the forestry professions have changed fundamentally and will continue to change. It is expected that the role of entrepreneurs will continue to increase in importance in the future.

Changes in the forestry professions

It is assumed that potential on the labour market will decline drastically in future, in other words a shortage of labour is expected. It is also assumed that based on demographic development, the proportion of older employees in the workforce will increase.

Expected labour shortage

Several presentations provided examples and analyses on the status of competence certification. Official requirements in relation to a license or work qualification still do not exist in many countries. Against this background and the increasing mobility of employees, a European Entrepreneurs Certificate is currently being developed, for example. This certificate describes standards which are based on good practice. Corresponding training and further training courses will then be offered by the relevant educational institutions based on the associated qualification profile.

Competence certification

3.6.3 Results of the 'Future Workshop'

As part of a 'Future Workshop', the most important topics of relevance to the future – of forestry training – were identified and assessed from the perspective of the participants. The arguments were grouped in six thematic areas (cf. tables below). The area “changing needs of the forestry sector” was assessed as most important followed by the topic “quality of training”.

Six thematic areas

Tab. 16 Assessment of the significance of the six topics

Topics	Importance	Number of Arguments
Changing needs of the forestry sector in relation to the forest and the forest managers	31 %	27
Quality of training	27 %	23
Financing of training	17 %	15
Partnerships and cooperation	12 %	10
International influences, international cooperation	10 %	8
Infrastructure and technology	3 %	3
Total for all topics	100 %	86

Of the topics discussed, the changing requirements within and of the forestry sector were clearly identified as being most important. The concern here was how trainees could keep up to date in their knowledge and how highly qualified experts could be attracted as trainees. Closely associated with this is the topic of “quality of training” which incorporates both technical and social dimensions.

Changes in the requirements of forestry training

Tab. 17 Selected arguments and aspects of the six topics

Topics	Selected arguments and aspects
Changing requirements	Updating of the skills of teachers and trainers to reflect latest developments; ongoing updating of knowledge and skills of trainers; guaranteeing of the attractiveness of the teaching professions; provision of possibilities for the exchange of knowledge and experience. Updating of training courses offered and adapted target-group-specific marketing; international marketing of courses (international network) Guaranteeing of the attractiveness of forestry professions; ongoing adaptation of training profiles to changing requirements; modernisation of job profiles.
Quality of training	Increase in training periods; use of new technologies, e.g. e-learning and social media. Management of increasing demands on qualification profiles in classes and learning processes; management of special target groups, for example private forest owners, elderly people and migration groups. Quality assurance and assessment of the effect of educational measures; certification standards and processes.
Financing of training	Need for innovation in a context of limited resources; development of quality of training with decreasing financial resources; problem of the niche market and increasing economic demands on the part of training institutions.
Partnerships and cooperation	Promotion of partnerships on the level of schools and training institutions and with private sector actors.
International matters	Management of competition and unequal competition situations; use of European programmes; institutional and transnational knowledge transfer and programmes.
Infrastructure and technology	New forms of learning; training centres as laboratories; promotion of cooperation between training institutions and manufacturers and companies.

3.6.4 Conclusions

In view of the numerous challenges faced by the forestry training institutions and the fact that the forestry sector is a niche area, international cooperation and the formation of clusters, including in the area of knowledge (training alliances), are assuming greater prominence. Increased cooperation between the training institutions and the private sector are also in demand. Partnerships with forestry operations and companies and with other organisations working on the ground should be entered into.

Increasing importance of international cooperation

With regard to training content, a further increase in the requirements relating to the qualifications held by experts is expected. The required skills may be expert-technical, organisational-methodical or social in nature. In addition to the corresponding systematic further development of training programmes, more measures in the area of further and continuing training are also in demand.

Requirements in relation to qualifications

Broadly based strategies should be developed in response to the expected labour shortage; for example, the employment participation of older people and women, greater labour market transparency and the redirection of migration flows.

Strategies for dealing with the labour shortage

3.7 Challenges for the future

The international survey clearly revealed that both the requirement and training profiles will have to undergo a continuous process of adaptation. This continuous process of adaptation to changing societal, economic and ecological conditions and requirements constitutes a permanent task for the relevant training and research institutions. Tried-and-tested basic forestry training must be guaranteed, however, increasing specialisation in various fields must also be facilitated at the same time.

Continuous process of adaptation

Many of the forestry and forestry-related training courses are cost-intensive (i.e. they involve a lot of work in the field, laboratory infrastructure and specialist equipment), however the market for the courses is small (small number of students in comparison with other courses). Hence, from an economic perspective, many forestry training courses are a critical issue for the training institutions.

Cost-intensive training courses

The importance of transnational and international processes will continue to increase and have a direct influence on the orientation of the training courses.

Importance of international processes

According to the responses to the survey, demographic change will have a particular impact on the forestry professions; attracting sufficient numbers of motivated young specialist employees for forestry training will pose a challenge. The precondition for success here is the provision of attractive future-oriented qualification profiles and interesting career options within the forestry sector. It should be noted in this context that a considerable number of forestry graduates already work outside the green sector in many countries today.

Demographic change

The following selection of comments from the survey convey a sense of the expectations and views of the participating experts:

Expectations and views

- “The challenge will be to adapt the relevant training plans to the wide-ranging diverging requirements of future forest personnel on a continuous basis. Further expansion and strengthening of skills is required in the areas of organisation (analysis, creation and implementation of concepts), the development of management concepts tailored to companies and operations, profit-oriented economic management, the creation of multiple company resources and infrastructural services in forestry operations and the development market and economic cooperation.” (Austria)
- “Need for government policies and legislation supporting non-wood benefits of forests (carbon sequestration, recreation, environmental issues).” (Ireland)
- “Increased harvesting activities, particularly thinning, to meet industry demands and wood energy requirements.” (Ireland)
- “There is still a focus on the multiple values of forests to society, i.e. wood an non-wood products and services, incl. e.g. biodiversity, recreation and adaptation to climate change.” (Denmark)
- “The biggest challenge is to find enough appropriate students to study forestry on vocational level, mainly forest machine operators. It is also challenging to keep the trained operators on the forestry field. The forest machine operator training gives very wide skills, so they are capable to work with other heavy machines, like excavators, fork-lifts in harbours etc. The payment is also higher in building sites and harbours.” (Finland)
- “In Norway, there has been a challenge over the last ten years to get applicants for all levels of forestry education. We have not managed to capture the interest of youngsters. Forestry has been seen as a bit old-fashioned food, and we have been unable to show the technological developments. It is therefore initiated regional and

national projects which will now look at the skills and recruitment to forestry.”
(Norway)

- “The greatest challenge is the relative decline of the more traditional forestry education programs. The “environment” based programs are developing very quickly and the balance between the new and the old programs is the main challenge we are facing at the moment. Young people want to be more and more involved in environment issues and they tend to perceive traditional forestry education as more geared towards the forest industry sector and not really relevant to the concept of sustainable development. We think this perception is not right but we have to live with it.”
(Canada)

Finally, knowledge transfer can be identified as a constant challenge in relation to the transfer of learned material into everyday practice, on the one hand, and in relation to the transfer of practical experience into the training programmes, on the other.

Knowledge transfer

In conclusion, the central challenge may be summarised as follows: Against the background of unfavourable demographic development, how can better quality of training be ensured in the context of limited or even reduced resources, increasing expectations and demands and segregating market interests?

Central challenge

4 Conclusion

The primary aim of this study was to provide an overview of the main forestry training courses in Europe and in selected countries of North America. This was achieved in that a total of 23 countries participated in the study and, despite some gaps, the results enable a correct assessment of the current situation to be made. In view of the mostly very small national forestry training markets, the overall assessment provides assistance in orientation both for future cooperation and for eventual focus setting at national level. Greater transnational and international cooperation represents a possible solution to overcoming the key challenge – increasing range of topics and greater demands with simultaneously small or even shrinking market (cf. Chapter 3.6).

Overview of main forestry training courses

The ISCED framework which was used for the study proved an effective solution for the transnational perspective (second aim of the project). Despite the differences in the training systems considered, it was possible for the participating countries to formally assign the individual training courses provided to the ISCED levels. This also enabled the general assessment of the depth of the qualification profiles that may be expected. However, it did not provide a basis for the actual assessment of the equivalence of the qualifications as this would also necessitate a comparison of the training content. This gap may be expected to be filled, in part, through the establishment of a European Qualifications Framework. In practice, high demand may be expected to arise where there is a lively exchange of experts between countries (qualification framework for selected training levels in selected specialised areas, possibly limited to groups of countries).

ISCED framework

Around half of the questions posed in the survey concerned the main changes and expected trends (third project objective). It emerged here that the starting positions vary significantly from country to country and the assessments differ accordingly. As already mentioned, uncontested is the fact of the increasing range of topics and expected competences and limited financial resources and expected recruitment bottlenecks.

Assessment of trends

Proactive and broad training on all levels constitutes the precondition for ensuring sustainable forest management. The knowledge and skills required for this are imparted in the corresponding training institutions. Cooperation, knowledge transfer and innovation force are success factors for future-oriented, economically and socially relevant forestry training.

Precondition for sustainable forest management

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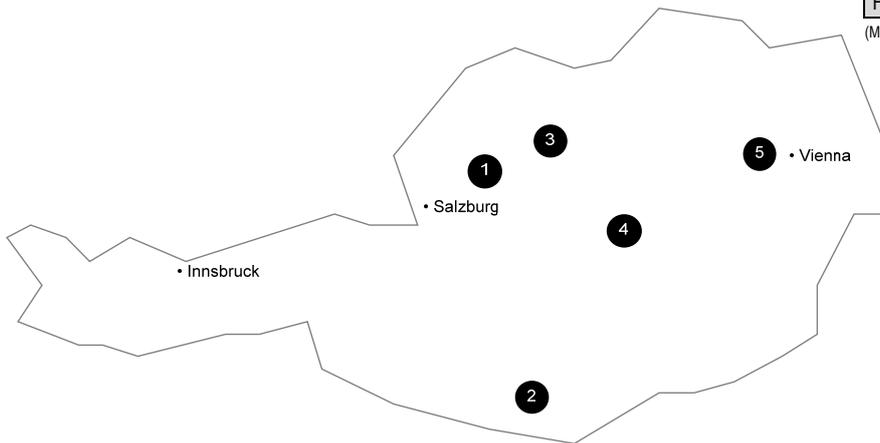
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Austria

Forest area (in 1000 ha):	3980.0
Percentage (%) of total land area:	48
Forest area per capita (in ha):	0.5
% of private owned forests:	-
Employment in forest sector (in 1000 pers.):	59
Contribution of forest sector to GDP (in %):	2.2
Forest area with legal right of access (in %):	94

(Ministerial Conference on the Protection of Forests in Europe, 2007)



1 Forstliche Ausbildungsstätte Ort; Gmunden; www.fastort.at/

2 Forstliche Ausbildungsstätte Ossiach; Ossiach; www.fastossiach.at

3 Forstfachschnule Waidhofen / Ybbs; Waidhofen Ybbs;
www.forstfachschnule.at

4 Höhere Bundeslehranstalt für Forstwirtschaft; Bruck an der Mur;
www.forstschule.at

5 Universität für Bodenkultur Wien; Wien; www.boku.ac.at

6 Bundesministerium für Land- und Forstwirtschaft, Umwelt und
Wasserwirtschaft, Sektion IV – Forstwesen,
[www.forstnet.at/Bildung und Schulen/Forstliche Staatsprüfungen](http://www.forstnet.at/Bildung%20und%20Schulen/Forstliche%20Staatsprüfungen)

Classification based on the ISCED classification system

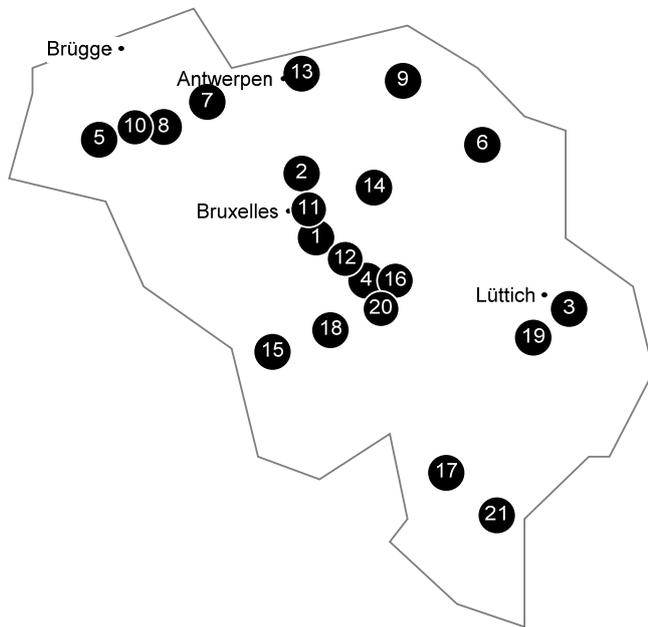
First stage of tertiary education – practical (5B) 1 2 4 6	First stage of tertiary education – theoretical (5A) 5 6	Further Training
Post secondary non tertiary education (4) 1 2		
Upper secondary education (3B+3C) 1 2 3		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forstfacharbeiter/in	1 2	3 y (f)	2	400
Forstwart/in	3	1 y (f)	1	40
Educations of level 4				
Zertifizierte/r Harvester- und Forwarderfahrer/in	1 2	1 y (p)	2	35
Educations of level 5A				
Bakk. techn. der "Forstwirtschaft"	5	3 y (f)	1	50
Diplomingenieur/in der "Forstwissenschaften" oder "Mountain Forestry" oder "Mountain Risk Engineering" oder "Alpine Naturgefahren – Wildbach- und Lawinenverbauung" (= Forstassistent/in)	5	2 y (f)	1	25
Forstwirt/in mit Staatsprüfung	6	2 y (f)	1	12
Educations of level 5B				
Forstwirtschaftsmeister/in mit Meisterprüfung	1 2	3 y (f)	2	70
Forstadjunkt/in	4	3 y (f) oder 5 y (f)	1	75
Förster/in mit Staatsprüfung	6	2 y (f)	1	35
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
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Belgium



Forest area (in 1000 ha):	698.0
Percentage (%) of total land area:	23
Forest area per capita (in ha):	0.1
% of private owned forests:	55.9
Employment in forest sector (in 1000 pers.):	32
Contribution of forest sector to GDP (in %):	0.8
Forest area with legal right of access (in %):	-

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Inverde; Hoeilaart; www.inverde.be (f)
- 2 KTA Horteco, Vilvoorde; www.kta-horteco.be (f)
- 3 Haute Ecole de la Province de Liège; La Reid; www.hepl.be (w)
- 4 Université de Liege, Gembloux agro-bio-tech; Gembloux, <http://www.fusagx.be/> (w)
- 5 Katholieke Hogeschool Zuid-West-Vlaanderen (KATHO); Roeselare; www.katho.be (f)
- 6 Provinciale Hogeschool Limburg; Hasselt; www.phl.be/eCache/DEF/2.html (f)
- 7 Katholieke Hogeschool Sint-Lieven; Sint Niklaas; www.kahosl.be (f)
- 8 University College Ghent; Ghent; <http://english.hogent.be/index.cfm> (f)
- 9 Katholieke Hogeschool Kempen; Geel; www.khk.be/khk04/eng/ (f)
- 10 Ghent University; Ghent; www.ugent.be (f)
- 11 Université libre de Bruxelles; Bruxelles; www.ulb.ac.be (w)
- 12 Université catholique de Louvain; Louvain-la-Neuve; www.uclouvain.be/ (w)
- 13 Ruca, University of Antwerp; Antwerp; www.ua.ac.be (f)
- 14 KUL Leuven; Leuven; www.kuleuven.be (f)
- 15 Haute Ecole de la province de Hainaut, Ath, (IPES); Hainaut; www.condorcet.be (w)
- 16 ITHCF – GrandManil; Gembloux; <http://www.ithcf.be/> (w)

- 17 Collège St-Joseph – Carlsbourg; Carlsbourg; www.carlsbourg-saint-joseph.be (w)
- 18 IPES Ath, Province du Hainaut (w)
- 19 IPEA La Reid, Province de Liège (w)
- 20 ISIH Haute école Charlemagne, <http://www.isia.be> (w)
- 21 Hte Ecole Robert Schumann; Arlon; www.hers.be/ (w)

Legend: (f): Flemish part; (w): Partie Wallonne

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 3 5 to 9 15 20 21	First stage of tertiary education – theoretical (5A) 4 10 to 15 20	Further Training
Post secondary non tertiary education (4) 16 19		
Upper secondary education (3B+3C) schools/institutions 1 2 16 17 18 19		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Skilled forestry worker (f)	1,2	2–3 y (f)	2	100–200
Forest warden (f)	1	1 y (every 2 yrs)	1	70 / 2yrs
Technicien qualifié en environnement (w)	16,19	2 y (f)	2	18–25
Agent technique de la nature et des forêts (w)	16,17,18,19	2 y (f)	4	50–65
Ouvrier qualifié en sylviculture (w)	16,19	2 y (f)	2	15–20

Educations of level 4

Conduite d'engins, bucheronnage, grimpeur-élagueur (w)	16,19	1 y (f)	2	5–10
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Educations of level 5A

BSc Bioingénieur (w)	4, 11,12	3 y (f)	3	200–250
BSc Bioingénieur (f)	10,13,14	3 y (f)	3	61–120
MSc Bioingénieur: Gestion des Forêts et des Espaces naturels (w)	4,12	2 y (f)	2	30–35
MSc Bioingénieur: sciences et technologies de l'environnement (w)	4,11,12,	2 y (f)	3	50–60
Master of Science in Bio-Engineering Sciences: Forest and Nature Management (f)	10,14	2 y (f)	2	31–60
Agronomie et gestion du territoire: orientation environnement (w)	15,20	2 y (f)	2	40–60

Educations of level 5B

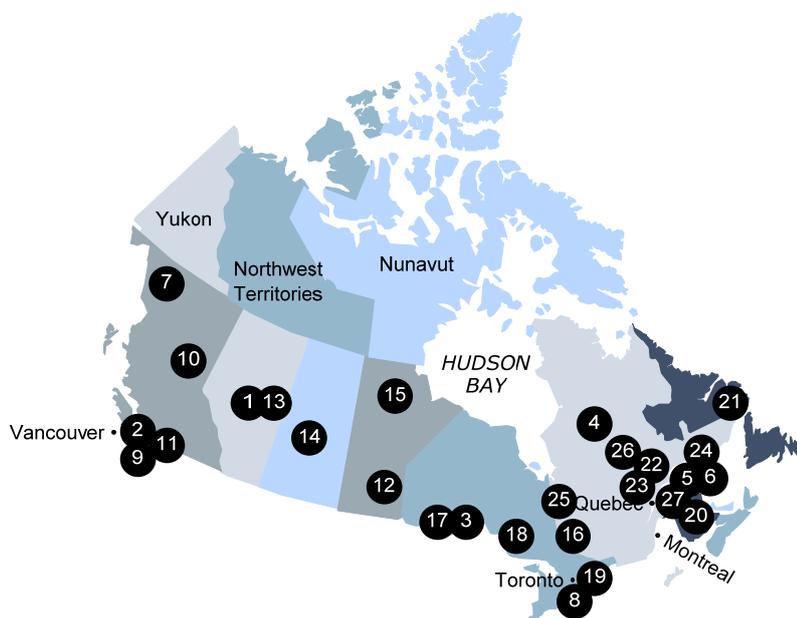
Professional Bachelor in Agriculture and Biotechnology (f)	5–9	3 y (f)	5	31–60
Applied MSc in Agriculture and Biotechnology (f)	8,9	2 y (f)	2	31–60
BSc en Agronomie (w)				
- Finalité Environnement	3,15,20	3 y(f)	3	30–45
- Finalité Forêt et Nature	3,15	3 y(f)	2	40–60
BSc - Construction - option" technologie du bois" (w)	21	3 y (f)	1	20–25

Further Training

Legend: y: years; m: months; (f): full time; (p): part time

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Canada



Forest area (in 1000 ha) (NFI 2006):	347710
Percentage (%) of total land area:	39
Forest area per capita (in ha):	10.1
% of private owned forests (NFI 2006):	7
Employment in forest sector (in 1000 pers.):	222.5
Contribution of forest sector to GDP (in %):	1.66
Forest area with legal right of access (in %):	-

(Angie Larabie; population data from 2011, forest sector data from 2010)

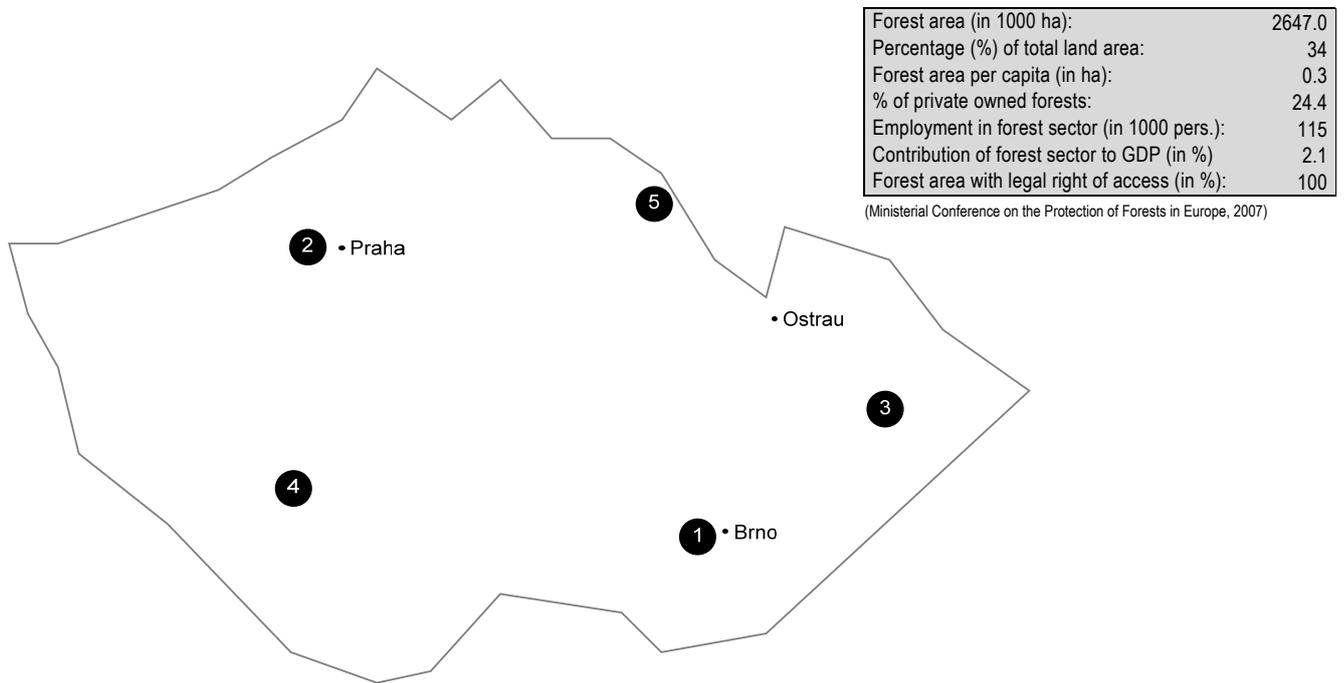
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- 2 University of British Columbia – Faculty of Forestry; Vancouver; www.forestry.ubc.ca
- 3 Lakehead University – Faculty of Natural Resources Management; Thunder Bay; <http://nrm.lakeheadu.ca>
- 4 Université Laval – Faculté de foresterie, de géographie, et de géomatique; Québec; www.sbf.ulaval.ca
- 5 Université de Moncton – Faculté de foresterie; Edmundston, NB; www.umoncton.ca
- 6 University of New Brunswick – Faculty of Forestry & Environmental Management; New Brunswick; www.unb.ca
- 7 University of Northern British Columbia – Faculty of Natural Resources & Environmental Studies; www.forestry.ubc.ca
- 8 University of Toronto – Faculty of Forestry; Toronto; www.forestry.utoronto.ca
- 9 British Columbia Institute of Technology – Forestry – Diploma in forest technology, Vancouver und Burnaby; www.bcit.ca
- 10 College of New Caledonia; Prince George; www.cnc.bc.ca/
- 11 Malaspina University College – Vancouver Island University; Vancouver; www.viu.ca/
- 12 Selkirk College; Selkirk; <http://selkirk.ca/>
- 13 Northern Alberta Institute of Technology; Edmonton; www.nait.ca
- 14 Saskatchewan Institute of Applied Science and Technology (SIAST); Saskatoon; www.siastr.sk.ca
- 15 University College of the North (UCN); Thompson; <https://mycampus.ucn.ca>
- 16 Algonquin College of Applied Arts and Technology; Pembroke; <http://www2.algonquincollege.com>

- 17 Confederation College; Thunder Bay; www.confederationc.on.ca/
- 18 Sault College; Sault Ste. Marie; www.saultcollege.ca;
- 19 Fleming College; Peterborough; www.flemingc.on.ca
- 20 Maritime College of Forest Technology; Fredericton; www.mcft.ca
- 21 College of North Atlantic; 17 campus in Newfoundland and Labrador; www.cna.nl.ca
- 22 CEGEP de Baie-Comeau; Baie-Comeau; www.cegep-baie-comeau.qc.ca
- 23 Cegep de Sainte-Foy; Québec; www.cegep-ste-foy.qc.ca
- 24 Cégep de la Gaspésie et des Iles; Gaspé; www.cgaspesie.qc.ca
- 25 Cégep de l’Abitibi-Témiscamingue; Rouyn-Noranda; www.cegepat.qc.ca
- 26 Cégep de St-Félicien; Saint-Félicien; www.cstfelicien.qc.ca
- 27 Cégep de Rimouski; Rimouski; www.cegep-rimouski.qc.ca

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
9 to 13	1 2 3 4 5 6 7 8	
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) Over 20 schools/institutions		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Educations of level 4				
Forest Ecosystem Technology diploma (14); Integrated Resource Management (14); Forestry Technician (16)	14,16	1 y (f) to 18 m (f)	2	61–120
Educations of level 5A				
BSc in Forestry: BSc Forestry program (1); BSc in Forestry (Forest Resources Management, 2); Bachelor of Science in Forestry Forest Operations (B.S.F., 2), Honours Bachelor of Science in Forestry (HBScF, 3); Honours Bachelor of Environmental Management (HBEM, 3); Baccalauréat en aménagement et environnement forestiers (B. Sc. A. 4); Baccalauréat coopératif en opérations forestières (4); baccalauréat en sciences forestières (B. Sc. F 5); baccalauréat en sciences forestières – régime coopératif (B. Sc. F. – régime coopératif, 5); BSc in Forest ecosystem management (BScF program, 6);	1,2,3,4,5,6,	4 y (f)	6	Estimate: 301–600 for all of 5A
Professional Masters: Master of Forestry (MF, 1, 2,3,6); MBA/Masters of Forestry Joint Degree (1); Maîtrise en agroforesterie (4); Maîtrise en sciences forestières (4); Master of Environmental Management (MEM, 6); Master of Forest Engineering (MFE, 6); Master of Natural Resources and Environmental Studies (MNRES, 7); Master of Forest Conservation (MFC,8)	1,2,3,4,6,7,8	1 y or 16 m or 2 y (f) or up to 4 y (p)	7	
Thesis – based Masters: Master of Science in Forestry (MScF, 1,2,3,6 ,8); Maîtrise en agroforesterie (MSc,4); Maîtrise en sciences forestières (MSc, 4); Maîtrise en sciences du bois (MSc, 4); Master of Science in Forest Engineering (MScFE, 6)	1,2,3,4,6,8	2 y – 2.5 y (f) or up to 6 y (p)	6	
Educations of level 5B				
Diploma in forest technology (9,12,13); Natural Resources and Environmental Technology Diploma (NRET, 10); Resource Management, Officer Technology and Forest Resources Technology Diploma (11); Natural Resources Management Technology Diploma (15); ; Forest Ecosystem Management Technician (17); Forest Conservation Technician diploma (18); Forestry Technician (19); Forest Technologist (20);	9,10,11,12, 13,15,17,18, 19,20	2 y (f)	10	121–300
Forest resource Technician (21); Programme Technologie forestière (22,23, 25,27); Programme Aménagement forestier - forest management (24); Programme Aménagement de la ressource forestière (26)	21,22,23,24, 25,26,27	3 y (f)	7	61–120
Further Training				
PHD Programs aren't considered on the fact sheet				
Legend: y: years; m: months; (f): full time; (p): part time				
Contact address	Further sources			
Robert Beaugard, ing.f., ing., Ph.D., Chair, Association of University Forestry Schools of Canada (AUFSC) Président, Association des écoles forestières universitaires du Canada (AEFUC) Doyen / Dean, Université Laval; Québec, QC, G1K 7PA; Tél. / Phone: +1 418-656-2116; Courriel / Email: doyen@ffgg.ulaval.ca	Natural Resources Canada, Canadian Forest Service: http://cfs.nrcan.gc.ca National Forestry Database: http://nfdp.ccfm.org National Forest Inventory: https://nfi.nfis.org Canadian Institute of Forestry: www.cif-ifc.org			
John F. Pineau; Executive Director / Directeur général Canadian Institute of Forestry / Institut forestier du Canada Tél. / Phone: +1 705-744-1715 ext. 585; Email: jpineau@cif-ifc.org				

Czech Republic



- 1 Mendel University; Brno; www.mendelu.cz/en
- 2 Czech University of Life Sciences Prague; Prague; www.czu.cz/en
- 3 Secondary Forestry School in Hranice; Hranice; www.sls hranice.cz
- 4 Bedřich SchwarzenberG's Forestry College & Secondary Forestry School; Pisek; www.czu.cz/en
- 5 Czech Forestry College and Secondary Forestry School Trutnov; Trutnov; www.clatrutnov.cz

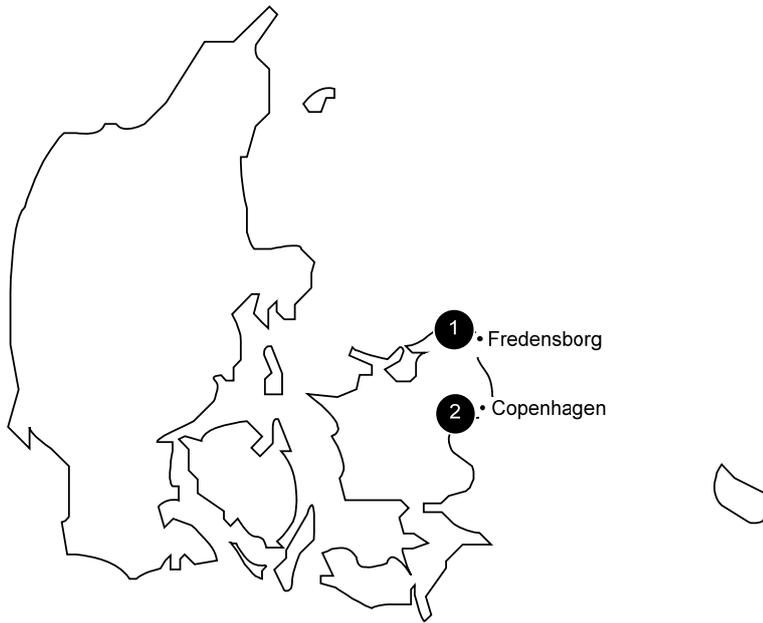
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) schools/institutions		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Upper secondary education in Forestry, Mechanization, Forest Ecology and Environment, Wood harvesting, including practical training	3 4 5	4 y	3	180
Educations of level 4				
Post secondary non tertiary education in Forestry Specialities: Forest Management, Wood Processing, Economy, including training course in timber harvesting	4 5	3 y	2	70
Educations of level 5A				
BSC in Forestry Specialities: Arboriculture, Forestry, Management of Natural Resources in the tropics and subtropics	1 2	3 y (f)	2	120+30
Master (MSc) in Forestry Specialities: European Forestry (EN), Forest Engineering	1 2	2 y (f)	2	75+25
Educations of level 5B				
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Ministry of Agriculture of the Czech Republic Information office Tesnov 17 117 05 Prague 1 Czech Republic Phone: +420 221 811 111 Fax: +420 224 810 478 e-mail: info@mze.cz http://eagri.cz/public/web/en/mze/	

Denmark



Forest area (in 1000 ha):	636.0
Percentage (%) of total land area:	15
Forest area per capita (in ha):	0.1
% of private owned forests:	56.7
Employment in forest sector (in 1000 pers.):	25
Contribution of forest sector to GDP (in %):	0.9
Forest area with legal right of access (in %):	-

(Ministerial Conference on the Protection of Forests in Europe, 2007)

1 Skovskolen, Danish forestry college; Fredensborg; www.sks.dk

2 Departement Forest and Landscapes, University of Copenhagen; Copenhagen; www.development.life.ku.dk/Department_profiles/Forest_and_Landscape.aspx

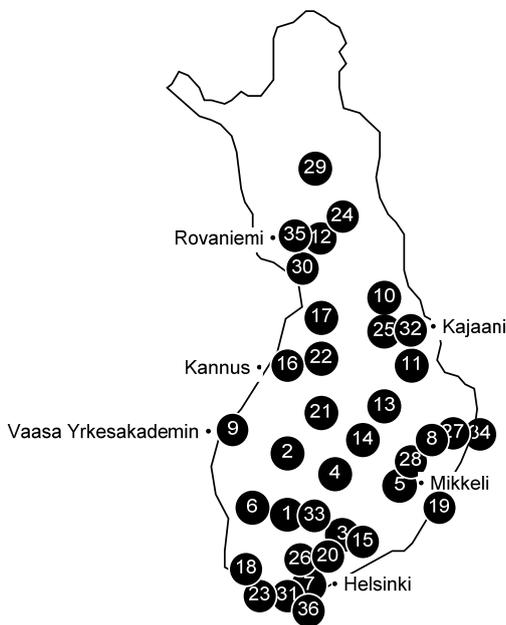
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 1	First stage of tertiary education – theoretical (5A) 2	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) schools/institutions 1		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
"Skilled forest and landscape craftsman" (Vocational education and training with a job profile)	1	3 y (f)	1	11-30
Educations of level 4				
Educations of level 5A				
MSc in Forest and Nature Management	2	2 y (f)	1	Approx. 15
MSc in Sustainable Forest and Nature Management – SUFONAMA	2	2 y (f)	1	Approx. 5
MSc in Sustainable Tropical Forestry – SUTROFOR	2	2 y (f)	1	6-10
Educations of level 5B				
BSc in Forestry and Landscape Engineering	1	4 y (f)	1	30
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Tove Enggrob Boon Director of study in Forest and Nature Management e-mail: tb@life.ku.dk Phone + 45 35331760	Mette Rask Jensen Director of Study in Forestry and Landscape Engineering Email: mrj@life.ku.dk Phone: + 45 35331595

Finland



Forest area (in 1000 ha):	23 311
Percentage (%) of total land area:	77
Forest area per capita (in ha):	4.4
% of private owned forests:	67.6
Employment in forest sector (in 1000 pers.):	83
Contribution of forest sector to GDP (in %):	5.4
Forest area with legal right of access (in %):	99.5

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Tampereen ammattiopisto; Tampere; www.tao.tampere.fi
- 2 SEDU/SEAMK; Ahtari; www.sedu.fi; www.seamk.fi
- 3 Hämeen Ammatti-instituutti/ammattikorkeakoulu; Evo; www.studentum.fi, www.hamk.fi
- 4 Jämsän Ammattiopisto; Jamsa; www.jao.fi
- 5 Etelä-Savon Ammattiopisto; Mikkeli; www.esedu.fi
- 6 WinNova; Kullaa; www.winnova.fi
- 7 Helsingin Yliopisto; Helsingin yliopisto; www.helsinki.fi/forestsciences
- 8 Itä-Suomen Yliopisto; www.uef.fi/metsa
- 9 Vaasa Yrkesakademin; www.yrkesakademin.fi/ (3)
- 10 Oulun seudun ammattiopisto; Taivalkoski; www.osao.fi/index.php?2199 (3)
- 11 Pohjois-Karjalan ammattiopisto; Valtimo; www.pkky.fi/Resource.phx/pkky/amo/valtimo/index.htm (3)
- 12 Lapin ammattiopisto; Rovaniemi; www.lao.fi/ (3)
- 13 Savon ammatti- ja aikuisopisto; Toivala; www.sakky.fi
- 14 Etelä-Savon ammattiopisto; Pieksämäki; www.esedu.fi
- 15 Etelä-Savon ammattiopisto; Savonlinna; www.esedu.fi
- 16 Hämeen ammatti-instituutti; Evo; www.hami.fi
- 17 Keski-Pohjanmaan maaseutuopisto; Kannus; www.kpedu.fi
- 18 Oulun seudun ammattiopisto; Muhos; www.osao.fi
- 19 Ammattiopisto Livia Maaseutuopisto; Paimio; www.livia.fi
- 20 Etelä-Karjalan ammattiopisto; Ruokolahti; www.ekamo.fi
- 21 Hyria koulutus Oy; Hyvinkää; www.hyria.fi
- 22 Pohjoisen Keski-Suomen oppimiskeskus; Tarvaala; www.poke.fi
- 23 Haapajärven ammattiopisto; Haapajärvi; www.kam.fi/hai/

- 23 Axxell, Brusaby; www.axxell.fi
- 24 Itä-Lapin ammattiopisto; www.kemjarvi.fi/ilo
- 25 Pohjois-Karjalan ammattiopisto Valtimo; Kajaani; www.pkky.fi
- 26 Jämsän ammattiopisto; TTS Rajamäki; www.jao.fi
- 27 Pohjois-Karjalan ammattiopisto Valtimo; Joensuu; www.pkky.fi
- 28 Savonlinnan ammatti- ja aikuisopisto; www.samiedu.fi
- 29 Lapin ammattiopisto; Sodankylä – Instituutti; www.lao.fi
- 30 Ammattiopisto Lappia; Tervola; www.lappia.fi
- 31 Siikaranta opisto; Espoo; www.siikaranta.fi
- 32 Kainuun ammattiopisto -liikelaitos, aikuisopisto; Kajaani; www.kao.fi (4)
- 33 Tampereen ammattikorkeakoulu; Tampere; www.tamk.fi (5A)
- 34 Pohjois-Karjaalan ammattikorkeakoulu; Joensuu; www.pkamk.fi (5A)
- 35 Rovaniemen ammattikorkeakoulu; Rovaniemi; www.ramk.fi (5A)
- 36 Yrkeshöskolan Novia; Raasepori/Tammisaari; www.novia.fi (5A)

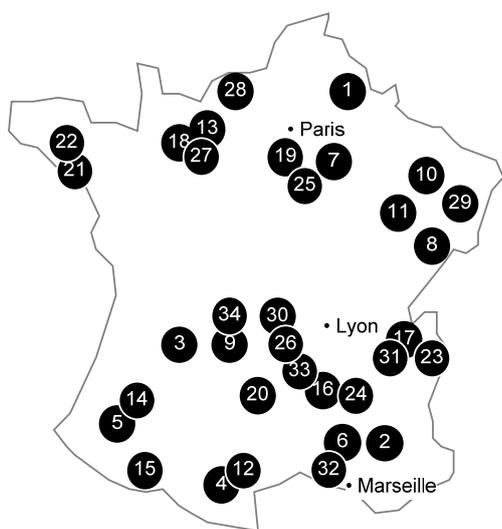
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
	2 3 7 8 33 34 35 36	
Post secondary non tertiary education (4)	5 6 15 31 32	
Upper secondary education (3B+3C)		
1 2 4 5 6 9 10 11 12 13 14 a 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Study programme for Forest Machinery Operator	1,4,5,6,9 to 12	3 y (f)	8	450 all together, no separate data available
Study programme for Forest Machine Mechanic	4,11,12	3 y (f)	3	
Study programme for Forest Worker	13 to 30	3 y (f)	19	
Study programme for Forest Energy Producer	2,13,17,18,21,28,30	3 y (f)	7	
Further qualification in Forest Energy Producer	2,21 (2011)	Depends on personal experience	2 (2011)	10 (2007–2009)
Further qualification in Forest Machinery Operator	1,4,5,6,9 to 12	Depends on personal experience	8	295
Further qualification in Forestry Entrepreneur	2,9,13,23,28	Depends on personal experience	5	190
Educations of level 4				
Forest Machinery Operator	32	Depends on personal experience	1	8
Forestry Special Degree – “Metsämestari” (Forestry Expert); Specialization in forestry knowledge leading to a higher ‘skilled’ forest owner/worker.	5,6,15,31,32,	Depends on personal experience	5	170
Educations of level 5A				
Forestry Engineers (Polytechnic degrees)	2, 3,33–36	4 y (f)	6	261
Master and Higher University degrees	7,8	4–6 y (f)	2	91
Educations of level 5B				
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Helena Koskinen Unit Director Tampere College, Transport and Forestry, Social and Health Care PL 217, 33101 TAMPERE/P.O. Box 217, FI-33101 Tampere, Finland Tel: +358 400 236 990 e-mail: helena.koskinen@tampere.fi www.tao.tampere.fi	www.oph.fi/english/education

France



Forest area (in 1000 ha):	17 262.0
Percentage (%) of total land area:	31
Forest area per capita (in ha):	0.3
% of private owned forests:	75.6
Employment in forest sector (in 1000 pers.):	214
Contribution of forest sector to GDP (in %):	0.8
Forest area with legal right of access (in %):	-

(Ministerial Conference on the Protection of Forests in Europe, 2007)

1	Centre de formation forestière de charleville; St Laurent;	21	Ireo; Arradon; http://mfr-foret.com/
2	Centre forestier de la région provence-alpes-côte d'azur; La Bastide des Jourdans; www.forestier.org	22	Mfr de Carentoir; Carentoir;
3	Ecole forestiere de meymac; Meymac; perso.wanadoo.fr/ef-meymac.legta	23	Mfr l'arclosan; Serraval; http://mfarclosan.hautesavoie.net/
4	Institut saint-joseph; Limoux; www.saintjoseph-limoux.com	24	Cefa; Montélimar; www.cefa-montelimar.org/
5	Centre de formation d'apprentis forestier regional; Sabres; www.sabres.educagri.fr	25	Lycée professionnel agricole, horticole & forestier de beaune-la-rolande; Beaune-la-rolande; www.lpa-beaunelarolande.fr/
6	Cípf – centre de formation professionnelle forestière; Chateaufarine de Rhone; www.cfpf.org	26	Centre de formation forestiere; Noiretable; www.eplea-roanne.educagri.fr/cff.html
7	Lycée forestier de Croigny; Les loges Margeron; www.lycee-de-croigny.cowblog.fr/	27	Maison familiale rurale "les forges"; La ferte bernard; www.mfr-la-ferte-bernard.asso.fr/
8	Centre de formation de Chateaufarine; Besancon; www.chateaufarine-formation.net/	28	Lycée horticole et forestier st joseph; Mesnières-en-bray; www.institut-mesnieres-76.com/
9	Cfa agricole & forestier du cantal; Aurillac; www.formation-et-cours.com/cfa-agricole-et-forestier-aurillac-cantal/	29	Lycée polyvalent "louise weiss"; Sainte marie aux mines; www.lyc-weiss-ste-marie-mines.ac-strasbourg.fr/
10	Cfppaf mirecourt; Mirecourt; www.formation-et-cours.com/cfa-agricole-et-forestier-des-vosges-mirecourt/	30	Lycée claud mercier; Le mayet de montagne; www.lyceeclaudmercier.fr/logistique.html
11	Centre forestier des récollets; Langres; www.centreforestierdesrecollets.fr	31	Cfppa la motte servolex; La motte servolex; www.reinach-formation.educagri.fr/
12	Lycee forestier du haut-languedoc; Saint-amans-soult; www.lyceeforestier.com/	32	Cfaad du loiret; Bellegarde; www.cfa-bellegarde.fr/
13	Lycee agricole prive e.s.a.t.; Giel-courteilles;	33	Maison familiale rurale des 4 vallées; Lamure sur azergues; www.mfr69.asso.fr/presentation.php?id=7
14	Centre régional de formation forestiere de bazas / aquitaine; Bazas; www.bazas.educagri.fr/letablissement-et-ses-centres/cfppa.html	34	L'ENGREF (l'Ecole Nationale du Génie Rural des Eaux et des Forêts); sit. à Paris, Nancy, Montpellier, Clermont-Ferrand; www.agroparistech.fr
15	Cfppa des hautes-pyrénées; Lannemezan; www.eplefpa65.educagri.fr/menuecfppa.htm		
16	Centre de formation professionnelle forestier; Saugues;		
17	Lycée agricole de pois; Pois; www.pois.y.org		
18	MFR de Pointel; Normandie; www.mfr-pointel.com/		
19	Institut pour le développement forestier; Paris;		
20	Ecole forestière de javols; Javols; www.ecoleforestiere-javols.com/		

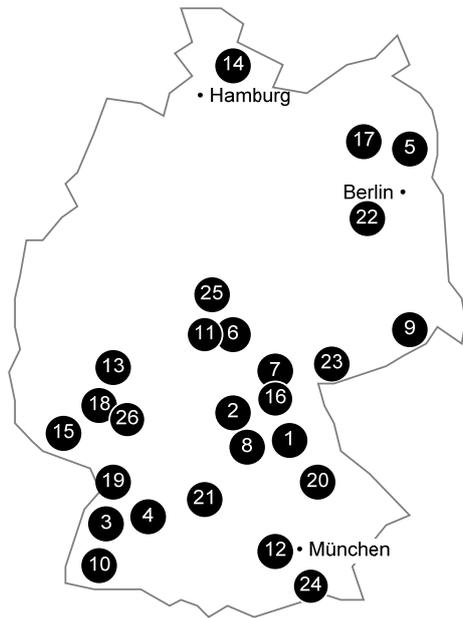
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
3,4,7,8,10,12,14,17,24,32	3,7,14,17,24,34	
Post secondary non tertiary education (4)		
1,2,3,6,8,16,19,20,32		
Upper secondary education (3B+3C)		
1 to 14, 16,17,20,21,24,32,33		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
CAPA travaux forestiers (sylviculture ou bûcheronnage) (ISCED 3C)	1,2,3,4,5,8,9,10,11,12,20,21,24,33	5m (f) – 24 m (p)	Over 30	121–300
BPA Conducteur de machines forestières (ISCED 3C)	1,2,3,6,7,8,10,14,16,20,32,	5m (f) – 24 m (p)	Over 10	61–120
BPA travaux forestiers bûcheronnage (ISCED 3C)	3,6,7,8,10,14,16,32	5m (f) – 12 m (p)	Over 10	121–300
BAC PRO FORET	1,2,3,4,5,7,8,9,10,11,12,13,17,20,21,24, 33	3y (f or p)	Over 10	301–600
Educations of level 4				
Certificats de spécialisation	1,2,3,6,8,16,19,20,32	5 m (f)	Over 10	61–120
Educations of level 5A				
Différentes licences forestières	3,7,14,17,24	12 m (f)	Over 10	61–120
Ingénieur forestier	34	3 y (f)	1	31–60
MASTER Gestion environnementale des écosystèmes et forêts tropicales	34	12m (p)	1	11–30
Educations of level 5B				
BTS Gestion Forestière	3,4,7,8,10,12,14,17,24,32	2 y (f or p)	Over 10	121–300
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Christian Salvignol Président de l'Association Nationale pour la Formation aux Métiers de la Forêt F 84240 La Bastide des Jourdans Tel: +33 4 90 77 80 01 E-mail: salvignol@eduforest.eu	www.chlorofil.fr

Germany



Forest area (in 1000 ha):	11 076
Percentage (%) of total land area:	32
Forest area per capita (in ha):	0.1
% of private owned forests:	44
Employment in forest sector (in 1000 pers.):	344
Contribution of forest sector to GDP (in %)	1.0
Forest area with legal right of access (in %):	95

(Ministerial Conference on the Protection of Forests in Europe, 2007 and A. Bernet)

- 1 Forstl. Bildungszentrum (FBZ), Nürnberg Buchenbühl; Nürnberg; www.baysf.de
- 2 Bayerische Technikerschule für Waldwirtschaft; Lohr a. Main; www.forst.bayern.de/technikerschule
- 3 Forstliches Ausbildungszentrum Mattenhof; Gengenbach; www.faz-mattenhof.de/
- 4 FHS Rottenburg; Rottenburg; www.hs-rottenburg.de
- 5 FHS Eberswalde, Eberswalde; www.hnee.de/Hochschule-fuer-nachhaltige-Entwicklung-Eberswalde-FH-E1016.htm
- 6 FHS Hildesheim-Holzminden (HAWK); Göttingen; www.hawk-hhg.de/
- 7 FHS Erfurt; Erfurt; www.fh-erfurt.de/lgf/fo/
- 8 FHS Weihenstephan-Triesdorf, Fakultät Wald und Forstwirtschaft; Weihenstephan-Triesdorf; www.hswt.de/fh/fakultaet/wf.html
- 9 TU Dresden; Tharandt; www.tu-dresden.de/forst
- 10 Universität Freiburg; Freiburg i. Br.; www.biom.uni-freiburg.de
- 11 Universität Göttingen; Göttingen www.uni-goettingen.de/de/19852.html
- 12 TUM München; München und Weihenstephan; www.wzw.tum.de
- 13 FBZ Neheim-Hüsten; Arnsberg; www.forstliches-bildungszentrum.nrw.de/
- 14 Lehranstalt für Forstwirtschaft, Bad Segeberg; www.lwk-sh.de/
- 15 Waldarbeitsschule Saarland, Eppelborn; www.saarforst.de/
- 16 FBZ Gehren, Gehren; www.thueringen.de/de/forst/dienststellen/fbz/

- 17 Waldarbeitsschule Kunsterspring, Kunsterspring; <http://forst.brandenburg.de/sixcms/detail.php/bb1.c.236510.de>
- 18 FBZ Hachenburg, Hachenburg; www.wald-rlp.de/index.php?id=502&L=2%2F.%2Fa%2Fecho4
- 19 FBZ Karlsruhe, Karlsruhe; www.fbz-karlsruhe.de/
- 20 Bayerische WBS Goldberg, Kelheim; www.forst.bayern.de/waldbauernschule/
- 21 FBZ Königsbronn, Itzelberg; www.fbz-koenigsbronn.de
- 22 FBZ Magdeburgerforth, Magdeburgerforth; www.sachsen-anhalt.de/index.php?id=25255C
- 23 Forstliche Ausbildungsstätte Morgenröthe; Muldenhammer; www.smul.sachsen.de/bildung/314.htm
- 24 FBZ Laubau; Ruhpolding; www.baysf.de/de/startseite/standorte/standort_detailseiten/forstliches_bildungszentrum_stuetzpunkt_laubau.html
- 25 FBZ Münchhof; Seesen; www.landesforsten.de/Niedersaechsisches-Forstliches-Bildungszentrum.57.0.html
- 26 FBZ Weilburg, Weilburg; www.hessen-forst.de/servicezentren/bildungszentrum.htm

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
2	4 to 12	
Post secondary non tertiary education (4)		
1 3 13 to 26		
Upper secondary education (3B+3C)		
16 schools/institutions		
1 3 13 to 26		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
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Educations of level 3B/3C

Forstwirte/Forstwirtinnen	1,3,13 to 26	3 y (f)	16	About 1900
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Educations of level 4

Forstwirtschaftsmeister/-in Abwechselnd führen je 4 der aufgeführten 16 Institutionen diese Ausbildung durch	1,3,13 to 26	1-2 y (p)	4	20-25
Staatl. Gepr. Forstmaschinenführer/-in Abwechselnd führen je 4 der aufgeführten 16 Institutionen diese Ausbildung durch	1,3,13 to 26	1-2 y (p)	4	10-15

Educations of level 5A

BSc in Forstwirtschaft / Forstwissenschaft / Waldökologie	4 to 12	Min. 3 y (f)	9	About 600
MSc in Forstwissenschaften / Waldökologie / Nachh. Ressourcenmanagement	9 to 12	Min. 2 y (f)	4	About 300
Forstinspektor/-in Forstorganisationen aller Bundesländer, sind nicht als Ausbildungsstandorte in Karte aufgeführt		1 y (f)	13	50-130 (both together, varying each year)
Forstrat/-in Forstorganisationen aller Bundesländer, sind nicht als Ausbildungsstandorte in Karte aufgeführt		2 y (f)	13	

Educations of level 5B

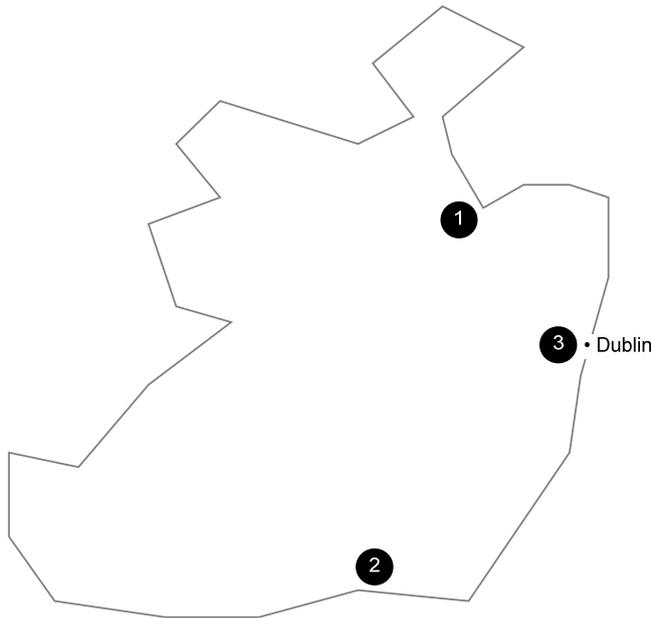
Forsttechniker/-in	2	2 y (f)	1	About 20
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Further Training

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Alexander Bernet, Referat 533 Nationale Forstpolitik, Jagd (BMELV) Rochusstraße 1, 53123 Bonn Telefon: +49 228 / 99 529-3669 E-mail: Alexander.Bernet@bmelv.bund.de Internet: www.bmelv.de	www.bildungsserveragrar.de/ .

Ireland



Forest area (in 1000 ha):	710.0
Percentage (%) of total land area:	10
Forest area per capita (in ha):	0.2
% of private owned forests:	-
Employment in forest sector (in 1000 pers.):	15
Contribution of forest sector to GDP (in %):	0.5
Forest area with legal right of access (in %):	100

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Teagasc Ballyhaise Agricultural College; Ballyhaise;
www.teagasc.ie/training/courses/vc_forestry.asp
- 2 Waterford Institute of Technology; Waterford;
www.wit.ie/StudyatWIT/UndergraduateCourses/Science/BScinForestry-WD076/;
www.wit.ie/StudyatWIT/UndergraduateCourses/Science/BScinLandMgtinAgricultureHorti-WD156
- 3 University College Dublin; Dublin; www.ucd.ie/agfoodvet/ucdforestry/

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
Post secondary non tertiary education (4) 1		
Upper secondary education (3B+3C) 0 schools/institutions		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Educations of level 4				
Certificate in Forestry (FETAC Level 5)	1	1 y (f)	1	16
Advanced Certificate in Forestry (FETAC Level 6)	1	1 y (p)	1	6
Educations of level 5A				
B. Agr. Sc. (Honours) [Forestry] (Forestry Honours degree)	3	4 y (f)	1	8
BSc in Forestry (Forestry Ordinary degree)	2	3 y (f)	1	15
BSc (Honours add-on) in Land Management (Forestry) Forestry Honours Degree	2	1 y (f)	1	5
Educations of level 5B				
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Marianne Lyons Teagasc Ballyhaise College Co. Cavan, IRELAND Tel: + 353 49 4338657 email: marianne.lyons@teagasc.ie	

Italy



Forest area (in 1000 ha):	11 026,0
Percentage (%) of total land area:	37
Forest area per capita (in ha):	0.2
% of private owned forests:	65.0
Employment in forest sector (in 1000 pers.):	297
Contribution of forest sector to GDP (in %):	0.9
Forest area with legal right of access (in %):	68.9

(Ministerial Conference on the Protection of Forests in Europe, 2007)

1 Università degli Studi di Torino; Facoltà di Agraria; Torino; www.agraria.campusnet.unito.it/do/home.pl

2 Università degli Studi di Milano; Facoltà di Agraria; Milano; www.agraria.unimi.it/

3 Libera Università di Bolzano; Facoltà di Scienze e tecnologie; Bolzano; www.unibz.it/it/sciencetechnology/welcome/default.html

4 Università degli Studi di Padova; Facoltà di Agraria; Padova; www.agraria.unipd.it/it/home/home.asp

5 Università degli Studi di Udine; Facoltà di Agraria; Udine; www.uniud.it/didattica/facolta/agraria

6 Università degli Studi di Bologna; Facoltà di Agraria; Bologna; www.agraria.unibo.it/Agraria/default.htm

7 Università degli Studi di Firenze; Facoltà di Agraria; Firenze; www.agr.unifi.it/mdswitch.html

8 Università Politecnica delle Marche; Facoltà di Agraria; Ancona; www.agr.univpm.it/Engine/RAServePG.php

9 Università degli Studi del Molise; Facoltà di Agraria; Teramo; www.unimol.it/unimolise/s2magazine/index1.jsp?idPagina=50723

10 Università degli Studi della Tuscia; Facoltà di Agraria; Viterbo; www.agraria.unitus.it/

11 Università degli Studi di Napoli Federico II; Facoltà di Agraria; Napoli; www.agraria.unina.it:20100/facolta/pubNews/home.do?codFacolta=13

12 Università degli Studi di Bari Aldo Moro – Facoltà di Agraria; Bari; www.uniba.it/ateneo/facolta/agraria

13 Università degli Studi della Basilicata; Facoltà di Agraria; Potenza; www.agrariaunibas.eu/

14 Università degli Studi Mediterranea di Reggio Calabria; Facoltà di Agraria; Reggio Calabria; www.unirc.it/agraria/

15 Università degli Studi di Palermo; Facoltà di Agraria; Palermo; www.portale.unipa.it/Agraria/home/index.html

16 Università degli Studi di Sassari; Facoltà di Agraria; Sassari; www.agrariaweb.uniss.it/php/agraria.php?cat=318&xml=

17 Istituto di Istruzione Superiore “Alberto Maria Camaiti”; Pieve S. Stefano; www.isiscamaiti.it/

18 Istituto di Istruzione Superiore “F. Meneghini”; Edolo; www.istitutomeneghini.it/index.htm

19 Istituto di Istruzione Superiore di Ceva; Ormea; www.istitutosuperioreceva.it/default.aspx?Sede=Ormea

20 Istituto di Istruzione Superiore Antonio Della Lucia”; Feltre; www.agrariofeltre.it/

21 Istituto Agrario S. Michele all’Adige; S. Michele all’Adige; www.iasma.it/

Classification based on the ISCED classification system

First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A) 1 to 16	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) From 17 to 21		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Expert in environmental-forestry sector	17	5 y	1	31-60
Technician for agricultural and rural development; monitoring and conservation of the equilibrium in the mountain land	18	5 y	1	31-60
Technician of the forestry environment	19	5 y	1	31-60
Environmental-forestry technician	20	5 y	1	31-60
Expert in ecological-forestry sector	21	5 y	1	31-60
Educations of level 4				
Educations of level 5A				
BSc Forest and environmental sciences	1,7,8,10,11,13,14,15,16	3 y	9	12-44 Total: 227
MSc Forest and environmental sciences	1,4,9,10,11,13,14,15,16	2 y	9	3-57 Total:135
BSc Enhancement and protection of the mountain environment and land	2	3 y	1	18
Curriculum Mountain agriculture under the BSc Agricultural Science & Technologies	3	3 y	1	7
BSc Forest and environmental technologies	4, 9	3 y	2	15-73; Tot: 88
MSc SUFONAMA (only the second year of the MSc is provided at UniPD; the first year is provided by another University of the Erasmus Mundus consortium)	4	1 y	1	10
MSc SUTROFOR (only the second year of the MSc is provided at UniPD; the first year is provided by another University of the Erasmus Mundus consortium)	4	1 y	1	6
Curriculum Mountain forest and agriculture in the frame of the BSc Sciences for the environment and the nature	5	3 y (the curriculum last 1 semester)	1	41
BSc Land and agro-forestry sciences	6	3 y	1	28
MSc Planning and management of agro-territorial, forest and landscape	6	2 y	1	15
MSc Science and technology of forest systems	7	2 y	1	14
BSc Science and technology for forest and nature conservation	10	3 y	1	7
MSc Conservation and restoration of forest and nature	10	2 y	1	9
BSc Protection and Management of land and agro-forest landscape	12	3 y	1	10; Total 615
Educations of level 5B				
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

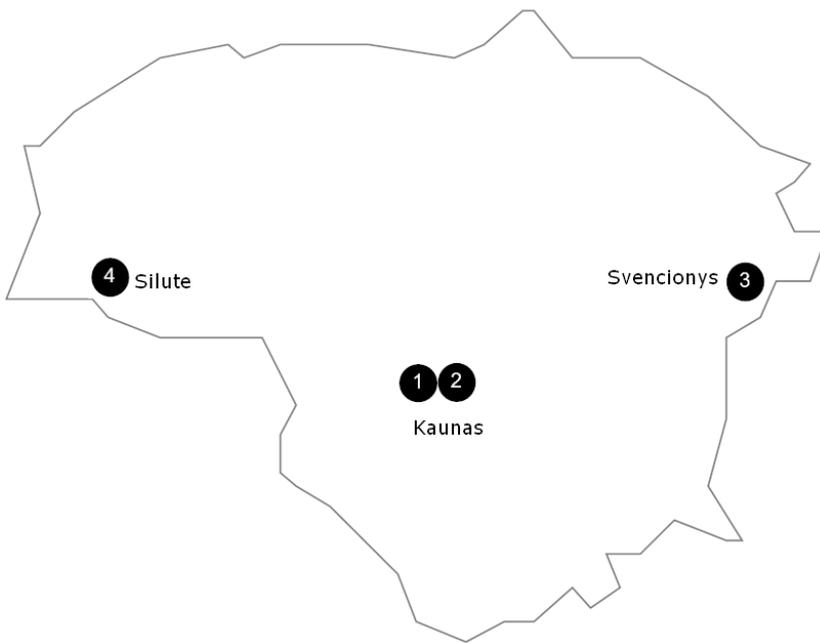
Contact address	Further sources
Prof. Raffaele Cavalli University of Padua Address Dip. Te.S.A.F Viale dell'Università 16 35020 Legnaro PD Tel. +39 49 827 2724 Mail raffaele.cavalli@unipd.it Internet www.tesaf.unipd.it/FOM/	

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forstwart/in (nur Forstbetriebe, Ausbildungsstätten befinden sich in der Schweiz)	-	3 y (f)	0	1-2
Educations of level 4				
Alle Ausbildungen finden in der Schweiz statt	-			
Educations of level 5A				
Alle Ausbildungen finden in der Schweiz statt	-			
Educations of level 5B				
Alle Ausbildungen finden in der Schweiz statt	-			
Further Training				
	-			

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Roland Jehle Olav Beck; Amt für Wald, Natur und Landschaft beck.olav@awnl.llv.li; (+423) 236 64 03; www.llv.li/amtsstellen/llv-awnl-organisation_ansprechpersonen.htm?nav=teaser&viewpos=3441&imainpos=1924	

Lithuania



Forest area (in 1000 ha):	2198.0
Percentage (%) of total land area:	35
Forest area per capita (in ha):	0.6
% of private owned forests:	32.6
Employment in forest sector (in 1000 pers.):	34
Contribution of forest sector to GDP (in %):	2.9
Forest area with legal right of access (in %):	-

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Aleksandras Stulginskis University; Kaunas distr.; www.lzuu.lt/me/en/15317
- 2 Kaunas College of Forestry and Environmental Engineering; Kaunas dist.; www.kmaik.lt
- 3 Svencionys Vocational Training Centre; Svencionys distr.; www.sprc.ten.lt
- 4 Silute Agricultural School; Silute distr.; www.szum.lt

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 2	First stage of tertiary education – theoretical (5A) 1	Further Training
Post secondary non tertiary education (4) 3		
Upper secondary education (3B+3C) schools/institutions 2 3 4		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
"Forest worker" (Vocational qualification)	2 3 4	3 y (f)	3	87* (2011)
"Forester" (Vocational qualification)	3 4	3 y (f)	2	50* (2006)
"Forestry employee" (Vocational qualification)	3 4	3 y (f)	2	13-25*
Educations of level 4				
"Forest worker" (Vocational qualification)	3	1.5 y (p)	1	25* (2011)
Educations of level 5A				
Bachelor of Forestry (Study program "Forestry") Specializations "Forest growing", "Wildlife and game management", "Recreational and urban forestry", "Forest inventory and management", "Wood science"	1	3 y (f) or 6 y (p)	1	70 (average)
Master of Forestry	1	2 y (f) or 3 y (p)	1	22 (average)
Educations of level 5B				
Professional Bachelor of Forestry	2	3 y (f) or 4 y (p)	1	35 -50
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time; * admitted number of students

Contact address	Further sources
Remigijus Zalkauskas Vice dean of Faculty of Forestry and Ecology e-mail: remigijus.zalkauskas@lzuu.lt Albinas Tebera Director of Kaunas College of Forestry and Environmental Engineering e-mail: a.tebera@kmaik.lm.lt	

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
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Educations of level 3B/3C

Opérateur de la forêt et de l'environnement (=Umweltfacharbeiter; DAP, Diplôme d'aptitude professionnelle)	1	3 y (f)	1	15
Technicien de l'environnement naturel (=Umwelttechniker, Diplôme de technicien)	1	4 y (f)	1	20

Educations of level 4

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Educations of level 5A

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Educations of level 5B

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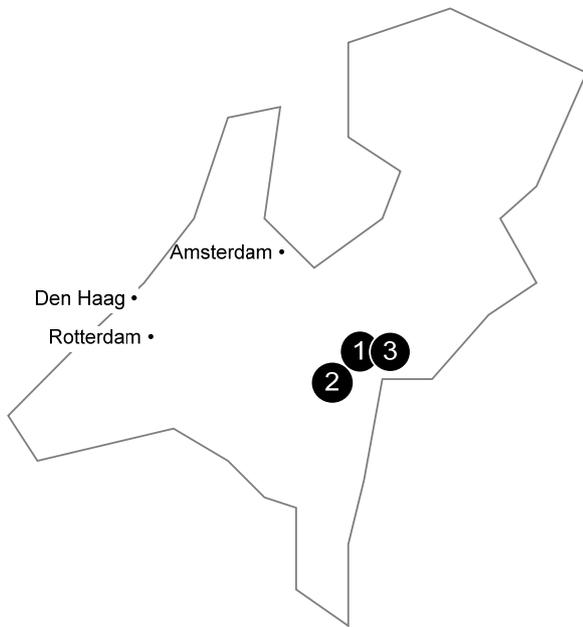
Further Training

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Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Madame Dauphin Simone Attaché de direction au Lycée technique agricole Ettelbruck Lycée Technique Agricole Boite Postale 76 L-9001 Ettelbruck Tél: +352 81 85 25-1 E-Mail: Simone.Dauphin@education.lu Internet: www.lta.lu	

Netherlands



Forest area (in 1000 ha):	365.0
Percentage (%) of total land area:	11
Forest area per capita (in ha):	0.0
% of private owned forests:	49.6
Employment in forest sector (in 1000 pers.):	40
Contribution of forest sector to GDP (in %):	0.6
Forest area with legal right of access (in %):	80

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Van Hall Larenstein, University of Applied Sciences; Velp; www.vanhall-larenstein.de/Wasser_Natur_und_Umwelt/Forst_und_Naturwirtschaft.aspx
- 2 Universität Wageningen WUR; Wageningen; www.bbn.wur.nl/de
- 3 Helicon opleidingen; Velp; <http://www.helicon.nl/internationalisering/>

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 1	First stage of tertiary education – theoretical (5A) 1 2	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) schools/institutions 3		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
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Educations of level 3B/3C

Skilled forest worker (professional training qualification)	3	3 y (f)	1	31–60
Skilled forest worker (middle management training qualification)	3	4 y (f)	1	11–30

Educations of level 4

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Educations of level 5A

Bachelor in Forest and Nature Management with Majors in Tropical Forestry, European Forestry and International Timber trade (Professional skills on a BSc level, education finishes here)	1	4 y (f)	1	120
BSc in Forest and Nature Management (most BSc continue with the MSc)	2	3 y (f)	1	31–60
MSc Forest and Nature Conservation	2	2 y (f)	1	31–60
MSc in European Forestry Erasmus Mundus (MSc EF)	2	2 y (f)	1	6–10

Educations of level 5B

Forest and landscape Engineer with technical training	1	2 y (f)	1	11–30
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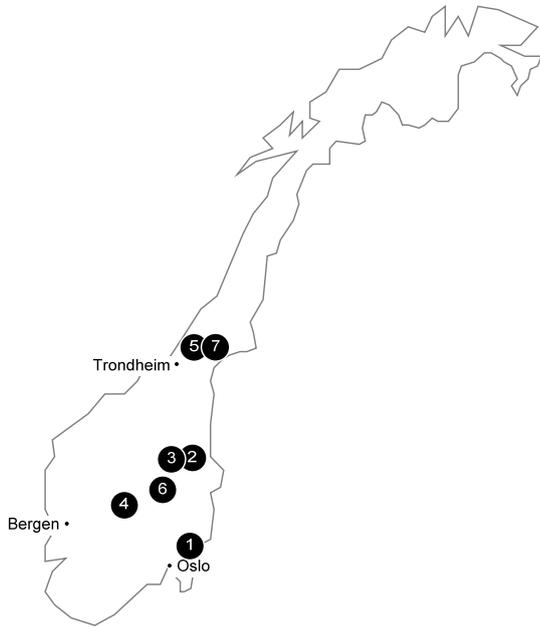
Further Training

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Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
John Riggers Van Hall Larenstein University of Professional Science P.O. Box 9001 6880 GB Velp The Netherlands John.Riggers@wur.nl +31 -26-3695707	

Norway



Forest area (in 1000 ha):	12 000
Percentage (%) of total land area:	39
Forest area per capita (in ha):	2.6
% of private owned forests:	76.2
Employment in forest sector (in 1000 pers.):	27
Contribution of forest sector to GDP (in %):	1.0
Forest area with legal right of access (in %):	100

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Norwegian University of Life Sciences (UMB), Department of Ecology and Natural Resources Management; Ås in Akershus: www.umb.no/ina-en
- 2 Hedmark University College Evenstad; Hedmark; www.hihm.no/English/Campus-Evenstad/Study-programmes
- 3 Solør Upper Secondary School Sønsterud; Hedmark; www.soloer.vgs.no/dtArticle.aspx?m=4672&amid=51484
- 4 Kongsberg Upper Secondary School Saggrenda; Buskerud; www.kongsberg.vgs.no
- 5 Mære Upper Secondary School; Sparbu i Nord-Trøndelag; www.mare-landbruk.vgs.no/
- 6 Forestry Extension Institute; Biri; www.skogkurs.no/english/engelsk
- 7 Midt-Norsk Skog- og Tresenter, Sparbu; Nord-Trøndelag; www.mare-landbruk.vgs.no/

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
	1 2	
Post-secondary non tertiary education (4)	3 4 5 6 7	
	Upper secondary education (3B+3C)	
	3 4 5	

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forest workers and forest machine operators ("Skogsoperatør*")	3, 4, 5	4 y (2 y + 2 y compulsory apprenticeship) (f)	3	45
Educations of level 4				
Forest Machine Operator	3, 4, 5	0,5 y, 1 y (f) or 2 y (f)	3	30
Forest Ecology and Management	3, 4, 5, 6, 7	1 (f)	5	20
Educations at level 5A				
Bachelor in Forest Sciences	1, 2	3 y (f)	2	30
Bachelor in Ecology and Management of Natural Resources	1	3 y (f)	1	35
Master in Forest Sciences	1	2 y (f)	1	15
Master in Environment and Natural Resources	1,2	2 y (f)	2	20
Education at level 5B				
Further Training				
Forest management, forest planning, forest economics, forest operations	6, 7	Short – medium term courses (p)	2	18

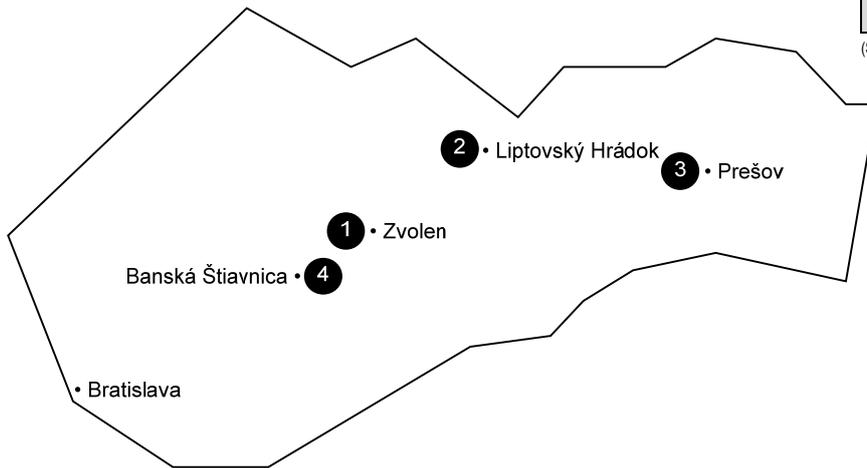
Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Mvh. Håvard Sagvolden Fagkoordinator Naturbruk, Kongsberg v.g.skole, Tlf. 32 865113 / 970 97545 havard.sagvolden@bfk.no Benthe Løvenskiold Kveseth Institution NHO Mat og Bio Address: Middelthungate 27, 0305 OSLO Tel +47 91878054 Mail benthe@nhomatogbio.no Web: www.velgskog.no	

Slovakia

Forest area (in 1000 ha):	1931.6
Percentage (%) of total land area:	40
Forest area per capita (in ha):	0.42
% of private owned forests:	42.6
Employment in forest sector (in 1000 pers.):	58
Contribution of forest sector to GDP (in %)	2.4
Forest area with legal right of access (in %):	94.1

(Source: Ministerial Conference on the Protection of Forests in Europe, 2007)



- 1 Technical University Zvolen; Zvolen; www.tuzvo.sk
- 2 Secondary Forestry School (Stredná odborná škola lesnícka Jozefa Dekreta Matejovie); Liptovský Hrádok; www.slslhr.sk
- 3 Secondary Forestry School (Stredná odborná škola lesnícka v Prešove); Prešov; www.slsपो.sk
- 4 Secondary Forestry School (Stredná odborná škola lesnícka Banská Štiavnica); www.slsbs.edu.sk

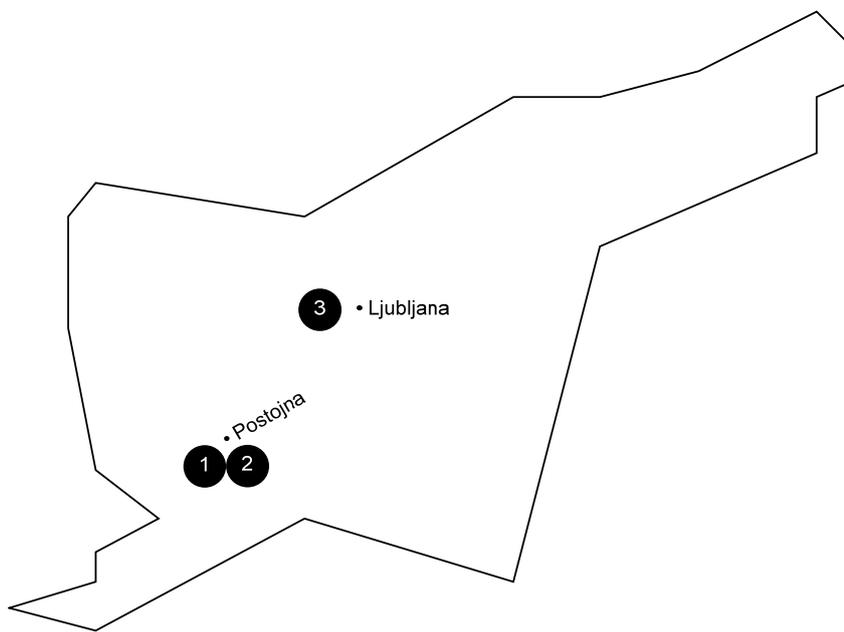
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education - theoretical (5A) 1	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) schools/institutions 2 3 4		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Secondary education in Forestry, Mechanization, Forest Ecology and Environment, Wood harvesting, including practical training	2 3 4	4 y (f)	3	180
Educations of level 4				
Educations of level 5A				
BSc in Forestry, Specializations: Forestry, Applied zoology and game management	1	3 y (f)	1	100 -120
Master (MSc) in Forestry Specializations: Forest engineering, Applied zoology and game management	1	2 y (f)	1	60 - 80
Educations of level 5B				
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Prof. Dr. Valéria Messingerová Vice-Dean for Educational Activities Technical University in Zvolen Zvolen E-mail: messin@vsld.tuzvo.sk Tel.: +421 45 5206 284 Ing. Michal Ferenčík, PhD. Department of Forest exploitation and Mechanization Technical University Zvolen E-mail: ferencik@vsld.tuzvo.sk Tel. +421 45 5206 832	

Slovenia



Forest area (in 1000 ha):	1308
Percentage (%) of total land area:	65
Forest area per capita (in ha):	0.7
% of private owned forests:	75.5
Employment in forest sector (in 1000 pers.):	22
Contribution of forest sector to GDP (in %):	1.8
Forest area with legal right of access (in %):	100

(Ministerial Conference on the Protection of Forests in Europe, 2007 and Golob Alexander)

1 SGLŠ Postojna; Postojna; www.s-sgls.po.edus.si/index.html

2 Šolski center Postojna, Višja strokovna šola; Postojna; www.vspo.si/kontakt.htm

3 Univerza v Ljubljani, Biotehniška fakulteta Oddelek za gozdarstvo in obnovljive gozdne vire; Ljubljana; www.bf.uni-lj.si/en/forestry/

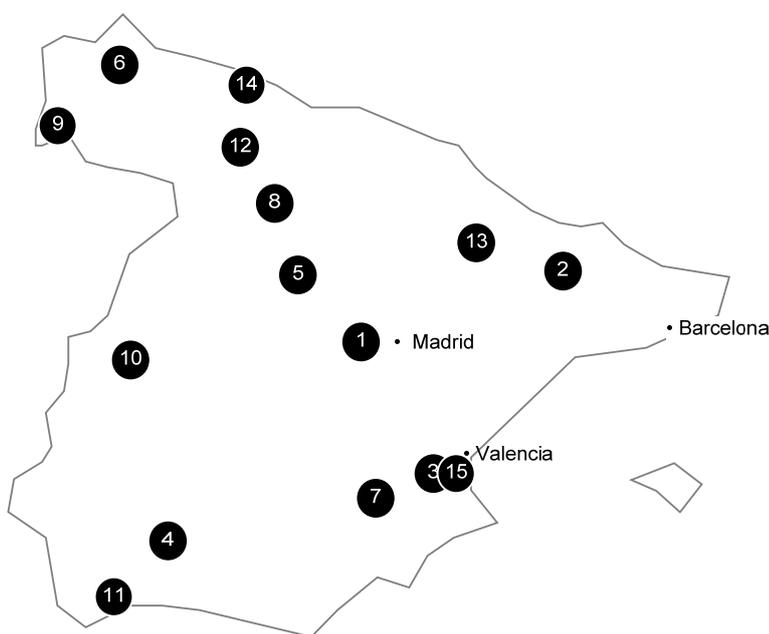
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 3 2	First stage of tertiary education – theoretical (5A) 3	Further Training
Post secondary non tertiary education (4) 1		
Upper secondary education (3B+3C) schools/institutions 1		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forester	1	3 y (f)	1	10
Forestry technician	1	4 y (f)	1	35
Educations of level 4				
Educations of level 5A				
First grade university study programme Forestry and renewable forest resources (BSc Degree)	3	3 y (f)	1	22
Second grade master study, programme in Forestry and management of forest ecosystems (MSc Degree)	3	2 y (f)	1	5
Educations of level 5B				
Forestry and hunting engineer	2	2 y (f)	1	10
First grade high professional study forestry programme	3	3 y (f)	1	20
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Andrej Breznikar andrej.breznikar@zgs.gov.si Zavod za gozdove Slovenije, Večna pot 2, Ljubljana	Golob Aleksander Ministry of Agriculture, Forestry and Food Tel./Phone: + 386 1 478 9082 E-mail: aleksander1.golob@gov.si

Spain



Forest area (in 1000 ha):	28 214.0
Percentage (%) of total land area:	57
Forest area per capita (in ha):	0.7
% of private owned forests:	75.5
Employment in forest sector (in 1000 pers.):	197
Contribution of forest sector to GDP (in %)	0.9
Forest area with legal right of access (in %):	-

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Escuela Técnica Superior Ingenieros de Montes, Universidad Politécnica de Madrid; Madrid; www.upm.es
- 2 Escuela Técnica Superior de Ingeniería Agraria de Lleida; Universidad de Lleida; Lleida; www.udl.es/serveis/ori/estudiantat_estranger/esp/eras/coordspa/etseaspa.html
- 3 Escuela Técnica Superior de Ingenieros Agrónomos, Universidad Politécnica de Valencia; Valencia. <http://www.etsia.upv.es/>
- 4 Escuela Técnica Superior de Ingenieros Agrónomos y de Montes, Universidad de Córdoba; Córdoba; www.uco.es/
- 5 Facultad de Ciencias y Artes, Universidad Católica Santa Teresa de Jesús de Ávila; Ávila; www.ucavila.es/
- 6 Escuela Politécnica Superior, Universidad de Santiago de Compostela; Lugo; www.usc.es/opencms/es/centros/eps/titulacions.html?plan=2782&estudio=2783&codEstudio=2640&valor=1
- 7 Escuela Técnica Superior de Ingenieros Agrónomos, Universidad de Castilla-La Mancha; Albacete; <http://agronomos.agr-ab.uclm.es/desarrollo/joomla/index.php>
- 8 Escuela Universitaria de Ingenierías Agrarias, Universidad de Valladolid; Valladolid; Palencia; www.palencia.uva.es:6080
- Escuela Universitaria de Ingeniería Técnica Forestal, Universidad de Vigo; Vigo; www.todoganado.com/empresa/escuela-universitaria-de-ingenieria-tecnica-forestal-universidad-de-vigo-euet.html
- 9 Centro Universitario de Plasencia, Universidad de Extremadura; Plasencia; www.unex.es/conoce-la-uex/estructura-academica/centros/plasencia
- 10 Universidad de Huelva; Huelva; www.uhu.es
- 11
- 12 Escuela Superior y Técnica de Ingeniería Agraria, Universidad de León; León; <http://centros.unileon.es/estia/>

- 13 Escuela Técnica Superior de Ingenierías Agrarias, Universidad de Valladolid; Soria; www.uva.es/cocoon_uva/impe/uva/centro?idCampus=36161&idCentro=34917
- 14 Ingeniería Técnica Forestal en Explotaciones Forestales, Universidad de Oviedo; Oviedo; www.uniovi.es
- 15 Escuela Politécnica Superior de Gandía; Universidad Politécnica de Valencia; Gandía; www.upv.es/entidades/EPG/indexc.html

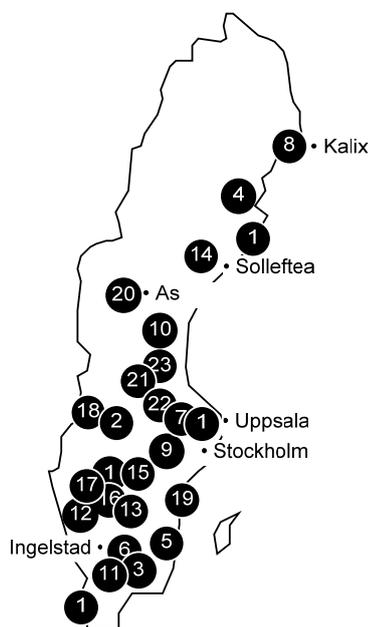
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B) 60 institutions	First stage of tertiary education – theoretical (5A) 1 to 15	Further Training
Post secondary non tertiary education (4)		
Upper secondary education (3B+3C) 52 schools/institutions		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Vocational training (CFGM Middle level cycle). Speciality: Forest works and environmental conservation – TECNICO MEDIO	52	2 y (f)	52	1000–1200
Educations of level 4				
Educations of level 5A				
Technical Forest Engineer in Forestry Management (1 st cycle degree; INGENIERO TECNICO) Specialities: – “Forest exploitations”	1,2,3,4,5,6,7,8,10, 11,12, 14,15	3 y (f)	13	450–550
– “Forest Industries”	1,2,9,13		4	
Forest Engineer in Forestry Management (2 nd cycle degree; INGENIERO)	1,2,3,4,5,6,7	2 y (f)	7	250–350
Educations of level 5B				
Vocational training (CFGS Advanced level Cycle). Speciality: Management and organisation of natural landscape areas. TECNICO SUPERIOR	60	2 y (f)	60	1800–1950
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Rosa Florensa and Isabel Rodríguez Centre Tecnològic Forestal de Catalunya Ctra. de St. Llorenç de Morunys, km 2 25280 Solsona +34 973481752 (ext 244) www.ctfc.cat	Centre Tecnològic Forestal de Catalunya. Solsona. www.ctfc.cat/ Universidad Politécnica de Madrid. Escuela Universitaria de Ingenieros Técnicos Forestales. www.montes.upm.es/ETSIMontes Universitat de Lleida. Escola Tècnica Superior d'Enginyeria Agrònoma. www.etsea.udl.es/ PROFOR: Spanish Forest association. www.profor.org/la-asociacion/contacto

Sweden



Forest area (in 1000 ha):	30 929.0
Percentage (%) of total land area:	75
Forest area per capita (in ha):	3.4
% of private owned forests:	69.4
Employment in forest sector (in 1000 pers.):	94
Contribution of forest sector to GDP (in %)	3.1
Forest area with legal right of access (in %):	100

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 SLU (Swedish University of Agricultural Sciences), Faculty of Forest Sciences; Alnarp, Skara, Umeå and Uppsala; www.slu.se/en/faculties/s/
- 2 Gammelkroppa Skogsskola; Filipstad; www.gammelkroppa.pp.se/skogsteknikerprogrammet/skogsteknikerprogrammet.php?select=skogsteknikerprogrammet
- 3 Blekinge, Naturbruksgymnasiet, Ronneby; Bräkne Hoby; www.ronneby.se/publicweb/templates/PortalPage.aspx?id=13551
- 4 Burträsk, Naturbruksgymnasiet, Skellefteå; Burträsk; www.skelleftea.se/naturbruksgymnasiet
- 5 Helgesbögymnasiet; Helgesbo; Ålem; www.helgesbo.nu
- 6 Ingelstadgymnasiet; Ingelstad; www.ingelstad.nu
- 7 Jällagymnasiet, Uppsala; Uppsala; www.jallagymnasiet.se
- 8 Kalix Naturbruksgymnasium, Norrbotten; Kalix; www.kalix.naturbruksgymn.se
- 9 Kvinnerstaskolan, Örebro; Örebro; www.kvinnersta.orebro.se
- 10 Ljusdal, Naturbruksgymnasiet; Ljusdal; ljusdal.naturbruk.org/index.asp
- 11 Osby, Naturbruksgymnasiet; Osby; www.naturbruksgymnasietosby.se
- 12 Plönningegymnasiet, Halland; Harplinge; www.plonninge.se
- 13 Ryssby Gymnasiet; Ryssby; www.ryssbygymnasiet.com/
- 14 Skedomskolan, Naturbruksgymnasiet Västernorrland; Sollefteå; www.naturbruk.net/skolor/skedomskolan.html
- 15 Sparresäter, Naturbruksgymnasiet, Västra Götaland; Lerdala; www.naturbruk.nu/sparresater
- 16 Stora Segerstad o Värnamo naturbruksgymn, Jönköping län; Reftetele; www.lj.se/segerstadvarnamonaturbruk

- 17 Svenljunga, Naturbruksgymnasiet, Västra Götaland; Svenljunga; www.naturbruk.nu/svenljunga
- 18 Södra Viken, Naturbruksgymnasiet, Sunne; Sunne; www.sodraviken.se
- 19 Vretagymnasiet, Östergötland; Vreta Kloster; www.nbg.nu/se/vretagymnasiet
- 20 Äsbygdens Naturbruksgymnasium, Jämtland; Ås; www.torsta.se
- 21 Älvdalens Utbildningscentrum; Älvdalen; www.alvdalen.com
- 22 Ösby Västmanlands Naturbruksgymnasium, Sala; Sala; www.osby.sala.se
- 23 Alfta skogstekniska utbildning AB; Alfta; www.skogstekniskautbildning.se/?p=fordonsprogrammet-smf

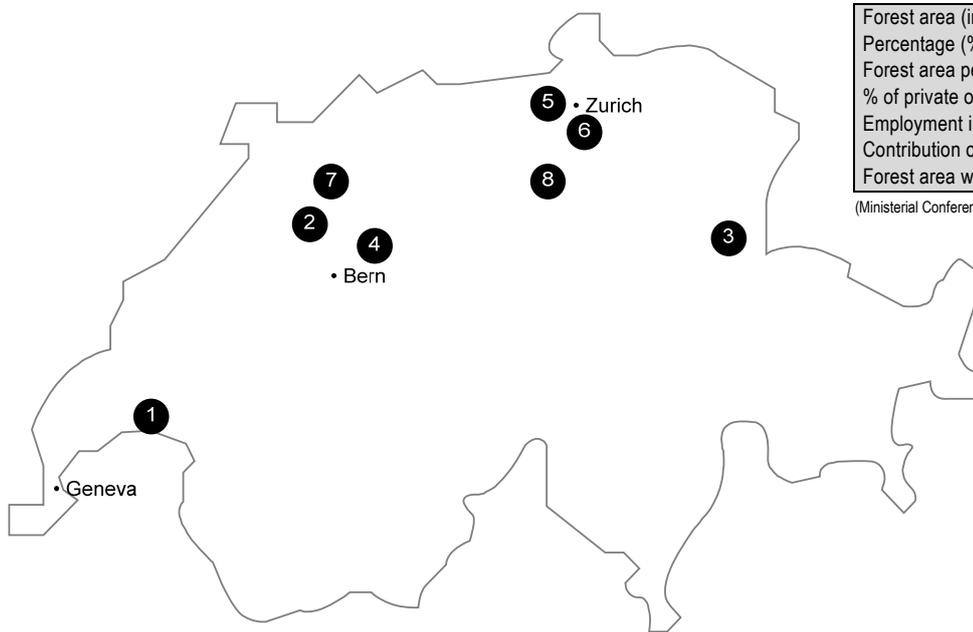
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
2	1	
Post secondary non tertiary education (4)		
4 16 18 19 21 23		Further Training
Upper secondary education (3B+3C) 20 schools/institutions;		
3 bis 22		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forest worker and forest machine operator	3 to 22	3 y (f)	20	316
Educations of level 4				
Harvester operator	4, 16, 18, 21, 23	1 y (f) or 2 y (f)	5	80
Forest management	19	1 (f)	1	44
Educations of level 5A				
BSc in forest management	1	3 y (f)	1	80
MSc in forestry	1	5 y (f)	1	50
Educations of level 5B				
Forestry technician	2	2 y (f)	1	18
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Hakan Hulebo Stora Segerstad och Värnamo Naturbruksgymnasium (7) 330 21 Reftele Sweden Telefon: ++46 70 347 19 46; E-mail: hakan.hulebo@lj.se	Europea Sweden President Claes-Göran Claesson Stora Segerstad och Värnamo Naturbruksgymnasium (7) 330 21 Reftele Sweden Email: claes-goran.claesson@lj.se Internet: www.naturbruk.se

Switzerland



Forest area (in 1000 ha):	1286.0
Percentage (%) of total land area:	32
Forest area per capita (in ha):	0.2
% of private owned forests:	31.5
Employment in forest sector (in 1000 pers.):	52
Contribution of forest sector to GDP (in %)	1.1
Forest area with legal right of access (in %):	100

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 Centre de formation professionnelle forestière; Le Mont-sur-Lausanne
www.formation-forestiere.ch
- 2 Bildungszentrum Wald; Lyss; www.foersterschule.ch
- 3 ibW – Bildungszentrum Wald; Maienfeld; www.bzwmaienfeld.ch
- 4 Hochschule für Agrar-, Forst- und Lebensmittelwissenschaften; Zollikofen;
www.shl.bfh.ch
- 5 Eidg. Technische Hochschule Zürich; Zürich; www.ethz.ch
- 6 Stiftung SILVIVA; Zürich; www.silviva.ch
- 7 Waldwirtschaft Schweiz, WVS; Solothurn; www.wvs.ch
- 8 Landwirtschaftliches Bildungs- und Beratungszentrum LBBZ; Cham;
www.schluechthof.ch

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
1 2 3 7 8	4 5	
Post secondary non tertiary education (4)		2 3
Upper secondary education (3B+3C) 16 schools/institutions		4 6

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Forstwart/-in	16	3 y (f)	16	298
Educations of level 4				
Educations of level 5A				
Bachelor of Science BFH in Forstwirtschaft 3 Vertiefungen: Wald & Gesellschaft; Wald- & Holzwirtschaft; Gebirgswald & Naturgefahren 2 Minors: Unterricht und Beratung; Management und Leadership	4	3 y (f) oder 5 y (p)	1	ca. 20
Master of Science BFH in Life Sciences 3 Majors: Management of Value Chains in Agriculture and Forestry; Sustainable Agricultural and Forestry Production Systems; Agriculture and Forestry in Transition;	4	1.5 y (f)	1	neu
BSc in Umweltwissenschaften 1 von 5 Vertiefungen: Wald und Landschaft	5	3 y (f)	1	15–40
MSc in Umweltwissenschaften 1 von 6 Majors: Wald- und Landschaftsmanagement	5	2 y (f)	1	ca. 20
Educations of level 5B				
Dipl. Förster/-in HF	2 3	21 m (f) + 1–1.5 y (p)	2	21
Forstmaschinenführer/-in	1 7	1 y (p)	2	7
Seilkranzeinsatzleiter/-in	3	1–2 y (p)	1	2
Forstwart-Vorarbeiter/-in	2 3	2–3 y (p)	2	13
Baumpflegespezialist/-in	8	2.5 bis 3 y (f)	1	15 (every 2 ears)
Further Training				
Zertifikatslehrgang Forstmanagement (CAS)	4	14 m (p)	1	10–20
Zertifikationslehrgang Naturbezogene Umweltbildung (CAS)	6	2–4 y (p)	1	18–20
Weiterbildung Ranger/-in	2	1 y (p)	1	10
Forstwart-Gruppenleiter/-in	3	1 y (p)	1	neu

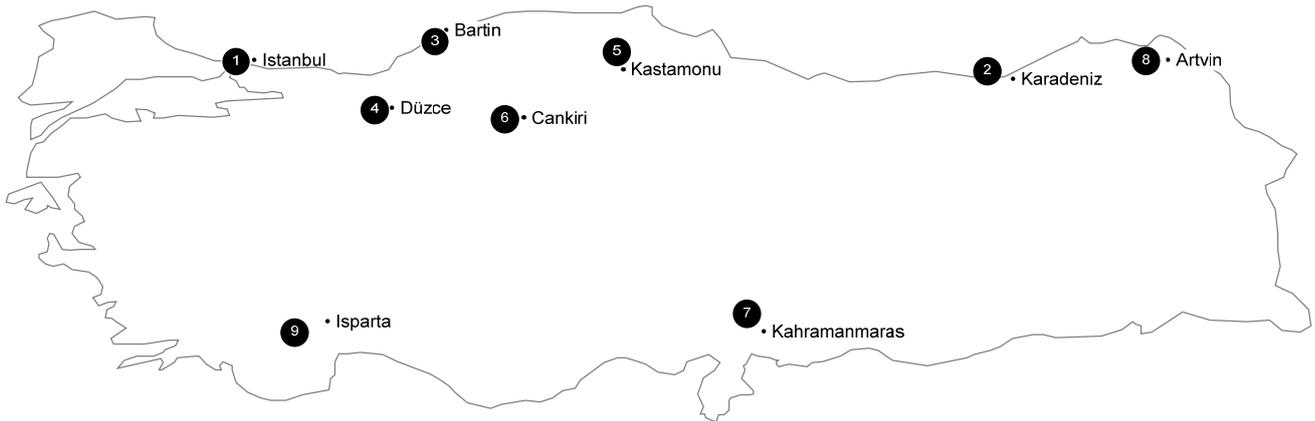
Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Rolf Dürig, CODOC Bildungszentrum Wald Hardernstrasse 20 3250 Lyss Tel. +41 (032) 3861245 info@codoc.ch	www.codoc.ch

Turkey

Forest area (in 1000 ha):	21500
Percentage (%) of total land area:	27,6
Forest area per capita (in ha):	0,3
% of private owned forests:	-
Employment in forest sector (in 1000 pers.):	500
Contribution of forest sector to GDP (in %):	1,8
Forest area with legal right of access (in %):	-

(Dr. Kenan KILIÇ and Prof. Dr Turgay AKBULLUT, 2011)



- 1 İstanbul University, Faculty of Forestry; İstanbul; www.istanbul.edu.tr
- 2 Karadeniz Technical University, Faculty of Forestry; Karadeniz; www.ktu.edu.tr
- 3 Bartın University, Faculty of Forestry; Bartın; www.bartın.edu.tr
- 4 Düzce University, Faculty of Forestry; Düzce; www.duzce.edu.tr
- 5 Kastamonu University, Faculty of Forestry; Kastamonu; www.kastamonu.edu.tr
- 6 Çankırı Karatekin University, Faculty of Forestry; Cankin;
- 7 Kahramanmaraş Sütçü İmam University, Faculty of Forestry; Kahramanmaraş; www.ksu.edu.tr
- 8 Artvin Çoruh University, Faculty of Forestry; Artvin; www.artvin.edu.tr
- 9 Süleyman Demirel University, Faculty of Forestry; Isparta; www.sdu.edu.tr

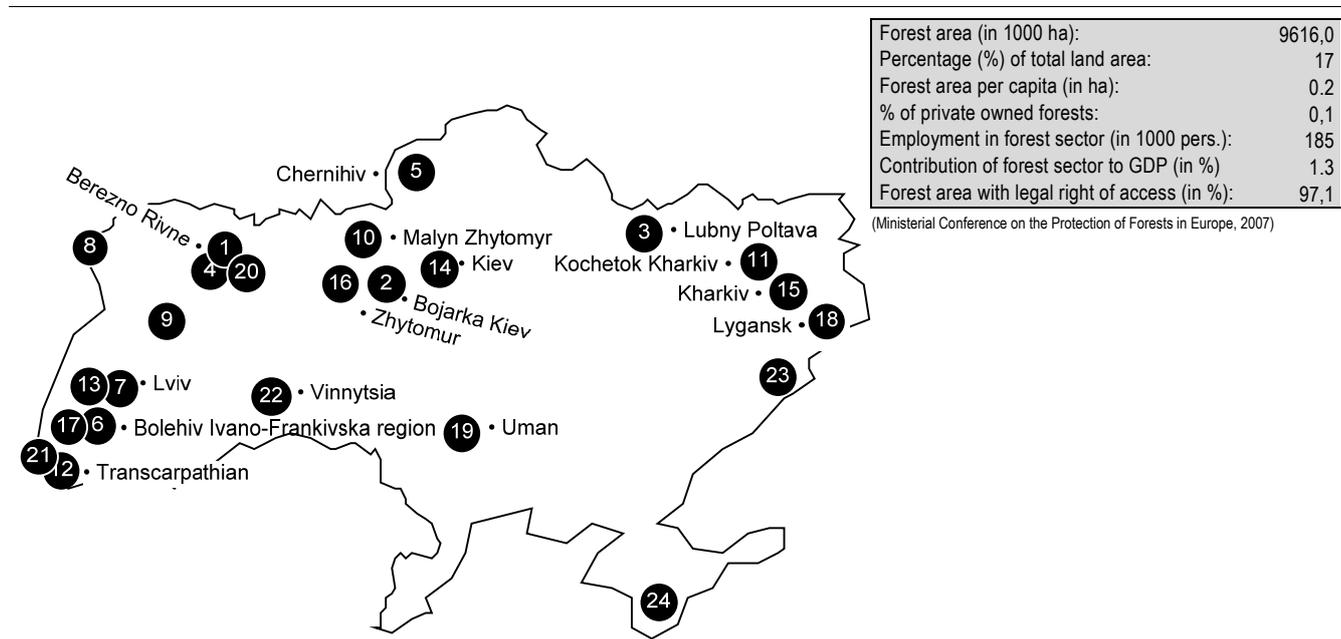
Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
1 8 9	1 2 3 4 5 6 7 8 9	
Post secondary non tertiary education (4)		Further Training
Upper secondary education (3B+3C)		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
Educations of level 4				
Educations of level 5A				
BSc in Forestry Engineering	1,2,3,4,5,6,7,8,9	4 y (f)	9	1000
BSc in Forest Industry Engineering	1,2,3,4,5,7,8,9	4 y (f)	8	650
MSc in Forestry Engineering	1,2,3,5,6,7,8,9	2 y (f)	8	60
MSc in Forest Industry Engineering	1,2,3,5,7,9	2 y (f)	6	20
Educations of level 5B				
Technician on Wildlife	1,8,9	2 y (f)	3	86
Technician on Arboriculture	9	2 y (f)	1	80
Technician on Forestry	8,9	2 y (f)	2	400
Further Training				

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Dr. Kenan KILIÇ General Directorate of Forestry Orman Genel Müdürlüğü Eğitim Dairesi Başkanlığı 06560 Gazi – ANKARA, TURKEY Tel:+90 312 296 40 00 / 5082 Fax:+90 312 296 41 36 Internet: www.ogm.gov.tr	Prof. Dr Turgay AKBULUT, Vice Dean, responsible from the Educational Programs at the Istanbul University Forestry Faculty takbulut@istanbul.edu.tr

Ukraine



- | | |
|---|---|
| 1 Berezniwska forestry scool; village Berezno Rivne region | 17 Prukarpatskiy University W. Stefanyka; c. Ivano-Frankivsk |
| 2 Bojarska forestry school; c. Bojarka Kiev region | 18 Lyganskiy National Agrarian University; c. Lygansk; http://lnau.lg.ua/ |
| 3 Lubenskiy forestry college; c. Lubny Poltava region | 19 Uman National University of Horticulture, c. Uman; http://udau.edu.ua/ |
| 4 Berezniwski forestry college; village Berezno Rivne region | 20 Nadslyshanskiy Institution; c. Berezno |
| 5 Storogunetskiy forestry college; c. Storogunec Chernihiv region | 21 Yghorodskiy National University; c. Yghorod |
| 6 Prukarpatskiy forest college; c. Bolehiv Ivano-Frankivska region | 22 Vinnytsia National Agrarian University; c. Vinnytsia; www.vsau.edu.ua |
| 7 Technical college of UNFU; c. Lviv | 23 Welukoanadolskiy forest college; v. Welukuy Anadol Donetsk region www.valk.hut2.ru/ |
| 8 Shatskiy forest college; v. Shatsk Volyn region | 24 Crimea agro-technical University (a branch of the National University of Life and Environmental Sciences of Ukraine); Crimea; www.csau.crimea-ua.com/ua/index.php |
| 9 Kremenetskiy forest college; city Kremenets Ternopil region | |
| 10 Malenskiy forest college; c. Malyn Zhytomyr region | |
| 11 Shygyewo-bobshanskiy forest college; v. Kochetok Kharkiv region, Chuguev district | |
| 12 Hustkiy forest college of UNFU; c. Hust Transcarpathian Region | |
| 13 Ukrainian National Forestry University; c. Lviv www.nltu.edu.ua/ | |
| 14 National University of Life and Environmental Sciences of Ukraine; c. Kiev http://nubip.edu.ua/en/ | |
| 15 Kharkiv National Agrarian University; c. Kharkiv www.knau.kharkov.ua/ | |
| 16 Zhytomurskiy National Agroecological University; c. Zhytomur | |

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training
	13 to 22 24	
Post secondary non tertiary education (4)		
3 to 12 23		
Upper secondary education (3B+3C)		
1 2		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
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Educations of level 3B/3C

Forester (Basic vocational education and training; after 9 years of schooling)	2 1	1 y (f)	2	140
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Educations of level 4

Younger specialist (Basic vocational education and training; after 9 years of schooling)	3 to 12 23	4 y (f)	11	250
Younger specialist, (Basic vocational education and training; after 11 classes of school)	3 to 12 23	3 y (f)	11	200

Educations of level 5A

Bachelor of forestry (university studies)	13 to 22 24	4 y (f)	11	365
Specialist of Forestry (university studies)	13 to 20 24	1 y (f)	9	340
Master of Forestry (university studies)	13 to 19	1.5 y (f)	7	160

Educations of level 5B

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Further Training

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
Chaskowkiy Oleg, As. professor of forest inventory department, UNFU, Lviv, Ukraine oleh.chaskov@googlemail.com	

United Kingdom



Forest area (in 1000 ha):	2865.0
Percentage (%) of total land area:	12
Forest area per capita (in ha):	0.0
% of private owned forests:	65.0
Employment in forest sector (in 1000 pers.):	190
Contribution of forest sector to GDP (in %):	0.6
Forest area with legal right of access (in %):	56.0

(Ministerial Conference on the Protection of Forests in Europe, 2007)

- 1 University of Cumbria, National School of Forestry; Penrith, Newton Rigg; www.cumbria.ac.uk/AboutUs/Subjects/ScienceNaturalResources/Forestry/Courses.aspx
- 2 ABC Awards; offices in Chorley, Nottingham and Trauton; www.abcawards.co.uk/land.php,
- 3 School of Biological Sciences, University of Aberdeen; Aberdeen; www.abdn.ac.uk/~for257/
- 4 Askham Bryan College (Harper Adams College); York; www.askham-bryan.ac.uk/home
- 5 Imperial College London; London; <http://www3.imperial.ac.uk/>
- 6 University of Bournemouth (Kingston Maurward College); Bournemouth; <http://home.bournemouth.ac.uk/>
- 7 University of Brighton (Plumpton College); Brighton; www.plumpton.ac.uk/courselist.aspx?PageClass=Course&DepartmentID=59&DepartmentName=Forestry
- 8 Coventry University (Warwickshire College); Coventry; www.warwickshire.ac.uk/courses.aspx
- 9 University of Central Lancashire (Myerscough College); Lancashire; www.myerscough.ac.uk/
- 10 University of Edinburgh; Edinburgh; www.ed.ac.uk/schools-departments/geosciences/
- 11 UHI Millenium Institute (Inverness College – Scottish School of Forestry); Inverness; www.uhi.ac.uk/home/uhi-campus/ic/courses-and-research
- 12 University of Northampton (Moulton College); Northampton; www.northampton.ac.uk/courses/undergraduate/detail/?id=0013
- 13 University of Portsmouth (Sparsholt College); Portsmouth; www.sparsholt.ac.uk/pages/course_details.aspx?idCourse=161
- 14 University of Sunderland (East Durham and Howhall College); Sunderland; www.eastdurham.ac.uk/1419/view_course_listing.php?course=Arboriculture/Environment/Horticulture&listing=L1457&id=5
- 15 University of Wales; Bangor; www.bangor.ac.uk/senrgy/

- 16 Holme Lacey College (University of Worcester); Worcester; www.worcester.ac.uk/discover/institute-of-science-and-the-environment.html

Explanation of names in (brackets): The first name listed is the official institution's name, the second name in (brackets) refers to the legacy name under which the school / college was once established and which is still used as campus name.

For level 3 and level 4 qualifications no individual institutions are listed. Most of the "colleges" listed above, providing level 5 qualifications also provide training towards some of the level 3 or level 4 qualifications.

Classification based on the ISCED classification system		
First stage of tertiary education – practical (5B)	First stage of tertiary education – theoretical (5A)	Further Training 1, 3, 10, 15
1 4 to 9 12 13 14 16	1 to 5 9 10 11 15	
Post secondary non tertiary education (4) over 20		
Upper secondary education (3B+3C) over 20		

Overview of qualifications / degrees	Institutions	Duration	N° of Instit.	N° of grads/year
Educations of level 3B/3C				
"City and Guilds" NVQ / SVQ levels 1, 2 / First Diploma, BTEC ND		1–2 y (f)	20+	61–120
Educations of level 4				
"City and Guilds" NVQ / SVQ level 3, BTEC level 3 Certificate in Forestry/Arboriculture		2–3 y (f)	20+	61–120
BTEC National Diploma in Forestry/Arboriculture SCOVTEC National Certificate in Forestry		2–3 y (f)	10+	31–60
BTEC Higher Diploma in Forestry SCOVTEC Higher National Diploma in Forestry		2–3 y (f)	10+	31–60
Educations of level 5A				
BSc (Hons) in Forestry / Forest and Woodland Management / Woodland Conservation / Arboriculture etc. (detailed names of programmes differ between institutions)	1, 2, 3, 4, 5, 10, 11, 15	3–4 y (f)	8	80
"Taught" M.Sc. in Forestry / Forest Management / Arboriculture (detailed names of programmes differ between institutions)	1, 3, 5, 9, 10, 15	1–2 y (f)	6	65
"Research" M.Sc. in Forestry / Forest Management / Arboriculture (detailed names of programmes differ between institutions)	1, 3, 10, 15	2–3 y (f)	4	
Educations of level 5B				
Higher National Diploma / Higher National Certificate/Foundation Degree (FdSc) in Forestry or Arboriculture (exact names differ between institutions)	1, 4, 5, 6, 7, 8, 9, 12, 13, 14, 16	2–3y (3y = with placement year) (f)	11	145
Further Training				
PhD	1, 3, 10, 15	typically 3 y	4	15

Legend: y: years; m: months; (f): full time; (p): part time

Contact address	Further sources
David Robson Professor and Associate Dean, Science National School of Forestry / Faculty of Arts, Business and Science University of Cumbria, Newton Rigg Campus, Penrith, Cumbria, CA11 0AH United Kingdom e-mail: David.Robson@Cumbria.ac.uk t: +44 (0)1768 89 3718	Andreas Ottitsch Senior Lecturer National School of Forestry University of Cumbria, Newton Rigg Campus, Cumbria, CA11 0AH United Kingdom e-mail: Andreas.Ottitsch@cumbria.ac.uk Office phone: +44 1768 89 3558