

FORESTRY EDUCATION BETWEEN SCIENCE AND PRACTICE

Proceedings of the SILVA – IUFRO Symposium held at Wageningen University, Wageningen, April 6th – 9th 2005



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PREFACE

The International Union of Forestry Research Organizations (IUFRO) and the SILVA-Network jointly organized a symposium, entitled:

Forestry education: between science and practice

From April 6th till April 9th 2005, this symposium was held in Wageningen, The Netherlands. The symposium focused on the academic forestry education programmes, exploring the state of the art developments and discussing actual topics. Main focus was on the very nature of academic forestry programmes, in the context of changing natural and social environments, the upcoming importance of pan-European thinking, and given the traditionally applied approach of many forestry education disciplines.

The symposium was a combined effort of the IUFRO (groups S 6.15-00, S 6.18-02 and S 6.06-04), and the SILVA-Network, organizing its 16th Annual Meeting. Local organizers were the Forest Ecology and Forest Management Group and the Forest and Nature Conservation Policy Group, both of Wageningen University.

The symposium was opened by three representatives of the different organisations involved:

- Prof. Bert Speelman, Vice-chancellor of Wageningen University, host of the meeting, welcomed the participants,
- Prof. Siegfried Lewark welcomed all participant on behalf of IUFRO, and
- Prof. Paavo Pelkonen, president of the SILVA-Network, formally opened the symposium.

Prof. Speelman of Wageningen University ended his welcome with a poem:

*The leaf wants more than the dawn after night.
More than the sunrise each day;
Death's nothing but the missing sunlight
Of too short a ray.*

Karol Wojtyla, "Song of the Hidden God", 1944

The kick-off of the symposium was taken care of by two key-note speakers: Prof. Paavo Pelkonen (Joensuu University) talked about higher forestry education in the 21st century, and ir Hans van Rooijen (Larenstein University of Professional Education) discussed teaching for science and practice.

Hank Bartelink
Pieter Schmidt

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SUMMARY: FORESTRY EDUCATION, BETWEEN SCIENCE AND PRACTICE

HANK BARTELINK AND PIETER SCHMIDT

Curricula in forestry aim at preparing students for jobs in the areas of forestry, nature conservation, and natural resource management. Nowadays a broad spectrum of curricula exists, not only in Europe, at the Bachelor as well as at the Master level, offered in regular Universities as well as in Applied/Technical Universities (the former Polytechnics).

Forestry, as well as natural resource management in general, is at the interface between science and application. Forestry curricula should be multidisciplinary and interdisciplinary by the very nature of the study object: forests (and nature in a wider sense) in relation to demanding societies. Nowadays, tree processes play a key role in curriculum development and, vice versa, in matching the programme with the demands for the labour market. The first is the changing role of forests in the also changing societies. The second is an increasing standardization of the higher education in Europe (the Bologna Process). The third is the increasing emphasis on skills and competencies, rather than on traditional knowledge, invoked by the decreasing half-life of knowledge, which calls for learning skills and attitudes rather than knowledge itself.

This results in a challenging scenery: how, in forestry education, to meet the demands from society and the associated range of disciplines and abstractions (practical management, academic science) against the background of a changing society, an increasing internationalization, and the need for an efficient and effective learning process.

The symposium aimed to define the key challenges in the current demands on and changes of forestry curricula, to explore promising developments, and to determine the future educational agenda. Important questions that had to be answered:

How should science and management-orientation be balanced in curricula and courses?

What are the basic skills and competencies that students should acquire and how can they acquire them?

What type of curricula and courses are needed, and at which levels?

Can forestry education be part of natural resource management curricula?

Which opportunities does the "Bologna Process" offer?

About fifty participants from fifteen countries listened to eighteen oral presentations (of which fifteen are published below) and contributed to several discussions, focusing on the five key-questions mentioned.

Contents of the symposium

Regarding the question on the balancing of science and management in curricula and courses, Merkel presented a vision on so-called open concepts, necessary tools for the didactics of applied sciences. He stated that every curriculum includes two hidden general learning targets: the power of scientific reasoning (of the future practical person) and the ability of practical insight (of the future scientist). Provided that time is limited, unfortunately these two goals are

2 Summary: forestry education, between science and practice

not complementary but competing. Merkel next describes under which conditions a flexible curriculum could be constituted anyway. Epema, in turn, presented an example of the latest developments in didactics in Wageningen, where competencies form the building blocks of the BSc and MSc programmes on forest and nature conservation. He amongst others describes the process of international peer-reviewing that is part of the accreditation procedure.

In the sessions on skills, Lewark presented an example of an international e-learning course on gender and forestry, which explicitly uses internet based learning and teaching.

Several types of curricula and course exist, as became evident from the presentations and discussions on the third topic. Utschig, for instance, presented recent experiences of the Technological University of Munich which, following the Bologna Declaration, adapted its traditional university forestry education and developed amongst others a modular bachelors course on forest science and resource management. Lewark gave an overview of courses tackling gender issues in Forestry, based on a survey carried out by the IUFRO unit Gender, Education and Forestry. It was concluded, that gender issues are still hardly touched upon in forestry curricula.

Can forestry education be part of a natural resource management curriculum? The answer seems to be a clear yes. The question whether curricula on natural resource management should replace the more traditional forestry curricula is rather determined by the regional or national economic importance of the forestry sector and the amount of attention paid to natural resource management and environmental protection. Jansen and Schmidt described the developments in Wageningen, where forestry and nature conservation make up one curriculum, responding to the increasing need for integrated natural resource management in Western Europe and many other parts of the world. Jensen, on the other hand, showed the example of Oregon State University, where the Natural Resources degree is an interdisciplinary degree supported by four Colleges: Forestry, Agricultural Sciences, Liberal Arts, and Science. It emphasizes skills and knowledge that students interested in managing natural resources need in order to cross traditional disciplinary boundaries and value systems; at the same time, it requires a specialization that creates an opportunity for students to develop a subset of skills, like the traditional skills and knowledge associated with forestry.

Last but not least: is the Bologna Declaration a threat or a challenge? From the presentations it appeared that it is both, on many occasions. The European faculties of forestry and natural resources management are working hard to implement the Bologna requirements and the new demands and needs of the changing societies. The competition inside the education sector is growing and forestry education has to react rapidly to the changing requirements of the different sectors of the society. Pelkonen and Schuck stated that universities have to maintain more and more an open and direct dialogue with the society. For universities an increasingly important concept is networking which is a programmatic and pragmatic concept of federalism and yielding. Examples of current curricular changes were presented by Fanlo and Aunos (describing the situation in Spain), by Vinokurova (Russia) and Mataruga, Maunaga and Blagojevic (Bosnia and Herzegovina); though developments are different (different environments, different goals), the causes of changes are highly comparable, and the discussions echo a lot of similar problems and considerations. A supra-national example was demonstrated by Ekö and Gemmel; the MSc-program Euroforester is a two year MSc program developed

within a network of nine European forest faculties. The geographical focus is on the region surrounding the southern Baltic Sea, where the countries share a similar setting for forestry, regarding tree species, fertility, climate etc., but differ markedly when it comes to for example history, national economy, forestry practices and languages.

Internationalization has become an important issue. Van Soest described the experiences with respect to the European Master of Forestry, and indicated the opportunities, provided that universities further develop European viewpoints. Schuck and Pelkonen stated that the increasing student mobility in Europe as well as the changing curricula makes it interesting to evaluate how attractive higher education forestry degree programs are. Results of a questionnaire distributed to the eight universities offering broad forestry education in Finland, Germany, The Netherlands, and Austria indicated that at several universities enrolment in the new forestry degree programs increased recently.

Increasing student mobility also improves the student's involvement in curriculum development and more visionary aspects of forestry education in a European context. Modley indicated that the participation of students in United Nations' decision making processes on forestry proved to be difficult to implement, but that the activities of the International Forestry Students' Association (IFSA) succeeded in changing this. The used methods proved successful too in enhancing the interest of forestry students in forest policy.

Clearly, for a strong international (pan-European) performance, it is absolutely necessary to invest in networks, like the SILVA-Network, the IUFRO-working groups and IFSA. Here information on latest insights and developments is shared. To be prepared for future developments, or even better, to be able to anticipate on changing environments (in a social, economical and political sense), universities should be well aware of both national and international (including European) developments, of their own strengths, and of the benefits and threats of cooperation with national and international partners (universities as well as e.g. companies).

In that respect, networks like SILVA-Network, IUFRO and IFSA will become increasingly important as platforms for discussions on future forestry education.

1 INTRODUCTION

1.1 INTRODUCTION

HANK BARTELINK AND PIETER SCHMIDT

Forestry education, between science and practice

Curricula in Forestry aim at preparing students for jobs in the areas of forestry, nature conservation, and natural resource management. Nowadays a broad spectrum of curricula exists, not only in Europe, at the Bachelor as well as at the Master level, offered in Applied/Technical Universities (the former Polytechnics) as well as in regular Universities. Traditionally, graduates are employed in management, policy, research, education, and consultancies. There is quite some variation in skills and competencies required for each position; being a forest manager requires different qualities than working in policy development, or than implementing new research directions.

Natural resource management, including forestry, is at the interface between science and application. Forest managers operating close to practical forestry have to be able to translate new scientific findings into practical considerations, and, vice versa, to translate problems emerging in practice to research demands that can be tackled by scientists. Forest scientists, on the other hand, need to be able to pick up signals from forestry practice and from policy makers in order to define relevant research agenda's; but they should also be able to translate and disseminate their research findings into policy recommendations and practical applications.

As a consequence, the contents of curricula in natural resource management in general and in forestry in particular have to reflect this. Forestry curricula should be multidisciplinary and interdisciplinary by the very nature of the study object: forests (and nature in a wider sense) in relation to demanding societies. The curricula need to cover fundamental ecological knowledge and technological know how, as well as sociology, gender issues, economy, business administration and policy analysis and should focus both on applications of scientific knowledge as well as on exploring the scientific domain. These are partly new, partly old - but continuously innovating - fields of teaching and learning. An exchange of information and experiences will stimulate the development and implementation of new curricula and courses and new learning and teaching strategies and methods.

To date three processes play a key role in curriculum development and, vice versa, in matching the programme with the demands for the labour market. The first is the changing role of forests in the changing society, including the increasing demand for leisure, the increasing involvement of stake holders (including the general public), the increased importance of environmental functions of forests, the decreasing emphasis on wood production combined with a growing attention for sustainability, and the focus on nature rather than on forest per sé. The second is an increasing standardisation of the higher education in Europe (the Bologna process), which, among others, implies a clear distinction between BSc and MSc programmes. The third is the

increasing emphasis on skills and competencies, rather than on traditional knowledge, invoked by the decreasing half-life of knowledge, which calls for learning skills and attitudes rather than knowledge itself.

This results in a challenging scenery: how, in forestry education, to meet the demands from society and the associated range of disciplines and abstractions (practical management, academic science) against the background of a changing society, an increasing internationalisation (affecting aspects such as curricula aims, structures and certificates), and the need for an efficient and effective learning process.

The symposium aimed to define the key challenges in the current demands on and changes of forestry curricula, to explore promising developments, and to determine the future educational agenda (see e.g. Erasmus Mundus). Important questions that were raised:

How should science and management-orientation be balanced in curricula and courses?

What are the basic skills and competencies that students should acquire and how can they acquire them?

What type of curricula and courses are needed, and at which levels?

Can forestry education be part of natural resource management curricula?

Which opportunities does the "Bologna process" offer?

1.2 HIGHER FORESTRY EDUCATION IN THE 21ST CENTURY

PAAVO PELKONEN AND ANNETTE SCHUCK

Summary

The European faculties of forestry and natural resources management are working hard to implement the Bologna requirements and the new demands and needs of the changing societies. The image change of forestry starting in the late eighties still continues today. The traditional forestry field was - and to some extent still is – in many countries strongly related to the state forestry administration and forestry services. This was reflected in the study programmes of many European countries. At the same time industrialized countries have gone through a loss of importance of the primary sector including forestry together with an increasing importance of a market driven approach. In the future the role of the government will be less strong since public policy is becoming less important in forestry and also in higher education. The competition inside the education sector is growing and forestry education has to react rapidly to the changing requirements of the different sectors of the society.

Even if universities are still autonomous they have to maintain more and more an open and direct dialogue with the society. For universities an increasingly important concept is networking which is a programmatic and pragmatic concept of federalism and yielding. It is based on the voluntary alliance of universities, who understand that their own autonomy and independence will be best served by working together. In this concept the internet based communication has a key role in the development of an efficient teaching and learning concept. Students will play an increasingly important, dynamic role that should step beyond the one of merely imbibing the knowledge that is passed onto them. Teachers and research scientists need to be open to form a partnership which would strengthen the transfer of knowledge and skills, but also draw the students closer to the institutions which provides solid foundations for the future

According to the technology platform initiative of the European Union the forest-based sector includes all stakeholders with major interests in forestry, forest-based materials, services and products for a sustainable society. Industrial wood processing companies, eco-tourism business, forest owners, entrepreneurs offering ecosystem services, environmentally oriented NGOs and many others are working together to further develop of the sector. In order to be competitive, the sector has to achieve further productivity improvements, while maintaining its sustainability record. New products and end markets, and smart applications resulting from society's needs, will contribute to cost reductions and increased eco-efficiency. Social and technological innovations together with technology and knowledge transfer will be the European forest-based sector's answer to its key challenges. The faculties of forestry and natural resources management form the hard core of the modern technology and knowledge transfer in the European forest sector.

For a Starter

For centuries forests and forestry have been attractive fields of study and research in the European universities and research institutes. The field has connected the human needs to preserve forest resources and utilise them. The requirement of a balanced attitude towards the needs of preservation and differentiating utilisation has caused increasing challenges in forestry education and research.

The majority of young people, who have started their forestry studies at universities, have been understandably interested in forests as a natural environment. According to a stereotype, forestry students like to hike deep into the forest, far from metropolises and city life. The dimensions of the modern sustainability concept of forestry, as defined by the increasing population of city dwellers, may be in good agreement with this stereotype and not so well with the content of traditional forestry education based on a more utilitarian viewpoint. This is the start for the future challenge.

Challenges in the European Higher Education Area

Structural changes caused by the EU

The forest sector development in the European Union is a typical example of the difficulties to find a balanced attitude for local, national and global policy issues. Since the three greatly forested countries (Austria, Finland and Sweden) joined the EU, their aim has been to keep forestry matters outside of the integration process. This national focus left forestry fully out of the political core process and it has mainly been defined as part of the environmental policy in the EU policy documents. This attitude regarding the joint forest policy has changed recently, which will have an impact on higher forestry education and research together with the efficient restructuring of the European Higher Education Area (EHEA). The European dimension flavoured with national nuances will form the basis for the future academic forestry education.

On the basis of the Consolidated Version of the Treaty on the EU, the Community shall contribute to the development of quality education by encouraging cooperation between Member States and by supporting and supplementing their action, while fully respecting the responsibility of the Member States for the content of teaching and the organisation of the education systems according to their cultural and linguistic diversity. The competence of the European Union does not allow direct measures to influence the national educational policies. Community action shall be aimed at: developing the European dimension in education, encouraging mobility of students and teachers by encouraging inter alia the academic recognition of diplomas and periods of study, promoting cooperation between educational establishments, and encouraging the development of distance education.

The limited competence of the EU is compensated for by a cooperative initiative, called the Bologna Declaration, which was signed in 1999. The responsible ministers of almost every European country have signed the Bologna Declaration and are committed to joint actions to establish the European Higher Education Area by 2010 and to promote the European system of higher education worldwide. The pace of change was clearly faster than anticipated some years ago. According to the aims of the Bologna Declaration the universities in almost all European countries will introduce new two cycle degree programmes (undergraduate/graduate) with the aim to adopt a system of easily readable and comparable degrees. Further goals are to establish

a system of credits (such as ECTS), to promote mobility by overcoming obstacles, to promote European co-operation in quality assurance and to promote European dimensions in higher education.

The follow-up Bologna Process also emphasizes aspects of lifelong learning. Regarding to study programmes a special emphasis is put on orientations and profiles in order to accommodate a diversity of individual, academic and labour market needs. Further encouragement is given to the elaboration of a framework of comparable and compatible qualifications for the higher education systems, which should seek to describe qualifications in terms of workload, level, learning outcomes, competences and profile. These common goals commit universities stronger than ever to co-operate on a national and international level. But while the basic documentation regarding the Bologna process remains clear and concise, the implications for the various faculties and departments at higher education institutions are far more complicated.

The response of the forestry education

Currently forestry faculties are working hard to implement the Bologna requirements. Presently though, forestry does not only face Bologna challenges, but at the same time a changing image. The labour markets are asking for a new profiling of forestry programmes at university level, especially regarding programmes offered by universities of applied science, also called polytechnic universities. The image change of forestry starting in the late eighties still continues today. The traditional forestry field was - and to some extent still is - in many countries strongly related to public forestry administration and forestry services. This was reflected in the study programmes of many European countries. During the last 20 years many industrialized countries have gone through a loss of importance of the primary sector including forestry, recently followed by severe reductions of administrative structures at state level. Also student application rates for university forestry programmes have been low (Nair, 2004).

Furthermore, changes in social demands regarding forestry and forestry education on a national as well as international level have to be taken into consideration. Traditionally considering it an empirical science, forestry institutions have come to realize during the last few decades that social issues are intricately related to forests and forestry. This resulted in a strengthening of social science aspects within the spectrum of forestry as a discipline (Schanz, 1999). Skills in cross-sectorial issues as well as in new technologies, languages and an increased emphasis on social sciences are key elements that need to be strengthened (Rojas Briales, 1999). While economics and political science have long been part of the forestry canon, issues such as sociology, futurology and psychology, as well as cultural and ethical aspects are considerably new to and less accepted in the forestry world. This change in spectrum also requires a continuing analysis of the future development of national and international regulations and changes in the natural, as well as the social environment (Schanz, 1999). As Nair (2004) concludes: most problems facing forestry and thus forestry education are symptoms of large social, economic and technological changes, which appear to be accelerating at a rapid pace. Many of these changes are linked to the fact that the developed world evolves from an industrial into a post-industrial type of society. The future will bring a greater need for service providers caused by the reduction of the public administration. This is especially relevant for the field of forestry where the public sector has traditionally served many private owners who increasingly come from an urbanized background with a growing need for know-how in forest management.

Changing organisations

In the future the role of governments will be less strong since public policy is becoming less important - also in higher education. Competition inside the education sector is growing and forestry education has to react rapidly to the changing requirements of the different sectors of society. The stakeholders in education have increased opportunities to directly take influence through constituency pressure and direct purchases. Even if universities are still autonomous they have to maintain a more and more open and direct dialogue with the society as stated in the new strategy formulated already more than 15 years ago in Europe (Anonymous, 1993). The new funding and budgeting mechanism, based on academic performance and society relevance, will be the driving force of this process.

The role of expertise and experts at a university will be a key factor for successful performance. University management and leadership are trying to find a good balance between the needs of individuals and the organisation. This target is especially important since financing of institutions, in combination with a growing work load, has been difficult during the last ten years. Future perspectives are not predicted to be any rosier. Everybody in the organisations has to be flexible in order to meet rapidly evolving challenges. Commitment to educational targets of a society and the related needs and arrangements of funding are not only the responsibility of managers and leaders anymore, but also increasingly the responsibility of every research scientist or teacher in an organisation. The commitment to the targets of society becomes more and more an elementary part of everyone's personal accountability.

Support from flexible networks

Networking is a programmatic and pragmatic concept of federalism and yielding. In higher education it is based on the voluntary alliance of universities, who understand that their own autonomy and independence will be best served by working together (Anonymous, 1993). This development has been strongly supported by the EU and was further strengthened through the policy that led to the partnership programme of the UN Conference on Sustainable Development in Johannesburg in 2002.

The basic policy of the European Union is to provide networks with seed funding only. The partners of a network can show their commitment through self-funding either in cash or in kind. The aim is to combine resources from different organisations to create strong partnerships, collaboration and a new basis for innovations. The challenge for the future can best be met by an advanced leadership and management of networks. The idea of networks is to connect more or less bureaucratic public organisations in a flexible way.

As an important part in the European integration process, the EU has since the 1980s strongly promoted cooperation and people-to-people exchange between universities. The mobility of students and teachers, joint study modules and programmes are typical outcomes of the EU Socrates Erasmus Programme. The Thematic Network Programme is an efficient tool to stimulate cooperative actions to develop academic education. The European Union has also opened network channels to non-EU countries all over the world. Phare, Tacis, INTAS and Interreg have provided funding for collaboration. Special programmes have been developed for North America, Latin-America, Asia, and for the non-EU Europe. The new Erasmus-Mundus is

opening an excellent funding mechanism for students from countries outside the European Union.

Virtualisation – a new challenge

Virtual education is an imperative outcome of the integrated European higher education area. Forestry education can learn from other disciplines and at the same time try to find the best possible practices for virtualisation in its own field. On the basis of first experiences there is no need to make a total change to virtualisation, but it may be better to combine step by step traditional contact teaching with the methods of internet based teaching and learning. Benchmarking of ICT-applications for forestry will show the most suitable areas and priorities of development among the field and laboratory courses or traditional lecturing. Even though careful piloting is important, in addition serious attempts to use ICT in real courses are needed, rather than various demonstration events without any ambitions to implement it in degree teaching and learning.

New partnership of students and teachers

In order to increase competitiveness, forest education has to analyse the needs and requirements of the clients of this century. The role of students and their unions and associations is more important than ever. The International Forestry Students' Association (IFSA) and its member associations are competent and important partners taking actions in developing the field of forestry education (IFSA, 2004). In accepting young specialists for the planning of future education, the universities are building preconditions to be more proactive than reactive.

Students will play an increasingly important, dynamic role at the universities; the role that they play should step beyond the one of merely imbibing the knowledge that is passed onto them. Teachers and research scientists need to utilise the resource that the student offers, and form a partnership which would strengthen the transfer of knowledge and skills and also draw the students closer to the institution providing solid foundations for the future.

Challenges from the Forest-Based Sector

The technology platform for the future development

According to the technology platform initiative (Anonymous, 2005) the forest-based sector includes all stakeholders with major interests in forestry, forest-based materials, services and products for a sustainable society. Industrial wood processing companies, eco-tourism business, forest owners, entrepreneurs offering ecosystem services, environmentally oriented NGOs and many others are working together to further develop the sector. The global industrial companies, for instance, have committed themselves to this kind of modern approach in their societal responsibility reports. In order to be competitive, the sector has to achieve further productivity improvements, while maintaining its sustainability record. New products and markets, as well as smart applications designed to meet society's needs, will contribute to cost reductions and increased eco-efficiency. Social and technological innovations together with technology and knowledge transfer will be the European forest-based sector's answer to its key challenges.

A contradictory picture

The forest-based sector accounts for eight percent of the manufacturing added value in the EU and is using a renewable resource. There are 16 million private forest owners and the sector is providing between three and four million jobs in industry. Notably, it enjoys global technological leadership and occupies a leading research and business position at international level (FTP, 2005). With these facts the sector clearly demonstrates its strong economic and social weight also in the European future.

In principle, there are excellent preconditions for a successful performance but in practice the problems of the forest industries are numerous. The doubts are mostly related to the global fibre production. There are signs that global investors become more sensitive to finance investments of the pulp and paper producers due to a poor implementation of the ethical codes of conduct defined in their societal responsibility reports. The modern, sophisticated process technology in pulp and paper production is ecologically sound and meets the requirements of industrial quality assessments. Environmental and society-related conflicts are mainly connected to the fibre production. The acceptability of both tree plantations and traditional forestry in virgin forests, especially in tropical countries, have been continuously criticised from the point of view of sustainability. Natural sciences have not been able to define safe production and social sciences have had great difficulties to analyse socially and culturally responsible forestry. The demand to take sustainability into account as a part of responsible business is leading to an uncertain future for the forest-based sector.

Challenges of the market relevant sustainability

The technology platform initiative (Anonymous, 2005) defines new challenges for the forest-related sustainability in the following statement: The vision of the forest-based sector is that by 2030, it will be a key contributor to a sustainable European society. It will operate a competitive, innovative and knowledge-based industry, fostering an extended use of renewable forest resources. In a new, bio-based and customer-driven European economy, it will make significant societal contributions. A unique strength is derived from its sustainability and its role in mitigating climate change. But the issue is not simple: securing the availability of raw materials while respecting the varied uses of forests will continue to be a demanding task. A central factor for success lies in an economic and environmental balance of the use of forest biomass for products and energy.

The target of the European Union to increase the use of renewable energy could mean that up to 150 million m³ wood should be harvested annually for energy production. The supply of this amount of energy wood needs strong research, development and training inputs. Socially and technologically product innovations are needed in order to meet the wood biomass demands of both forest and energy industries. Furthermore, an increasing price of crude oil will damage the pulp wood market. The forest-based sector should take serious steps in order to develop a sustainable production chain which covers the production of virgin fibre, efficient fibre recycling, and finally the end use of fibre and other wood products in the energy sector. A reactive strategy will lead to an uncontrolled development in the energy use of wood.

The technology platform initiative (Anonymous, 2005) also defines new challenges related to customers' needs in the following statement: In working towards a more sustainable society, it

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is vital to pursue the development and design of products that meet present and future customer needs, whilst being recyclable. Process innovations will not only have to support sustainable development but also to improve flexibility in manufacturing whilst significantly decreasing capital costs. The challenges posed by new competition from other parts of the world must be met.

Apart from the many supportive facts, the forest-based industries have great difficulties to gain the needed confidence in today's pluralistic and multi-faceted market economy. Pulp and paper which are typical bulk products are not attractive from the point of view of the end users. Signals of the market can not be transmitted through the long production chain to the forest industries or to the stakeholders of forestry. The signals are too weak and can not be interpreted comprehensively at the grass-root level of timber production and wood processing.

Future credibility of the global forest-based sector will be measured on the Asian market. In Asia, 2 billion people are using 20 kg paper per person per year while in Europe 0.4 billion people are using 250 kg. The attitude of 0.4 billion people in the EU is directing the development and the global attitude towards the forest-based fibre production. The role of forestry education should be essential when the growing fibre consumption is challenging forest management. Too many graduates from the degree programmes in forest science are not capable to argument for green, market-driven production. The shift in education from traditional forestry towards natural resources management may offer tools to challenge expanding needs of forest preservation.

Talent and innovations in focus

The technology platform initiative (Anonymous, 2005) is defining new challenges related to a long-term competence base and innovativeness in the following statements: When looking to the future, it is essential to secure the long-term competence base and the innovative lead of the sector, as well as actively participating in a single market for knowledge and succeeding in attracting young talent. The sector will not only be able to meet these challenges, but more importantly, can take advantage of opportunities to provide significant social, economic, environmental and technological benefits. Through strategic investments, by fostering alliances and with political support, the forest-based sector will be in a position to significantly increase the use of forest-based materials whilst maintaining other important functions of forests such as biodiversity and recreation.

The European Union will improve knowledge and technology transfer processes through strengthening and expanding the developmental periphery of the universities. Centres of Excellence and Centres of Expertise together with Business Incubators are working on industrial contacts, intellectual property development, and fundraising, being typically interdisciplinary, project-oriented research and development partnerships which organise collaboration between different research units and enterprises in the EU.

The Centres of Expertise will be further developed to increase connections between companies and researchers of the universities. Combining different kinds of skills and knowledge in a Centre of Expertise enables young people to solve practical problems critical to the economic and social development of changing societies (Clark, 1998).

In order to improve a traditional transfer process from a master (professor, senior scientist) to a novice (students, junior scientists) and to society, the Business Incubators will be strengthened in the university cities. Students who have gained skills and expertise during their studies can study business management, leadership, and further develop business ideas in an innovative environment. Young talented people will even be financed by public funds before they move to real business.

In many countries in Europe, the forest-based sector is no longer an attractive partner for political decision makers since it has not been able to improve the employment in forested regions. By placing major emphasis on process innovations the sector has strongly increased mechanisation of forest work and wood processing, but this has not improved social sustainability in rural areas. From this point of view it is not surprising that in the ranking lists of regional authorities the development centres related to forest-based industries are not among the top positions. Thus the limited employment perspectives of the forest-based industries reflect on the attractiveness of the forestry education in Europe. Universities have to be even more capable to provide different kinds of development centres populated with young talented people who are able to make necessary product innovations for wood processing, ecosystem services and eco-tourism.

Conclusion

Forestry and the whole forest-based sector have been affected by turbulent changes. Towards the end of the 20th century, the number of stakeholders interested in forestry has increased due to internationalisation and globalisation of trade and due to environmental movements. In this context forests are nowadays widely seen as a common global resource, producing environmental and ecosystem services through basic ecological processes like carbon and water cycles and through maintained biodiversity.

The key role of sustainable forest management as defined in the Brundtland Report (Brundtland, 1987), has been widely accepted as the basic concept for forestry education. The relatively recently introduced social and cultural elements of sustainability offer a further challenge for curriculum development and for defining new areas in forestry education. Traditionally great emphasis has been placed on economic, ecological as well as technological aspects of forestry. The socio-economic dimension is seen as a strong development area according to the latest interviews and studies, whilst socio-cultural aspects of forestry are still taking the first steps to be implemented in forestry education. In order to find a balance between the different dimensions of sustainable forest management, forestry as a professional and educational area has to place more emphasis on inter-disciplinary expertise.

Social responsibility is a core phrase of today's business management. The importance of defining values and ethical codes of conduct for the forest product market is increasing and this trend will brand the first decades of this century. Forestry education and research should be able to provide tools to analyse sustainable forest management with respect to the basic values of humanity. Forestry education has to be able to define a credible balance of rights and responsibilities of human thinking and action along the long chain between the local people and the global stakeholders.

Concluding remarks

It is unlikely that the weak, even nonexistent forest policy of the European Union will offer good preconditions for or direct academic forestry education and research in Europe.

There will be strong influence from agricultural, environmental and energy policies in the EU on forestry education and research.

The increasing competition between universities, the implementation of the Bologna Declaration, and the requirement to create a critical mass in educational units will underline networking and partnership.

Forestry education and research as a relatively small player in the European Higher Education Area need active cooperation with other forest-related sciences.

Europeanization means also global challenges and responsibilities.

Forestry education and research has to be flexible and proactive in the current high pressured environment.

A balanced approach to the different dimensions of sustainable forest management is a key factor for both education and research; from ecological, economical and technological aspects to the inclusion of social and cultural dimensions.

The importance of defining the values and ethical codes of conduct for the markets is increasing.

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2 SCIENCE AND PRACTICE: SKILLS AND COMPETENCIES IN FORESTRY CURRICULA

2.1 OPEN CONCEPTS – A BASIC NEED FOR THE DIDACTICS OF APPLIED SCIENCES

HUBERT MERKEL

Summary

Every curriculum includes two more or less hidden general learning targets: the power of scientific reasoning (of the future practical person) and the ability of practical insight (of the future scientist). Provided that time is limited, unfortunately these two goals are not complementary but concurrent. Necessarily a balance has to be found. It would be the best that the student himself/herself could decide upon his/her individual compromise.

Is it possible at all to constitute such a flexible curriculum and – if yes - what are the conditions making possible such a decision for the learner? Analyzing recent cognitive theories we can imagine learning as successively elaborating of concepts in form of a network. That means (among other things) that the same concept exists and can be understood on very different levels of complexity and abstraction. It stands to reason that e.g. normally a meteorologist has another, more elaborated concept of ‘radiation’ than a forester.

But this is not a real problem when supposing that an elemental quality of a concept is its self-similarity and when we consequently respect this quality in our teaching efforts.

Unfortunately this rule is frequently violated. A common didactical method – especially in applied sciences - is trying to create consistency already at a low level. From empirical educational research at school we know that this leads to oversimplification and prevents further understanding. Therefore the possibility of continuous and principally unlimited improvement of semantic networks by the student himself/herself has to be brought into the focus of attention in curriculum development as well as in every teaching situation. Concepts have to be taught in an ‘open’ way¹.

Introduction

Forestry education: between science and practice – this is the title of the SILVA & IUFRO Symposium in Wageningen. Some people feel this – science and application – to be a contradiction; many colleagues watch this with concern. Against the backdrop of fundamental changes in natural resource management and forestry as well as in education in Europe and in the whole world this issue can no longer be remained untreated nowadays. Only if we succeed in facilitating the transfer from science to application and vice versa we can solve our problems for a better future of nature and mankind. And the key for these solutions is a very good education: An education which involves scientific reasoning as well as practical impact on each and every level.

¹ About the duty of a scientist to keep in mind practical impacts will be reported in another place.

This paper is not about science and application as a contradiction. On the contrary, this view is about a misunderstanding originated from the history of our organization of education and institutions. This paper is not about organizational, institutional and political aspects of higher education. But the apparently apolitical issue ‘good didactics’ is not to be seen isolated from those subjects. Good didactics lead to good institutional and democratic development².

Knowledge never damages somebody - neither the institution in which she or he works. Knowledge is basic to all action. It should be common sense that of course not each and everyone are able to understand each and everything, but it should be common sense too that it is possible to present knowledge in a way

which allows everybody herself or himself to reach her or his individual limits of understanding. We are far from this state and the reasons are deficient structures in education and institutions and some fundamental mistakes in didactics. So this paper is neither about genius nor about idiots but it’s about average learners like the author and the other 95 % of the learning population.

The communication problem

After these introducing words the subject will be approached from a more theoretical point of view. In the invitational paper we could read: “Forest managers have to be able to translate new scientific findings into practical considerations, and, vice versa, to translate problems emerging in practice to research demands ... Forest scientists ... should also be able to translate and disseminate their research findings ...” The key word here is ‘to translate’. It clearly shows us that we are definitely not confronted with a contradiction. But it indicates a communication problem. Perhaps it leads us to a solution too.

Thinking of translation first of all we think of words to be translated. If that really was the problem, the solution would be easy: What we needed is simply a dictionary. Obviously the problem is another one.

Words denote concepts. Concepts have to be acquired by learning. Learning happens in a million different ways. So, if people acquire different concepts during their learning history denoted by the same word, misunderstandings will be preprogrammed. And that’s the point.

Concept learning

Before going in details a very short summary of the understanding of knowledge and thinking, teaching and learning underlying the further reasoning has to be presented:

The scientific background of educational reasoning here is still the conceptual network theory of Lindsay, Norman and Rumelhart (LNR) from the early 70s (Lindsay and Norman, 1981; Rumelhart and Norman, 1976; Anderson, 1989; Strube 1996). They developed an idea of knowledge as a set of interrelated concepts forming an active, structural, semantic network

² Some ten years ago, I met a German forest officer, who told me: „The young people leaving your forestry school are badly prepared for their job, they know too much“. I did never understand.

called cognitive structure. Basic to all learning process is the connection of new, still unknown concepts with old, already known concepts. In this way – admittedly to some extent mysteriously – new meaning is emerging

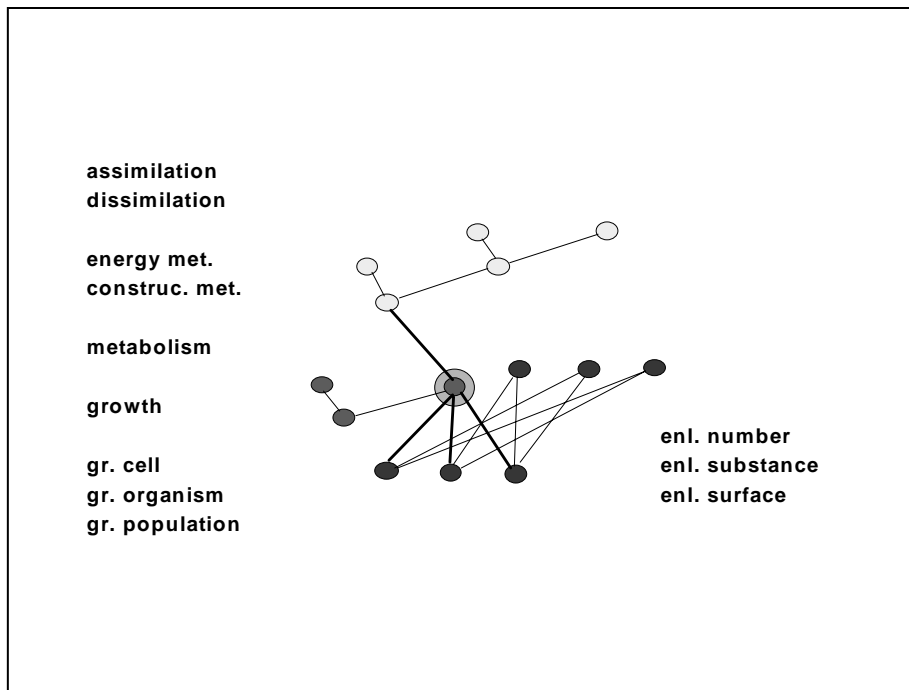


Figure 1: The concept ‘growth’ as a part of a conceptual network.

A simple example should explain this: It is the concept ‘growth’ in a biological context (Please compare figure 1. For more details see Merkel, 2004.):

- ‘cellular growth’, ‘growth of organisms’, ‘growth of populations’ we can subsume as special cases of the general concept ‘growth’ (*Bottom layer, front, dark knots*);
- beneath ‘differentiation’ we can interpret ‘growth’ as an element of ‘development’ (*Central layer, front, grey knots, not named*);
- ‘enlargement of substance’, ‘enlargement of surface’ and ‘enlargement of number’ we can regard as elements of the different forms of ‘growth’ (*Bottom layer, back, dark knots*);
- furthermore we can comprehend ‘growth’ as a special case of ‘metabolism’ which has as elements ‘energy metabolism’ and ‘constructive metabolism’. ‘Constructive metabolism’ again has as elements ‘assimilation’ and ‘dissimilation’ (*Top layer, white knots*).

What we have now is a vivid imagination of knowledge: A network with knots (concepts) and meshes (relations; in this case ‘*is element of*’ and ‘*is special case of*’). It’s a picture, it’s a metaphor, and perhaps it’s a theory. But what is the difference? We can’t decide, whether it is true or not, but this is not so important at the moment. If it is useful and if it’s not the cause of contradictions to recent powerful psychological theories of learning we can use it as a tool not only to analyze the structure of a subject matter but to explain some learning phenomena too. There exists an elaborated method called concept mapping (Novak and Govin, 1995; White and Gunstone, 1996).

It is useful; there is little criticism and by no means any reason to give up this ‘theory’ although other approaches have been developed in the mean time (Al-Diban, 2002; Dörner, 1997; Strube, 1996). But the network model of Lindsay, Norman and Rumelhart is more than a simple application of a crude connectionism. We can see this, if we try to answer the question “What is the meaning of a concept?” by means of this semantic network theory - or in other words if we analyze how ‘new meaning’ emerges in a growing network. Another simple example:

- We start with the (already known) concept: tree;
- It has as elements branches, roots and leaves, trunk and so on;
- It is an example for a plant;
- It is an element of an ecosystem;
- A beech and a spruce are examples for a tree.

Without any doubt everybody could easily elaborate a more and more complex concept of tree in a short time.

Up to now we can see: Every new added concept becomes part of the meaning of the central concept of our examination. If we develop this idea consequently we must state that finally all relations in which a concept is linked constitute its meaning. This means in the end that our conception of the world affects each and every concept we own. It is a very interesting aspect which we should keep in mind but it is not the one which we are looking for now. At the moment another quality of the concept of a concept which the LNR-model reveals is in the focus of attention.

Self-similarity of concepts

A concept can be understood on very different levels of complexity (and abstraction) but it is always a matter of the same concept. Is it really the same concept? Indeed, it is every time that the less complex version (of a novice or a child) has the same structure as the more complex one (of an expert) and – even more important – if the less complex version allows for an independent increase in more complexity.

The hypothesis is that concepts on different levels of understanding are self-similar – if we don’t make fundamental mistakes building them up. If a low level concept is similar to itself on a higher level, a more or less independent conversion to more complexity is easily possible.

Although the concept of self-similarity already has trickled down from fractal- and chaos-theory to general knowledge a simple idea appropriate for our purpose can help standardizing our actual concept. As we already could notice metaphors - in fact simple pictures - sometimes are helpful in understanding (see figure 2).

One of the secrets of the art of teaching is to conserve self-similarity in simplifying concepts for didactical purpose. Presenting a low level concept the full concept must be present in embryo, so to speak. That is the main aspect of what ‘Open concept’ (see figure 3) stands for.

Misconceptions

From numerous high school studies we know that the greatest obstacles for understanding are so called misconceptions, wrong imaginations born in the learners learning history. There are two main reasons for the creation of those misconceptions: naïve handling of everyday-perception and teachers' desire to present simplified facts in a consistent, not contradicting way.



Figure 2: A simple metaphor for the concept ‘self-similarity’.

In both cases we can state that the existing concept is not similar to the real one and therefore finally not compatible. Not the incompetence of the learner but this lack of similarity explains the problems and finally the inability of further understanding:

- Subsuming a whale as a fish;
- Subsuming the fog over the cooking pot as water vapour;
- Subsuming a forest as an organism;
- Subsuming ecological equilibrium as a static phenomenon;
- Assuming that forests belong to nobody because we can enter and leave them where ever and whenever we want.

All these propositions prevent real and profound understanding. Only if we classify whales as mammals we can really understand their behaviour:

- Only if we know that water vapour is an invisible gas and fog consists of droplets which are liquid we can understand the process of condensation in the atmosphere and the formation of clouds;

- Only if we assume that forests are ecosystems (in the broader sense) we really can understand and explain all ecological, economic and social impact of management decisions;
- Only if we stress from the very beginning the steady state character of the equilibrium concept we can avoid the misunderstanding of the existence of the one and only one ecological equilibrium;
- Only if we stress from the very beginning that every forest has an owner, owners' interests will be embodied as an essential part of the concept in foresters' brain adequately.

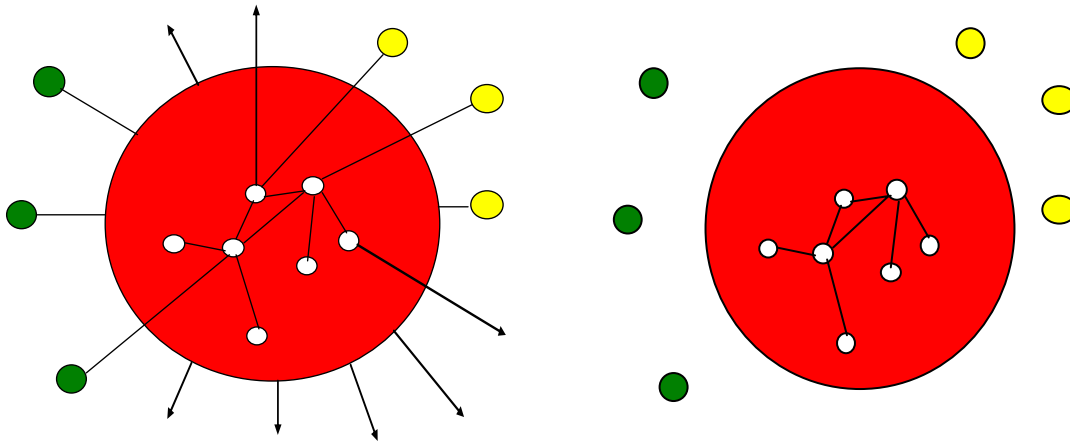


Figure 3: A simple picture symbolizing ‘open’ versus ‘closed’ concepts; please note the relations (—) and the possibility for further links (→).

Another – not less important - aspect of ‘Open Concept’ is its fundamental boundlessness and immensity. Further up we could see that the meaning of a concept depends on all relations in which it is meshed. Finally our conception of the world affects the meaning of every single concept. This necessarily means that every presentation of a concept is incomplete.

Unfortunately we consider this as a shortcoming. Far from it, a good presentation draws the attention at least to the existence of such ‘missing links’. It would even be better to name and show some of these “anchors” for further reasoning. Presenting a set of enclosed terms free of contradictions is the most unscientific way to teach a matter of fact - it is the original sin of (academic) education.

Conclusion

Applied sciences have to rely upon conceptual clarity and honesty in particular. Different domains meet each other. Basic sciences lay the foundations.

Owing to lack of time alone education without simplification doesn't work. Even though, profound and fundamental understanding in separate but related fields of study must be at least possible.

There is a simple implication for education: Actually we need the best teachers on the most elementary level. Nobody – not even an expert - knows a full concept. But a good teacher must be aware of the relevant elements and the fundamental structure brought in line with the latest scientific research. So nothing will go wrong. In this way she or he passes on knowledge with the opportunity of self-improvement.

If we really trust in our concepts and especially in our way to pass them on – respecting and communicating their quality of self-similarity and their fundamental boundlessness - we can trust in the independence of the young people managing their studies by their own their whole life long.

In the end it can be stated that scientific reasoning and practical insight is not a contradiction. Knowledge as a learning outcome is basic to both, science and application. We can imagine learning as successively elaborating of concepts in form of a network. But that means that the same concept exists and can be understood on very different levels of complexity and abstraction. Simplification in education is necessary but it has to be done in a way which allows for self-improvement by the learner. Creating consistency already on a low level leads to oversimplification, misconceptions and prevents further understanding. Therefore simplifying concepts for didactical purpose has to conserve their self-similarity: Presenting a low level concept the full concept must be present in embryo. Concepts have to be taught in an 'open' way.

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2.2 BSc AND MSc PROGRAMME BUILDING IN THE FOREST AND NATURE CONSERVATION AREA: THE USE OF COMPETENCIES

GERRIT EPEMA

Summary

Wageningen University is in the process of developing and implementing competencies in the various BSc and MSc programmes. A competency is a combination of knowledge, skills and attitude applied in a specific situation. For the BSc and MSc programmes Forest and Nature Conservation sets of core competencies and sub-competencies will be presented.

The competencies were peer-reviewed by international colleagues to compare the programme with international standards and to provide an international context to the competencies. In the new accreditation procedures in the Netherlands also the relevance of the programmes for society has to be shown. In addition a professional validation took place by an external advisory committee, consisting of people working in the professional field of Forest and Nature Conservation. Both the academic and professional evaluation was positive. Presently the description will be adapted somewhat to incorporate more in detail the domain knowledge, which was actually done before in the traditional description of the aims and objectives of the programme, and to fine-tune the formulation of the level of MSc exit competencies. In the actual programme already a lot of competencies are implicitly or explicitly present. At the set-up of the curriculum in 2000, the staff developing various courses was already asked to incorporate specific competencies in the courses. Year by year the programme was adapted to cope with changing situations and insights like the introduction of the BSc-MSc system, sharper formulation of the boundary between these two phases, and evaluations by students and staff.

The process of developing and implementing competencies is not yet finished. A number of problems encountered during the process will be discussed. The diversity in incoming students, especially in the MSc phase, based on cultural differences, type of bachelor education (professional or academic) and domain knowledge will also be given attention. Finally ideas are presented to overcome the major stumble blocks for fully implementing the competency approach.

Introduction

Wageningen University is in the process of developing and implementing competencies in the various BSc and MSc programmes, including the BSc and MSc Forest and Nature Conservation. This process, although announced officially in 2003, is a rather gradual process. Wageningen University, as former Agricultural University, has always been aiming at scientific research alongside practical applications of the research. Also questionnaires to alumni revealed the wish for more practical expertise next to science. When the Wageningen system shifted back from four to five years in the late 90s one of the changes was - next to extension of internship - a block directed to training professional competencies in the last year. In 2000, programmes with courses of a standard size of four weeks (about six ECTS) had to be developed for all studies, with the explicit wish to incorporate skills and attitude in the more domain-oriented courses instead of separate courses. With the start of the BSc-MSc system (2002) also a

discussion was held to determine the boundary between the BSc and MSc, which influenced a number of courses like the bachelor completion³.

Since already so many elements of competencies were included in the curricula, it was decided not to change the programme completely. First core competencies and sub-competencies were developed per programme. Subsequently matrices with competencies and courses were made to implement this approach, where the actual content played a role. Presently for the BSc and MSc, the competencies and competency-course matrices have been developed and adaptations in the courses are partly implemented.

Experience with this new approach is rather different for BSc than for MSc. In the BSc phase student groups are relatively homogeneous and new students have already experience with more competency oriented courses at secondary school and almost all students have a Dutch nationality. Moreover the students have a similar academic starting level, since they all have followed a six year preparation for university level. In the MSc phase however, besides students from the regular BSc also student with somewhat different domain background may enter from other universities and universities of professional education. A large amount of students are international with various cultural backgrounds and large differences in educational systems. First experiences with these groups are discussed below.

For more details on the discussions below the reader is referred to Epema *et al.* (2004), van Leeuwen *et al.* (2003), van Leeuwen *et al.* (2004a, b), Rip and Epema (2004), Vodde and Epema (2003).

BSc competencies

General objectives

The BSc Forest and Nature Conservation is directed specifically to the understanding, management and policy aspects of forest and natural areas around the world, including the tropics. Central in the programme are the objects 'forest' and 'nature' as complex, often multifunctional land use forms in the context of a worldwide increasing social and economical pressure on natural resources.

The BSc graduates in Forest and Nature Conservation have basic academic competencies to deal with ecology, policy and management of forest and nature in the above-mentioned context. Competencies are in the field of: application of knowledge on forest and nature in interaction with man; insight in research; dealing with the complex integration of society and ecology in forest and nature conservation; communication and working in teams; a critical attitude and lifelong learning attitude. It is a typically integrated social and natural sciences study with a large common part, where during the specialisations the specific socio-economic aspects and competencies (specialisation A - Policy and Management) or natural sciences aspects and competencies (specialisation B - Ecology and Management) can be extended (see also Jansen and Schmidt, this volume).

These objectives are a continuation of those of the earlier five-year programme, but they are adapted to the level of the three-year programme of the BSc. Previous to the BSc/MSc system, the programme of Forest and Nature Conservation was five years (1995 –1999). The contents of

³ Small thesis based on literature.

the first three years of this programme served as basis for the BSc that started in 2000. For more information one is referred to Vodde and Epema (2003).

Core competencies

The exit qualifications have been formulated as seven core competencies. Within those competencies the domain specific knowledge and skills of the graduate are described as well as the general skills and attitude.

The competencies have been described following a format, in which the work level of the graduate (operational, tactical and strategically) and the level of complexity of the work situation (basic, integral and innovative) are described. The seven core competencies are:

- *Insight into carrying out research in the field of forest and nature:* The BSc graduate is capable to distinguish the different aspects of scientific research and carry out scientific research on a basic level. The BSc graduate is capable of carrying out operational/tactical research. This can be both ecological and socio-economic research and it will deal with questions and problems related to forest and nature conservation.
- *Effective communication and co-operation in teams:* The BSc graduate can tactically use different communication skills. The BSc graduate therefore functions on a basic level in a multidisciplinary team with respect to forest and nature conservation.
- *Reflective lifelong learning:* The BSc graduate is capable of taking an operational approach while developing and maintaining a reflective and inquiring attitude, on an integral level, with respect to his/her own scientific attitude and with respect to the societal responsibilities that are related to forest and nature conservation. Important aspects of this are, on the one hand, keeping track of developments and, on the other hand, periodically updating one's skills and knowledge with regard to forest and nature conservation.
- *Application of knowledge in the domain of forest and nature conservation:* The BSc graduate is capable to operationally use methods and techniques related to forest and nature conservation. On an integral level he/she can position the domain in a social and natural environment. This will enable him/her to describe and explain different social, economic and ecological aspects of forest and nature conservation on a national and on an international level.
- *Complexity of society and ecology of forest and nature conservation:* The BSc graduate is capable of identifying different interests and their positions in complex situations on an integral level and in an operational way within the domain of forest and nature conservation. He/she is also capable of placing these interests in such a way that it will serve the ecological and social interest of forest and nature.
- *Command of specific forest and nature policy knowledge and skills:* A BSc graduate with the specialisation of forest and nature conservation policy is operationally/tactically capable of indicating the relevance of policy for forest and nature conservation on an integral level. With this, he/she can then put forest and nature conservation in a specific socio-economic context.
- *Command of ecological knowledge and skills:* A BSc graduate with the specialisation ecology is operationally/tactically capable of indicating on an integral level the significance and the consequences of forest and nature management for ecosystems. With this, he/she can then put forest and nature conservation in a specific ecological context.

Academic validation

The exit qualifications have only recently been reformulated in terms of competencies. The programme of Forest and Nature Conservation is a unique education programme in the Netherlands. Therefore, in order to compare the programme with international standards and to provide an international context, the competencies were sent for peer-review to five international references.

All experts have affiliation with scientific education and research in different parts of the domain of forest and nature conservation. They all considered the BSc competencies “fully in line/ well agree” with the international standards. And all five agreed that the exit qualifications relate well to the requirements of the MSc education. The remark that “this set of competencies will serve as a valuable example” was made more than once. The comments will be included in the further development of the competencies.

Professional validation

Professional validation of the programme is ensured through the accordance between the intake requirements of the MSc studies accepting BSc graduates Forest and Nature Conservation and the BSc exit qualifications. Within Wageningen University four MSc studies, Forest and Nature Conservation, Geo-Information Science, Leisure Tourism and Environment, and Management of Agro-Ecological Knowledge & Social Change unconditionally accept BSc graduates of Forest and Nature Conservation. The BSc competencies are consistent with the MSc intake requirements. A similar list for several international MSc studies is under development. One example from that list is the MSc European Forestry, financed by the EU - Erasmus Mundus programme. This is a joint European Master programme developed and introduced by six well-established European universities providing forestry curricula. Wageningen University is one of those six universities and BSc graduates of Forest and Nature Conservation are able to participate in this 120 ECTS programme. In principle the BSc Forest and Nature Conservation gives admission to this programme, but only students that meet the requirements of all participating universities are accepted.

Furthermore, several European universities offering a forestry curriculum are exploring cooperation possibilities for the development of ‘double degrees’.

The recently reformulated competencies have also been forwarded to people in the professional field of Forest and Nature Conservation. Comments were collected through e-mail as well as during the External Advisory Committee meeting in November 2004. The general opinion was that the BSc competencies provide a good basis for further MSc education. The External Advisory Committee thinks that the professional market is not ready to take up BSc Forest and Nature Conservation graduates, at least not yet.

One specific remark of the External Advisory Committee concerned the need for a better description of the basic domain knowledge in the BSc competencies. This remark has been acknowledged by the programme coordinator and the programme committee, and will be taken into account for further development and fine-tuning of the competencies.

Comparison with Dublin descriptors

The Dublin descriptors are regarded internationally as tools to measure the level of BSc and MSc graduates (www.jointquality.org). The five Dublin descriptors are:

knowledge and understanding,
applying knowledge and understanding,
making judgements,
communication,
learning skills.

A matrix was developed that plots out the seven core competencies and the 33 sub-competencies against the Dublin descriptors. The matrix can be found in Van Leeuwen *et al.* (2004a). The descriptors can be found in various sub-competencies. The first two Dublin descriptors get more attention, especially in the fourth, sixth and seventh competency. A solid base of knowledge in the first phase of the BSc is considered as indispensable for further specialisation and for the application of skills acquired during the full length of the BSc and MSc curricula of Forest and Nature Conservation.

The graduates of BSc Forest and Nature Conservation possess exit qualifications that prepare them for future MSc education. Within Wageningen University the BSc graduate Forest and Nature Conservation has unconditional admission to the MSc's: Forest and Nature Conservation; Geo-Information Science; Leisure, Tourism and Environment; Management of Agro-Ecological Knowledge & Social Change.

Next to these internal programmes, there are several international MSc studies that will most probably admit a BSc graduate Forest and Nature Conservation, but a list of those MSc studies is still in development.

With the BSc education formalised, the option has been created for working after finishing the BSc instead of further study. The market response on this new development is not yet known. Different opinions are heard from the working field:

External Advisory Committee: ruling opinion is that a Higher Vocational Education graduate is preferred above a BSc graduate Forest and Nature Conservation. This has to do with the lack of practical experience of a BSc graduate.

Personal opinion M. Verhoef, deputy secretary general of the Ministry of Finance: The BSc/MSc system is new and has to develop. It is still not known if the BSc graduate "will jump on" the labour market. In this case, the state government will think of recruitment and traineeship of BSc graduates.

Presently, almost all BSc graduates who continue with an MSc programme stay in Wageningen. Between 75 and 80% of these graduates continue with the MSc programme Forest and Nature Conservation. The expectation, regarding current efforts to offer international programmes, is that gradually more graduates will choose for the exchange option and follow an MSc programme outside Wageningen University. This development will however be dependent on the market situation.

MSc competencies

General objectives

The central themes within the MSc Forest and Nature Conservation are conservation, sustainable management, and policy aspects of forest and nature. Forest and nature are complex, often multifunctional land use systems in a context of increasing social and economical pressure on natural resources.

Within the Forest and Nature Conservation programme, constructive approaches are developed such as sustainable natural resource management accounting for biodiversity conservation, silviculture, social forestry and agroforestry, as well as management strategies for nature reserves and development of large-scale ecological networks. These approaches are based on thorough understanding of both ecological functioning of ecosystems, including interactions between vegetation and herbivores, as well as on the analysis of socio-economic and cultural functions of forest and nature.

For a more detailed description of objectives of the programme Forest and Nature Conservation and for an operationalisation of objectives in goals we refer to the Self-Evaluation Report (Vodde and Epema, 2003). This also gives insight into the continuation of the objectives of the former five-year programme into the MSc programme.

Core competencies

The exit qualifications for the MSc Forest and Nature Conservation have been formulated as seven core competencies. Within those competencies the domain specific knowledge and skills are described as well as the general skills and attitude a graduate needs to cope with in his/her first position in the professional field.

The competencies have been described following a certain format. For an exact description, see Vodde *et al.* (2004b). Two important aspects of that format are the work level of the graduate (operational, tactical and strategically) and the level of complexity of the work situation (basic, integral and innovative). The seven core competencies are:

- *Carrying out fundamental and applied scientific research:* The graduate as an independent researcher is able to carry out scientific research on an integral level of the ecological and social economical aspects of Forest and Nature Conservation. In a tactical and strategic way he/she can suggest possibilities for the benefit of sustainable management of forest and natural areas, on various scale levels, both national and international. The results are usable for policy makers, designers, managers and planners for the benefit of the forest and nature conservation.
- *The formulation of policy:* The graduate as a policy maker is able to formulate a feasible policy on an integral level for both the government and within an organisation. The graduate is also able to indicate what the consequences of these tactical and strategic policies are for management of forest and natural areas, both national and international.
- *Giving advice:* The graduate is able to give balanced tactical advice, aimed at the social economical and ecological aspects of policy and management for a sustainable forest and nature conservation. In different situations the advice will be formulated on an integral and innovative level and will be usable for governments, organisations, companies and private individuals.
- *The making of applicable designs:* The graduate as a designer is able to invent and construct methods and means on an integral level, which will contribute to a better and more efficient research and a sustainable management of forest and natural areas, both nationally and internationally. The approach during the design is tactical when it concerns technical tools and methods, and strategic when it concerns policy.
- *The execution of co-ordinating tasks:* The graduate is able to develop into a person who can fulfil a co-ordinating role within a company or organisation on an innovative level for different activities, which play a role in the formulation of management plans, and strategies

for forest and natural areas. In a strategic way the graduate attempts to align users, managers, owners and other stakeholders to include sustainable development in policy and in implementation of forest and nature conservation.

- *Specialisation in the area of forest and nature policy*: The graduate with policy as specialisation can play the role of researcher, advisor or policy maker and is able to create and guide decision-making processes in a tactical way on innovative level with governments, manager- and stakeholder organisations in the area of forest and nature conservation.
- *Specialisation in the area of ecology of forests and nature*: The graduate in the role of researcher or advisor is able to integrate knowledge and development and can apply this on a strategic level for the analysis and the design of sustainable and ecological efficient management of forest and natural areas.

Academic validation

The exit qualifications have only recently been reformulated in terms of competencies. The programme of Forest and Nature Conservation is a unique education programme in the Netherlands. Therefore, in order to compare the programme with international standards and to provide an international context the competencies were sent out for peer-review to same international references as for the BSc. Their comments are as follows:

According to four peer-reviewers, the formulated exit qualifications of the MSc “are fully in line with/ agree well” with the international standards within the discipline of Forest and Nature Conservation. As an answer to the question whether the qualifications are related to the requirements of professional practice, the peer-reviewers found the qualifications on the MSc providing a good basis both for further academic training and research (PhD) and for a variety of professions.

Together with other detailed remarks, this will be taken in account on further development of the competencies. In general, the results of this peer-reviewing give confidence in the competencies, as a solid construction to build further on.

Professional validation

The recently reformulated competencies have also been discussed with (inter)national people in the professional field of Forest and Nature Conservation. Comments have been collected through e-mail as well as during the External Advisory Committee meeting in November 2004. The Dutch External Advisory Committee had a positive opinion on the competencies, which were well related to the professional field. However, according to the committee, several competencies have been formulated on a too high level. These comments will be used for further development of the description of the competencies.

The importance of all seven competencies for a MSc graduate Forest and Nature Conservation was also underlined by the international reviewers. Some described a lack of several competencies in his/her working/ profession environment and thought it an improvement when they are already embedded as much as possible in the programme.

Overall, the remarks from the External Advisory Committee will be taken into account to provide the current competencies with a sharp and concise formulation.

Comparison with Dublin descriptors

The Dublin descriptors were plotted against the seven MSc core competencies and the 34 sub-competencies. The full matrix can be found in Van Leeuwen *et al.* (2004b). The matrix shows an equal distribution of the sub-competencies between the five Dublin descriptors, except for the second descriptor, which is represented in a large part of the sub-competencies. The abundance of this descriptor reflects that knowledge and skills acquired earlier, potentially during the BSc, are integrally implemented in the programme. This is consistent with the objectives of the MSc Forest and Nature Conservation.

The exit qualifications are also based on the requirements of the relevant practice in the prospective professional field. New graduates of the MSc Forest and Nature Conservation start their careers as researcher, advisor and policymaker. Though, after ten years this image switches to fewer positions in advising and more in company management. This illustrates the presence of an important academic competence, namely lifelong learning and development.

Present status of competency implementation

At this moment all Wageningen programmes have described their competencies and sub-competencies. Also matrices with courses and competencies exist and comparisons to the general Dublin descriptors have been made. The progress in implementation varies. For the BSc and MSc Forest and Nature Conservation the competencies have been described to the satisfaction of academics and professionals. However the domain has to be described somewhat more extensively and the level of some competencies have to be adapted. The implementation in the courses for competencies like carrying out research, effective communication and application of domain knowledge are rather satisfactory, but for some other competencies this implementation has not yet been finished. Moreover, adequate testing has not yet been developed for all sub-competencies.

The development of the competencies has been done for the different programmes rather separately. Presently discussions, how to formulate typical “Wageningen” and academic competencies, are ongoing. Probably this influences also the final competencies for forest and nature conservation, but it is believed that this will be mainly a reformulation and rearranging but not a large change in the content of the competencies and the courses.

Experiences with BSc students

Most courses in the BSc are in Dutch. Most students have a Dutch nationality and only few are from Belgium. The students have a similar academic starting level, since they all have followed a six year preparation for university level at secondary school. The programmes at secondary school were recently changed, to prepare future students better for university. Therefore the transition to academic education in the new programmes is rather smoothly. Students have already experience with working independently and in small groups and attending not too many lectures. A problem arises due to the fact that at secondary school students have to specialize whether in a more natural sciences oriented or a social sciences oriented profile. Both groups are accepted in the programme. The differences in knowledge of for instance biology, mathematics at one hand and geography and economy at the other hand are not easy to handle for staff and students. The main study problems are caused by the present combination of natural sciences

and social sciences oriented courses, which are supposed to be all crucial for forest and nature conservation. Next to a common base students specialize for half a year in one of the specializations: policy and management or ecology and management. The two common years in the BSc (also a free choice part of 27 ECTS exist) show that both types of students are able to pass, but quite some students have a problem whether in the more natural sciences oriented or the more social courses. The external advisory board suggested formulating the BSc without specializations, but we decided to keep this limited specialization possibility. Students indicate that they like these specializations, since they are able to study some subjects more deeply and obtain the feeling that they become experts in the field of forest and nature. In summary, the main variation in BSc students is the background knowledge and not skills or attitude. Since knowledge is easier to describe and adapt, problems faced are relatively limited.

Experiences with incoming MSc students

For admission to the MSc, students should have

- A relevant BSc,
- Ability to finish in 24 months,
- An adequate grade point average (GPA),
- A sufficient command of English,
- Motivation to follow the programme.

The admitted student groups will vary according to:

- Cultural differences,
- Educational system,
- Type of bachelor education (professional versus academic),
- Domain background.

These subjects will be looked into below. It has to be stressed that general observations are given and that individual students may deviate from the general trends.

Cultural differences

MSc students from different European and other countries participate in the MSc Forest and Nature Conservation. This MSc programme reflects the competencies, which are felt important for an international setting (from a Dutch perspective). Therefore students in Wageningen will experience this approach in an international student setting. It is believed that this setting is an enrichment for both Dutch and international students, giving ability to function in a more and more international world. An extensive description of cultural differences and their effects on education can be found in Hofstede (1986, 1991) and many subsequent publications.

Culture is a phenomenon, which is induced by the collective programming of the mind distinguishing the members of one group or category of people from another. The contrasting cultural values can be described according to Hofstede (1991) in five dimensions:

- Power distance,
- Individualism/collectivism,
- Masculinity/femininity,
- Uncertainty avoidance,

- Long-term versus short-term orientation.

It turned out that people from different countries score quite different in these dimensions. This affects attitude to many aspects, including education. Some striking features are given based on Hofstede (1991) and some observed phenomena for our MSc students are added. It must be noted that these phenomena are rather accidental observations, not based on systematic research. Also individuals may differ considerably from the average. Table 1 presents dimension scores of Hofstede for those countries, from where the majority of our students come.

The power distance measures how subordinates, in this case students, respond to power and authority of teaching staff. Countries like the Netherlands, UK, Germany, Austria and the USA have a relatively low-power distance. High-power distance countries are most Asian and African countries and in Europe countries like France, Greece and Spain. In low-power distance countries, teachers expect the students to initiate communication, to find their own paths, to contradict and criticize teachers

Table 1: Scores for selected countries, based on dimensions of Hofstede (<http://www.geert-hofstede.com/>).

Country	Power distance	Individualism/ Collectivism	Masculinity/ Femininity	Uncertainty Avoidance	Long-term Short-term
Argentina	49	46	56	86	
Austria	11	55	79	70	
Belgium	65	75	54	94	
China	80	20	50	60	118
Czech Republic	62	40	60	65	
Ethiopia	64	27	41	52	
France	68	71	43	86	
Germany	35	67	66	65	31
Ghana	77	20	46	54	16
Greece	60	35	57	112	
India	77	48	56	40	61
Kenya	64	27	41	52	25
Spain	57	51	42	86	
Netherlands	38	80	14	53	44
Sweden	31	71	5	29	33
UK	35	89	66	35	25
USA	40	91	62	46	29

It is observed for our students that in the formulation and sharpening of the research proposal for their MSc thesis and its execution, students from countries with a high power distance have relatively more problems in coming up with new ideas, which differ too much from the original proposal brought by the staff. The same is valid for problem-based learning courses. In the programme it is shown and explained that a critical and independent attitude is important. Still, differences in attitude remain. Since scientific independency is judged positive and reflected in the final mark, attitude could affect the final mark of some students.

In countries, which score high on the individuality index, like many West-European countries, Scandinavia and the USA, people are expected to take care for themselves. They will for instance more easily react in class in response to a general invitation by the teacher; they like challenges, and expect that they are taught how to learn. They also consider acquiring competencies of more importance than obtaining certificates. Students from collectivistic cultures (most of the countries located in Asia and Africa) have a contrasting approach. They prefer to learn how to do things and strive to achieve higher marks.

The competencies of the MSc Forest and Nature Conservation curriculum typically emphasize individualism but include working in small groups. To judge students adequately, they have to be assessed in the different working forms. It is observed that disagreement on marks between staff and students occurs more often with students from collectivistic countries, probably because these students are keener on higher marks. Another cause may be that these students judge some competencies as less relevant.

In feminine societies like countries in Scandinavia and the Netherlands, people like to cooperate well with each other and are less competitive. Teachers tend to use average students as the norm, and students practice mutual solidarity. The education system would usually like to reward also social adaptation, for instance how to work with each other and not only academic performance. Also employers in these countries appreciate alumni with these competencies.

One of the problems which are faced by the introduction of competencies in Wageningen University is how to judge and reward these “soft” values.

When uncertainty avoidance is strong, cultures see uncertainty as threatening. In countries where avoidance is weak (Netherlands, USA, UK and Scandinavia) students are able to work with rather unstructured learning situations (like problem-based learning courses), and broad assignments. In these countries teachers interpret intellectual disagreement as a stimulating experience.

Students from countries with strong uncertainty avoidance prefer courses, where students learn to solve problems accurately and structurally. It is remarkable, that they often judge these courses, in which they learn many skills, as more academic than more unstructured courses, where students have to develop their own ideas of tackling problems. These last types of courses however are - at Wageningen University - considered essential for developing academic competencies.

The Netherlands has an intermediate position in between short and long-term orientation. The MSc Forest and Nature Conservation promotes both fast results and perseverance.

We observed that for instance Chinese students, having a long-term orientation, spend much more time in studying, both in the class and outside, than students from Europe. In judgement of the thesis, the time spent is however not judged, which occasionally leads to some disagreements with students. Finishing a thesis in time determines only a small part of the mark. This aspect of thesis evaluation has to be reconsidered.

Differences in culture affect expectations of students, judgement of parts of courses and to a certain extent performance. However the various courses and overall programme are judged as very positive by different groups, probably because a lot of knowledge and skills are offered

adequately in the programme, which can be used in any future job setting. Most students also appreciate that they better understand other cultural attitudes, making them more competent in respecting, dealing and understanding people from other cultures. Moreover quite a few competencies are not culturally dependent.

Educational system

The educational systems of the incoming MSc students vary dramatically. In many countries students are used only to frontal teaching and reading many pages of literature. They have no experience with applying this knowledge, to set-up research, to be critical, or to work in teams. For these students supporting courses have been developed, like research methods, and trends in forest and nature conservation, and they also can follow lectures as ethics and philosophy. We normally get quite enthusiastic reactions to our type of teaching, but it takes some time to get used to the system. Most students indicate that this is enrichment, even if they cannot apply all competencies in their home settings. Some others indicate however that they want to get more knowledge.

Different types of Bachelor Education

Students of the MSc Forest and Nature Conservation presently vary in the type of bachelor education, being scientifically oriented for universities bachelors and more professionally oriented for students from universities of professional education and polytechnics. However, universities in Europe vary considerably; some are comparable to universities of professional education while others are very academic. Also the difference between various polytechnics can be considerable.

For Wageningen University as a whole, differences in performance between students with a university BSc and a professional bachelors ("HBO" in Dutch, meaning: higher professional training) have been studied. Average overall course marks, and final thesis marks hardly differ, but for courses, followed by both types of students, students with a university BSc do score better. This indicates that for the present programmes, allowing students to take BSc courses as supporting courses, a considerable part of the HBO students is able to adapt to academic competencies. Since the number of supporting courses will be limited, HBO students will have to follow a preparation programme as minor in their bachelor or specific supporting courses before admission to MSc.

The difference between University BSc's (Wageningen) and HBO Bachelor's (van Hall-Larenstein) on entering the Wageningen MSc is studied for Forest and Nature Conservation (Epema, 2004). Comparing the domain no large differences were found, but when comparing competences, especially academic competences, differences were prominent. Also students with a bachelor from the HBO, following the MSc Forest and Nature Conservation turned out to have more problems in abstract thinking. Based on this a preparation programme as minor in the HBO bachelors or as supporting courses in the MSc are developed, including courses as mathematics and statistics and courses where various academic competences are trained within regular courses. In this way a more equal entrance level for academic competence is achieved. Vital remains, that they also in the new situation follow the course "Research Methods in Environmental Sciences" as part of their MSc, where they learn how to set-up scientific research proposals. In the Academic Master Cluster they preferably should not select subjects like Project Planning and Management and Communication Skills Development, but Philosophy

and Ethics, and Academic Writing. The advantage of a preparation programme is that students entering the MSc from the HBO can follow the same flexible programme as the University BSc students. In this way they not only achieve the minimum competencies offered by the compulsory part of the programme, but they are also able to perform at a higher level for the competencies or profile themselves by a minor in another domain.

For BSc students from other universities in the Netherlands differences in academic competencies with Wageningen are relatively unimportant. These students are well able to follow the MSc Forest and Nature Conservation programme. For admission to the programme in the new situation, mainly the domain is of importance. This will be treated in the next section. Students from universities outside the Netherlands vary considerably. It is difficult to make general statements about performance and admissibility, since variations between universities are large, individual students deviate from the mean, students develop different during their studies and cultural differences are present. This pleads for an individual assessment of the students by admission committees to see if they can be admitted directly, or should follow a preparation programme or better to be turned down. It also pleads after admission for an individual programme to establish a good choice in the optional part of the curriculum.

Domain Background

Besides students with a Wageningen University BSc in Forest and Nature Conservation, who are automatically admitted, more programmes are considered to be relevant. Presently students with a bachelor background in for instance forestry, nature conservation, biology, environmental sciences, animal management, and rural development follow the MSc programme. For the policy specialization even students with an economy background will be admitted under the condition, that they did a specialization in forest and nature and also followed a number of relevant courses in the free part of the programme or as minor. The way to handle this is by offering a common course on present trends in forest and nature and making tailor-made MSc programmes with relevant supporting courses and giving the opportunity to follow some courses in the bachelor. In this way the students are able to follow the advanced courses and selecting a relevant thesis topic. The final competencies will vary based on their BSc background and selected free courses, but at least a minimum amount of the competencies can still be met. Crucial in this approach is an agreement on the individual programme by study advisor and student and an adequate admission procedure. Only students will be admitted to the MSc, who are able to finish the MSc in two years.

Conclusions

The bachelor-master structure is a good start in giving students more flexibility in education. However differences in exit competencies of the bachelor student vary strongly, based on orientation of the bachelor (scientific, professional), cultural differences and domain knowledge. On admission to the MSc programme and during the programme these differences have to be tackled in order to educate students with the same range of minimum competencies. An individual approach is crucial;

Students of the Wageningen MSc Forest and Nature Conservation Programme, having at least a common a set of joint competencies, will vary according to personal competencies, the bachelor

background and personal choices. These differences should be made clear, so that employees and students are aware of the strong and weak competencies;

International curricula, like the Wageningen programmes, are successful as long as knowledge and skills are trained well and respect and understanding of different cultural attitudes is part of the programme. Describing the programme in competencies helps to communicate with international employers, but the appreciation of different competencies will depend on the type of job and its cultural setting;

In order to make competencies comparable, the formulated competencies should be compared with the Dublin descriptors. Formulation of specific university and academic competencies and a specification of a format per university or group of universities may help to use the competencies as means of communication.

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2.3 LEARNING BY DOING – AND A PRODUCT TO END WITH: E-LEARNING GENDER COURSE⁴

SIEGFRIED LEWARK

Summary

A new international E-learning course on gender and forestry was held from September 2004 to January 2005 as a blended course at Hedmark University College, Norway, and at the University of Freiburg, Germany. Based on earlier courses held at the University of Freiburg this course has been developed into an E-learning course now, with face-to-face phases of four days at the beginning and internet based learning and teaching throughout the following five months (so called blended course), with 5 ECTS credits. The result of this first and the planned following courses will be a booklet with life stories of women in different positions in and around forestry.

Earlier E-learning courses

A new international E-learning course on gender and forestry (Gender research in forestry) was held from September 2004 to January 2005 as a blended course at the Hedmark University College, Norway, and at the University of Freiburg, Germany, by the author together with Merete Furuberg and Marion Karmann. There are two lines leading to it: former classroom gender courses and E-learning courses with different topics within the teaching program of Work science at the Faculty of Forestry and Environmental Sciences of the University of Freiburg.

The latter courses were especially focussed on ergonomics and have been developed and held together with colleagues from the University of Stellenbosch, South Africa (Längin, *et al.*, 2004a; Längin, *et al.*, 2004b; Lewark and Längin, 2003). Learning success and the impacts of course settings and learning conditions have also been studied within a PhD project (Längin, 2005). These courses generated experiences with different learning and teaching platforms (WebCT in Stellenbosch and CLIX in Freiburg). The new course has been designed and carried out using another learning and teaching platform: eGO (acronym for electronic group organisation), developed by the Institute for Informatics and Society of the University of Freiburg which proved to be a tool easy to use and quickly to learn, with a direct contact with the program administrator (screenshot in figure 1).

The educational concept in these cases was blended learning, which combines contact days at different stages of the course (face-to-face phases) with internet based learning and teaching, generally throughout one semester. Most of the courses have been organised as teaching modules within the forest sciences curriculum (Lewark, 2001; 2002) of the University of Freiburg. They have been electives with two to five ECTS credits.

⁴ Based on Lewark, 2004b

The concept of the new E-learning course on gender in forestry

The new gender course is based on classroom courses held at the University of Freiburg seven times since 1999 (electives) with somewhat changing focuses (women's work in forestry, gender analysis, female careers). The outline of these courses has been described earlier (Lewark, 2004a).

The screenshot shows the eGO learning platform interface. The browser window is titled 'EGO - Opera' and the address bar shows 'http://bachmann.ig.uni-freiburg.de/index.php'. The page header includes navigation links like 'home', 'Calendar', 'Contacts', 'Chat', 'Forum', 'Files', 'Notes', 'Mail', 'Options', 'Help', and 'Logout'. The user is identified as 'Siegfried Lewark' in the 'Gender & Forestry' group, with the date 'Thursday, 30. Dezember 2004'. The main content area is a file upload section with a table of course materials.

Name	Date	Byte	Comment
1 Bibliographies, textbooks & links	14.10.2004 09:06	D	articles moved to other file
2 e-Learning literature	23.10.2004 17:38	D	Papers on e-learning (see also Unasylva number)
3 Education, gender & forestry literature	23.10.2004 17:38	D	Papers on gender issues in forestry courses
4 Gender in forestry literature	25.10.2004 11:44	D	
5 Official documents	14.10.2004 09:25	D	Documents from EU, ILO, FAO, ethic guidelines also
6 Presentations from organizers	14.10.2004 09:25	D	here we will upload our presentations from Evenstad & Fr...
7 Theories and methods	25.10.2004 11:45	D	
8 Uploading tasks, working results, photos	14.10.2004 09:26	D	Here should the results of participants' work go - to be...
8.1 Interviews: Texts & guidelines	14.10.2004 09:26	D	
8.1.1 Interview guidelines	23.10.2004 18:01	D	
8.1.2 Interviews Evenstad	23.10.2004 18:01	D	
8.1.3 Interviews Freiburg	24.10.2004 13:13	D	NOTE DOCUMENT SIZES
8.2 Photos	14.10.2004 09:27	D	
8.3 Task 1: Synopses	14.10.2004 09:27	D	
8.4 case studies	10.11.2004 18:00	D	Krishna started case studies, so here is the box for it

Figure 1: Screenshot from eGO learning platform showing part of the course material (participants post their assignments and interview texts directly under the appropriate heading of the files section of the platform).

Those courses in Freiburg had been organised as one week blocks, which according to the curriculum regulations in Freiburg meant 20 contact hours and 20 hours of self study. Two ECTS credits were given upon successful participation. The main target group has been students of forest sciences. The learning/teaching form was a workshop with experts and much emphasis on self directed learning and an active role of the students: presentations, interviews of the experts and a documentation of the whole course as a product. Female experts from forestry, journalism and related gender study fields shared their professional experience with the female and male students of forestry (with equal shares, whereas the percentage of female students in forestry curricula in Freiburg is around 30%). Knowledge was collected on the statistics concerning women in forestry, published experiences, on self understanding in their roles as well as on organisations of women in forestry in Germany and in other countries. Typical questions to elaborate were: Why are women entering this "classical male professions" (and why is forestry called a typical job for men)? Where are women going when they finished their

studies in forestry or the civil service as a forest administrator? What kinds of physical, psychological, rationale and legislative reasons (and what other kinds of reasons may be there?) may prevent women from entering or may encourage them to engage in forestry?

Objectives as stated in the course description were to obtain:

- Methodical skills and affective orientation in the field of gender studies;
- Knowledge, through statistics in forestry, profiles about qualifications, policies (gender mainstreaming), laws and results from research, about:
 - The number of trained and employed women in forest work;
 - Published information about their experiences in jobs and about their self-perception as women in forestry;
 - Organisations and self help groups of women in forestry in Germany and abroad;
 - Research plans and results in the field of Gender Studies.

The new course (Gender research in forestry) has been transformed into an international course in English, using contacts from the IUFRO unit Education, Gender & Forestry. Course contents have been proposed as:

- Theoretical dimension of „Gender-Studies“;
- „Gender-Studies“ in the context of forestry on national and international level;
- Concept „learning by research“;
- Design of studies in gender in forestry research.

Table 1: Matrix developed for discussing of content priorities with the participants.

Female / male	Forest workers	Foresters	Forest owners	Contractors
Careers, employment, working profiles				
Working conditions, stress & strain				
Motivation & attitudes, job satisfaction, social relations				
State of knowledge, research questions				

The decisions about the focus in the different courses have been taken together with the participants using a matrix (table 1).

Table 2: List of interviews of women and men in different fields of activity in and around forestry

Fields of activity	Interviews of course group	
	Evenstad	Freiburg
Forest ownership / work for oneself	8 female 4 male	-
Community forestry (Nepal)	2 female 5 male	-
Forest work	-	-
Foresters work in narrow sense	-	-
Services (entrepreneurs)	-	-
Natural protection	-	1 female
Students	-	-
Teaching & research	-	1 female

The course started with a presentation and discussion of basic information on the state of knowledge on gender issues in forestry, followed by a methodical introduction. Afterwards the course focussed on living situations and professional careers of women and men on different levels of forestry (table 2). In realisation, biographical interviews have been carried out (see box 1) and written down in the form of life stories, which have been compiled in an internal brochure. The idea is to eventually make a publication based on the internal brochures of several subsequent courses. Interviews and life stories lead to understanding of the conditions of the professional biographies as well as the attitudes and experiences behind that.

Box 1: Example of an interview as a result of the E-learning course.

<p><i>” ... within the natural conservation area, gender issues are not a problem.”</i> <i>Diana Pretzell, Germany</i></p>
<p>Single. At present she is working for a project named PLENUM in the state of Baden-Württemberg. She has a PhD in forest sciences and also studied journalism.</p>
<p>Diana decided to study forestry because she looked for a career where she could combine: ecology, economics and international contact. She found forestry was a good chance to do it at the same time. She had to do practical work in the first semester. She did not have problems during the field work with the forest workers but could notice that the behaviour of the master forest worker towards her was a little different compared to the others, the male forest workers. She found that foresters wanted to demonstrate that this work is only for men, and they wanted to show her that she could not do it. This situation was a little uncomfortable for her. She also worked during her studies for a forestry project in Chile. There she noticed that when she occupied a lower ranking position than her male colleagues, there was no problem, but when working in an equal position or higher, then the colleagues didn't accept it very well. Among her co-students, during her studies, there was no problem, even though there were more men than women (25%). During her PhD studies, at the Institute of Landscape Management of the University of Freiburg, the difference was negligible especially because there were almost the same numbers of men and women.</p> <p>When Diana had obtained her PhD, she applied for a job in the PLENUM project where she now works as a manager. PLENUM is a nature protection strategy in order to achieve environmental and conservational aims not by mandatory regulations, but on voluntary basis in cooperation with the population. At present the PLENUM conception is implemented in five project areas of the whole area profile (???), which makes up 13% of the surface of Baden-Württemberg. She is in one of the five projects named "Naturgarten Kaiserstuhl" which is close to Freiburg.</p> <p>Her activities within the project are mainly managerial, consulting service, moderation, and political activities. She has very good relationship with all her colleagues; she has no difficulties at all with them. She also thinks that within the natural conservation area, gender issues are not a problem. Diana thinks that there is a tendency in the future to increase women's participation in forestry. However she has recognised that when women raise children, the situation could be different. Women must be multifarious and try to coordinate their responsibilities for their families and jobs.</p>
<p>Life story based on an interview by Cristabel Durán and Néstor Gutiérrez, Freiburg 14.10.2004. We met Diana Pretzell at her office in the District Administration Office in Freiburg, where she told us about her life, and the project where she works.</p>

The international approach resulted in a broad representation from different countries: In the first course participants came from Nepal, Norway, Slovakia, Venezuela and Germany. The blended setting with its approach of learning by doing and the resulting brochure has led to very active students' roles and an open and creative learning climate.

We are planning a second course in the winter semester of 2005/2006⁵, and think about a pure internet group in addition to the groups with a direct start in Evenstad and Freiburg. This will be an answer to the experience that many potential participants were not able to come to Evenstad or Freiburg for the starting phase. The participants in an internet group would not profit from the advantages of the blended setting. But we hope that we may integrate them into a course, in which many of the participants meet personally, so that we may realise a good deal of the concept of blended learning and get a good learning success.

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⁵ This course has been started with 28 enrolled participants and is in a final phase in March 2006

3 WHICH OPPORTUNITIES DOES “BOLOGNA” OFFER: CURRICULUM DEVELOPMENT

3.1 THE RUSSIAN SYSTEM OF HIGHER FORESTRY EDUCATION AND INTERNATIONAL COOPERATION

NATALIA VINOKUROVA

Summary

The contemporary situation of the system of Russian higher forestry education and the actual progress of the reform processes are described.

Introduction

“One man’s meat is another man’s poison.”

Russia is a huge country with own traditions of higher forestry education⁶. Russia will always need Forestry Science specialists because one quarter of the world forest resources is located on the territory of Russia. Nowadays, the total number of students trained in forestry - related professions amounted to 30,000 people, including about 2000 students from the Commonwealth of Independent States and other foreign countries. Specific disciplines alone are taught by over 300 professors (doctors of science), and more than 1500 assistant professors (candidates of science).

The famous Dutch painter Vincent Van Gogh noticed "I feel that I am always a traveller going somewhere to a destination". The same feelings appear when we try to understand the meaning of numerous Russian reforms. If we look at the Russian system of higher education in the framework of the Bologna Process we will see that it is a traveller now, "going somewhere to a destination". The purpose of this paper is to highlight the process of entering by the Russian higher forestry education into the Bologna Process and describe some special characteristics of the Russian higher education using some examples from the Moscow State Forest University.

The higher forestry education in Russia

Moscow State Forest University is a leading centre of higher forestry education in the Russia Educational and Methodological Association (EMA), which is based in the Moscow State Forest University. Today there are 52 state institutes of forest training in six specialisms and over 30000 students in EMA (Sanaev, 2003). So, the higher forestry education system in Russia consists of a large-scale structure, which has its own specific correlations with the interests of the government, labour market and intellectual demands of the students. Hence, this huge and sustainable structure of Russian forestry higher education with its own historical traditions

⁶ The oldest forestry institution of higher education is the St. Petersburg Forest Technical Academy which was founded in 1803 by a decree of Emperor Alexander the First. So Russia has a huge experience in forestry higher education which comprises over 200 years history and a very large territory for scientific forestry observation.

based on our national cultural background is not flexible enough for new reforms. At the same time Russia has a unique geographical, geopolitical and economic situation and location. Historically Russia has always been a multi-national state; its geographical and geopolitical factors indicate that Russia is Eurasia and not only Europe (Savitsky, 2003). Geographical and regional components should be taken into account especially in such fields of national culture as higher education.

The Russian programme of the development of the higher education

The economic situation in the world has changed now and one of the main demands of global market is mobility. The Bologna Declaration is one of the answers to the present needs of educational and labour markets. The Bologna Declaration of 1999 was the responsibility of Ministers. According to the aims of the Bologna Declaration the universities in almost every country in Europe will introduce for the basic university education a new degree structure. It includes the intention to adopt a system of easily readable and comparable degrees, to adopt a system with two main cycles (a three year undergraduate, BSc and a two year graduate MSc), to establish a system of credits (such as ECTS), to promote mobility by overcoming obstacles, to promote European co-operation in quality assurance and to promote European dimensions in higher education.

The Bologna Process is moving from a phase of ideas toward a phase of implementation. Significant steps have already been taken but by 2010 all countries must fully implement the reforms. Russian institutes and universities are interested in international mobility and development of international academic exchange. The main problem for further development of the Russian system of higher education is how to choose the right way for such kind of cooperation. How to implement valuable international experience in a national system of higher education? Russia has its own programme for the development of education for the years 2006-2010 which purposes and stages can be described as follows (see also Anonymous, 2005): The aim of the education modernization is to provide a competitive advantage for Russia in the world. The first stage (2006-2007) is devoted to the elaboration of education development models according to the different directions of the education system. The second period (2008-2009) is connected with investments into the material basis of education (purchase of modern equipment and so on, information and staff provision). During the third phase (2010) Russia should see the first results from the previous periods.

Public responsibility in the Russian system of higher education

It is well known that every innovation contains its pluses and minuses. What does the Bologna Declaration offer to the Russian system of higher forestry education? Where are we? Where are we going to? One of the main positive principles of the Bologna Process is the public responsibility (see Nyborg, 2005). The public responsibility for higher education encompasses the structural elements of the Bologna Process such as a national framework, degree structure, quality assurance and recognition. Public responsibility as an essential element in the social dimension of higher education may be expressed as:

- Making higher education equally available for everybody;

- Meeting the need for appropriate studying and living conditions for the students, so that they could complete their studies without obstacles related to their social and economic background.

The social dimension of the Bologna Process should also include living and working conditions for university teachers and staff as well as lifelong learning.

According to the programme of development for the Russian education system the first point about making higher education equal for everybody includes four main points:

- Development of a modern system of sustainable education;
- Quality control of the professional education;
- Attraction of investments from private companies into the education system;
- Creation of conditions for accessibility for everybody's qualitative education (see Anonymous, 2005).

The point about public responsibility as the main positive principle of the Bologna Process is a very difficult point for the current situation in Russia. In general, there is a low level of public responsibility or any social guarantee in Russia. We are still in the period of social, economic and political reforms and as one can imagine it is not a sustainable system for any kind of guarantees. Russian industry is destroyed and the labour market for qualified specialists in Russia is closed too (see Teplyakov, 2003). The Russian system of higher education is still under strong state governance but the planned economic system has already disappeared. Who should distribute the specialists from forest universities, instead of the so-called "GOSPLAN", a special central planning committee during the Soviet period? The methods of governance should be changed according to the current requirements. New private employers do not need highly qualified specialists as a BSc or a MSc, especially in the forestry industry where reforms are now only in the first stage and where no working places for such kind of specialists exist. Previous cultural values have been crashed down but there is no new national and economic idea for governance in the new state. Public responsibility supposes that every member of the society knows what he wants to reach in his life provided that the economic situation of his country is stable. Instability lessens in everybody the feeling for any responsibility very strongly (Barbashin, 2003). Now employers can not formulate requirements for quality qualification. And there are no resources for new tasks in the education system, which are necessary to answer the requirements of the current economic situation. Thus, public responsibility is closely connected with a high standard of living in the state, with economic and political stability, and with new ideals that are shared by the majority of the society. This is one of the main problems in the development of the international system of higher education in Russia.

Another factor which influences negatively the development of public responsibility in Russia is high index of power distance and autocracy system of the government (Hofstede, 1986)⁷. Russia is an orthodox country and there is no tradition of independent political minds, 'because the

⁷ The concept of power distance measures the human inequality and its acceptance in a society. Power distance is identifiable in different fields of society and social life. In essence, power distance is associated with how unequal the less powerful members of organizations and institutions experience the power distribution in society. This implies that inequality is defined from below, not from above. It also suggests that on society level, inequality is endorsed by the followers as much as by the leaders (Hofstede, 1986).

whole life depends on the leader's decision and all power in Russia comes from God'. This is the influence of the Asian or Eastern mentality. As for the academic life in Russia a huge distance between students and professors exists. Students, as a rule, could not influence the university's internal policy. Thus we see students and professors in Russia have only duties, no responsibilities toward each other.

Another problem is the ageing of teaching staff. On the one hand this is a consequence of the special culture of governance. Russia is a country with collectivistic culture in governance and one of the fundamental principles is respect for old age. The elderly are seen as the true repositories of wisdom and knowledge and, therefore, as assets of great value to the community. Hence, the young generation is not allowed to criticize the old generation and really influence the strict conservative university regulations. On the other hand professors have a low salary and they have no interest or possibility to raise the level of their skills, resulting sometimes in old-fashioned knowledge. The consequences of this low level of the standard of living of professors are manifold: a regular interruption of the teaching continuity, a reduction of the level of research activities, the abandonment of the principle of unity of theory and practice. This is enhanced by the outflow of promising young academic staff to business structures and abroad.

All these problems affect negatively the quality of education. Thus before introducing reforms, the Russian society should revise public responsibility in living and working conditions for university teachers and staff, taking into account that lifelong learning is an aspect of the social dimension.

Institutional autonomy in Russia

Another positive principle of the Bologna Process is institutional autonomy. Institutional autonomy implies that institutions have the freedom they need to carry out their mission and the control of their internal system. This principle is implemented now in the higher education system in Russia. First of all this principle is closely connected with aspects such as curriculum, internal university's regulations and research.

Russia knows a specific cohesion between science and education. Here, Russia resembles America more than Europe and differs from them by its preferences for the scientific competence above the educational one. If Europe has developed toward fusion of science and education, it would be better if Russia develops its own model of contemporary education (more science and less education especially in doctoral degree). Higher education in Russia functions under the control of the Ministry of Education and Science. This is obvious, because about 50 % of the educational disciplines in the curricula (the so-called "Federal component") are allocated strictly by the Federal Agency of Education of this Ministry. Only 50 % is determined by the university. At the same time, each university could develop independently its own system of research and consulting activities, and could regulate its own staff, its internal regulations and other aspects. Russia is an autocracy country and had a tradition of Tsar's government for more than 1000 years⁸. Thus it is impossible to implement the autonomy principle of Bologna Process

⁸ Centralization of authority and authoritarian leadership has a long history in Russia. Over the centuries, Russian culture has been replete with ruling elites and authority figures that tightly controlled society and suppressed personal freedom. Among these were leaders of Russian Orthodox Church, tsars, landowners, and the communist party elite. The identification of power in Russia contains in itself the sacral meaning. Thus, the Monarch is the only person who

in full measure in Russia all at once. Nowadays, the institutional autonomy is much larger and universities are relatively independent from the Ministry of Education and Science. This progress is a great success as compared the Soviet period. The conclusion is, we should follow the culture, but not fight against it.

Mobility and current situation in the Russian system of higher education

Mobility is the next basic idea in the Bologna Process. Important factors for students' and professors' mobility are access to study opportunities and related services, and recognition of examinations and degrees. For university teachers, time spent abroad doing research or teaching should be recognized without loss of statutory rights. The international students' and university teachers' mobility, however, introduces two key issues, the first of which is language (English). The English language is one of the first barriers towards the development of international mobility in higher education. We should take into account that only one third of the students from the Moscow State Forest University have international certificates, supporting their linguistic, in general English, skills and only some students could pay for their education abroad. But the problem is not in the lack of linguistic skills. The problem is in difference of meaning of forestry definitions in different languages. Is it possible to develop and elaborate a "lingua franca" for the future forestry education? Should we use the Latin language or anything else?

The purpose of studying abroad plays the main role here for Russian students. I mean the labour market. Russia has no labour market for BSc and MSc graduates in forestry. Russia is not even a member of the European Union. Thus Russia has no common labour market with Europe. Should Russia create its own labour market and corresponding system of higher education radically different from the EU, especially in forestry or not because of its regional component? The Russian forestry is different from the European forestry. At least we have different climate conditions. What kind of specialization should be more interesting for Russian forestry students? What should they study abroad? Where in Russia could they really implement their knowledge which they will obtain abroad? Is it possible to develop an adequate labour market for such kind of specialists? Who will pay for the education abroad: Russian Ministry of Science and Education or the European Union? Is it necessary for new employers to spend money on such kind of specialists? Students in Russia are the most mobile stratum. They press forwards to come to and to stay in two Russian capitals, Moscow and St. Petersburg, but their native regions have a lack of able-bodied staff. The main reason is the high standard of living there and the possibility of surviving. The young generations hope only on branches of joint stock enterprises in Russia, because the Russian industry is decreasing. Is it possible to create a labour market in Russian forestry for BSc and MSc graduates very soon? As compared with Europe Russia has no united labour market because of various special geographical and economic developments; the latter is one of the main problems for the development of mobility as one of the basic ideas in the Bologna Process.

has the responsibility for the land, and other persons, who are free from this duty, should fulfill all orders of the supreme power. Among the clearest evidence of the unequal distribution of power in Russian society was the Table of Ranks instituted by Tsar Peter I in 1722. This system, which determined status and privileges in society according to 14 ranks, remained in effect until 1917

Education in Russia means not only gaining vocational skills but implies the Holly-blessed spiritual upbringing of the young generation too⁹. Thus, Russia has its own understanding of effects of the Bologna Process in education. According to the latest version of our officials from the Ministry of Science and Education, Russia will develop the next reform plan in higher education (see Anonymous, 2006): Russian institutes and universities will offer both BSc and MSc curricula for some disciplines and - at the same time - the actual engineering degree, or curriculum for "specialist" will be preserved. The latter will be a so-called "monolevel" system of training. The principal problem of implementation of "credits" (such as the European Credit Transfer System – ECTS) is how to calculate correlations between professional and academic components in education according to the requirements of the global economic system and internal national economic possibilities.

Consequently, Russia has its own way of development that has some similarities with Asia, but less with Europe. Conservatism, worship of predecessors, power distance, negative attitude to innovations, and traditionalism are the main features of the Eastern Asia mentality. The place of destination for the Russian higher education will be always uncertain, because European universities and traditionally German system of higher education in Russian universities prepare specialties for Russia as a country with Eurasian system mentality and traditions in forestry. Thus the words of Famous Dutch painter Vincent Van Gogh "I feel that I am always a traveller going somewhere to a destination" are still very actual for the understanding of the process of reforms in Russia in the framework of the Bologna Declaration.

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⁹ Typically Russian way of thinking was represented by life's principles of one of the famous Russian scientists N. P. Kondakov (1844-1925). He was famous for his research in geopolitics, history, archaeology, Byzantine, old Russian and European medieval art. He was one of the outstanding Russian philosophers - Eurasian. Kondakov had a wide circle of disciples in different parts of the world. Among them there were such well-known scientists as: Ellis H. Minns (1873-1953) - English historian, archaeologist, professor of Cambridge University; Gabriel Millet (1867 - 1953), French archaeologist, historian of arts, Byzantine art, professor of College de France. Kondakov noticed what means the true sense education "It is necessary to avoid crowds. Search for societies of those who can make you better. Admit to your society those persons whom you can make better. There is no need to deliver lectures to crowds for the sake of distribution of your ideas. You should despise the approval of crowds and the feelings of pleasure from it. Do not consider that you lost time if you were studying for yourself. The unique and true blessing is belief in yourself, it can be reached if you are not afraid of work. Work itself is not the blessing, but it brings up your soul". The St.-Petersburg branch of Archive of the Russian Academy of Science. Fund 115, Inventory 3, case 20, list 1.

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¹⁰ Book destroyed during fire in the library of the Moscow State Forest University.

3.2 FORESTRY EDUCATION AT THE UNIVERSITY OF BANJA LUKA (BOSNIA AND HERZEGOVINA)

MILAN MATARUGA, ZORAN MAUNAGA AND DONI BLAGOJEVIĆ

Summary

The Faculty of Forestry in Banja Luka is one of the youngest forestry faculties in Europe, it was founded in 1992. Consequently, numerous problems confront it, starting from not enough equipment to insufficient professional staff. On the other hand, this makes transformations on all levels easier and faster.

Actual teaching at the faculty follows curricula and syllabi which are, more or less, similar to those used at forestry faculties in former Yugoslavia; moreover these syllabi and curricula didn't undergo any major changes during the last 50 years. Officially, undergraduate studies last for four years, however the average time students study at our faculty is 6 years and 7 months. During their studies they spend about 60-70 working days in the field classes.

In future the Faculty of Forestry in Banja Luka will offer a new curriculum with three, two and three years respectively for the BSc, MSc and PhD degree. As we want to introduce this new curriculum in a proper and the best way, we expect help and support from and cooperation with other Faculties of Forestry in Europe.

General facts about the Faculty of Forestry of Banja Luka University

Due to recent history, the Faculty of Forestry of the Banja Luka University had to start from scratch a couple of years ago. Having this mind it is clear that this young faculty is confronted by numerous problems, starting from housing and equipment to insufficient professional staff. Today, most lectures at the Faculty of Forestry are given by teachers from the University in Banja Luka, while only a minor number of lectures (30%), in the third and fourth year are given by professors who work for Universities in Belgrade, Sarajevo, Ljubljana, etc. More information about Faculty of Forestry can be found at our website www.sfbl.org.

On the other hand, being a young faculty makes a transformation at all levels (curriculum, organisation, labour) easier and faster. To do that is a good way, we nevertheless need assistance from other faculties. This is facilitated by the fact that we are now a member of EFI and of the SILVA network.

Forestry university education at the Banja Luka Faculty of Forestry from 1992 to 2005

Teaching at our faculty follows a curriculum and syllabi which are, more or less, similar to those used by other forestry faculties in former Yugoslavia. Moreover this curriculum and these syllabi didn't undergo any major changes during the last 50 years. Currently, there is only one curriculum offered by the faculty - general forestry. Undergraduate studies last for four years, or eight semesters, and upon its completion students are obliged to write a final paper. One semester lasts 15 weeks. The curriculum and the syllabi comprise a very heavy workload: a great number of elaborate papers have to be written, and a lot of practice work and field classes

to be followed. Hence, only a small number of students obtain graduation in the anticipated period of four years; consequently, on average, students spend six years and seven months within the faculty. According to rough estimations the students' encumbrance is about 280 ECTS for BSc degree in forestry. Students have to pass 37 exams, 20 of which last for two semesters. In this period they spend 60-70 working days in the field, mostly during the third and fourth year in the following subjects: dendrology, phytocoenology, forest typology, silviculture, entomology, phytopathology, forest cultures and plantations, dendrometry, forest communications, forest exploitation, forest management, hunting, etc. In the curriculum, there is no possibility for any elective subject. On the other hand, students have during the last two years the opportunity to participate in elective field work organized within some areas (hunting, grafting, forest protection, etc).

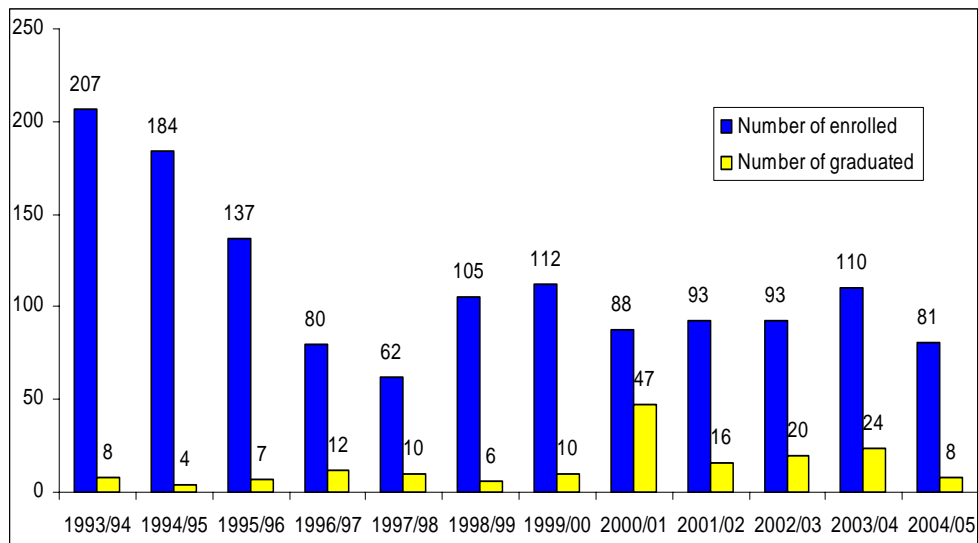


Figure 1: Number of enrolled and graduated students at the Faculty of Forestry in Banja Luka.

Figure 1 shows the number of enrolled and graduated students for the past twelve years. We have to point out that only 15 % of the enrolled students graduated, with the remark that the faculty is still in its first years of development. During the last five years, this percentage raised to 28%. The general economic and social conditions of the country as well as the fact that students have to fund themselves (the average salary in the country is about 220 € per month) influenced this small number of graduated students. Up to now 1352 students have been enrolled and 172 of them graduated.

However, the graduated students have a very broad knowledge regarding on the one hand silviculture, protection, conservation, utilization and management of forest resources and on the other hand management of, including measures needed to be taken within, areas protected for nature, biodiversity and ecosystem conservation. Besides biological knowledge, students master a wide knowledge of planning and implementing of timber extracting and transport systems, of forest resources utilization, ranging from timber assortments to hunting. Subjects like organization, economy, ergonomics, and wood trade provide students with enough knowledge and courage to formulate a (forest) policy for these areas.

50 Which opportunities does "Bologna" offer: curriculum development

Postgraduate studies last for two years (four semesters), in which candidates, depending on the course, take 6-9 subjects and are obliged to write a master thesis. Writing the thesis, together with the application procedure, grading and defence, usually takes much time; consequently it takes three to five years for a student to obtain his MSc degree in forestry.

The faculty has initiated a series of activities towards the reform of the education system at the University recently:

- The basic principles of the Bologna Declaration were analysed;
- The curricula taught at Forestry Faculties in neighbouring countries and in Europe were analysed;
- The complexity of the forest ecosystems in the area where we educate our students was evaluated;
- Private persons were interviewed;
- Several discussions between teachers and students were organised on the topic "Reforms of the high education system" in order to reach consensus.

Table 1: Proposal for the BSc curriculum General Forestry at the Faculty of Forestry in Banja Luka.

Sem-ester	Number of exams (obligate and elective)	Obligate subjects	Elective subjects	Total ECTS
I	8	Computer science in forestry, Chemistry, Mathematics, Meteorology with climatology, Sociology, Statistics in forestry, Oral and written communication	English language, German language	31
II	7	Forest botany, Plantphysiology, Geology, Geodesy and cartography, GIS in forestry	English language, German language, Geometry with technical drawing, Machines in forestry	29
III	6	Dendrology, Forest soil science, Phytocoenology and typology, Ecology of forests	Management and supervision of protected areas, Biodiversity of forest ecosystems, Wood characteristics, Basics of wood processing, Wood anatomy	28
IV	6	Forest genetics, Dendrometry, Forest phytopathology, Forest entomology	Increment of one-stand forests, Increment of different-stand forests, Breeding trees, Forest seed husbandry, Production of plant material	30
V	6	Silviculture, Forest utilization, Forest communications, Forest cultures and plantations	Game breeding, Hunting, Integrated protection, Forest protection	30
VI	4	Basic of forest management, Forest economics, Introduction in forest policy	Safety at work in the forest, Wood trade, Basics of organization in forestry	17
	1	Final paper		15
Total	38	28	10/23	180

Forestry university education at the Banja Luka Faculty of Forestry from 2005 onwards

The Banja Luka Faculty of Forestry plans to organize its teaching in future according to a BSc - MSc - PhD structure with respectively a length of three, two and three years. The BSc curriculum General Forestry includes in total 37 one-semester exams and a final paper (see table 1). Ten out of 37 courses are elective, which students can choose out of 23 offered subjects. The total encumbrance would be 180 ECTS and students would have 324 working hours of field classes.

After the BSc of three years, students would be able to choose one of the four MSc courses offered:

- Forest and wildlife management;
- Forest protection;
- Forest utilization;
- Organization and forest policy.

Students would take nine core and eight elective courses, the latter to be chosen from 15 offered subjects. Every course runs over two years. Depending on the group of elective subjects students would be in a position to choose particular course e.g. forest ecosystem protection, forest growing, forest and hunting areas planning, production of forest seeds and planting material, etc. (figure 2)

Development goals

The Faculty of Forestry of the Banja Luka University has the intention to reach the following goals during the next five years:

- Improvement of the teaching process:
 - Introduce a curriculum system based on two main cycles of education (three and two years) (figure 2);
 - Include an addendum to the diploma;
 - Establish a credit system like the ECTS;
 - International exchange of teachers, associates and students.
- Strengthening of the professional staff structure:
 - Provide better work conditions;
 - Financial support for master and doctor thesis;
 - International exchange of teachers and associates.
- Development of scientific and research work within international areas.
- Enlarge the space and equipment of laboratories and certify these.
- Set up a network of permanent experimental areas and teaching areas for the area of Republic of Srpska.

Problems encountered

The faculty faces the following problems during the efforts to improve the curriculum:

- The legislative process in Bosnia and Herzegovina is slow; the law on university education was under legislative procedures for two years;
- The faculties in neighbouring countries - the area of former Yugoslavia (except Faculty of Forestry in Zagreb) haven't changed their curricula;

- Some activities are not defined clearly, for instance students' obligations according to the new curriculum; the possibility for students to transfer from one curriculum to another one; etc.;
- Financial issues;
- The ecosystems in the area are complex and diverse;
- Demands in economy for widely educated professional staff;
- Unification of all faculties among which the faculties for technology, economics and biology;
- Teaching staff finds it difficult to accept large changes, etc.

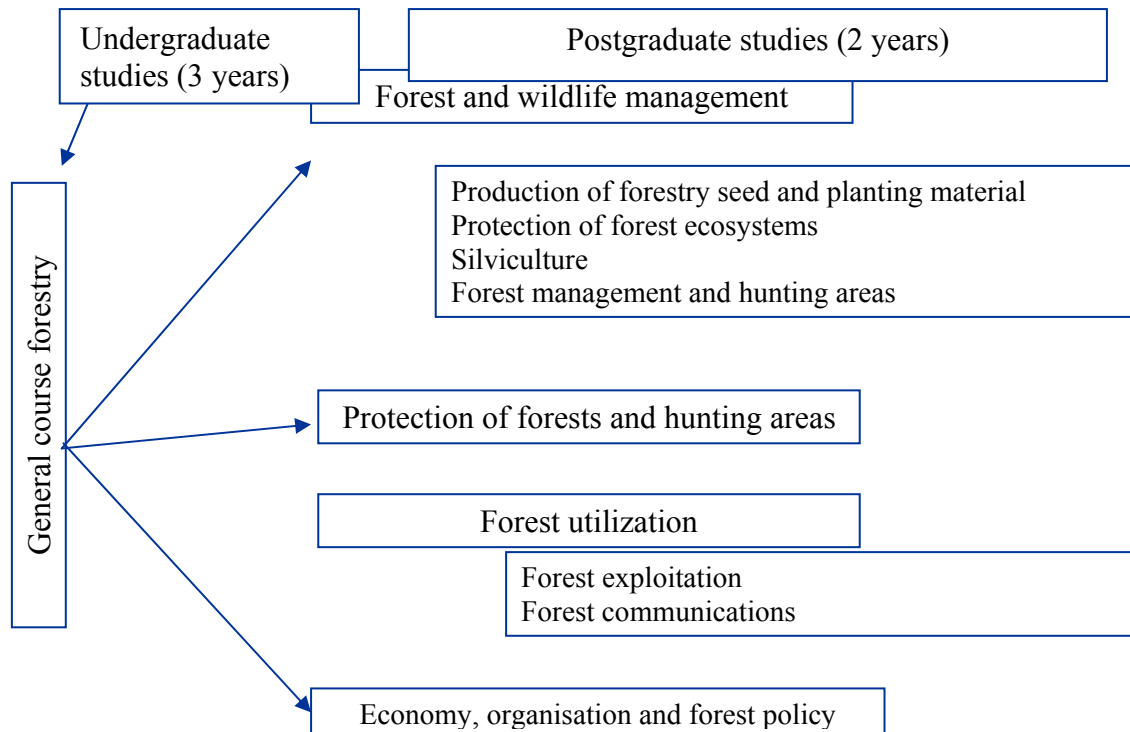


Figure 2: Organization of future undergraduate and postgraduate studies at Faculty of Forestry in Banja Luka

Conclusions

- The Faculty of Forestry of the Banja Luka University has a strong wish for affirmation by and cooperation with all institutions orientated towards forestry;
- -For this faculty it is essential to exchange experiences in education in forestry, with interested parties in order to facilitate and step up the reforms in short period;
- -For this, support from and cooperation with all Faculties of Forestry in Europe is necessary.

3.3 EUROFORESTER A DEVELOPING MSC PROGRAM

PER MAGNUS EKÖ AND PELLE GEMMEL

Summary

EUROFORESTER is a two year MSc program currently being developed within a network of nine European forest faculties. The elaboration of the curriculum is partly being funded by the EU. The aim of the program is to attract students interested to work in the forest sector. However, even if the emphasis is on the use of forests, great attention is also devoted to issues of sustainability, environmental concern and nature conservation. The geographical focus is on the region surrounding the southern Baltic Sea, where the countries share a similar setting for forestry, regarding tree species, fertility, climate etc., but differ markedly when it comes to for example history, national economy, forestry practices and languages. We hope that this MSc program will contribute to increase the understanding among nationalities and to tear down barriers. The MSc program is scheduled to be launched in 2007, but during the five last years, as a forerunner, students from all participating countries (and others) have been able to study forestry at master level for one year at the Southern Swedish Forest Research Centre in Alnarp. This has been made possibly by scholarships generously offered by mainly IKEA but also by the StoraEnso Company. The experience from this adventure is great.

Introduction

The Southern Swedish Forest Research Centre in Alnarp was established in 1988 as a department within the Forest faculty of the Swedish Agricultural University (SLU). At first it was more or less a pure research institute. However, education has during the years become an increasingly important activity. An initiative to start an international master education was made in 2000. At first the cooperation was limited to Sweden and Lithuania, but has since grown to include all Baltic States, and Poland, Germany, Russia, the Ukraine and Denmark. The curriculum for the program, known as "EUROFORESTER", is currently being elaborated jointly by the participating countries. The work is made within a Curriculum Development (CD)-project funded by the EU.

Background

Traditionally the forestry education in Sweden has had a quite narrow national perspective, perhaps due to the fact that forestry and forest industry have been major contributors to the national economy. When discussing international issues the focus has been more on remote situated countries, than on our neighbours. However, the ongoing internationalization, the new Europe that emerges, with all that it implies concerning free movement of labour and possibilities for companies to easily operate over the borders, must now be recognized when designing a modern forest education. Looking around, from the Alnarp horizon, we suddenly see our selves surrounded by a number of smaller and bigger countries, and a large number of forest faculties, geographically in fact much closer to Alnarp than Alnarp is to its mother faculty in Umeå (figure 1).

The habitat for EUROFORESTER is the southern Baltic region, in the transition zone between the boreal and the nemoral forest zone. The settings for forestry are similar in the region concerning climate, productivity and species composition. The share of wooded land is high and forestry and forest industry are essential branches in the national economy. It could be advocated that the gravity of European forestry is located in this area, also recognising that the region is a net producer of pulp, paper, round wood and other produces from the forest. (This said as the name EUROFORESTER has caused some astonishment and turmoil.)

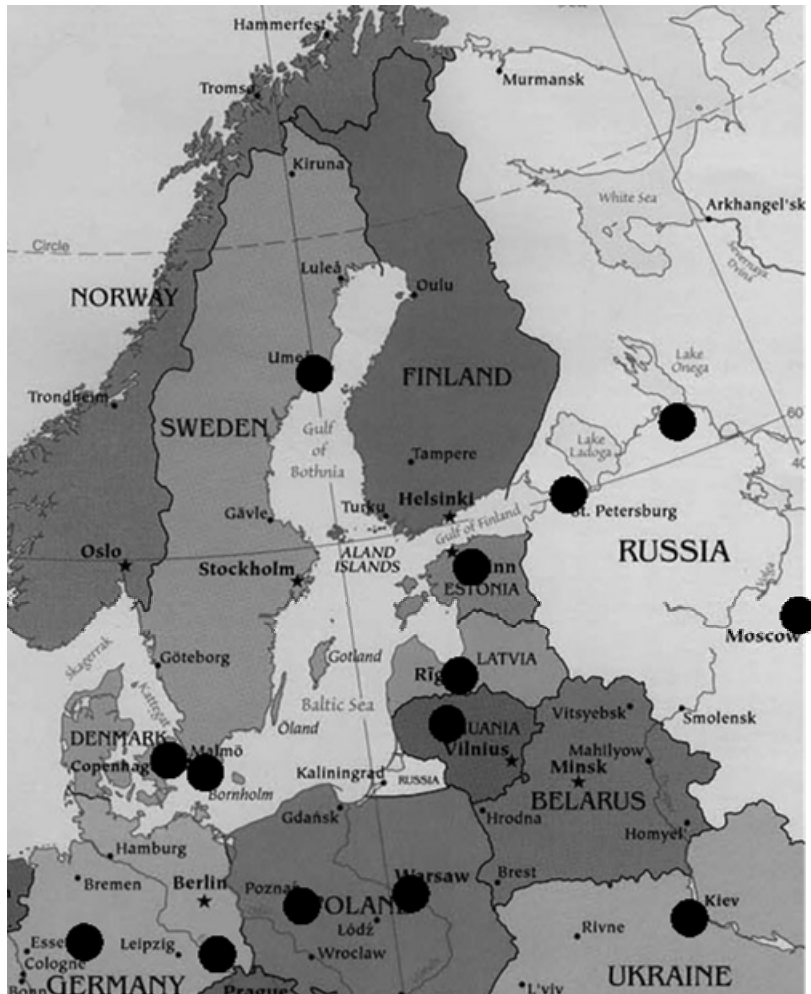


Figure 1: Forest faculties in the EUROFORESTER network. (Alnarp is located close to the city of Malmö).

In the region there are also a lot of differences in for example history, culture, forestry traditions, population density, language etc. Together these differences and similarities make a very interesting background for an international master program in forestry, promoting understanding, collaboration and overcoming the language barriers.

The Bologna proposal of a 3 + 2 years BSc and MSc education is that it hopefully will make it possible to establish international Master programs with different specializations, as a complement to national forestry educations, all resembling each other. Therefore it seems naturally and beneficial that international master programs with different profiles will emerge, as for example EUROFORESTER, the European Master of Forestry established in the SILVA-network and managed by the University of Joensuu, Urban Forestry managed by the Royal Veterinarian and Agricultural University (KVL) in Denmark, the program for Tropical and Subtropical Forestry offered by the Georg-August-Universität in Göttingen, and others.

The development of the Euroforester-program

The EUROFORESTER program has a history dating back to the academic year 2000/2001. Due to early contacts with the forest faculty in Kaunas we managed to procure some scholarships from the Swedish Institute and were able to run courses for one semester with Swedish students and with ten students from Lithuania. From that time things happened fast. Already the next year there was an agreement with nine faculties in the region to try to develop a joint program. There were also about 30 students from Estonia, Latvia, Lithuania, Poland and Sweden, eager to study in Alnarp for one year. Things do not happen entirely by themselves and of course there were a lot of discussion on the way, in different networks, facilitating the process. At present we are educating the fifth cohort of students and have since the start extended the network to Russia and the Ukraine.

To run the program so far had not been possible without sponsors and we have been very fortunate in this respect. IKEA made a commitment for 20-22 scholarships during the first five year period, paying for the students living costs during their stay in Alnarp. The funding also included some funding for travelling in order to keep contacts within the network. IKEA has now extended their commitment for another five year period. During the last two years the company StoraEnso has also contributed with five similar scholarships.

At present we also have an ongoing curriculum development (CD) project within the network, funded by the EU. The aim of the CD project is to achieve a curriculum for a two year master program in forestry with a content that all partners can agree on and in which the partners have an active engagement in the education. Currently there are four working groups elaborating the syllabi (figure 2). The CD project will be reported in the fall of 2006.

Today the students end up with a diploma comprising 60 ECTS, which they can transfer into their national educational system and which can be used for a national exam. Each year some of the students have decided to also apply for a Swedish MSc exam. In this case the students make a master thesis (30 ECTS) at SLU and a credit transfer is made from their national study record into the Swedish system. In this way several students have obtained a double degree, both a Swedish and a national. When the EUROFORESTER program is fully established, the exam will of course be issued as an "independent" exam.

Are the students happy?

We have made interviews and evaluations with the students that so far have been studying in the program. In general the students seem to be very content with the education and their stay in Alnarp. Besides a high quality education we hope that the students get a general understanding of the region and the settings for forestry, a good ability to communicate in (European) English and a network among themselves for the future. We judge these extra-curriculum achievements to be as important as the formal education and try to promote them in different ways.

It is of course always fruitful to study abroad and an international exchange of students should always be encouraged. However, to study in this type of program has some advantages compared to just going abroad and follow some courses at other universities. The program is from the beginning designed for an international mixture of students, which implies that the students will be in the same situation from the start and that the natural way to communicate also outside teaching always will be English.

The content of the EUROFORESTER program

The basic ideas of the program is that it should have

- A focus on economic forestry;
- An anchorage in the southern Baltic region (in the nemo-boreal vegetation zone);
- A content that covers interesting and relevant topics for the region;
- A design that promotes comparisons and analyses over the national borders;
- A design that promotes a general understanding of the region and the different cultures.

Since production forestry is an important part of the economy in the region it is relevant that the program should have this focus. After examination the students should be attractive for employment in private - and state enterprises dealing with forestry management and forest industry. However, when forming the curricula the economic focus implies by no means neglecting issues of biodiversity, nature values, recreational values, long term depletion of the nutritional status of the soil or other factors constituting the concept of sustainable forestry.

We consider it to be essential to have a geographical focus as it promotes a natural collaboration with different stakeholders. Furthermore, we believe that a geographical anchorage is important when forming a coherent curriculum for the program. However, we do not think that this should reject students from outside the region as the program could function as a "case study" with principles applicable elsewhere.

To promote an across boarder view could among other things be achieved by special requirements on the master thesis, concerning the content, but also including regulations such as having two supervisors from different countries.

To promote a general understanding it is important to engage teachers from different countries and to make study tours, but also to incorporate elements of "studium generale" in the curricula. The latter implies integrating studies and discussions on issues outside forestry, which are essential for the understanding of the region.

EUROFORESTER is outlined as a two year program (figure 2). The first year consists of four courses of 15 ECTS each. The objective for the first course is to obtain a good understanding of how forestry is practiced in the more boreal part of the region. Focus is on conifers and on how growth and wood quality can be influenced by silviculture. Nature values and ecological values are identified and it is discussed how these values are and should be handled in practical forestry. The second course is built around a case study where we try to implement the knowledge acquired in the first course. The course starts with an overview of methods and models used in practice for the estimation of stand and forest development, and for planning. In the case study a management plan for a large estate outside Gothenburg is elaborated. Operational plans are made for shorter periods focusing on wood production. A long term strategic plan is produced considering a number of different goals, besides wood production. The spring semester starts with a course in forest policy, where the planning issues are elevated to a regional, national and international level. The main focus is on the international level, also stretching beyond the borders of the region. In the last course the attention is turned to the southern part of the region and to the broadleaves. The major part of this course concerns nature and ecological values, but the course also includes silviculture, and the use and market of hardwood.

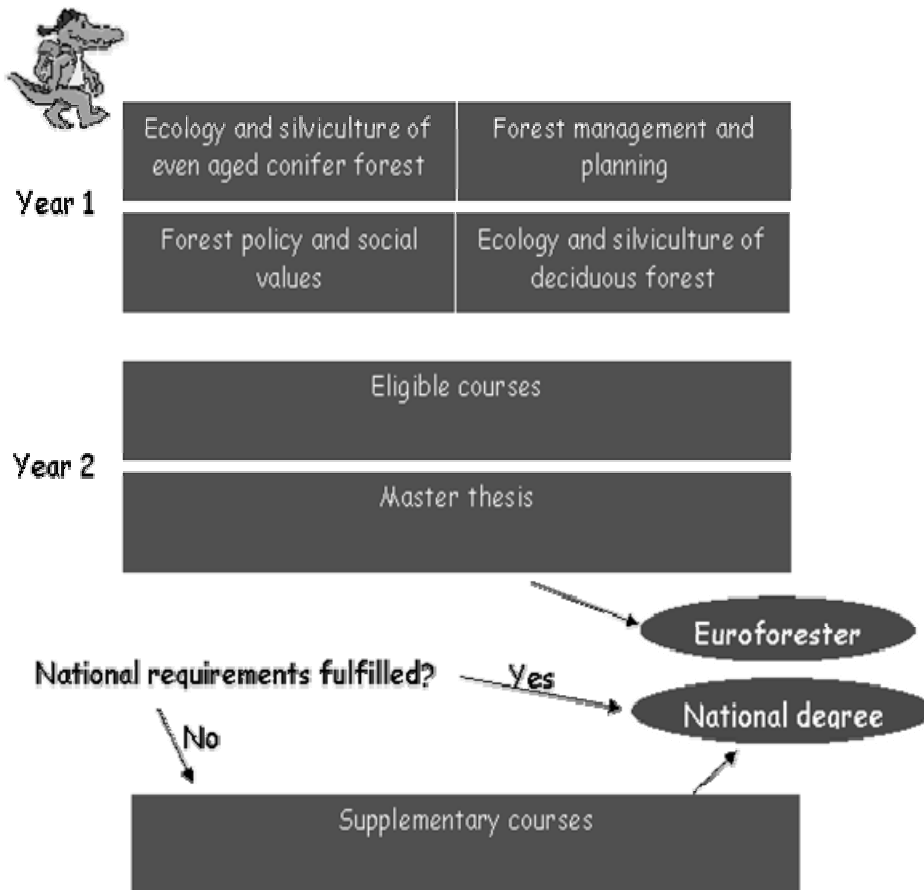


Figure 2: The suggested curriculum for EUROFORESTER, a two year MSc program.

During the second year the students should accomplish a thesis comprising 30 ECTS, with requirements as described above. The remaining 30 ECTS consists of eligible courses that can be chosen freely within the network, or adapted to national requirements. The students will after completing the program obtain a MSc degree. Depending on the national requirements the students can also obtain a national degree, perhaps after supplementing with courses with a content not considered being covered by the EUROFORESTER program and being mandatory in the national program.

One advantage with an "independent" MSc program is that the admission is made once and for all, and that the students will obtain a degree after finishing the program, which is well known and recognized by all partners.

Something about the pedagogy

For the success of the program it is important to try to be in the front edge of modern pedagogy, recognizing that knowledge is built from personal experience and that the education should have a student oriented focus. We are therefore mainly using methods intended to activate the students, e.g. elements of problem based learning (PBL), group assignments, net discussions, essay writing etc., thereby reducing the amount of traditional lectures. It is tempting to implement distance learning, as the students come from a large geographical area. However, to some extent this contradicts the ambition to build a network among the students and to achieve a general understanding of the region. We therefore hope that it also in the future will be possible to gather the students at a campus during the first year. But, for shorter periods during the first year, and perhaps for longer periods during the second year distance learning is definitely an option. We are already using some distance learning in our ongoing courses and quite much of modern information and communication technology (ICT).

Field studies and study trips are indispensable in forestry education and in this MSc program study trips over the borders are also necessary elements. Therefore great efforts must be made to finance such events.

There are of course a lot of obstacles to overcome. Teachers from different countries have a different background in learning traditions and furthermore in most cases teaching is just one part of their duties. The pedagogical education of the teachers and their interest for pedagogical issues vary. Currently we are running a course on distance leaning and ICT, within our network. Such activities are necessary in order to exchange ideas and to keep an ongoing vital pedagogical discussion.

There is one obvious problem that at least in the short-term is hard to overcome. For many of the subjects that will be studied in the program there is a lack of relevant literature and text books, written in English and with bearing on the region. So far we therefore have been directed to the use of scientific articles, in perhaps a too great extent.

EUROFORESTER a developing program

We hope that EUROFORESTER will be launched shortly as a two years MSc program, perceived by the students as having a high quality, creating an identity and good opportunities to get a relevant job in the forest sector.

Vision is however one thing and the realization could be something different. First of all it is important to recognise that the curriculum development and the elaboration of the syllabi of the individual courses are continuously ongoing processes that should be adapted to changes in the surrounding world. Therefore EUROFORESTER will hopefully stay a developing and not stagnant program. It is also important to recognize that emerging possibilities for financing, new techniques, political initiatives etc. have had and will have an ad hoc influence on the development.

Finally one should be humble and realize that success of the program is totally in the hands of the good will and the collaboration between a large number of partners. The network is currently elaborating the curricula consists of forest faculties from Estonia, Latvia, Lithuania, Poland (Warsaw, Poznan), Russia (Petrozavodsk, St Petersburg, Moscow), the Ukraine (Kiev), Germany (Tharant, Göttingen), Denmark and Sweden. This is of course not a closed society; members can join or leave as it suits them.

3.4 ENROLMENT IN FORESTRY EDUCATION PROGRAMS AT EIGHT EUROPEAN UNIVERSITIES BETWEEN 1990 AND 2004

ANNETTE SCHUCK AND PAAVO PELKONEN

Summary

The aim of the Bologna Process is to construct a European Area of Higher Education, with comparable degrees and a common credit system to facilitate mobility of students and graduates. Many forestry faculties in Europe are currently developing new degree programs while implementing Bologna-related demands. At the same time, forestry education faces not only these challenges but also a changing image and labour market. Moreover, in many European countries in the mid-1990s enrolment in forestry programs was comparatively low. Even before the Bologna Declaration was signed, this created a need for new profiling of forestry programs at university level, and increasing student mobility in Europe makes it necessary to evaluate how attractive higher education forestry degree programs are. Results of a questionnaire distributed to all eight universities offering broad forestry education in Finland, Germany, The Netherlands, and Austria made it possible to identify current trends in student enrolment. The results indicate that at several universities enrolment in the new forestry degree programs increased recently. During the last 15 years also the share of female and foreign students has increased indicating a change in the profile of new students for higher forestry education programs.

Introduction

The image of higher education degree programs often determines whether they are attractive to potential students (Bills, 2004, p.149). The image in turn depends on many factors, such as the tradition and the title of the degree, the quality of education, the length of the studies, the relevance of the competence profile to society, the employment situation of graduates. However, universities are "nonprofit firms" operating on "trust markets" (Winston, 1999) where "people investing in human capital through a purchase of higher education don't know what they're buying – and won't and can't know what they have bought until it is far too late to do anything about it". Furthermore, the public image is not always based on facts and the image is also subject to changes in perception and society. According to Nair (2004), forestry education is faced with a number of changes in countries that make the transition from industrial to post-industrial societies: "these changes, especially the shifts in demand for products and services from the divergent needs of different segments of society, would make the traditional standard package of forestry education, primarily developed in the context of industrial forestry, increasingly irrelevant." Many European countries have recently gone through the mentioned transition. At the same time, public environmental awareness has been enhanced by publications such as *Silent Spring* (Carson, 1963) or *The Limits to Growth* (Meadows *et al.*, 1972), media attention (e.g., the forest die-back discussion in Germany in the 1980s described by Makkonen-Spiecker, 1999) and campaigns by environmental non-governmental organizations.

Certain developments concerning forestry and forestry education can be predicted with relative certainty. Lewark *et al.* (1998) identified six major general trends affecting forestry professionals and consequently education: 1) globalization of markets and policies, 2) new EU policies for rural development, 3) reduced involvement of the public sector in forestry, 4) organizational changes in industrial and commercial companies towards leaner and more flexible models, 5) development of "green" markets, and 6) expansion of university education in the public and private sector. Lately, a shift of societal demands away from economical and ecological considerations towards a forest-cluster oriented services market with a more holistic view on sustainability including also social and cultural aspects is being recognized (Saastamoinen, 2005). These expectations suggest certain strategies for the development of competence profiles, but the future labour-market profile for forestry graduates still remains unclear. Structured research into students' motivation to study forestry is also needed to be able to anticipate the future development of enrolment in forestry education and an analysis of students' motivations and expectations would also help to create attractive curricula.

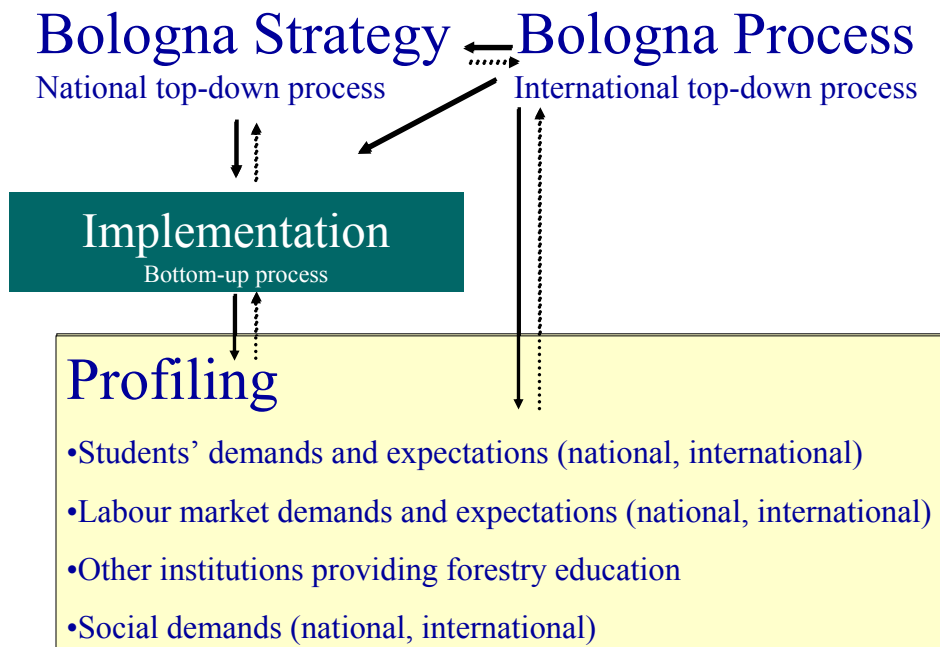


Figure 1: Demands and expectations currently influencing curriculum development.

So far, there has been little or no systematic monitoring of students' motivation to study forestry as well as reasons for student drop-out at higher forestry education institutions in Europe (cf. Rautopuro, 2001). For a long time, European universities have been market-independent, but increasing pressure towards efficiency and educational and scientific excellence combine with societal demands formulated in the so-called Bologna Process form a complicated framework concerning higher education. Curriculum reform is thus influenced by a multitude of complex considerations (figure 1).

Table 1: Degree programs offered by the surveyed forestry faculties in the study year 2003/2004. Bold degree names indicate that the degree program is taught fully in English. Universities: Helsinki/FI (HEL), Joensuu/FI (JOE), Wageningen/NL (WAG), Vienna/AT (VIE), Göttingen/DE (GOT), Freiburg/DE (FRE), Munich/DE (MUN), Dresden/DE (DRE), (Schuck *et al.*, submitted).

University	Bachelor degree (year of introduction)	Master degree (year of introduction)	Diploma (year of introduction)
HEL, FIN	-	Forest Economics and Marketing (1994), Forest Ecology and Forest Resource Management (1994)	-
JOY, FIN	Agriculture and Forestry (1995)	Agriculture and Forestry (1982), European Forestry (2000)	-
WAG, NL	Forest and Nature Conservation (2000)	Forest and Nature Conservation (2002)	-
VIE, AT	Forest Science, Wood and Fibre technology, Management of Environment and Bio Resources (all in 2004)	Mountain Forestry (2002), Mountain Risk Engineering. Forest Sciences, Wildlife Ecology and Wildlife Management, Wood Technology and Management, Management of Environment and Bio Resources, Phytomedicine (all in 2004)	-
GOT, DE	Forest Sciences and Forest Ecology (1999)	Tropical and International Forestry; Forest Management; Nature Protection and Forest Ecology; Wood Biology and Wood Technology; Forest Ecosystem Analysis and Information Management (all in 1999)	-
FRE, DE	-	Sustainable Forestry and Land Use Management (1998)	Forest Science
MUN, DE	Forest Science (2000)	Forest Sciences and Wood Technology (2000), Sustainable Resource Management (2001)	Forest Science (2000)
DRE, DE	Forest Sciences (1999)	Forest Sciences (1999), Tropical Forestry (1993), Wood Technology and Marketing (2004)	Forest Sciences (1811), Environmental Protection and Landscape Management (1993)

The need for accreditation of defined competence profiles of degree programs and for a shift of educational focus from teaching to learning outcomes (Gonzales and Wagenaar, 2003) together with increasing student mobility and consequent interest in university rankings have introduced the term of competitiveness. Forestry education has not been included in university rankings, though, since in most European countries the number of universities offering broad forestry education is limited to one or a few. Thus the assessment of competitiveness has to come through internal or external evaluation, and through comparison with other similar institutions.

Forestry faculties at universities have recently had to fight for their independence or survival. Several of them were merged with other faculties or departments or even closed altogether (Miller, 2004). This happens at a time when public demands regarding forestry are growing rather than shrinking. The aim of this article is to analyze the effect of the degree program reforms on the enrolment of forestry students in higher education institutions in Europe and to discuss, whether enrolment or graduation numbers can serve as an indicator for competitiveness.

Material and Methods

To be able to analyze the enrolment effect of current changes, a questionnaire was distributed to all eight universities offering broad forestry education in Germany, Finland, Austria and The Netherlands (table 1).

These faculties¹¹ were chosen because their educational tradition in forestry has in the past been closely linked while the economic importance of the forest sector in the respective countries differs. The faculties were asked to nominate an expert who then provided statistical data on student enrolment, graduation, and drop-out rates as well as information about curriculum changes in the period 1990-2004.

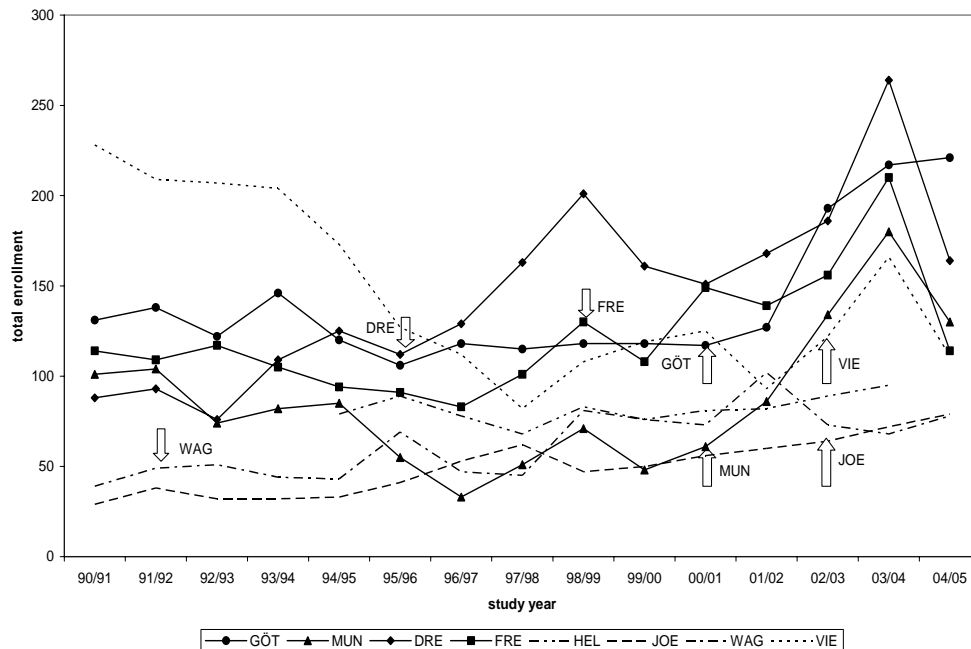


Figure 2: Total enrolment of students at eight faculties in the period 1990 - 2004. The introduction of MSc degrees is marked by an arrow.

Results

Forestry degree programs and credit system

Before the recent reforms, most faculties had each offered one national degree in forest science with the possibility of specialization within the program. Afterwards, most forestry faculties offered one Bachelor (BSc) degree and a broadening selection of Master's (MSc) programs.

¹¹ The term faculty of forestry is used for "a group of academic staff with interests and expertise in forestry", see Kanowski (2001) defining forestry education curricula at a given institution.

Three German universities still offered national diploma degrees in 2003/2004. At many forestry faculties, national students formally enrolled in an MSc program and the BSc was an optional by-product of the studies. Several faculties considered the MSc programs offered in 2003/04 to be test versions and planned to develop them further. Faculties now offer a broad range of MSc degrees covering different aspects of forestry and resource management. The new degree names avoid the term forestry and use the terms forest, nature or environment instead. All forestry faculties have introduced the European Credit Transfer System (ECTS) to measure student workload.

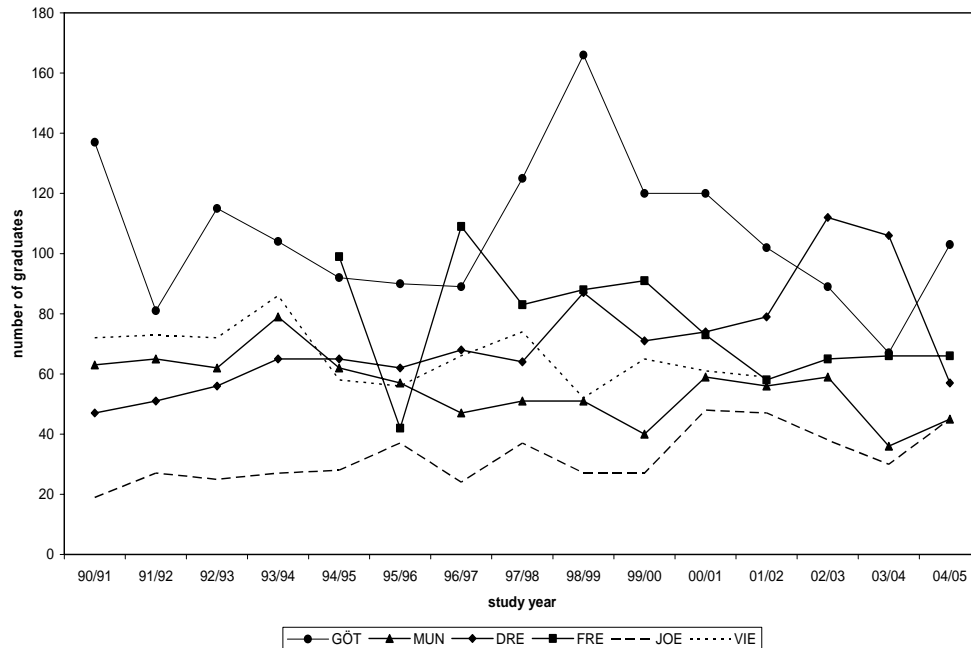


Figure 3: Graduation of students at forestry faculties in the period 1990 – 2004. Wageningen and Helsinki submitted incomplete or no graduation records.

Student enrolment and graduation

The easiest way to assess attractiveness of forestry degree programs for students appears to be to use student enrolment (figure 2) or graduation (figure 3) as an indicator.

The gathered information shows that enrolment at most forestry faculties increased after 1995 with a pronounced peak in 2003/04. But enrolment does not necessarily mean that students will successfully graduate. Graduation numbers can be easily collected and are available for all faculties (figure 4), but due to the individual time lag between enrolment and graduation they are difficult to predict and interpret.

However, enrolment can only serve as an indicator, if access to degree programs is not limited. Enrolment rates at faculties with limited access give no indication of demand as long as application rates do not drop below the enrolment threshold. In Finland, access to forestry programs at universities has been and continues to be tightly restricted with entrance tests and

admission based on test results in combination with extra points based on grade points in the matriculation exams. The forestry faculty of the University of Joensuu experienced an application high in 1996, followed by a low in 2001 and a recovery thereafter (figure 4). These changes are not reflected in the enrolment numbers, because more students apply than are accepted.

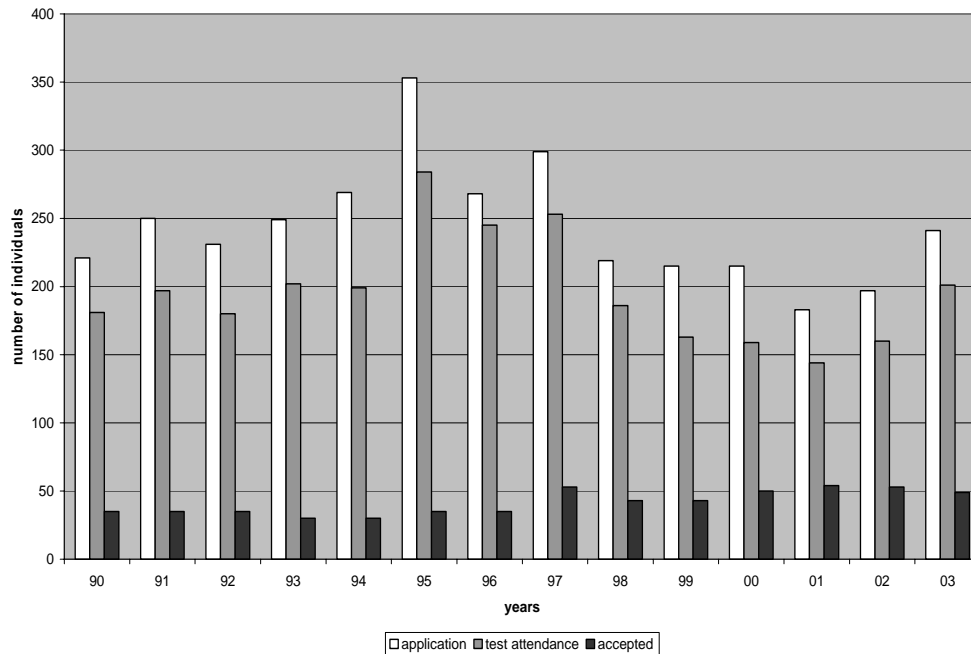


Figure 4: Application, test attendance and acceptance of students in Joensuu in the period 1990 – 2003 (source: university statistic).

In Germany the central distribution agency (*ZVS*¹²) stopped the distribution of forestry study placements at universities after 1995 due to low application rates (utilization rates had dropped from 102% in 1987/88 to just 61% in 1995/96). Since then all applicants were admitted to forestry programs, but after the peak in 2003 several faculties discussed the reintroduction of admission procedures.

Female students

While forestry and forestry education traditionally used to be dominated by men, the share of female student enrolment has risen from on average of 22% in 1990/91 to 36% in 2004/05 (figure 5).

At Finnish faculties, the share of women in higher forestry education was more than 30% to begin with but shows high year-to-year variability during the observation period.

¹² <http://www.zvs.de/>

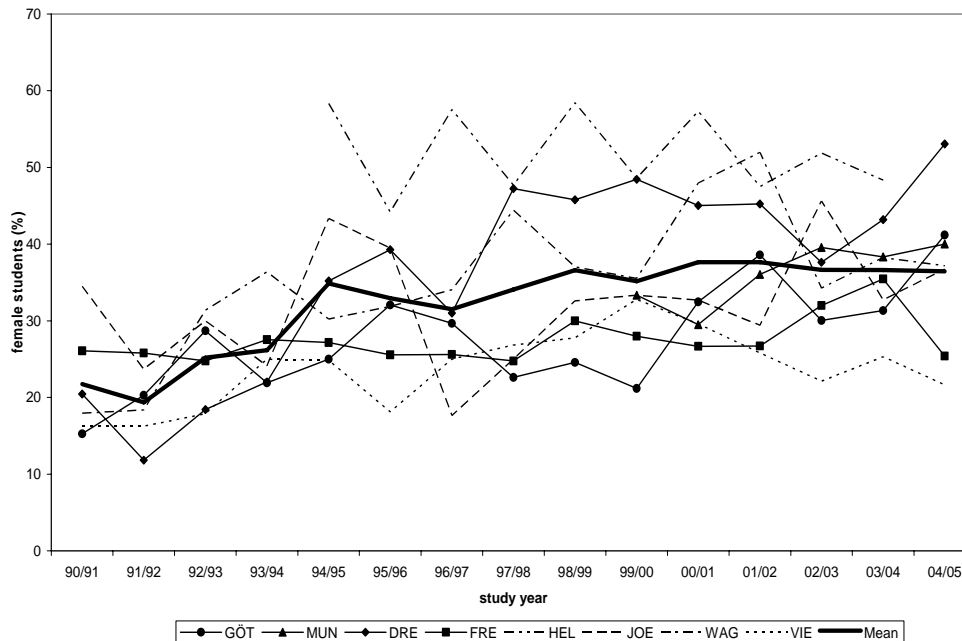


Figure 5: Share of female students' enrolment at eight forestry faculties in the period 1990 – 2004.

Foreign students

During the last two decades, the number of students studying abroad has increased considerably in Europe, specifically due to funding provided by national and international organizations, as well as the European Union. For all faculties apart from Helsinki, the number of foreign students has increased considerably. The percentage of foreign students studying for a degree has increased from an average of 5% in 1990/91 to 24 % in 2004/05 (figure 6).

Dresden's and Göttingen's share below 10% were caused by greatly increased total enrolment after 2001/02 (cf. figure 2). Especially the introduction of Master's degrees targeted specifically at foreign students or taught in English has increased the interest of and possibilities for students to study forestry at the surveyed faculties.

Discussion

Over time, forestry education seems to have a rather stable potential to attract students, but the year-to-year variation can be high. The surveyed faculties did not offer other explanations for year-to-year variation in student enrolment rates than demographic reasons. Unfortunately, economic considerations at universities are frequently based exactly on student enrolment. To avoid large scale fluctuations of enrolment, there seem to be only two options: 1) long-term monitoring of enrolment to support the evidence of a cyclical character of enrolment to secure budgetary needs over time or 2) limitation of enrolment to rather low levels in comparison to application rates increasing the chances for excellence in education and science due to a favourable student-teacher ratio. This emphasizes a need to assess students' motivation to study

forest science and also to monitor drop-out. Concerning graduation, a comparison of current graduation figures for Austria with graduation numbers covering the period from 1880-1992 presented in Lewark *et al.* (1998, p.78) suggests a 10-15 year cycle between graduation peaks.

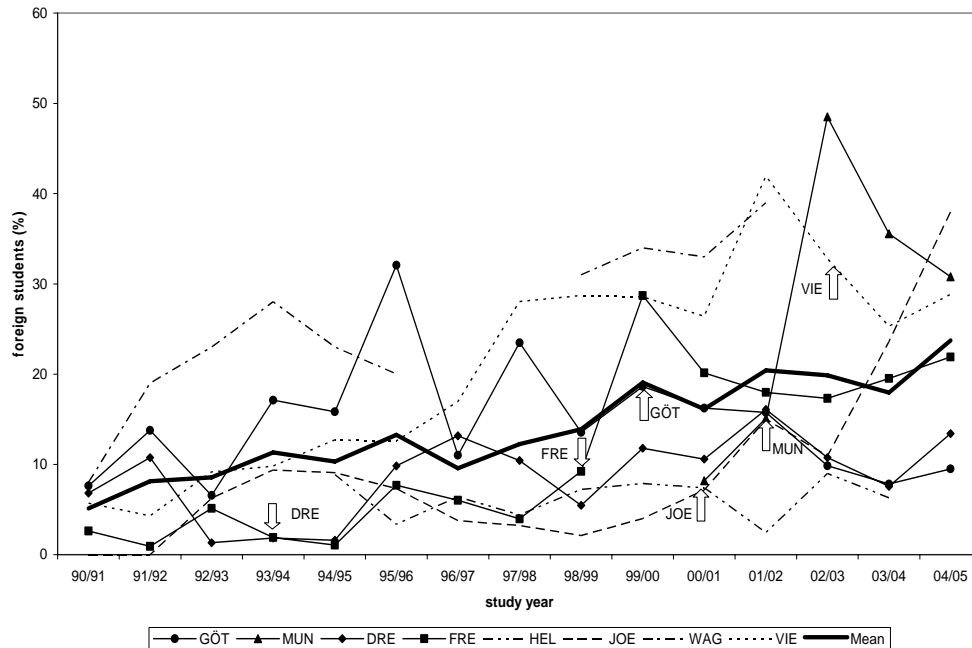


Figure 6: Share of foreign students' enrolment in a degree program at eight forestry faculties in the period 1990 – 2004. Data submitted by Wageningen, Helsinki and Munich were incomplete. Arrows indicate introduction of degree programs specifically targeting foreign students.

The results of this survey indicate that forestry degree programs in Europe have recently become more attractive for both women and foreign students. Systematic adaptation and tailoring of curricula to demands of these groups should be considered. The increase in the share of foreign students is the result of active efforts of the faculty to develop strategies to promote internationalization, as well as the availability of MSc programs taught in English. Nevertheless, it was mentioned that English language teaching is not always easily accepted by the home students.

On the whole there appears to be great potential to increase the number of foreign students in forestry programs at universities. Where access to study programs is limited, active promotion of new degrees can increase the chances to attract top students, stabilize application and thus strengthen the faculty's position. However at faculties that do not charge enrolment fees, budget restrictions make limitations necessary. If access is not restricted, advertisement of degree programs can be problematic, since over-proportional application rates and consequent admission could overwhelm faculties and overstretch capacities in peak years.

To stabilize enrolment in higher forestry education, employment opportunities for graduates also need to be stabilized. Stable enrolment and attractiveness in turn strengthen the position of

faculties at the university negotiating table. If forestry degree programs accept all the students they can attract, they need to consider labour-market demands carefully. As mentioned earlier, graduation rates are difficult to monitor and predict, and so is the transition from the university to the labour market. Moreover, in many parts of Europe the introduction of independent undergraduate degrees appears to further complicate the labour-market situation. According to the current interpretation (Bergen Communiqué, 2005), the BSc has to provide a first professional qualification, but at present the occupational BSc level is in many countries filled with graduates of universities of applied sciences.

Alumni networks have recently been established at many European universities to analyze the employment profile of graduates, but systematic collection of data is only in the early stages and thus information about employment remains incomplete. Some distribution tables of graduate employment have been created, but limited response to surveys is a problem. With a diversifying labour market, a more active approach is needed to ensure that students learn strategies to promote their own competences to gain access to jobs. This can be done by working together with potential employers from different fields in form of regular meetings of an advisory board. Another option can be closer co-operation with employment agencies or recruitment services especially in the final phase of the studies. This cooperation can also yield continuous information on the dynamics of the labour market and demands of potential employers allowing continuous readjustment of competence profiles at regular time-intervals.

The results of the survey demonstrate some difficulty to use enrolment or graduation numbers as an indicator to assess the competitiveness of forestry degree programs. It appears that application to and enrolment in study programs follows a cyclical development that is difficult to control or influence. While social demands regarding forestry and forest science are indeed currently growing and broadening, it is up to the forestry faculties to accept the challenge to find solutions that integrate stable funding, social relevance, efficiency and quality of higher forestry education and to balance these solutions with stable employment opportunities.

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3.5 EXPERIENCES WITH RESPECT TO THE EUROPEAN MASTER OF FORESTRY AND OPPORTUNITIES FOR THE NEAR FUTURE: A EUROPEAN PERSPECTIVE

MAARTEN IVAN VAN SOEST

Summary

The MSc European Forestry is a relatively fresh phenomenon: A real child of the ongoing Bologna Process for the integration of higher education in Europe. The environment, in which the SILVA Network gave birth to this prodigy, is that of unlimited international possibilities. The practical side of this bold step towards the total integration of curricula from different international universities will be discussed. The values underlying the Bologna Process are parallel to those that underlie the much broader processes of the integration of the European continent. Balancing academic prestige with vocational experience is a sometimes conflicting action, but necessary in the integration of Higher Education (HE) in Europe. Reaching the limits of what is possible; the experiences made can be of vital importance for the development of future trajectories. As Universities open up for the process of integration, access to a broad knowledge base can be provided. Acquiring partners not solely inside universities, but also in (non)-governmental research institutes and forest enterprises, will increase the renown of the program and improve the employability of its students.

Introduction

The potentials of networks like SILVA Network and IUFRO in the integration European Union can be displayed by the effort which is made to extend pan-European networks on every level of subject for law, commerce, research and education. In this effort lies a certain resource of cooperation and investments from these fields. Directing forest management from a European level delivers diverse opportunities for regulation and combining intergovernmental visions and to mutually come to sustainable solutions. The interconnectivity on a certain topic, e.g. forestry, combines knowledge and experiences in different cluster groups of expertise, based on cultural and traditional background. Connecting different acknowledged forestry faculties, as well as the main research instances, delivers an integrated knowledge base, generated by diverse stakeholders in fields of research and education, which can be exploited by arranging exchanges and meetings in which knowledge on a certain subject can be addressed and a common strategy can be designed.

The importance of these conferences and meetings is to communicate proceedings and to make universities aware of the directional changes which coincide with the cooperative Bologna Process. Universities are working to integrate the BSc-MSc system in the faculties and are expanding their expertise by searching connection with enterprises. Mutual recognition and mobility for both students and teachers are the main advantages of the EU integration and implying the use of networks for this end. Universities themselves keep the overall responsibility for ensuring quality education and feedback on this is given by the national

government of the member state. A network of faculties on itself is no assurance for quality education, but the member faculties have to have the same quality level to assure that their cooperation is on the highest possible level.

SILVA Network, since 2002, has been trying to get the most out of the integration process, by combining resources and knowledge of several European universities and setting up a mutual master program, Master of Science European Forestry. This program is designed to administer a real change of approach towards combining forestry curricula. Allowing international students to share the same career and the professors to act more mobile, creates a more consistent European exchange system and allows for the free moving space between several universities involved. The recent expansion of the program, with the Erasmus Mundus proceedings, opens windows to other forestry stakeholders and broadens the knowledge base representing the program all over the world.

Integrating Universities

The changes in society have a strong reflection on what universities are doing and where they allocate their resources. Universities in Europe have to integrate to some extent, more or less forced by the ongoing Bologna Process. This integration is eminent, but faces some problems at the heart of the defining concepts of university. Traditionally universities are upper class educational institutes with a strict policy towards maintaining their scientific relevance and assuring the best quality of education possible. Now universities are more aware of their public mission of improving society by exploiting potential capacities of human and natural resources and evolving technology towards better life standards. This quality can be described as the employability of science in society. As international integration is now eminent in HE, would the public missions of these institutions not also be changed? Can the integration process influence the status of universities in a negative way? The universal definition of university can maybe give us a framework for this question.

The University is an autonomous institution at the heart of societies differently organized because of geography and historical heritage; it produces, examines, appraises, and hands down culture by research and training. To meet the needs of the world around it, its research and teaching must be morally and intellectually independent of all political authority and economic power. (Magna Charta Universitatum, 18 September 1988, p. 59)

The declaration states that political authority and economic power should not be influencing the research and education going on at a university. But what can be said about the Bologna Process, is it not a political or economical process? Many higher educational institutes do embrace the moral and intellectual dependency on enterprises, which in the future are to be called universities. One can state that nowadays academic values and higher education are undergoing directional changes. The aims for the directional changes lie in combining independence of mind, the traditional mission, with employability for people who are fit for sustainable leadership and innovation, which are often thought to be conflicting. Having indicated these aims, it is obvious that the ultimate aims and virtues of "pure academy" and of "employability" coincide, as do the skills required for both aspirations: a methodical approach, systematic structuring, awareness of limits of scope and need for interactivity. So, addressing

the problem of conflict properly simply means to realize that there is an identity of aims and skills rather than of conflict between academy and employment. In this context, the real problem of quality does not lie in a conflict of aims and of desired skills but in designing and implementing adequate learning experiences and didactics (Kohler, 2003).

The international coherence of higher education is encouraged by the Bologna Process. European higher education has to adapt to the US educational system as well as to unify under themselves. HE had to adapt because otherwise the risk of being undervalued by the rest of society. HE is supposed to be innovating and market directed, fitting into a knowledge industry of private investors producing knowledge and graduates as economic resources. Public missions become overshadowed by market interest and this is shown in the HE process of integration. Integration of HE depends on the Bachelor-Master structure, which implies a division of phases (3+2) and makes vocational education a predecessor of scientific education. In this way, the distinction between scientific and vocational education becomes vague (balanced by the universities themselves, under strong influence of economic power and political EU authority) and a real dichotomy between traditional educational approach and European integration arises. The renown of institutions assures the quality of the education, rather than academic values and emphasis is rather laid on individual benefits of return than on social benefits (Scott, 2003).

In many aspects the university tries to meet the needs of the world around it, but if totally independent of political movements and economic power, is doubtful. Privatizing universities needs a lot of adaptability of the institution. Traditional academic values have to be preserved and defended in an ongoing race to beat the budget, with commercialization and vocationalisation of education and research as main threats. The growth of so-called managerialism in higher education suggests that the differences between academic institutions and other kinds of (non) governmental organizations in a knowledge-based society are being reduced and that a process of convergence is underway. If this is a bad influence on the universities, is disputable, but the definitions of the academic institute 'University' have to be revised.

External forces

Eastern European universities in many aspects had to and still have to adapt more drastically to the evolving changes in HE in Europe. Due to the strong dependency of these instances toward the political authority present and the stamp of Russian communism, the faculties are compared to the Western countries less autonomous and the shift towards privatizing universities is more abrupt. Huisman (1997) considers the sling movement between political planning and self regulation when talking about the offer of curricula at Universities. Zgaga (1997) describes this shift from political dependency toward autonomous positions of universities as the moving of a pendulum, held by the forces of political influence and strife for autonomy. If a societal trend offers opportunity to lessen political dependency, the 'autistic' position, not aware of the public mission of research and education, disappears and more emphasis can be laid on what the public demands of universities (figure 1). Producing graduates ready for the international market opportunities fit these public demands, as well as using knowledge towards society improvement, exploiting potential capacities of natural and human resources and to evolve technology for life improvement.

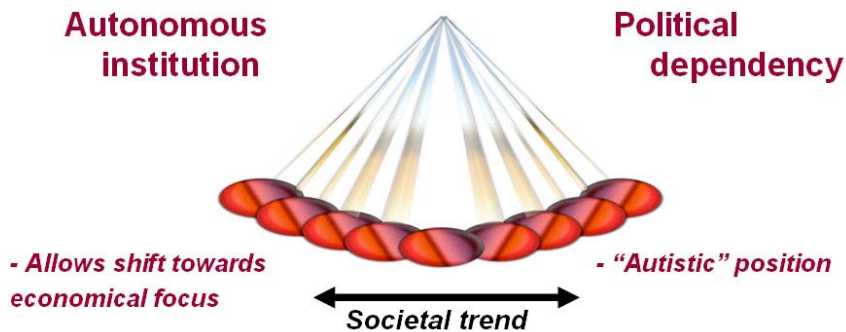


Figure 1: Zgaga's logic of pendulum, showing the quest of the Eastern European universities to find a balance after societal change.

Trying to explain a certain range of education type, using the same principle, but focusing on different forces that redirect the pendulum, the universities are seeking balance between the two types of education. The willingness of the universities to change their curricula into management oriented education, determines the force of the directional trends towards more public awareness. The public demands have grown off late and also a broader group of people is able to follow academic education. Incoming students expect a job after graduating and enterprises will cooperate with universities only if commercial ends are met in the research projects. The production of independent knowledge and scientific results will only be interesting if it can be sold or arouses publicity. The university has to find balance in this commercialization of education and certainly not reducing the scientific interest (see figure 2).

Conservationist movement in the universities are talking about not changing the focus of the education in universities and to stick with the decent empiric research done by universities, but the fact is that universities were suffering from heavy competition by vocational institutions of higher education. Financial resources provided by the government were no longer sufficient to support the innovation rate of the competing institutes and the embracement enterprises and students, this was especially striking for the 'Life sciences' (agricultural) universities, which adapted by changing image, and getting vocational education back in the programs. The decrease in student amounts also made these type institutions look at the possibilities on acquiring students abroad, hence the head start for the employment of the Bachelor Master structure in academic education in the Netherlands was made by Wageningen University.

European Forestry

The Master of Science in European Forestry (MSc EF) fits in the changing movement of the academic world. With an integrating Europe, the opportunities to study and teach together with more mobility are vivid. A broad access to knowledge is offered by combining resources and expertise of six forestry faculties in Europe. Motives for students to enrol, as well as their academic results are considered in a selection trail which can fit the students to the possibilities and criteria of the program. The broad access to knowledge and contacts is offered, allowing for specialist development and the formation of complete views on subjects. The students and teachers experience a true European consistency when moving from one city to the other and

these experiences will expand the knowledge base on which the MSc Program leans. The fresh character of the program also provokes some child illnesses. A practical disadvantage can be that students are faced with administrative problems considering the enrolling procedure of the different universities. Diplomacy can also be a setback, especially in the provision of visas. Furthermore, the institutions and cooperative enterprises have to accept a certain insecurity considering the lack of former experience with this three year old Master program. Provoking interest of political and business stakeholders leads to valuable funding (e.g. Erasmus Mundus) and career opportunities for the students. A constant effort is needed to distinguish the program from regular programs to ensure a stable flux of students and cooperating enterprises. Especially the 10 ECTS long Applied Period (AP, see figure 3), where students are placed in an enterprise for practical environment, needs a lot of support from the cooperative universities.

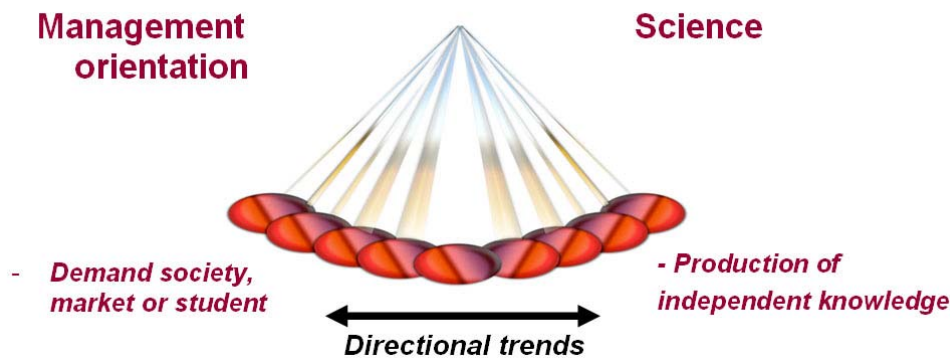


Figure 2: Logic of pendulum, adapted to show choice for universities in integrating Europe: How to balance education

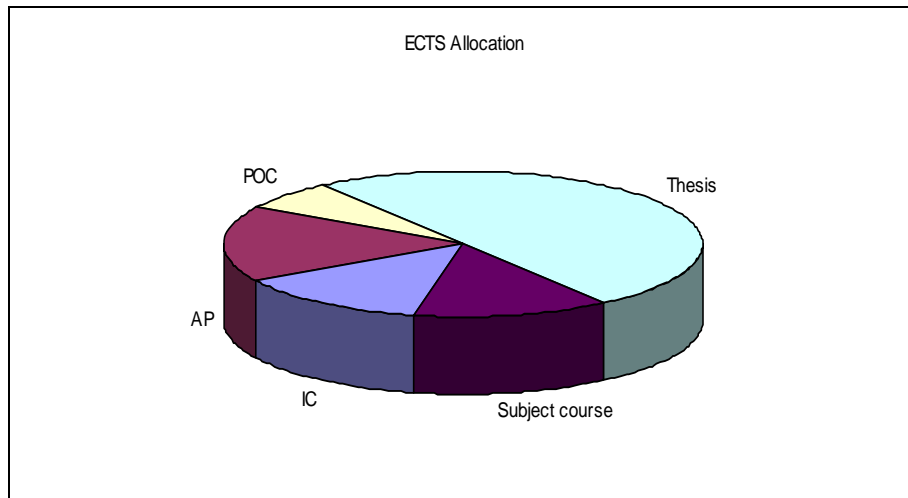


Figure 3: Allocation of ECTS (European credit transfer system points) in the different courses and subjects of MSc EF. POC: problem oriented course; AP: applied period; IC: introduction course.

Regarding the question, how MSc EF should balance science and management-orientation in its courses, no right answer can be given, as long as the academic values (of which the students are already aware) are protected and a thesis is part of the program, as the students themselves are responsible for choosing the subject of the thesis. The students themselves have a lot of influence on the success of the program. Their employability and academic talent determine the future of the program and its renown in the higher education sector. For now, the Master is expanding its boundaries by the opportunities given by the Erasmus Mundus Program and in a few years the conclusion can be made if this step was one in the right direction. If international experience is also a big academic value, this Master offers a lot of aspects of directional change which are found back and promoted in the Bologna Process and in this view, it is a good indicator for the proceedings of the integration of HE in Europe.

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3.6 STUDENTS' INVOLVEMENT IN EDUCATION GOVERNANCE EXPERIENCES WITH EDUCATION ON INTERNATIONAL FOREST POLICY

RICHARD ALEXANDER MODLEY

Summary

Notwithstanding repeated appeals during ministerial conferences, the participation of students in United Nations' decision making processes on forestry proved to be difficult to implement. The activities of the International Forestry Students' Association (IFSA) succeeded in changing this. The used methods proved successful too in enhancing the interest of forestry students in forest policy.

Students' participation in the Bologna process

In the ministerial declarations from Prague and Berlin concerning the Bologna Process, ministers highlighted several times the importance of the involvement of students as full partners in higher education governance. They noted that national legal measures for ensuring student participation are largely in place throughout the European higher education area and called on institutions and student organisations to identify ways of increasing actual student involvement in higher education governance. This idea of increased stakeholder participation goes along with the enlarged inclusion of participatory methods in all kind of decision-making processes of the EU and the United Nations.

But very often this call for participation is an empty promise from both sides:

- Decision-makers have problems with equal participation of young people or don't take them serious enough.
- Students have to prove continuously their ability to make valuable contributions before they get heard
- Students are not supported when establishing networks and mechanisms that help them to generate knowledge that could be provided to the processes.
- Further they have to tackle the nature of their volatile constituency causing problems of continuity. The time of being student is limited and the transfer of knowledge to succeeding generations is crucial.

Since two years the International Forestry Students' Association (IFSA)¹³ is developing a mechanism for effective student participation in decision-making processes and an improved knowledge transfer from decision-making level to the student's education. The carried out activities in the sector of international forest policy will be described below to give an insight in the potential and the requirements of effective student participation in decision-making and education governance.

¹³ IFSA is 15 years old global organisation consistent of 55 student organisations from over 41 countries representing around 10.000 forestry students.



Figure 1: The information cycle used by IFSA.

Participation in international forest policy processes

With the United Nations Conference on Environment and Development (UNCED) 1992 in Rio de Janeiro, countries realized the need to agree on guidelines for the implementation of sustainable management of forest resources. Numerous follow-up processes have developed under the umbrella of the United Nations to guarantee the implementation of the decisions made in Rio. One of the outcomes of the Rio Conference was the AGENDA 21, which highlights the need for including the civil society in environmental decision-making processes. To date the Rio follow-up processes, as the Convention on Biological Diversity (CBD), the Climate Framework Convention (UNFCCC) and the United Nations Forum on Forests (UNFF), have implemented participatory mechanisms to allow civil society to be part of their decision-making process.

Youth was identified as a major stakeholder in sustainable development. This led to an increased need for youth participation in international environmental discussion and decision making processes conducted by the United Nations. However, as the negotiated content of the

environmental decision processes of the UN are extremely complex, current methods of youth participation failed. The question is: "How can young people as non professionals effectively participate in complex decision-making?" As youth participation at the UN has developed recently there are no blueprints how to organise it.

Education through participation

In 2003 IFSA started to liaise with forest relevant international processes and got accredited at the CBD, UNFCCC, UNFF and the Ministerial Conference on the Protection of Forests in Europe (MCPFE). Accredited organisations have the right to participate in the meetings of the processes as observers. At UNFF, IFSA even got the status of the children/youth focal point with the task to represent and coordinate several youth organisations. The mandate of representation includes not only a broad constituency, but also a mechanism to consult them and share the outcomes of participation. The students from the first UN representation of IFSA at UNFF3 organized a seminar on international forest policy where they shared their gained knowledge with other students. Thirteen more seminars in ten countries followed. The seminars served as places to disseminate information and to recruit students as youth delegates for the UNFF process and later for the CBD, the UNFCCC and MCPFE.

With the developed information cycle (see figure 1) IFSA could guarantee that its youth representation bases on a consultation of a large number of students and could further improve the knowledge about international forest policy among forestry students.

Although the organization of the seminars was aimed at the start to serve as recruitment for youth delegates, it later provided some more benefits. We found out that many forestry students had a range of prejudices against forest policy. Traditionally, forestry students are more interested in practical elements of the education as silviculture and botanic issues. Moreover international forest policy is difficult to teach. Its content changes continuously. Numerous negotiations in different processes are spinning a dense and complex spider web of interdependencies that is difficult to understand as the actors do not follow a logical structure but political compromises.

Further students do not see that forest policy matters on the grass roots level. It is difficult to see a direct impact on sustainable forest management (SFM) coming from UN processes.

The participation and information through the IFSA seminars on forest policy changed the perspectives of the students from an observer position to an actor's position inside the spider web. This made forest policy a living experience. The far away UN decisions now were made right in front of the students and they even had the possibility to influence the decision making. The core topic of the youth representation, education, was through their lobbying recognized for the first time in the international forest policy dialogue (see figure 2 and the UNFF Resolutions).

In a changing environment for higher forestry education, it is important to keep contact with the decision-making level of the forest relevant sectors. There is a high demand to tackle the enormous problems of managing the forest resources in a sustainable way. However, this demand has not reached yet the labour market for graduates of higher forestry education.

For the question raised in the beginning of this article, i.e. where student participation makes sense, the IFSA experience can provide some answers. Three levels of impact can be identified due to IFSA activities:

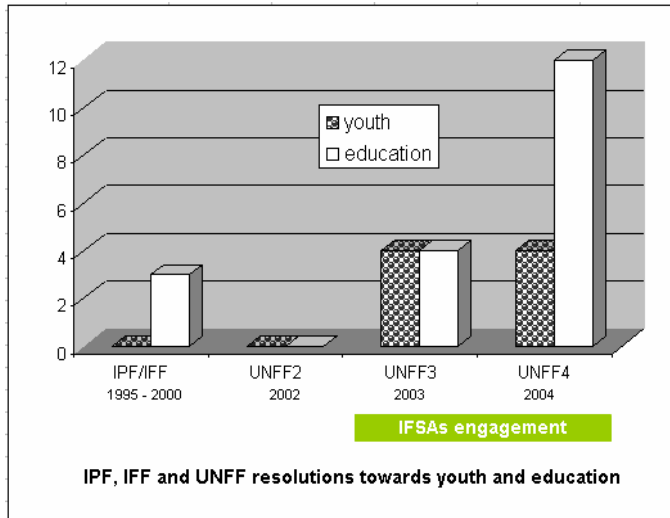


Figure 2: Number of resolution regarding youth and education in the International Panel on Forests, the International Forest Forum and the United Nations Forum on forests.

Participating at UNFF, IFSA made a case for the high relevance of forestry education to implement sustainable forest management. This is the first step towards an increased awareness among politicians about this causal relationship. If forest education institutions follow this initiative, in future there should be more resources available for forestry education.

On university level, IFSA could increase the interest of students in international forest policy. This interest is a signal for the development of curricula. New ways of linking the participatory experiences of the students with the higher education in universities might provide a fruitful learning environment.

IFSA's participation strengthened the democratic structure of the UN processes relevant to forests. It increased the transparency of the processes and the commitment and ownership of the students as future decision-makers towards the implementation of the outcomes of the negotiations. This can tackle one of the biggest problems UNFF, CBD and UNFCCC encounter: lack of implementation. Teaching students about these international frameworks is a logical step for future implementation.

UNFF Resolutions – relevant to youth and education

The following resolutions were formulated during the UNFF meetings in 2003 and 2004 in Geneva and can be grouped as follows:

Participation

- The participation for the first time of women and youth and children, along with six other major groups, was noted with appreciation and government representatives considered the trend of increased major group representativeness was encouraging. [...] (UNFF3: 52, 2)
- The involvement of major groups is important in maintaining forest cover to meet present and future needs and, in particular, the participation and education of women and youth are vital contributions to the future delivery of sustainable forest management. (UNFF3: Resolution 3/3, j)
- Youth and children have much to contribute to the execution and evolution of scientific forest research, and their participation should be enabled through improved forest-related educational opportunities. (UNFF4: 29)
- Some partnerships tend to exclude stakeholders, such as youth and women, and often become labelled as social gatherings rather than as effective catalysts for positive change. Lack of information access, education, communication networks, as well as adequate human capacity and financial resources also hamper the ability of various stakeholders to become involved on an equal footing and in maintaining constant participation. (UNFF4: 10, 28)

Capacity building and Implementation of sustainable forest management

- Strengthen environmental curricula in educational institutions for forestry and forest industries highlighting applications of environmentally sound technologies, as well as management of environmental and social impacts and risks of forestry operations. (UNFF3: 14 r)
- Cooperative networks of research and educational institutions and among those in developing countries and countries with economies in transition should be strengthened. (UNFF3: 19)
- The involvement of major groups is important in maintaining forest cover to meet present and future needs and, in particular, the participation and education of women and youth are vital contributions to the future delivery of sustainable forest management; (UNFF3: Resolution 3/3, j)
- UNFF encourages support, particularly in developing countries, for national programmes of education, communication and capacity-building regarding sustainable forest management among youth, in order to promote their involvement in maintaining forest cover to meet present and future needs. (UNFF3: Resolution 3/3, 13)
- Capacity-building programmes are especially rare for youth in developing countries and should be enhanced. Institutional barriers to such activities must be removed and funding increased if this group is to be well educated on forestry issues. (UNFF4: 10, 22)
- Joint research programmes were regarded as an effective means of both minimizing duplication of efforts and increasing training and educational opportunities for scientists and students. Collaborative Partnership on Forests members were encouraged to work with regional scientific research networks on such activities. (UNFF4: 10, 18)
- In order to ensure long-term implementation of decisions taken at the international level, lessons learned through the international dialogue must be incorporated into the formal education system. Curricula should be reformed to include such concepts as community-based forest management and ecosystem management, and must include skills training in

participatory planning, implementation, coordination, networking, negotiation and conflict management. (UNFF4: 10, 21)

- UNFF urges countries, within their capacities, to recognize the importance of forestry education and research for achieving sustainable forest management, and calls upon countries, within their capacities, to enhance forestry education and research capacity.
- Incorporate forest conservation and sustainable forest use into educational curricula, starting at the primary-school level. (UNFF4: Resolution 4/1, 15)
- UNFF invites member states to consider incorporating the concepts of sustainable forest management, monitoring, assessment and reporting, and criteria and indicators, where appropriate, in educational curricula. (UNFF4: Resolution 4/3, 18)

Rising the profile and the awareness of forests and their sustainable management

- The importance of sustainable forest management awareness-building among youth and children, the future forest managers, was highlighted. [...] (UNFF3: 52, 15)
- Access to education is often limited in developing countries, where many young people are not even able to attain a basic education. Yet even in wealthy countries, education concerning forest conservation is not always included in standard school curricula. This needs to be addressed, starting at the primary level, if students are to be aware of the value and benefits of forests. (UNFF4: 18)
- It was also stated that in order to ensure sustainable forest management across generations and to increase understanding of forests as a critical resource, a greater emphasis needs to be placed on education through the integration of social and cultural aspects of forests in kindergarten, school and university curricula. (UNFF4: Resolution 4/4, 9)

Agenda 21 the advocate for civil society participation in decision-making

- Youth comprise nearly 30 per cent of the world's population. The involvement of today's youth in environment and development decision-making and in the implementation of programmes is critical to the long-term success of Agenda 21. (AGENDA 21, Chapter 25)
It is imperative that youth from all parts of the world participate actively in all relevant levels of decision-making processes because it affects their lives today and has implications for their futures. In addition to their intellectual contribution and their ability to mobilize support, they bring unique perspectives that need to be taken into account. (AGENDA 21, Chapter 25)

3.7 FROM THE 19TH CENTURY TO THE BOLOGNA PROCESS: CHANGES IN THE SPANISH FORESTRY HIGHER EDUCATION

ROSARIO FANLO AND ALVARO AUNÓS¹⁴

Summary

The study programs of forestry in Spain have hardly changed in the period between their establishment, in the mid 19th century, until today. Only in recent years, the situation has changed due to the increasing importance of environmental issues, eco-physiological aspects, and conservation of the forest ecosystems. At present, the structure of the forestry curricula is very diverse at the Spanish universities. Curricula are structured in 6, 5 or 3+2 academic years. The future curricular organization in Spain will be in accordance with the Bologna process; on short notice the Spanish government will decide about the structure, i.e. academic programmes in a 3+2 or 4+1 format.

The reduction in the number of registered students over the past years will encourage Spanish universities to organise joint courses, especially at the MSc level.

The beginning (19th century)

The earliest establishment of forestry education in Spain occurred, as in many other European countries, in the 19th century, basically as a response to an increasing societal awareness about the need for conservation of natural resources, including forests and natural spaces. Forests were badly managed, and the forest area rapidly decreased, as a consequence of

- A large increase of the areas devoted to agriculture;
- An increase of rangeland, based on the Mesta privileges¹⁵;
- An increase of navy productions, and therefore deforestation;
- In increase of the fuel demand.

Besides, the need for preservation of forestry resources and control of hunting and fresh water fishing were of increasing concern to certain parts of the society.

In the early 19th century, two Spanish students were granted by the Queen to visit Tharandt (Germany) to study the forest educational system there. As a result of their stay, a State depending School was created in Spain, one of these two students being the first director. The new school, called "Escuela de Ingenieros de Montes", created in 1847 in Villaviciosa de Odón, was moved to Madrid in 1914. The main features of the curriculum were:

- Quasi military discipline;
- Corporative approach (working in groups);
- Balance between conservation and production;
- "Knowing is making" (students are to be versatile).

¹⁴ Special thanks to Teresa Lopez for the translation of this paper.

¹⁵ Mesta: still functioning livestock organization originating from the Middle Ages.

Students got trained in the following skills:

- Management of public forest;
- Management of fauna;
- Control of hunting;
- Hydrologic controls;
- Control of fresh water fishing.

The 20th century

After 1914, management and conservation of natural spaces was given priority resulting in the establishment of the first Spanish National Park (Covadonga). Later, during the Civil Spanish war (1936 – 1939), all academic activities were suspended and a lot of “forestry agents” were lost.

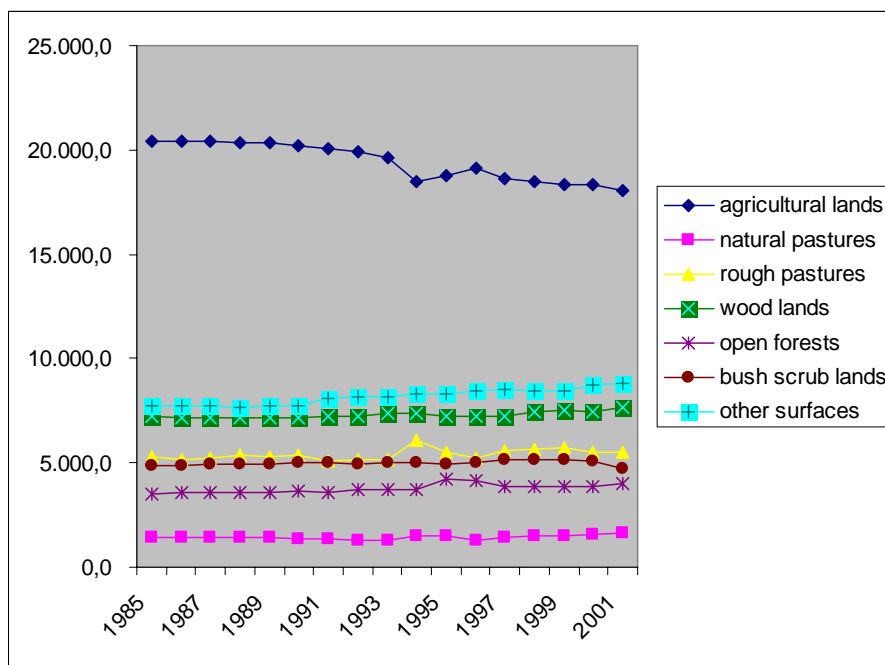


Figure 1: Evolution of Spanish land use in last twenty years. Surfaces in ha x 10³.

During the 1950s collaboration with French and Moroccan schools was very close. The School depended on the Ministry of Agriculture until 1964, when it was integrated in the Polytechnic University of Madrid. Until that date, the students worked for the Spanish Government integrating the Special Body of State Forestry Engineers.

From the 1960s onwards, forestry studies have become more and more diverse, but always oriented toward the public service. The State was still the main employer. Little by little, new jobs were appearing in the private sector, mainly in forestry and timber industry, furniture, import and export of wood products, etc. The changes in land use which started earlier,

continued in this period (see Figure 1). Another two schools, Córdoba in 1982 and Lleida in 1989, started teaching forestry with new curricula structures: five years in Cordoba and three plus two years in Lleida.

The present (end of 20th century and beginning of 21st century)

Forestry University study programs in Spain nowadays are leading to two types of degrees: BSc level and MSc level (also called Forestry Technical Engineer and Forestry Engineer, respectively). The number of Forestry Schools in Spain offering MSc level degrees at the present time is 7: Madrid offers an MSc level with a 6 year curriculum; Córdoba and Valencia also offer MSc levels but with 5 years curricula; Lleida, Lugo, Palencia and Ávila (the latter is a private university) offer both, i.e. BSc and MSc levels with curricula of 3+2 years. Another 12 schools in Spain offer just the BSc level with 3 year curricula.

The decrease in number of registered students in the past five years is a serious problem. The enrolments shifted from 779 MSc students in 1999 to 525 in 2003, and from 1030 BSc students to 510 in the same period of time.

Another large problem are the unemployment rates for both engineers as well as technical engineers, as can be seen in Table 1. These rates differ also according to gender: 21 % of the women foresters are unemployed, while unemployed men account for 11% (see Sala, 2000).

Table 1: Unemployment rates (%) for engineers and technical engineers.

Work type	Engineer, MSc level	Technical Engineer, BSc level
Autonomous	5	9
Public sector	33	10
Private sector	43	51
Studying	6	11
Unemployed	14	19

The future of the Spanish forestry studies

One of the most likely structure to be agreed on by the Government is: a BSc level degree with a load of 240 ECTS credits, where 60 to 75 % of the total credits are compulsory courses; and a MSc level degree with a load of 60 to 120 ECTS credits composed mainly of specialisation subjects. This will be followed by a Post degree level (PhD), with some seminars and a thesis work.

It is foreseen that our future curricula structure might be different from those in other European countries, where the most common curricular structure is 180 ECTS credit BSc + 120 ECTS credit MSc.

But the skills of common or transversal abilities acquired will be coincident, as well as the teaching system, based on the following premises:

- Learning University as opposed to Teaching University;
- Learning competencies as opposed to Learning information;

- Guiding teacher as opposed to Leading teacher;
- Formative evaluation as opposed to additive evaluation;
- Training abilities;
- Problem solving with integrated application of knowledge and abilities.

Conclusions

There has been a clear curricular change during the past one and a half century, where the interests have shifted from a productive approach to a sustainable conservation and management of the Spanish forestry resources. The forestry employers have also shifted from the public to the private sector.

The future model of the forestry study programs in Spain is not clear yet, regarding lengths (or duration) of the BSc and MSc programs, but the different Spanish schools will have to work together in order to obtain a space for common working and learning which puts them in a competitive situation along with other European Universities.

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4 CURRICULA ON FORESTRY OR ON NATURAL RESOURCE MANAGEMENT?

4.1 CAN FORESTRY AND NATURAL RESOURCE MANAGEMENT CURRICULA CO-EXIST?

EDWARD C. JENSEN

Summary

Conference organizers have raised the question, “Can forestry education be part of a natural resource management curriculum?” Oregon State University (OSU) in the United States of America has a decade of experience that allows us to answer this question with a resounding “Yes.”

Since 1993 OSU has offered a four-year undergraduate Bachelor of Science (BSc) degree in Natural Resources (NR) while maintaining vigorous “traditional” BSc degrees in forest management, forest engineering, forest recreation, wood science and engineering, fisheries and wildlife, rangeland resources, and other related fields within natural resources. The Natural Resources degree is an interdisciplinary degree supported by four Colleges within OSU: Forestry, Agricultural Sciences, Liberal Arts, and Science. It emphasizes skills and knowledge that students interested in managing natural resources need in order to cross traditional disciplinary boundaries and value systems; at the same time, it requires a specialization that creates an opportunity for students to develop a subset of skills, like the traditional skills and knowledge associated with forestry. To date, the most popular specialization has been one focusing on the management of forest ecosystems. Several students, who have chosen to major in natural resources, but specialize in forest ecosystems, have graduated to become successful managers of forest lands.

The Natural Resources degree program has grown dramatically since its inception in 1993; at the beginning of the 2004 academic year approximately 175 students are currently enrolled on two separate campuses and another 75 students are enrolled via distance education. A third campus within Oregon’s system of higher education has just added the NR degree to its offerings. At the same time, traditional forestry and related natural resource programs continue to offer strong, vibrant, and often growing programs.

The remainder of this paper describes the rationale, mechanics, and special challenges associated with the Natural Resources degree program, as well as its relationship to our traditional forestry degrees.

Introduction

While many universities in the United States have folded their forestry programs under the broader umbrellas of environmental science or natural resources, OSU has managed to maintain

separate, and prosperous, programs in both forestry and natural resources. I like to help you understand how we have done that.

One note of caution: I believe that curricula are developed within specific situations to meet specific needs, so I will not try to convince you that what has worked for us will necessarily work for you, but I will try to convey the idea that what we have done has worked well for us in the hope of stimulating your thinking,

Natural Resources in Oregon

Before discussing the relationship between forestry and natural resources curricula, I would like to help you understand the kinds of natural resources that we manage in Oregon. Of course, I can not cover everything that fits under this broad umbrella, but I like to give you a glimpse.

In a state about half the size of France, we have a diverse array of forest types: from the moist, dense Douglas-fir and western hemlock forests of western Oregon to the dry, sparse ponderosa pine and western juniper forests of central and eastern Oregon. Although our forests are dominated by conifers, we also have niche-specific hardwood dominated forests, especially in western and southwestern Oregon.

Oregon's forests are valued for wood, water, wildlife, recreation and aesthetic values, for grazing values for both domestic animals and wildlife, and for a diverse array of other resources and values. Most of our cities and towns directly interface with our forest and range lands, and issues in one are directly linked to issues in the other.

Structure of Oregon State University

Before describing the interface between forestry and natural resource curricula at Oregon State, it is important to understand a little about the structure of our university. We currently have about 20,000 students divided into 13 colleges. Five of these colleges have a primary interest in natural resources: Forestry, Agricultural Sciences, Science, Liberal Arts, and Oceanic and Atmospheric Science. Although Oceanic and Atmospheric Science teaches several undergraduate classes, they do not provide an undergraduate degree; therefore, they will not be included in the remainder of this discussion.

The College of Forestry currently has about 400 undergraduates and 150 graduate students. It is divided into 4 departments that offer 7 separate undergraduate curricula—some with long histories, while others are quite new. Most have undergone a number of name changes through the years; the names listed below reflect the current names of our undergraduate degree programs, while the dates indicate the year each program was established:

- Forest Management (1906);
- Forest Engineering (1913);
- Wood Science and Engineering (formerly Forest Products) (1927);
- Forest Recreation Management (1974);
- Forest Engineering/Civil Engineering (dual degree) (1992);
- Natural Resources (interdisciplinary degree) (1993);
- Outdoor Recreation Leadership and Tourism (2002).

The Colleges of Agricultural Sciences, Science, and Liberal Arts are all much larger than the College of Forestry, and have many more departments. At least some departments and programs within each College are closely allied with natural resource fields. For example, The College of Agricultural Sciences contains 10 departments, including Crop and Soil Science, Fisheries and Wildlife, Rangeland Resources, and Horticulture, among others. The College of Science contains 13 departments, including Biology, Botany and Plant Pathology, Geosciences, and Environmental Science, among others. The College of Liberal Arts contains 18 departments, including Anthropology, Philosophy, Political Science, and Sociology, among others. It is important to note two things from this:

- At OSU, many programs that are commonly allied with Forestry, like Soil Science, Fisheries and Wildlife, Rangeland Resources, Horticulture, Biology, Botany and Plant Pathology, Geosciences, and Environmental Science, are all separate programs from the College of Forestry.
- At OSU we have many faculty and students associated with Liberal Arts who have a deep interest and active involvement in forestry and natural resources, especially in Anthropology, Philosophy, Political Science, and Sociology.

Why was a new approach needed?

With all of these colleges and departments interested in forestry and natural resources, why was a new approach needed? There were many reasons, but I will focus on three:

- In the US, professional needs were (and still are) changing. Employers are asking for graduates who can move more easily across disciplinary boundaries, manage a diverse array of interconnected natural resources in the face of increasing social pressure and controversy, and function more effectively in team-based decision teams.
- Existing curricula at OSU were (and are) rigid and somewhat difficult to adapt.
- There is still a need for students trained in the traditional disciplines.

OSU's response to these issues was to propose a new interdisciplinary degree in Natural Resources — one that would compliment, but not compete with, its strong and independent traditional disciplinary degree programs. Here are several key aspects of this new program:

- Four Colleges agreed to cooperate in this venture: Forestry, Agricultural Sciences, Science, and Liberal Arts.
- The focus would be to create a new natural resource-based degree program that worked across disciplines and value systems.
- This in itself is not a novel idea in the US. What made this approach different from most other efforts in the US is that OSU wanted to maintain its traditional programs in forestry and other natural resource fields, and not to subsume them beneath a single banner of “natural resources” or “environmental sciences”.

Several goals were initially established for the new NR program:

- To provide a broad, integrative education;
- To emphasize skills with people and values within a natural resources context;
- To provide a variety of curricular options around common themes;
- To create a welcoming home for students, and 5) to complement rather than compete with existing programs.

A number of key skills sets were readily identified for graduates of this new program. Potential employers told us that graduates needed a better ability to:

- Communicate — orally and in writing — with a diverse array of audiences (not just technical specialists);
- Solve problems and make decisions — in the face of incomplete information and an uncertain future;
- Manage for a wider array of goods, service, and values;
- Use emerging technologies;
- Manage increasingly complex problems;
- Work in teams;
- Integrate across disciplines.

Structure of the Natural Resources Program

Next, I like to give you a quick picture of what the new NR degree program looks like. Four major components account for most of the credits within the program (about 169 of the required 180 credits):

- OSU Baccalaureate Core;
- Natural Resources Core;
- Natural Resources Breadth;
- Natural Resources Specialty.

Once those four areas are accounted for a few elective credits remain (about 11/180 credits), although students can always choose to take additional elective credits.

- The **OSU Baccalaureate Core** is taken by all OSU students. It accounts for about 52 of the 180 credits taken within a standard degree program. Fifteen distinct categories of courses must be taken, with many choices of courses within each category. The major categories include: communication skills, mathematics and science, critical thinking, art and literature, world culture, contemporary global issues, and science-technology-and society.
- The **Natural Resources Core** is taken by all NR students, and varies only slightly for each student. Each NR student must complete a set of core NR courses accounting for about 46 of the 180 credits required for their entire program. These courses fall into the following six categories: Mathematics and Science, Biology and Ecology, Earth and Atmospheric Science, Economics and Policy, Water Management, and Natural Resource Decision-Making. There are a limited number of courses within each category that will satisfy the requirement.
- The **Natural Resources Breadth** requirement is taken by all NR students and varies modestly for each student. To meet this requirement, each student must take at least one (1) course from each of the seven following NR categories: Forestry, Fisheries and Wildlife, Land and Water, Range Management, Amenities Management, Resource Values and Philosophy, and Social and Political. Each breadth area offers from 6 - 15 courses that will meet this requirement. Multiple courses are offered both to meet diverse student interest and to facilitate course scheduling.

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- Finally, each student must complete a 50 credit **Natural Resources Specialty** of his/her own choosing. These credits must be chosen from at least three distinct fields of study. Specialties can either be prearranged, or can be tailored to meet the needs of individual students. Examples include: Forest Ecosystems, Natural Resources Education, Watershed Management, Natural Resource Policy, Human Dimensions in Natural Resources, Agroforestry, Geosciences, Native Americans and Natural Resources, and Natural Resource Technology. This is one of the most attractive features of the NR program to students.

It is also important to understand at least a little about the administrative structure of this program. Initially, the NR program was overseen by four deans; although these four still retain primary responsibility for the program, two others are currently involved, and soon there will be one more. As a result, there are many masters to serve. In addition, there is a part-time Program Director who is also a member of a traditional department in the College of Forestry, and two half-time positions, Program Coordinator and Head Advisor, both currently held by the same person. There is an NR Advisory Committee, with one volunteer faculty representative from each of the four primary participating colleges; curriculum oversight is the primary responsibility of this committee

Some differences between the NR program and traditional programs

Now that the structural foundation for this program has been established, it is worth noting some of the key ways in which the NR program differs from the traditional academic programs at OSU:

- The NR program is not centered with a single department or college;
- The NR program does not have a designated faculty. Faculties who teach NR students all have other academic homes;
- There are, by design, very few NR-specific courses, although after 12 years we are beginning to change that a bit;
- The NR program has no graduate, research, or continuing education programs;
- The NR Program Director does not control financial resources or personnel decisions;
- The NR Program is designed to have a minimal budget;
- NR graduates face less predictable career paths than traditional students.

Offering this program is not without its challenges. Here are a few of those challenges, separated into two groups: those that are primarily student-centered and those that are primarily administrative in nature.

Student centered issues

- Employability has always been a concern—at least on the part of faculty and administrators who are used to traditional hiring methods. Initially, there were concerns that these new NR students would not find jobs for which to compete. So far, this has not been the case for the majority of NR students.
- Providing good advice for students (professional, academic, and personal) continues to be a concern. Each of the four colleges participating in the program handles advising differently. Some use a professional advisor and others disperse advising responsibilities among several faculties. In a program with this many nuances, this approach has not always worked to the

advantage of students in the program — and some students actually switch colleges to get the type of advising they want.

- Because students are dispersed across four colleges and seldom come together as a group, they do not develop the same sense of group identity that students in our traditional programs develop. We are beginning to counteract that by forming an NR club, just like we have a “forestry” club, a “recreation” club and a “forest products” club.

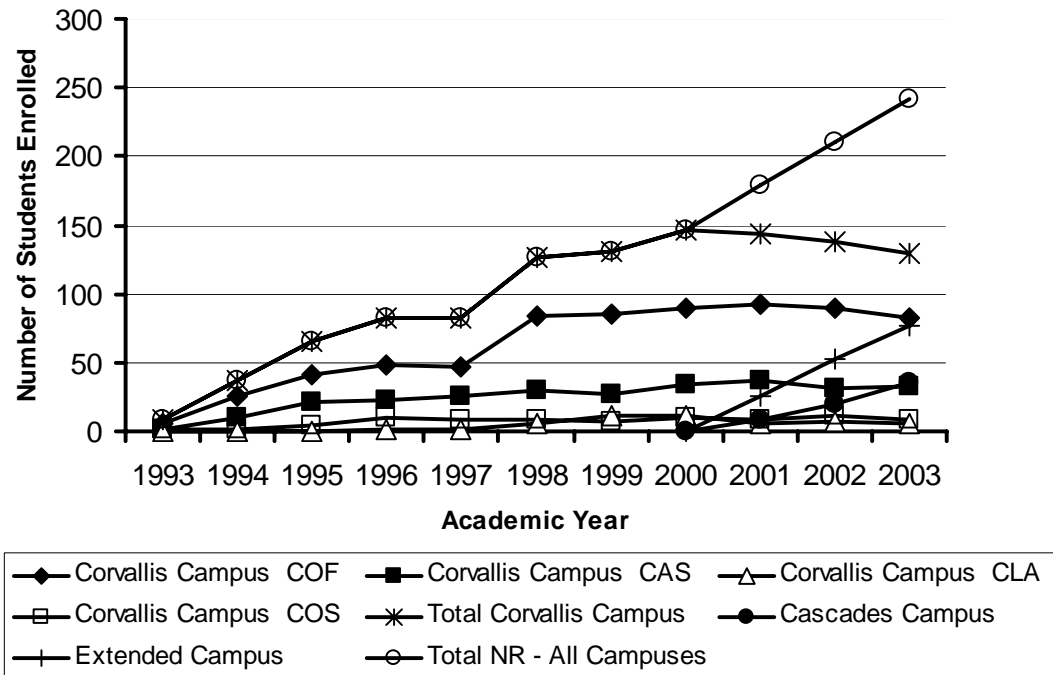


Figure 1: Natural Resources program enrolment by campus, 1993-2004. COF = College of Forestry, CAS = College of Agricultural Sciences, CLA = College of Liberal Arts, and COS = College of Science.

Administrative issues

- The Program Director does not have the same authority or resources as a department head. He has no line authority to “command” and few resources with which to provide incentives.
- Strategic planning — the kind needed for growth and evolution — presents challenges, since it is done by a committee which only has the power to recommend.
- Tactical support — the kind needed for day-to-day operations — is handled differently within each College. This was helped tremendously several years ago when the College of Forestry decided to fund a half-time program coordinator to assist the Program Director.
- In tough financial times, securing resources is always a challenge — but all the more so when multiple deans need to be involved and agree on a single approach.
- The NR program started on the Corvallis campus. It has since expanded to two additional campuses and is also available on our “distance” campus network.

Indicators of Success

So, what have been the results of our efforts? Here are four examples:

- The number of students enrolled in NR has increased from zero in 1993 to 225 in 2004.
- The NR program has grown in complexity. In 1993 it was offered only on the main campus of OSU (Corvallis). In 2005 it is also offered at OSU's Cascades Campus in Bend, Oregon and via our distance education program. Soon, it will expand to Eastern Oregon University.
- NR students have enjoyed reasonable success in the job market. In the past three years, 80-100% of those graduates looking for work have been employed. Of those, most report that they are working in fields related to their major; about half report that they are in full-time career track positions.
- And, since one of the initial goals of the NR program was to not compete directly with academic programs in the traditional disciplines, it is important to note that those programs continue to do well at OSU.

Two figures support the above assertions. Figure 1 illustrates growth in various aspects of the Natural Resources Program over time. It shows three trends:

- Overall growth of the NR program since its inception (Total NR — All Campuses).
- The growth in enrolment at the three separate campuses where the NR program is currently offered (Total Corvallis Campus, Cascades Campus, and Extended Campus).
- How NR enrolments in the four colleges participating in the NR program have fared since the inception of the NR Program.

Since one of our goals was to not compete directly with the traditional programs, we should also look at enrolment in those programs as the NR has grown over the past decade. Figure 2 illustrates enrolment trends in five significant forestry and forestry-related natural resource programs at OSU. Although there may be some impact from the NR program, it appears to be small.

Keys to success and lessons learned

So, what are some keys to the success of the Natural Resources program at OSU?

- The attractiveness of an interdisciplinary program to students. For many, it seems to reflect their professional interests and outlook on life.
- Flexibility afforded by the NR Specialty portion of the degree. This allows students significant input into the courses required to complete their degree. The ease of creating new specialties and eliminating old ones allows the curriculum to adapt to changing conditions. The individualized specialty allows students to move into the NR program later in their academic careers than for traditional, less flexible degrees.
- A few dedicated faculty and staff. Without the commitment of a few, the program would likely have faltered.
- Recently having natural resources identified as one of the six key themes for OSU has given a real boost to the undergraduate degree program, both on-campus and beyond.
- Cooperating with, rather than competing with, traditional programs has been vital. Over time, many faculty and administrators who started as doubters have become advocates.

- Success has bred success. Traditional programs that were once reluctant to become a part of the NR program now participate readily. The Forest Management program of which I am part is an excellent case in point. While we were once reluctant to welcome NR students into the “inner circle” of forest management, we are now looking for ways to improve their forestry education, and we are also beginning to adopt several of the NR curriculum approaches within our own program

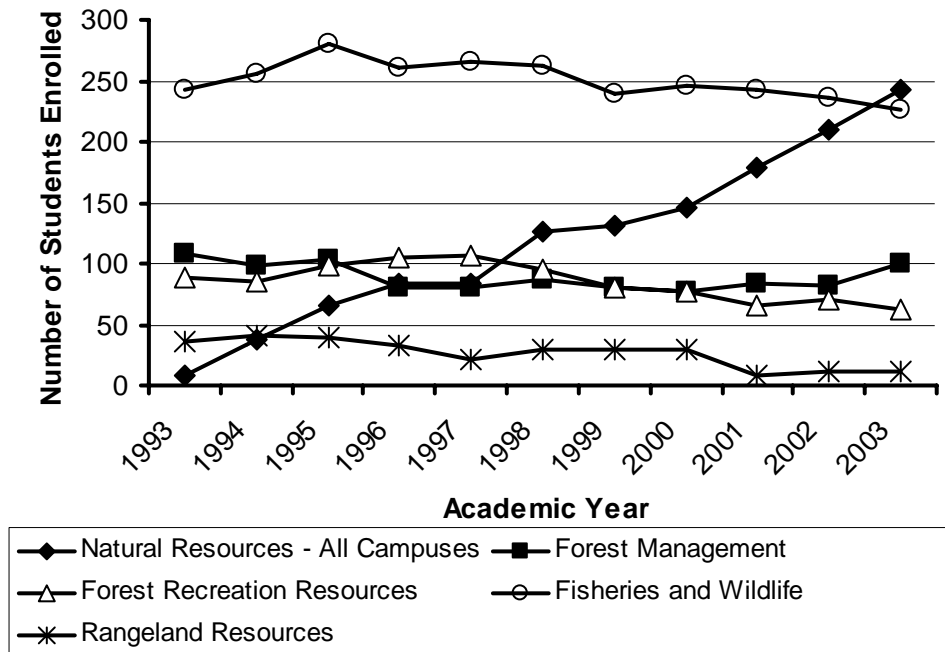


Figure 2: Enrolment in selected forestry and natural resources undergraduate degree programs at OSU, 1993-2004.

What conclusions would I draw from our experience?

- A Natural Resources curriculum certainly **can** be compatible with traditional degrees in forestry and other natural resource fields. At OSU, the NR degree program has flourished, and it is not apparent that this has come at the expense of enrolment in the more traditional programs.
- The Natural Resources degree is attractive to students, who like its breadth and flexibility. This flexibility also allows innovation in pedagogy.
- Student-chosen specialties are a key to the success of the Natural Resources program at OSU.
- Natural Resources graduates are attractive to employers — some more than others, of course, but the number seems to be increasing.
- With care in selecting a specialty, a broad-based Natural Resources student can also prepare to become a capable forest manager.

So, in response to the original question, can educational programs in forestry and natural resources be compatible, the OSU experience answers a resounding “yes.”

4.2 FORESTRY AND NATURE CONSERVATION IN ONE CURRICULUM AT WAGENINGEN UNIVERSITY: A CONTRADICTION IN TERMINIS?

HANS JANSEN AND PIETER SCHMIDT

Summary

The development of the university forestry education at Wageningen University and its predecessors is described. Main focus is on the recent change-over from a forestry curriculum towards a forest and nature conservation one, the reasons for this change and the experiences with the new curricula at both BSc and MSc level.

Historical context

Forestry as a profession in the Netherlands developed slowly between 1830 and 1900. Already before 1830 some larger landowners had attention for some form of sustainable management of trees and forests, but that concerned more a sideline activity of farmers or an estate agent. Main activities between 1830 and 1900 were in the former Dutch colony Indonesia plantation forestry (*Tectona grandis*) and in the Netherlands afforestation. Between 1850 and 1950 200,000 ha forests were planted in heather, peat and sandy areas, whereas in the same period about 700,000 ha nature areas, then called 'waste land', were converted into agricultural land (CBS, 1985). In this period, the Heidemij (private society for land and forest management activities) and the State Forest Service were founded, in 1888 and 1899 respectively. In 1905 the Society for the Conservation of Nature Monuments (Natuurmonumenten) was founded, mainly driven by biology teachers and researchers, and bought its first area Naardermeer (van der Windt, 1995).

Forestry Education 1884 -1954

Teaching in forestry developed slowly, first in Frederiksoord (vocational training 1887-1902), in Arnhem (private school of the Heidemij since 1903 professional college) and in Wageningen, where in 1884 the first teacher in silviculture was appointed at the local public agricultural school, the start of the forestry education in Wageningen. In 1899 a forestry curriculum was established at this school. This school was changed into an applied university in 1917 and into a university in 1986, in both cases with the description Agriculture added. This word disappeared in 1999. Below, this institute will be called Wageningen University for short. Before 1917, the forest managers for the Dutch colony Oost Indië (now Indonesia) were educated in Tharandt (Germany) with some topping up in Wageningen. After 1917 till 1955, about ten tropical and one to two temperate foresters were trained in Wageningen each year. In the tropical curriculum the emphasis was on exploitation, in the temperate curriculum on afforestation (van den Bosch, 1986). However, both were traditional forestry curricula, technology/management oriented and included a six months internship. Supply and demand of graduates was more or less in equilibrium and most of them found a job in forestry. Three forestry chairs were involved in the

curriculum, covering five fields: silviculture, forest management, economic and social aspects of forestry, forest exploitation, forest mensuration, and some attention for wood science.

Forestry Education 1955 - 1970

After the Second World War and the independence of Indonesia, the market for graduates in tropical forestry and other tropical fields diminished. All Wageningen University curricula were renewed in 1955, resulting in two new forestry curricula, one with emphasis on silviculture, the second with emphasis on management and exploitation. Both curricula were grounded on basic sciences. The latter, however, was still a traditional forestry curriculum, but without attention for civil engineering (roads, bridges). The former was more research oriented and included a number of basic biological sciences such as taxonomy, genetics, zoology, entomology and phytopathology. These two curricula graduated about ten students each year, which number grew from 1965 onwards to about 45.

The whole curriculum consisted out of compulsory courses. Courses on nature conservation, mainly followed by forestry students, were given as additional courses during the evening. The marks were included in a list of marks attached to the degree certificate. The same held for courses on hunting.

About one third of the courses were taught by the three forestry chairs, and about two third by the other Wageningen University chairs. In the early sixties, nature conservation was recognized as a discipline and an extra ordinary professor in this field was appointed. Historically seen, this was relatively late. Already during the late nineteenth and early twentieth century, nature conservation and nature management as an activity was the domain of land gentry, forest owners, biology teachers and researchers, foresters, and hunters. The State Forest Service has managed nature areas since its foundation. Natuurmonumenten engaged quite a lot of foresters to manage its areas. Only after the incorporation of 'nature policy' into the Ministry of Agriculture, Wageningen University installed an extraordinary chair for Nature Conservation. This chair, the first in the field of nature conservation in the Netherlands, was changed into an ordinary one in 1970.

Forestry Education 1971 - 1981

In the middle of the nineteen seventies, university teaching was in (com)motion. Next to changes in society (among others the pan European students' protests in 1968) there were financial reasons. Many young persons enrolled in universities and hence teaching budgets were reduced through a shortening of the curriculum length from five to four years. The lifespan of curricula was shortened too. The 1955 curricula were abandoned in 1971 and changed into one new forestry curricula with three specializations: one aimed at silviculture, one at socio-economics and one at techniques.

The forestry chairs, broadening the palette of courses offered, attempted around this time to establish a forestry-faculty-model inside Wageningen University. Courses such as forest economy, forest protection, forest ecology, forest hydrology forest inventory, aerial photo interpretation for forestry, forestry and rural development, wood science and wood technology

etc. were offered, partly in competition with courses taught by the basic chairs. The contribution of the forestry chairs to the forestry curriculum was enhanced to fifty percent.

Forestry Education 1982 - 1994

The number of freshmen enrolling peaked in 1990 and shortly after that year even the total number of enrolled students dwindled. The strategy of the forestry chairs was doomed to failure and no new forestry chairs were created. In 1982 a new forestry curriculum started with five specialisations (forest policy, forest management, afforestation, forest development and forest products). Each specialisation knew a temperate and a tropical variant, each with quite a lot of restricted optional (i.e. free choice from a given selection of courses) and optional (i.e. free choice from all courses given at Wageningen University) courses. Nature conservation was listed as restricted choice course in some of the specialisations; however, quite a lot of students included nature conservation courses as optional courses. In 1989, the number of specializations was reduced to two main specializations: one aimed at the temperate zone and one at the tropics and a so-called inter-specialization leisure and tourism. In 1988, a special two-year MSc curriculum tropical forestry open for BSc graduates was started with a social forestry and a forest ecology specialisation. Meanwhile, outside the forestry curriculum, nature conservation specialisations were included into the curricula tropical land use and biology. In 1987, one of the forestry teachers tried to change the forestry curriculum in to a natural resource management one, but he found no support.

The need for more profound changes

After 1980, the public support for forestry diminished very quickly, whereas the support for nature conservation and its NGO's grew at the same rate. The forestry curriculum, however, was still greatly popular among freshmen, even though jobs in the forestry sector were very difficult to be found. Many switched to the restructuring of rural and urban areas, involving nature and environmental values with emphasis on forests, nature areas and other ecological structures. The scarce employment possibilities in typical forest management disappeared though scale enlargement. For both the traditional and the new employment possibilities, the forester had to compete with for instance biologists, botanists or social geographers with a sideline in nature conservation in the curriculum. In reality, about one third of the forestry graduates found a job in at least some relation with his education. One third again found work with a very thin relation with his curriculum and the last third found work without any relation with the forestry aspects of his education. Examples of the last category are garbage collector, youth hostel host and oil magnate.

The situation at the start of the nineteen nineties is characterised by:

- A forestry curriculum popular among the freshmen, however, they don't consider it as an education for a profession; but more as a hobby; their choice is based on some feeling for nature and environment and some interest in forests;
- A labour market, turning away from forestry, but still engaging quality graduates;
- A shrinking thematic (agriculture and environment) university, with a high reputation abroad on the one side and agriculture having a negative image in the Netherlands on the other;

- A forestry staff which broadened their fields of interest but forgot to invest into research.

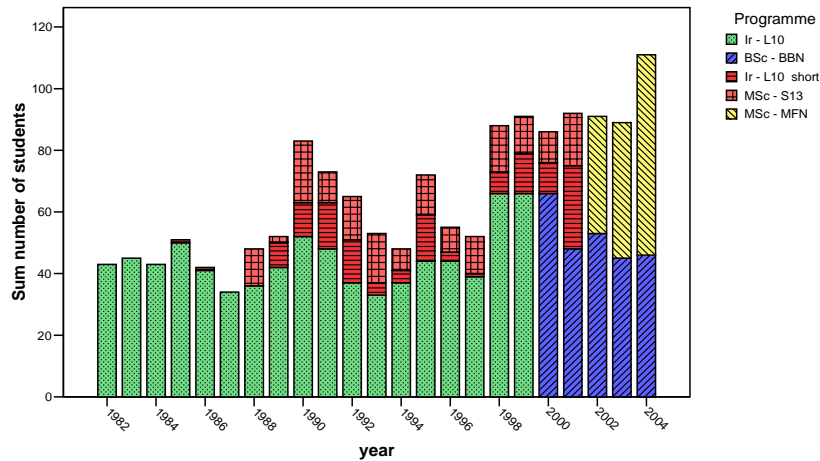


Figure 1: Students' intake since 1982. The former Ir degree is equivalent to the BSc + MSc degree. The HBO –Doorstroom student follow in the Ir – L10 programme the last two years after a professional BSc degree and it is equivalent with an MSc degree

In 1993, the independent curriculum committee forestry decided to renew the forestry curriculum and to change its scope and name into forest and nature conservation. This endeavour was successful and paid off in students' enrolment (see figure 1). Officially in 2002 but actually already in 2000 this curriculum was restructured in a BSc-MSc format.

Disciplinary considerations

Forestry has a long tradition in quite successfully managing and protecting nature areas. Many traditional peculiarities of forestry are also valid for nature conservation management (Blum, 2004; Jacobs *et al.*, 2004):

- No mobility of production site;
- Low input into production process;
- Complexity of production processes;
- Irreversibility of production processes;
- Long time horizons;
- Risk and uncertainty;
- Susceptible for damaging environmental factors from outside the area;
- Partial identity between product and means of production;
- Multitude of objectives, often in form of joint production; Low degree of excludability and rivalry;
- High involvement of people living in, near or from the area;
- High involvement of people enjoying the area.

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There are some discrepancies too (Blum, 2004):

- In nature conservation timber harvest is a mean at the most, in forestry an objective;
- According to the Maslow motivation theory (Maslow, 1954), forestry is placed at lowest level of fulfilling physiological and safety needs, providing fuel and other woody products and providing jobs, whereas nature conservation can be listed on the higher level of fulfilling needs of self-esteem and self-actualization.

The conclusion is that from a disciplinarian point of view, no problems exist to structure a curriculum focussing on both forestry and nature conservation. However, questions remain regarding which criteria and at which moment specialisations have to be inserted.

Concrete solution: Forest and Nature Conservation Education¹⁶ 1995 - 2004

From 1995 till 1999, the five-year curriculum Forest and Nature Conservation had four specialisations: forest and nature policy, management of forest and nature, forest and nature development, and recreation and tourism (see for a detailed description van Baren *et al.*, 1998). With the change into a BSc-MSc model (actually 2000, officially 2002), these specialisations disappeared and at both levels two new ones were formulated: Policy and management and Ecology and management. The five-year curriculum was split up into a BSc and an MSc curriculum, both with the name Forest and Nature Conservation, abbreviated here as FNC. In 2002, the existing MSc curriculum Tropical Forestry was integrated into the MSc-FNC curriculum; ending a long tradition of using the adjective tropical in a curriculum name.

In the BSc curriculum, one third of the teaching is typical for the curriculum, in the MSc one more than two third. Now four chairs are responsible for these curriculum specific courses: Forest and nature policy, Forest ecology and management, Nature conservation and plant ecology, and Resource ecology.

Actual curricula Forest and Nature Conservation

The BSc and the MSc curricula each with two specialisations have been developed with a certain connection to each other and have a total length of five (three and two) years. The BSc curriculum is characterised by a common part of 114 credits (of which 60 credits in the first year, 36 in second and 18 in third year), a for each specialisation specific part of 39 and a optional (free choice) part of 27 credits. The latter can be used for a minor. Individual courses, grouped according to disciplinarian background, are given in figure 2. The first BSc year is characterised by a variety of social science and natural science courses. The second and third BSc year is characterised by the choice for one of the two specialisations. Student who have chosen the specialisation Policy and management have to follow more social science courses, whereas those who have chosen Ecology and management have to do more natural science courses. There is, however, still a common part of 54 credits. Each BSc year is concluded with a so-called Integration practical. At the end of the first year the course Forest and nature conservation I (introductory field course, including both natural and societal sciences) has this

¹⁶ The Dutch title of the curricula is Bos en Natuurbeheer, which correctly should be translated as Forest and Nature Management. However it was decided by Wageningen University to use the title Forest and Nature Conservation.

function and the course Forest and nature conservation II (management tools) at the end of the second year. At the end of the third year the course Strategic planning in forest and nature conservation, partly carried out in the border area between the Czech Republic and Germany integrates all teaching up till that moment. Moreover at the end of the third year a small essay based on literature has to be written.

The two-year MSc curriculum consists of 12 credits for advanced topics, 6-12 credits for research methodology, 12 credits for the Academical Master Cluster (professional skills and project work), 36 credit for the major MSc thesis and 24 credits for the internship outside Wageningen University. The balance of 24-30 credits can be used for a minor thesis.

The specialisation Policy and management knows three thesis options: Policy, Economy and community-based conservation, and Rural development, the specialisation Ecology and management knows three thesis options too: Forest ecology and forest management, Nature conservation and plant ecology, and Resource ecology.

Evaluation

After an increase in enrolment at the start of the five-year curriculum Forest and Nature Conservation from 40 to 60 this number went back to the previous level of about 40 in 2001 (see figure 1). A probable explanation for this decline is the increased number of nature conservation specialisations in biology and geography curricula at other Dutch universities during the last five years. The enrolment at MSc level doubled in 2002, thus compensating for the lower recruitment at BSc level. This increase was due to more students from developed countries and more students from Dutch applied universities, topping up their BSc. The recruitment from the traditional source, the developing countries, remained the same.

The internal flow of students from the BSc-FNC to the MSc-FNC is the usual one at Wageningen University (see also Epema, this volume). Three quarters of the graduates of the BSc-FNC curriculum do this. Teachers involved in the MSc courses are in general not complaining about the quality of these students. About one quarter of these BSc students enrol in another MSc curriculum, partly at Wageningen University, partly outside. No acceptance problems are known.

The Netherlands has no tradition with BSc graduates from universities trying to find a job on the basis of this degree. Moreover, no entrance to the job market was planned here, the expected next step being the MSc-FNC. Hence, there is no quality evaluation by the job market here.

Concerning the MSc graduates it seems that graduates of the Ecology and Management specialisation move more towards research, quite a lot of them continue in a PhD programme. On the other hand graduates of the Policy and Management specialisation seem to find easier a job in the broad field of nature and forest management outside the university. It is, with only six years experiences with graduates from this curriculum, too early to evaluate if these trends are a characteristic of the curriculum or of the job market.

Foreign students enrolling in the new MSc curriculum, mostly have a forestry background and also a forestry job. They generally return to these jobs without problems.

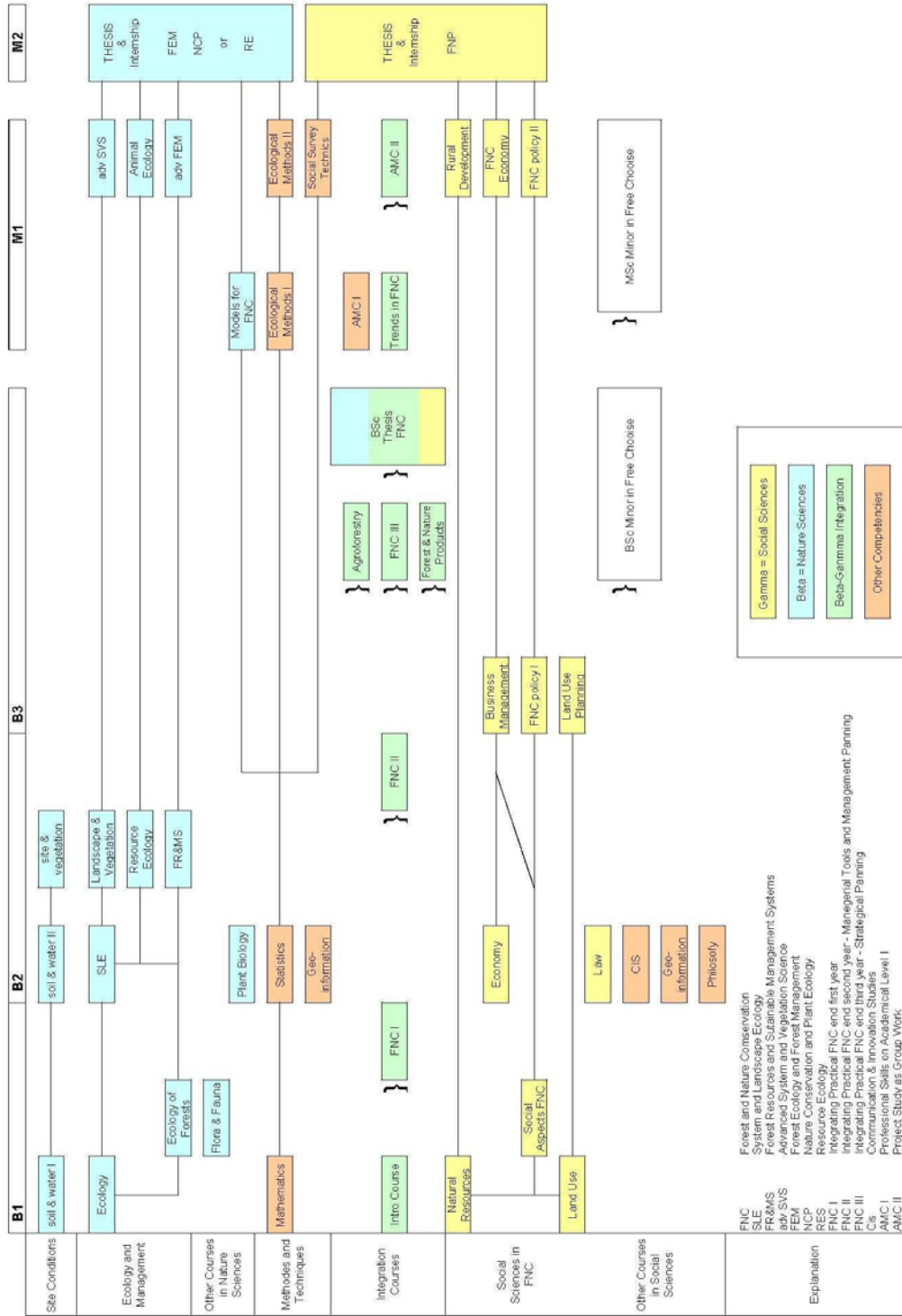


Figure 2: Programmes Forest and Nature Conservation 2005 - Flow Chart Courses BSc and MSc

Conclusion

It is of course early days to evaluate the new curricula. They started seven years ago and have a combined course length of five years. That means that only the fastest students have reached the job market. Those who crossed over to other MSc curricula apparently did not meet problems and those who started on the job market found a job. Not a bad sign for a curriculum, but more experiences should be gathered.

Of course there were teething troubles, some aspects of forestry and of nature conservation did not receive enough attention during the earlier versions of these curricula, both students and teachers complained, but these have been smoothed out.

It can be seen also that changes in the curriculum forestry and its change into a curriculum forest and nature conservation reflect changes in society, with some time lag.

Remains the main question, mentioned in the title of this paper: can forestry and nature conservation cohabit in one curriculum? We did not find any negative signs regarding this question, neither from the content of the curriculum, nor from the chances of the graduates on the labour market. Forestry and nature conservation in one curriculum is – thus – not a *contradictio in terminis*. This also means that the decision to join these two fields in one curriculum was a good one and that the partners should continue on this road.

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5 EXAMPLES OF CURRICULA AND COURSES

5.1 GENDER ISSUES IN FORESTRY CURRICULA – RESULTS FROM SURVEYS 2002 AND 2004

SIEGFRIED LEWARK

Summary

An introduction is given into the fields to be covered by the new IUFRO unit Gender, Education and Forestry, where little systematic information has been published so far. There is vast information about gender courses outside of forestry programs in the internet.

A first survey on gender issues in forestry curricula was carried out in 2002 by the IUFRO unit Gender, Education and Forestry, which has been repeated in 2004/2005. Main results: 32 courses had been named from 16 different countries, which implicitly or explicitly included gender issues into compulsory and elective courses, mostly given regularly.

It was concluded, that teaching gender issues seems to be something special, often considered as women's business. Prerequisites are supporting structures, committed teachers and responding students and knowledge from research available. As forestry is a gendered business a thorough understanding of gender issues must be part of the qualification of forestry graduates.

Scope of IUFRO unit Education, Gender and Forestry (6.18.02)

Gender studies are a field of growing scientific interest worldwide as we may see from current research projects and conferences. In rural development, agriculture and forestry differences in gender relations as compared to those in urban societies have been revealed. International cooperation has been started through a new IUFRO research group Gender and Forestry with units Gender research in Forestry and Education, Gender and Forestry (<http://iufro.boku.ac.at/iufro/iufro-net/d6/hp61800.htm>).

The mission and scope of the IUFRO unit Education, Gender and Forestry (6.18.02) have been presented and discussed systematically along a mind map (figure 1) during the IUFRO European Regional Conference in Copenhagen 2002.

It was stated that a thorough knowledge about gender issues must be part of the qualification of forestry graduates as forestry is a gendered business. Therefore gender issues must be integrated into forestry curricula in the core and in the elective part. Teaching gender issues will be based on research, which includes graduate analyses (Schmaltz 2004) and gender separating evaluations. Gender research related to forestry is a new field, but there are already good examples.

As gender studies are a new subject in forestry curricula there is little systematic knowledge about the activities so far, mostly from graduate analyses including gender related statistics (Gerecke, 1997; Lewark, 2003). The first activity of the IUFRO unit started in 2002 was a survey on ways and examples of implementing gender issues into forestry curricula. It has been

repeated before the Second World Wide Symposium on Gender and Forestry in Tanzania in 2004. The results of the two surveys are being presented below.

Gender studies as a teaching subject worldwide

An internet search on gender studies as a subject of university learning and teaching gives a vast number of examples ranging from single courses to comprehensive study programs, collections of course material and links to further search. No information though was found on gender issues in forestry courses exceeding the information collected in our survey. Our search was especially focussing on information available in the internet on e-learning courses using the internet, as an internet based course on gender & forestry has been developed and offered at the University of Freiburg (Lewark, 2006).

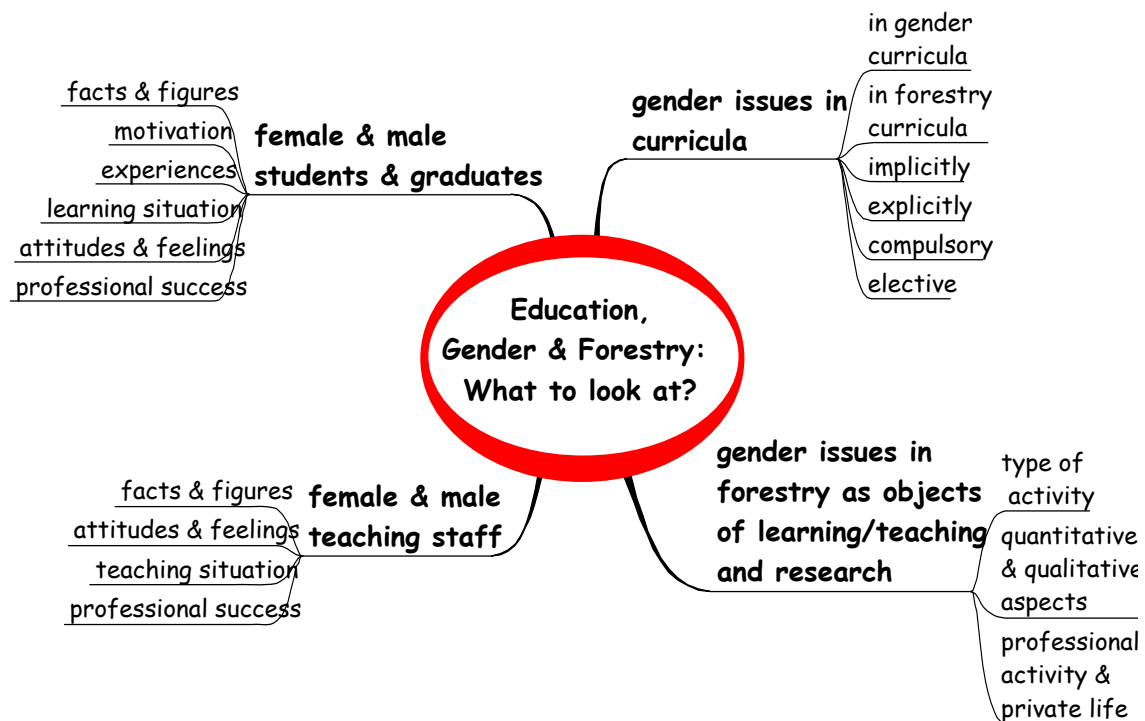


Figure 1: Fields of interest of the IUFRO unit Education, Gender and Forestry (6.18.02) structured in a mind map.

Only four examples will be named here (all revisited in early 2006):

- Welcome to the internet for women's studies –
- www.vts.rdn.ac.uk/tutorial/women/;
- Syllabi on the Web for Women- and Gender-Related Courses –
- www.umbc.edu/cwit/syllabi.html;

- Women's Studies Courses via the Internet, Syllabi, and other Course Materials – www.library.wisc.edu/libraries/WomensStudies/curriculum.htm;
- Gender and Women's Studies for Africa's Transformation (GWS Africa) – www.gwsafrica.org/about/index.html.

A closer look shows a dynamic situation with many new course projects emerging, but in many cases not well established and not being updated after some years of initial project funding.

Ways and examples of implementing gender issues into forestry curricula: preliminary results from worldwide surveys (2002 and 2004)

The IUFRO unit Education, Gender and Forestry (6.18.02) is collecting basic information about gender issues included into forestry curricula, as there was no known published information like that. As a first pragmatic approach a basic questionnaire (2002) (form see Lewark, 2004) has been developed and sent to colleagues using within IUFRO available mailing lists (gender & forestry mailing list and list of IUFRO office holders). More than 800 questionnaires have thus been circulated including an unknown number of double addresses. This means that individual colleagues have been asked whose interest principally was assumed. This has been repeated in a similar way in 2004, as response was rather limited in 2002.

Allocation of the recipients to countries was not possible because of many e-mail addresses on the mailing lists with extensions like .edu or .gov, but it was obvious for those answering. The numbers of courses including gender issues named are given in table 1, by countries. Together there were 57 answers (38 in 2002).

Table 1: Numbers of courses including gender issues named, by countries

USA	6	Canada	2	Germany	1	Poland	1
Sweden	5	Ghana	2	Honduras	1	Switzerland	1
Australia	4	Norway	2	India	1	Tanzania	1
Austria	2	Denmark	1	Nigeria	1	Zambia	1

Within the 57 answers, 32 courses including gender issues within forestry curricula have been named by 29 respondents. 19 courses include implicitly¹⁷ gender issues (figure 2), only 9 explicitly (four not stated).

In most of those cases, the teachers themselves answered. The negative answers (not included) came from colleagues obviously interested in the topic, from more than 20 different countries. As the sex of the respondent had not been asked for and the names do not always give a clue, the exact numbers of answers by women and men cannot be given, but there seems to be a slight majority of answers from women.

¹⁷ implicitly: courses with topics like forest policy including gender issues; explicitly: gender issues main content of course, named in the title.

Out of the 32 courses including gender issues 21 were indicated as given regularly, for the others it is not clear. 14 are compulsory courses, 12 are electives (6 not stated). All of the courses explicitly including gender issues are electives.

As the number of answers was limited the enquiry of single teachers in forestry curricula shall be pursued with additional addresses. In addition to that an enquiry at the IUFRO member institutions would be desirable.

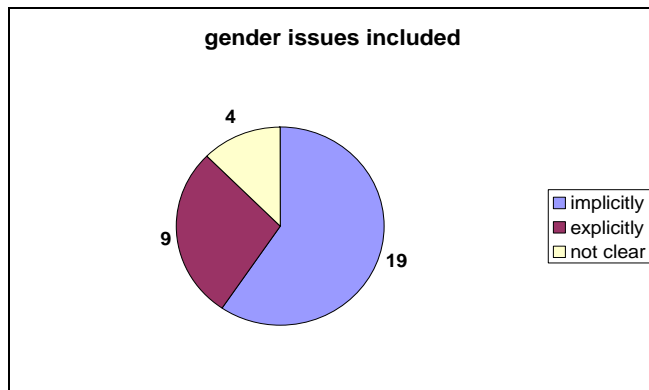


Figure 2: Numbers of answers according to courses including gender issues implicitly or explicitly.

The statistical figures from figure 2 and 3 give a first indication on the importance attached to gender issues in curricula of forest sciences. Trends of development would be of interest, but an increasing attention paid may be assumed. As we want to know about the topics and methods treated in the courses, the course descriptions from the courses named in these curricula will be collected. The courses held at the University of Freiburg from 1999 to 2003 have already been presented as an example (Lewark, 2004). These courses in Freiburg have been developed into an internet course (cf. Lewark, 2006).

Information beyond these first statistical data are included in the comments given on the forms, of which parts are quoted in table 2.

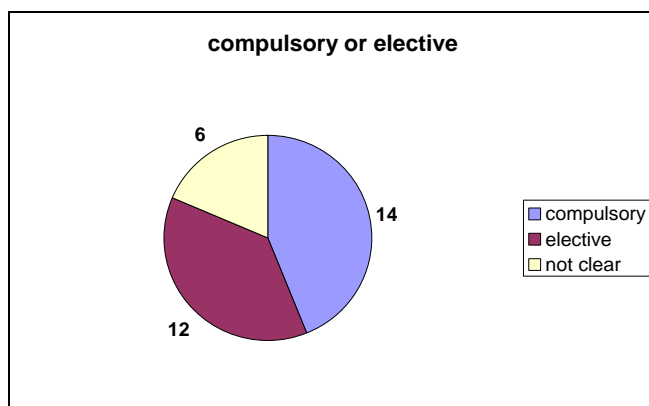


Figure 3: Courses including gender issues according to compulsory and elective ones.

Table 2: Quotations of comments from the questionnaires

Generally about the inclusion and reasons behind that:
<i>Not included:</i>
Students are provided the same level of instruction, regardless of gender, race or age. [USA]
Gender is not a factor when looking at forestry so isn't included in the curriculum. [UK]
Gender issues are not included into curriculum because all the lecturers are men. [Finland]
My reply is fast as I have never heard that gender issues are included into forestry teaching. [Italy]
None of the nine Forestry Faculties has a program of this kind. [Turkey]
Gender issues are not really dealt with specifically as they are not a major issue in Australian Forestry. ... It is probably fair to say the industry is still male dominated but this is changing as more female students graduate and the older generation is retiring.
<i>Included:</i>
Gender issues are included in many of our courses [at my university]. ...
Many of our women graduates are extremely successful professionally and hold positions in public and private institutions throughout Latin America.
In India, ... both male and female have equal opportunity to get admitted into these courses [on agricultural and forestry sciences].
Starting 2006 a full course on gender and forestry will be in the Certificate and Diploma courses. [Zambia]
As president of the International Society of Arboriculture (a professional education and research society), I created a working committee and selected a chair to explore diversity issues in the profession including cultural, ethnic, racial, and gender issues. The gender component of the discussion is proceeding well.
About contents and contexts:
Gender issues are discussed mainly in connection of perceptions and attitudes towards forests and nature; cultural context of forest uses and practices; access to and management of land and forest resources. [Switzerland]
In the forest management course (given in the first year which is common for all forestry students) gender issues are taken up in the employment situation of forest workers in Sweden. Also gender issues in forest ownership are discussed. In the work science course, the effects of different working conditions are being discussed in which gender issues are considered. In the course package on organisation and leadership gender theories are introduced and discussed as well as the effects of different leadership principles. [Sweden]
We also give a post-graduate course "Gender perspective and science in forestry and agricultural research" and a post-graduate course where gender aspects are included titled "Natural resource utilisation and implications for the local community". [Sweden]
We don't do much, but I show a video that chronicles women's involvement in the Clayquot sound protests and we talk a bit about how value orientations to the environment vary between men and women. [Canada]
Though some courses have been offered at the faculty on gender in the context of behavioral biology and have been touched upon in courses on public outreach / education and nature conservation, these courses were not mandatory.
In addition, in core courses and in relation to discussions about values and forests, the gender aspect was generally ignored. [UK]
I know about other existing or planned courses including gender issues in forestry curricula: HIV/AIDS issues in different community levels, consequences and measures to prevent spread and finally eliminate it from the society. [Tanzania]

Conclusions

From the limited number of 57 answers to our questionnaire in 2002 and 2004 and the comments included from obviously interested individual respondents, mostly university teachers and IUFRO officers, we may conclude:

- There is a limited number of courses including gender issues or explicitly devoted to it in forestry curricula;
- Teaching gender seems to be something special;
- Gender issues are very often considered women's business.

The experiences imparted showed that prerequisites for successful teaching gender issues to forestry students are:

- Supporting structure;
- Committed teachers;
- Responding students.

Gradually gender issues in forestry become visible and perceived, also in learning and teaching. Does this indicate changes of thinking? The IUFRO unit will take part in continuing collecting information and broadening the views. In a next phase course descriptions will be collected and analysed.

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5.2 A BACHELOR COURSE IN FOREST SCIENCE AND RESOURCE MANAGEMENT: AN EXAMPLE FOR A MODULAR COURSE SYSTEM IN FOREST EDUCATION AT TECHNISCHE UNIVERSITÄT MÜNCHEN

HEINZ UTSCHIG

Summary

Based on the Bologna Declaration the Munich University of Technology decided to adapt its traditional university forestry education. The new Bachelor curriculum is presented and some discussion points met during its development are elaborated on. At the end some questions, which still have to be answered, are raised.

Introduction

The Bologna Declaration (EU, 1999) is more and more recognised and accepted at German universities (KMK, 2005a; National Report Germany, 2002). The ministers for education and the representatives of our universities now have a roadmap to introduce the new system (KMK, 2005b). But they don't tell us what to do with the old system of Fachhochschule (Universities of applied sciences) and Universities, who are actually both planning Master and Bachelor programme's. Actually, the official interpretation is that the new graduation system supplements the traditional German system of Diplom, Magister and Staatsexamen degrees (National Report Germany, 2002). This political discussion 'how to keep the traditional system alive' is still influencing the discussion about the best solution for introducing the Bachelor and Master system in our country. Notwithstanding these uncertainties, the Munich University of Technology (TUM) developed a bachelor degree for forest science and resource management. Some problems encountered are discussed below.

Basic principles for the Bachelor course Forest Science and Resource Management at TUM

Job market oriented

Originated in a School of Forest Science the planning group installed to formulate the BSc course, thought about an attractive title for this course. In the end, we decided to add the topic of Sustainable Resource Management. First, we discussed to underline especially the aspects of Renewable Resources. But the colleagues from agricultural sciences wanted to claim this aspect for their programmes and so we had to select the wider aspect of Sustainable Resource Management. The reasons for this choice are first the idea to enlarge the job market for our students effectively in the field of renewable resources - where we found a high competence at our Campus. Second, we wanted to show, that principles of forest sciences are useful in the whole field of sustainable resource management.

Workload based

This Bachelor programme, which was introduced in winter term 2005/2006, is strictly planned by the criteria defined by the Bologna Declaration. The old course “Forstwissenschaft” was completely redesigned because of the demand to base it on a fair workload calculation for the students: One semester has a value of 30 ECTS, the whole Bachelor programme 180 ECTS points. Each module has a workload of five ECTS (six modules per semester) and each module has, as a maximum, four lecture hours per semester per week. One ECTS is calculated with 30 hours workload for the student, in total a student will have a workload of 1800 hours per year like a full time professional.

Compulsory optional Subjects: (à 5 Credits)							International Forestry	Renewable Resources: Breeding and Plantation Technology	Element Cycling in Forest Ecosystems
							GIS	Nature Conservation and Environmental Law	Woody Plant Medicine
Bachelor of Science in Forest Science and Resource Management (1 Semester = 30 Credits, 1 Module = 5 Credits)									
6 SS	Bachelor's-Thesis	Bachelor's-Thesis	Compulsory optional Subject	Project	Forest Planning	Environmental and Land Use Policy			
5 WS	Internship	Internship	Compulsory optional Subject	Landscape Development	Raw Material Markets and Quality Assurance	Informatics and Introduction to Scientific Work			
4 SS	Forest Sites	Forest Operations and Logistics	Civil and Public Law	Silviculture	Technology and Utilization of Renewable Raw Materials	Forest Protection			
3 WS	Natural Resources: Soil and Vegetation	Ergonomics and Industrial Law	Forest Economics	Forest, Growth and Environment	Technology and Utilization of Wood	Animal Ecology			
2 SS	Mathematics II	Eco Climatology	Inventory	Dendrology	Characteristics of Wood and other Renewable Raw Materials	General Economics	Biology II		
1 WS	Mathematics I	Chemistry		Experimental Physics	General Education Subject	General Macroeconomics	Biology I		

Figure 1: The structure of the Bachelor programme Forest Science and Resource Management. The topics in semester 1 and 2 are integrated to a basic unit, which has to be passed before the student can continue the study. From the six compulsory optional subjects, added to the figure in the upper right part, the student has to select two.

Modular structured

Figure 1 shows the structure of the programme. The modular structure and the elements taught in each semester can be recognized. The topic is only described with a short term; an example of one topic in more detail is given in figure 2. Here the traditional borderline of teaching fields is abandoned, the interdisciplinary element is integrated and more than one teacher with different disciplines are involved (figure 2). The teachers have to harmonise the content and to adapt it to the new frame.

The course structure of our Bachelor curricula

Basic courses

Basic courses in mathematics, physics and chemistry teach the knowledge in natural sciences (two semesters), which is important for an academic and scientific career (figure 1). As a member of a University of Technology we have to fulfil this basic requirement. This will also guarantee a high quality level of our degree. These courses are, just as the subsequent modular structured courses in the following years, a compulsory element (see 3.3). This part is very different to the curricula designed for e.g. the “Fachhochschule” at our Campus Weihenstephan.

Title	Forest, Growth and Environment
Speaker	Biber
Number	
Teaching target	Understanding the basic physiological processes on the level of leaves and trees in interaction with the driving forces of plant growth. This is the basis to understand the principle rules of tree and stand dynamics.
Content	The module includes the following teaching units: C- und H ₂ O-cycle on tree level (Matyssek, Ecophysiology of Plants) 1,5 cp, Principles of cycling of nutrients in forest stands (Göttlein, Forst Nutrition Unit) 1,0 cp, Basic rules of growth processes and dynamic of forest trees and stands (Pretzsch, Forest Growth) 2,5 cp
Preconditions	Basic courses, esp. Biology I and II, Theoretical Ecology and System analysis, Mathematics and Statistics
Form of exam	Oral or written
Semester	Winterterm
Credit Points (cp)	5
Teachers	Göttlein, Matyssek, Pretzsch, Biber
Literature	BEGON, M., HARPER, J.L. und TOWNSEND, C.R., 1991: Ökologie, Individuen, Population, Lebensgemeinschaften, Birkhäuser Verlag, Basel Boston Berlin, 1024 S. BERTALANFFY, L. von, 1951: Theoretische Biologie, 2. Band: Stoffwechsel, Wachstum, 2. vollständige
Language	German

Figure 2: The module Forest, Growth and Environment with a workload of 5 ECTS.

Modular construction

During the first year both basic and modular courses are included in the program, later on mainly modular courses. Designing a modular program was a shift of paradigm. The former consecutive lecture system was completely substituted. Now, the traditional subjects are combined in modules and, where necessary, enlarged with new elements. Looking at the overall program (see figure 1), it can be stated that the three traditional pillars of forest education, the fields of forest ecology, forest management and social sciences, are preserved, but the subjects are better linked.

If we look to a module like Forest, Growth and Environment (figure 2) the interdisciplinary approach is evident. Forest growth is not a stand-alone unit, it takes the knowledge of ecophysiology and forest nutrition and links it to the reactions of trees and stands. The latter two

topics are now more problem-orientated embedded, and the sense of both will become clearer. In this way we tried to design all modules.

Internship and project work for transferring knowledge and obtaining practical experience

In our old course structure internships were to be absolved during the term breaks. Now Internship is for the first time really integrated in the workload calculation (figure 1). This underlines the importance of practical job oriented knowledge in such a program. Additionally, we launched a project work module to enlarge the social skills and abilities of our student. The project work shall motivate the students to change their behaviour from a more passive role to an active one.

The Bachelor's thesis is now on the one hand integrated in the program as an important step of knowledge transfer for the students. On the other hand, the limits established by the workload do not allow stressing the time budget of the students too much. Hence, the length is limited to 10 ECTS.

The last year of the program is a very individual one. The students can use it for profiling related to their interests. They can concentrate on special topics or they can gain a broad knowledge base by combining the elements internship, project work and Bachelor's thesis (figure 1). But, on the other hand, we also restricted the specialisation. We think that a common knowledgebase is very important for the profile and the employability of our students.

Discussion and conclusion

Remaining questions

Facing the necessity of joining the Bologna process, universities posed a lot of questions. Some answers were given by the government, but still a lot of questions remained unanswered:

What is the future minimum standard for forest education in Europe for a Bachelor or a Master curriculum? At this point in time, it is clear that there is actually no consensus about content and workload for these curricula like we had in our traditional university and "Fachhochschule" curricula. It will really be a challenge for the SILVA-Network to foster an intensive discussion on these subjects.

What are the perspectives for student mobility within Europe in such a system? What about accreditation? Is it a meaningful tool or a dispensable issue? As SILVA-Network was established as an education network, student exchange was and is the "motor" for this Network. If our Bachelor students will have too much time pressure, they won't think about student exchange. Shall this be a privilege of the Master programmes?

How do the dramatic changes in the organisation form of the forest services influence the role of Bachelor/Master education? If the forest services are more and more organised in private companies, they will develop other requirements for the attitudes, skills and abilities of their employees and hence our students. Do we adapt our curricula and courses to these new demands or do the companies select people from other fields of education?

Perspective

With regard to all problems and restrictions our roadmap is quite clear. In the winter term 2005/2006 we introduced the new Bachelor programme. The old Bachelor programme and the old Diploma programme are coming to an end. In 2006 we will also finish the reorganisation of our Master programmes from a three to a four-semester system, again with a strong emphasis on workload calculation. According to the Bologna Declaration a three plus two model (three years for the Bachelor, two years for the Master) is the aim. Then the final change to the new system according to the Bologna Declaration will be ready.

Finally, as a vision we think that forestry will continue to play an independent role in the system of environmental education, close related to other subjects in that field. The result will be various Bachelor programmes in this field, each with emphasis on a different topic. Also, there will be various Master programmes with very specific and very different topics and tasks.

These curricula will form the basis for the higher management level in the forest and environmental science related job market and for recruitment of scientific talents, which are willing to join the third step of university education, a PhD program. Recently we got the chance to establish a structured PhD program. It will be organised in a training program, which is no longer individually organised by a Chair but by the School. This PhD program should guarantee a good tuition system and a high scientific level. This is the next dramatically change in our academic education system in Germany. Hence, future-oriented Universities need a strong profile based on research and education activities.

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6 DISCUSSION AND CONCLUSION

6.1 GENERAL DISCUSSIONS

During the conference, on three occasions discussion groups were organised to discuss questions formulated by the organisers, related to the preceding presentations. The groups discussed these questions and reported their remarks to the general meeting. Once, a general discussion was organised, discussing questions raised during the conference. Below, the reports to the general meeting as formulated by the reporters are given, preceded by the questions. The last chapter presents the general discussion.

Discussion meeting 1: Scientific versus professional focus (academic versus professional focus, civil effect of BSc-diploma, etc.)

Key-questions:

- Forestry graduates are employed in a wide range of jobs, running from management, policy, research, education, to consultancies. Is a broad orientation a key feature of academic forestry programmes? How should science and management (policy, economics) be balanced in curricula and courses?
- Being a manager, researcher, or teacher requires certain skills, competencies, and attitudes; being a forester requires professional knowledge. How should these items be taught: is timing an issue, or order? Should skills and knowledge be combined in courses or not combined at all?
- Academic forestry graduates can be employed amongst others as scientists or foresters. Are there key competencies in the curriculum that distinguish between a scientific versus a more applied career?
- What distinguishes an applied academic forestry curriculum (and its graduates) from a polytechnical programme (and its graduates)? Competencies? Skills? Job positions? Other aspects?....
- Academic BSc-graduates will in many cases continue with an MSc-study. Is there or will there be also a job market for academic BSc-graduates? Or is there too much competition with polytechnical bachelors?

Report on the discussions in group 1 by Tomi Tuomasjukka

Key points from the discussion

- Different tracks of employment are a reality for present day foresters. Some foresters have a very professional track, whereas others are likely to take a more academic track.
- The labour market has different roles in different countries. In some countries labour markets can be a major driver, in others the labour market is small or non-existent.
- The importance of extra curricular activities in finding a job is high.
- Small faculties have difficulties to offer wide choices and options. It may be most useful to identify particular niches, particularly for small institutions.

- Often the faculty of forestry is a separate entity. This is often not desirable. Wageningen is really mixed with other faculties – this enables the development of competencies.
- There are two types of survival strategies
 - Ask the markets what is needed, adapt to it. Adapt to market demand, specific skills and knowledge. How to adapt to the time gap?
 - Focus on generic competences. Adapt to the uncertain future by having a strong theory and background and generic competences.

Report on the discussions in group 2 by Annette Schuck

Question 1

- There is an apparent dichotomy between the application and research orientation of curricula, as well as between professional and scientific profiles.
- There needs to be an agreed core of courses and then optional courses that can be selected by the students to provide for specialization.
- There is a thin borderline between the omnipotent graduate and the universal dilettante.
- Researchers have to be very specialized today, but research-oriented teaching does not necessarily have to be specialized. Teaching is based on scientific work as an example, but also research is a broad field.
- There is a need to define profiles clearly, then to define aims and means to reach the aims, and last to constantly work on optimization.
- Much of the decision is also a political process and as such frequently country-specific. The Bologna process asks for harmonization, but formal restrictions create friction, when old systems are squeezed into new forms.

Question 2

- One basic question is: is it necessary to have a distinction between application- and research-oriented degrees already at BSc level (two types of degrees) or rather at MSc or even at PhD level (PhD as the first purely scientific degree?). This question will have to be addressed.
- Presently there is more and more overlap created between other disciplines, leading to a power struggle between departments or faculties. A crucial question is: can you force people to co-operate and share responsibility. There will be a transitional process: some people who are willing to co-operate will serve as pilot groups, forming a nucleus of co-operation and if co-operation is successful, it will expand by organic growth.
- One danger: students are used as test persons and gradual transition can create “lost generations” of students.
- A combination of skills and knowledge should be aimed at, making use of modularized teaching requiring meaningful thematic combinations of courses that deliver a wider context than traditional lectures. This also serves as an integrator of pieces of knowledge in a wider context.

Question 3

- One crucial aspect concerns the employability of the BSc, since presently the BSc creates the greatest friction with degrees offered by other institutions than universities. Traditionally, universities first taught scientific foundation courses early in the studies

(mathematics, physics, chemistry), which was the main distinguishing feature between universities and universities of applied science/ polytechnics. Basic knowledge in the context of subject-related skills, i.e. related to forestry, was frequently taught only after the second year. For true employability of the scientific BSc this timing would have to change. In this case the foundation for making the connections between areas of knowledge needs to be built right from the start. Also here meaningful modularization could help.

Question 4

- Some part of the answer was already given in question 3.
- There was a question whether the distinction “applied” versus “scientific” in the context of “application-oriented” vs. “research-oriented” really holds. There is also applied research and research and development (R&D), how does this fit with the black-white distinction. There was a feeling that this topic was politically pushed to create increasing competition/pressure between institutions. Universities use research examples in their teaching as the object of knowledge, so to speak “hands on research” in teaching, which can also be seen as a form of application. Additional confusion is caused by the engineering degrees.

Question 5

- The universities have to adapt to new thinking but also the job market has to adapt to new graduates and the students have to agree to the proposed solution.
- What is “right”? Do universities have to react to the present job market or to the future job market and how can this be achieved?
- Crucial will be to provide graduates with self-competence, a feeling of: “I am competent”.
- An overlap in educational approach is difficult, especially if the awarded degrees are on the same level – in that case overlap of educational approaches of institutions creates more confusion than that it helps to clarify profiles. The crucial question is: do we really have competition between institutions or do they complement each other?

Report on the discussions in group 3 by Ed Jensen

This general question resulted in a rich discussion in which we raised several questions and made several observations. Some of those are summarized below:

- Is this a meaningful or false dichotomy?
- Is the difference really one of university approaches to education (university vs. polytechnical)?
- Is it a question of technical skills vs. professional skills?
- In forestry, we need to combine scientific and professional approaches.
- Is the scale of management to be practiced important - with smaller scales needing more professional approaches and larger scales needing more scientific (or academic approaches)?
- The answer to this may be shaped by the size of the country, the importance and nature of forestry, and the size of the “forestry” faculty.
- Regardless of the answer, forestry students need professional skills influenced by scientific approaches.

- We had a good discussion on what is meant by “scientific”. Does it mean following the scientific method, or using good analytical and critical thinking skills?
- Are there key competencies that characterize this difference between a professional and scientific focus?
- Regardless of which approach is used, we need to develop students who have the ability to adapt and grow over time.
- Competencies are a necessary approach - and need to be developed directly from professional expectations.
- Relatively few of our students go on to become scientists, so how much should the desire to produce scientists drive our curricula?

Discussion meeting 2: The Bologna process: bitter sweet challenges (quality assurance and accreditation, skills and grading, etc.)

Key-questions:

- Does the Bologna process lead to more cooperation or more competition between forestry faculties or programmes or networks inside Europe? Will new networks develop, or are new networks necessary?
- What does the Bologna process mean/offer for the position of Europe as a global player?
- Will all forestry faculties/ programmes be able to join the new developments at the same speed? If not, is that a risk?
- Does harmonization of programmes also lead to a loss of specific niche areas?
- What are benefits and threats when organizing accreditation at a European level?

Report on the discussions in group 1 by Jens Emborg

The Bologna process puts a strong emphasis on structure rather than content. This raises some concern among some members of this discussion group that many of the creative advances in educational methods made in the past several years could be lost. As a particular example, consider the case of Freiburg. To fit the curriculum to the job-market in a three-years-degree creates significant pressure for specific knowledge, restricting educational options.

The issue of whether the Bologna process results in greater competition or cooperation is a particular concern for small universities. At this point it is unclear if the Bologna process will result in development of specialized niches in small universities, if they will adapt in some other way, or if they will be unable to persist. There is potential under the Bologna process for collaborative programs, and there are at least some examples of initial work in this direction.

Report on the discussions in group 2 by Heinz Utschig

Question 1

- Attract special students by a special profile of courses.
- Internationalisation is not the problem to forestry education, they are used to it.
- We lose a harmonised system.
- New ideas are not coordinated.

- We need basic rules (length, workload, demand...).
- Bachelor seems to be more a local thing.
- Master programmes are competition factors (name and content will be factors for competition...).
- Neighbouring disciplines will compete.

Question 2

- Joint Master programmes seem to be very attractive.
- Liberal attitude is a benefit.
- The Bologna process makes the education more transparent and as a consequence attractive.
- The diversity of languages seems to be a problem.
- We have to open the focus of our lectures (from local to a more regional (global) approach).

Question 3

- Universities with different speeds, that is normal in this process.
- The students will give a clear comment to the local situation, they react very sensitive (internet, ...).
- Like in ECTS implementation, you see the problems, you have to look in detail („paper is patient“).
- To change the headline is easy, to transform in reality is another thing (major and minor implementation).
- Change will need some time (process of adapting).
- Meetings like this lead to a more coordinated process.
- We are bound in our own systems, we need a window of elective fields; and then the first step in moving forward to the Bologna agreement is done.

Question 4

- Niche is the chance for small universities
- The running examples for niches (Mountain forestry...) are very popular by the students
- Wageningen left tropical forestry, some niches (and with them the chances at the job market) are gone
- Niches normally are killed by the own universities
- Master programmes offer various possibilities of specialisation, this is also a chance

Report on the discussions in group 2 by Johanna Gleissner

In the course of the debate, two main tendencies were identified:

On the one hand, there was an overall consensus that competition in itself was not necessarily unfavourable, since it could act as a catalyst to both enhance cooperation among universities and encourage diversification by e.g. specialisation of single faculties. As an example for successful multilateral cooperation, an e-course not being the property of one single university but developed and offered in cooperation as a joint module programme was referred to.

On the other hand, the establishing of comparable degrees and curricula, if done not in a harmonising but in a standardising manner instead, would most likely result in an undesirable loss of specific niches of the single universities' portfolios. One possible compromise solution

put forward was to provide a profound basic education supplemented by areas of specialisation different from the ones offered at universities in neighbouring countries.

Another important aspect dealt with was the difficulty to accommodate students with extremely diverse backgrounds and the question how to define and to assess prerequisite knowledge as an admission requirement. In this context emphasis was put on the importance for the students to keep the MSc as an option for reorientation after graduating from their BSc. Therefore the concept of purely consecutive BSc and MSc programmes was indicated questionable.

Finally, the group members agreed on the need to give a head start of confidence both to colleagues from other institutes and faculties as well as to the students who were acknowledged to have a strong interest in ensuring the quality of their education themselves.

Discussion meeting 3: Education in Forestry and Nature Management: co-existing, co-habiting or one-and-the-same?

Key questions:

- Can or should forestry education be part of natural resource management curricula?
- Is it necessary to “protect” the domain forestry or e.g. silviculture in natural resource management programmes? In the name of the programme? In the contents of the curriculum?
- The profession of natural resource manager is not the exclusive domain of foresters, graduates of other disciplines can also do the job. The situation in the Netherlands shows that forestry can easily become of minor importance in the mind of the public (timber production becomes a dirty word). Is the development of joint courses and curricula on natural resource management a way to survive for forestry as profession and for academic forestry curricula?

Report on the discussions in group 1 by Neeltje van Hulst

Issues in broadening up the scope of forestry to nature conservation / management:

- Differences in definitions / terminology;
- Translation problems English vs. own language;
- Difficult to leave “forestry”;
- Forestry has several negative aspects, according to students and society the context is too narrow;
- Scope of ‘Natural Resource Management’ is too wide (including soil, water, etc.).

Independent of the name of the study-programme, it is important to formulate a clear description of the programme, to show the broad scope of forestry and forest, and nature conservation. It is difficult to squeeze all subjects in one programme title, covering all the aspects. Moreover, it depends on the definitions of forestry and natural resource management, existing in the academic world and society.

If forestry is still important in a country, the name will remain in the programme, but in all cases including the word forest(ry) in the title emphasises the relevance of forestry to society and explains the contribution of forestry in a broader perspective (i.e. more than wood-cutting). Nature management is/ can be a part of forestry!

Name and title of the programme depends on the geographical and social situation:

- Amount of forest;
- Position/ importance of forest and forestry;
- Importance of nature conservation;
- Request from society;
- Interest of students;
- Number of students.

Co-existence of programmes is related to the above mentioned items. Large universities or countries are able to provide more programmes, i.e. a 'forestry' and a 'forest & nature/ resource management' programme. Small universities have to make a choice between programmes, or they have to cooperate within and outside universities to provide different programmes. They have to develop new courses, drop other courses, combine faculties and permit student exchange. This choice will depend on society, student interest, geographical situation and demands from the labour market.

It is an option to have a BSc-programme with a combination of forestry and nature conservation and further specialisation in two MSc programmes, one in Forestry and one in Nature Conservation.

Report on the discussions in group 2 by Sven Wagner

Question 1

- Will be different at each university depending on capacities.
- The issue of forests is a "must" in any curriculum of natural resource management (NRM); overlapping with forest curricula will be very different.
- In NRM a single student has to choose and concentrate on particular issues; forestry might be one:
- A mentoring system is more necessary than in forest education.
- Synthesis disciplines are more important than in forest curricula

Question 2

- The importance of the name of degree depends of outcome of question 1; if melting of degrees has occurred, name should show forestry. In any other case name is not important.
- Accreditation is important to make sure that NRM is covering variety of issues like forest, freshwater, air and others.

Question 3

- What does survival mean? There is a difference between attractiveness in job market and attractiveness of curricula for students.
- While the job market seems somehow unpredictable, universities can attract students by prominent issues. Some examples are: urban forestry, climate change, hazard and risk management, recreational forests, rural development, biomass production. In all of these issues collaboration with neighbouring disciplines is necessary. However, this is not necessarily a guarantee for students to get a job.

- To adapt to an unpredictable job market universities should offer broad degrees or a variety of degrees depending on capacity (question 1).

Report on the discussions in group 3 by Ed Jensen

As with the earlier discussion questions, this general question resulted in a rich discussion in which we raised several questions and made several observations. Some of those are philosophical in nature and some are more practical - they are intermixed below:

- Is forestry a subset of nature conservation or vice versa?
 - Forestry has long included concepts of sustained yield and the principal tenets of sustainability.
 - However, others outside of forestry are reluctant to accept/believe this.
- Is the real dichotomy between science and management, or forest management and natural resources management?
- The answer to this question may very well be country/culture specific. In some countries, forestry and nature conservation is a natural mix (especially where forestry is less important) and in some countries they seem to be quite separate (and often at odds with one another).
- Does the Bologna process provide an opportunity to “save” forestry curricula, by enabling students to change their course of study between years 3 and 4? This might make it easier for students from other disciplines to move into forestry as their interests develop later in their academic careers.
- Forestry (and foresters) needs to be linked with the ability to solve complex problems, to look into the future and envision desired conditions, to make decisions in the face of uncertainty, and to manage forest resources sustainably.

General discussion meeting

Two subjects and questions that emerged from the presentations and discussions requested a general discussion. A short impression is given below.

- Types of Master curricula: traditional, research-aimed or subject-aimed?
- Is there a need for a lobby organisation for forestry education?

Report by Martijn Boosten

Question 1: Types of Master curricula: traditional, research-aimed or subject-aimed?

This discussion dealt with the types of master curricula in forestry education. The question was raised whether a master program in forestry should be subject-aimed? A subject-aimed master was defined as a master that deals with topical issues in monitoring the environment and the role of forests in society, e.g. illegal logging, greenhouse effects and acid rain. Although it was agreed that this kind of masters are ideal to train students to deal with current problems and issues, it was also stressed that subject-aimed masters often are temporal. It was suggested that a market oriented approach should be used when defining forestry curricula. However the participants agreed that market perspectives for forestry graduates are very broad. Therefore it would be difficult to adjust a curriculum to the market.

The term 'traditional master curriculum' was briefly discussed. It was however not clear whether a traditional master should be defined as a master based on traditional curricula or as a master based on traditional forest functions, e.g. wood production.

Also the distinction between professional and scientific master curricula was discussed. According to the participants of the discussion a scientific master in theory prepares students for a career in science, whereas a professional master prepares students for 'the job market', e.g. consultant agencies, forestry enterprises and NGO's. However in practice many scientific master graduates do not choose (or don't have the possibility) for a career in science. A scientific master curriculum should take that into account. Also the participants agreed that scientific master students should be trained to tackle new emerging problems. The discussion ended with the statement that scientific bachelor (BSc) curricula should prepare students mainly for a scientific master and not for the job market, because BSc graduates are not able to compete with professional Bachelor graduates on the job market.

Question 2: Is there a need for a lobby organisation for forestry education?

The second topic for discussion was the need for a lobby organization for forestry education. It was stated that the value of forest benefits and goods for society is broadly recognized, whereas the value of well trained and highly educated foresters for society is not so obvious. It was stated that 'forestry is lacking in marketing and promoting its scientific and professional products'. Therefore the participants concluded that a lobby organisation for forestry education is needed to raise awareness about the value of foresters and forestry education for society. This lobby organisation should create and promote a common view on forestry education and its value for society. The organisation should also address problems in society that are linked with forestry.

6.2 CONCLUDING REMARKS: FORESTRY EDUCATION IN A CHALLENGING ENVIRONMENT

SIEGFRIED LEWARK, PIETER SCHMIDT AND HANK BARTELINK

Forestry education, between science and practice: the road to the Wageningen symposium

Looking back at our inspiring symposium we will – rather than present a summary or even a resolution – write down a few observations and give some (necessarily subjective) comments, thus trying to pinpoint the key issues discussed during the presentations and meetings. The value of meetings like this is primarily in exchanging knowledge, ideas, and insights. The highly variable states of the art in different countries, partly due to the strongly differing local settings, create an overwhelming amount of experiences, from which a lot can be learned. Its value is in comparison, exchange, and cooperation, not so much in identifying best practices.

The symposium and its topic were initiated as the result of several developments, both in SILVA-Network and IUFRO settings:

For the SILVA-Network most of the topics of this symposium are follow-ups from those of earlier annual meetings, in particular the ones in Wageningen in 1997 (see Schmidt *et al.*, 1998), Joensuu in 1998 (see Pelkonen *et al.* 1999), Beauvais (2003) and Freising (2004) (see Tahvanainen and Pelkonen, 2004). The Wageningen 1997 proceedings include descriptions of 26 forestry curricula; comparison with the present curricula, of which many examples were shown at the symposium, gives a good impression of the huge curricula developments over (only) the past couple of years.

The IUFRO Education group had its first meeting in Freiburg in 1998 (see Lewark and Schmidt, 2004). There the paradigm of the active learner was touched upon, as well as the topic of natural resource management curricula versus forestry education was discussed.

The IUFRO unit Education, gender & forestry, established in 2000, only recently started to collect information about gender issues in curricula; first results indicated that experiences run from zero to the existence of a number of specific courses.

The IUFRO group Education and Research in Silviculture has a longer history. It started outside IUFRO as a German speaking, circumalpine discussion platform for silviculture and became a multilingual IUFRO group around 1986, mainly aiming at teaching (!) silviculture.

Answers to the five leading questions for the symposium have been attempted mostly by giving examples from the different universities represented.

The forestry curriculum

Apparently, there is no such a thing as the Forestry curriculum. National, regional or local conditions will and should strongly determine the contents of forestry curricula. Not only the economically important issues like forest cover and importance of the forest industry for the BNP but also socially and politically important issues like the focus on production (among others timber) and reconstruction after the (second world) war or some political change-over, and richness and amount of leisure time play a role. Ecological conditions (e.g. boreal versus

Mediterranean) are also reflected in the various curricula. A nice insight into the rapid changes in the world of forestry curricula appears when present curricula are compared with the descriptions in Schmidt et al. (1998).

Curricula contents should reflect societies' needs. The growing number of curricula on nature conservation and natural resource management can hence largely be explained by changing emphases in societies on the preservation of the natural environment, where forestry generally is considered one of the land-use types. The question should thus not be whether forestry and natural resource management can co-habit in one curriculum. Whether the focus is on natural resource management in general, or on forestry in particular, is largely a matter of focus, determined by local (regional) conditions. In the boreal zone, for instance, wood production (an important part of forestry) plays a key role from an economic point of view, which may legitimate the development of "pure" forestry curricula. In many Western European countries, characterized by high population densities and high pressure on nature, more emphasis is put on the conservation of natural resources, including forests. Adapting curricula is thus not only a matter of responding to pan-European development like the Bologna-declaration; it should strongly be related to what is considered the backyard of the university (e.g. region, country), which is echoed in the needs of societies.

Balancing science and practice

Many authors related the question of science and management orientation directly to the discussion on relevance for the labour market, i.e. the opportunities for the graduates. In some countries there is still a traditional link between the education and the labour system, whereas in many others this link has disappeared. Only few universities systematically investigate where their graduates go; in general, the impression is that graduates end up in a very diversified field of occupation. Consequently a practical orientation in the curricula can only be at the level of generic competencies. The individual competence profiles of the graduates depend on the possibility of choosing elective courses or limited specialisations in different lines of studies – we have seen different examples ranging from traditional high proportions of compulsory courses to elaborated ways of offering different options to the students, and even to the use of the Dublin descriptors for a description of competencies aimed at.

The discussion on different roles of graduates of universities of applied sciences and of graduates of regular universities continues. Civil effects (i.e. acceptance by the labour market) of bachelor graduates of regular universities are still minimal in countries having implemented these curricula recently. Uncertainties on accepting bachelor graduates on the labour market will not stimulate students to use these curricula. Are universities here ahead of events? It is important, anyway, to anticipate wherever possible e.g. to play a pro-active role in discussions with the labour market on future competencies of our graduates.

The Bologna Process

The Bologna Process aims at an improved mobility by standardisation of structures of curricula. Even in following this direction – mostly with three plus two years for Bachelor and Master curricula – a huge diversity is likely to persist. The importance of the local situation seems to

have a lasting impact on both the type of universities and the contents of the academic forestry education. There will be no uniformity, but different profiles of curricula in different places, which – with a growing mobility – highly increases the students' opportunities for individual qualification profiles. The universities will cooperate, even share resources in joint activities like teaching, but they will also compete more than before.

This process contains many opportunities, but there is still a long way to go. Especially differences in implementation rate as well as different interpretations by all partners (governments, universities, students and labour markets) hamper a faster increase of student and staff mobility.

Recent developments indicate that competition among universities will get a stronger international dimension in the coming years, both from a quantitative point of view (student numbers), and a qualitative one (quality of education and research). On the other hand, universities can take advantage of international cooperation. An important condition for mutual benefits is to take advantage of each others niche expertise. This means: do not try to cover the whole world (Europe) in your curriculum, but foster your local speciality. A second, equally important condition is the formulation of uniform regulations about fees and diploma's. Abandoning national traditions here is pre-requisite to overcome serious bottle-necks in pan-European cooperation.

Three remarks to conclude

First, many other topics have been touched in single papers and during the subsequent discussions and the working groups, including: work loads, selfstudy, e-learning, PhD-programs, forest & health, gender issues. If you came with many divers questions you got a lot of answers during the symposium, but a lot of open questions remained or arose.

Second, networks do become more important tools for international cooperation and for the international performance and image of universities and programmes. The SILVA-Network is a good and valuable example of such a network. The forestry education community is strongly encouraged to increase cooperation, e.g. by an extended use of existing networks like the SILVA-Network. Next to organising meetings, this cooperation could find a form in a website comparing forestry and/or natural resource management curricula, thus continuing the initiative of the SILVA-Network in the Wageningen 1997 symposium.

Finally, future forestry and future nature management require both future (i.e. different from now) scientists and field officers who also speak the language of partners from other disciplines. Universities, when developing curricula, should take that into account.

During the presentations and even more during the discussions, the importance of this kind of meetings, where learning and teaching aspects of forestry and nature management on scientific and professional level are the central issue, surfaced regularly. Teachers and students both learn a lot, from different solutions for the same problems in other local settings to improve the international network of forestry education. We are hence looking forward to the next meeting in this challenging field.

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