



RESEARCH LETTER

# On Education in Forest Science

Forest education – forestry – natural resource management – higher education – curricula – employment – life-long learning

A large, curved, semi-transparent white banner is superimposed over a background photograph. The photograph shows a group of people in a field setting. In the foreground, a person wearing a red and black plaid shirt and a green cap is looking down at a document. Other people are visible in the background, some standing and some sitting on the ground. The overall scene suggests a practical field activity or a workshop related to forest science.

## KNOWLEDGE IS KEY TO ENSURING OUR ENVIRONMENTAL SAFETY

As forests cover almost one third of the world's land surface and provide multiple ecosystem services, they are critical to securing our environmental safety. Forest knowledge is the basis for understanding the relationship between people and forests. Education also plays a key role to ensure appropriate forest management.

Forest education has a long tradition. Traditional forest knowledge is a crucial component of forest education.

Over centuries, indigenous peoples and local communities have gained significant knowledge on how to manage and conserve forests. Considering today's new societal demands - such as increasing demands for ecosystem services and novel resource governance systems - other forms of learning have gained importance. Formal forest education should aim to provide the knowledge that is needed to meet these challenges effectively.

## HIGHER FOREST EDUCATION HAS GAINED COMPLEXITY

Currently, higher forest education is undergoing crucial structural changes, triggered by globalization and global change which are in turn altering expectations of stakeholders and society.

Forest education has become much more complex. While previously it aimed at preparing graduates for taking up employment in the wood industry, today it is rather about

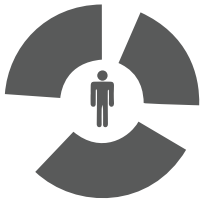
understanding, maintaining and managing forests and related ecosystem relationships as a natural resource.

Today's forest education has to take into account results of both scientific research and practice in order to provide humans with state-of-the-art knowledge to manage forests sustainably and to tackle related challenges such as climate change and water scarcity.

## GRADUATES OFTEN WORK OUTSIDE THE SECTOR

The professional attractiveness of the forestry sector for graduates has decreased. Today, increasingly graduates seek their careers outside the traditional forest sector. For example, they are working in the fields of tourism and recreation or infrastructure development, on climate change or on land use changes – in fields that are not always directly related to forests. This calls for changes in the focus of education in forest sciences.

In the past there have always been more male than female graduates in higher forest education. However the number of women who have completed university forestry degrees has significantly increased in developed countries. Also in developing countries one can observe an increase in women graduating in forestry. In general, gender issues have gained importance.



### KNOWLEDGE GAPS

There is a need for improved forest sciences study programmes worldwide and for the development of standards of education, which meet the requirements of today.

Research in higher education has shown a shift from the traditional instruction paradigm (i.e. tutor-oriented teaching) to the learning paradigm, in which education institutions have to do all they can to fulfil their ultimate responsibility which is “to produce learning”. Only an active learning process will lead students to the complex set of competences expected from graduates today. This includes the need to actively involve students in the development of modern educational programmes. Innovative approaches are needed to fulfil this task, e.g. to develop new methods for assessing the knowledge and skills of students and innovative methods on how to organize independent work of students.

In today’s competitive economy employees are expected to be resilient, mobile and to have good learning capacities and skills. Being up-to-date with current knowledge and trends in technology is key to finding employment after graduation as well as to a successful career. There is a need to provide graduates and practitioners with effective lifelong-learning solutions and to promote experimental research that focuses on lifelong learning in forest sciences.

## IUFRO LEARNING INITIATIVES – A DIDACTIC EXPERIMENT

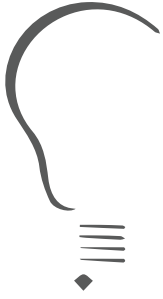
To date the IUFRO Task Force “Education in Forest Science” has initiated three Learning Initiatives, which aim at knowledge transfer in combination with the testing of new educational programmes and techniques at university level. IUFRO Learning Initiatives are educational events (in the form of summer schools) with participation from students from forestry faculties and forestry institutions worldwide, being held in joint cooperation with the International Forestry Students' Association (IFSA). Around 90 students from 17 countries in total attended the Learning Initiatives so far. The first Learning Initiatives focused on precision forestry, the second on forests and forestry in times of climate change, and the third on model forests. The novelty of this programme is grounded also in its methods to select topics, teachers and instructors, the place where classes are conducted, applied techniques in the field and laboratories, and methods of testing knowledge and skills. A detailed description of the programme, its implementation, and evaluation of knowledge and skills of the participants was partially published in the book: “Preliminary results of the research on standards and programs in the forest University Education.” (Guest editors: Piotr Paschalis-Jakubowicz, Simon Bijak, Krzysztof Stereńczak. Warsaw - Horns 2012).  
<http://www.iufro.org/science/task-forces/education-forest-science/publications/>

## IUFRO’S TASK FORCE “EDUCATION IN FOREST SCIENCE”

This Research Letter summarizes findings of IUFRO’s Task Force “Education in Forest Science” between 2011 and 2014. The group focused on questions of educational requirements in forest sciences in the 21<sup>st</sup> century and assessed effective ways to realize the concept of life-long learning in the sector.



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## LESSONS LEARNED

As programmes of higher forest education have been challenged by changing societal demands and growing pressures such as climate change, forest sciences curricula should move towards focusing on generic and methodical competences instead of contents and descriptive approaches, enabling graduates to tackle novel and complex problems. They should also move towards competences to integrate and communicate knowledge across disciplines and to new learning units addressing challenges such as climate change, adaptive ecosystem management, governance systems, gender issues, and forests as a source of energy.

An assessment of forestry curricula at university level in different regions of the world has shown crucial weaknesses regarding the educational scope of the programmes. Curricula are still rather traditional and do not cover many of the issues that will be needed later on in professional life.

Another global assessment showed that employers of graduates from forest universities and colleges rated the educational skills of their employees as positive. However, they also highlighted the absence of many subjects that are required to carry out forestry in the 21st century, such as skills in risk analysis and decision-making, knowledge on the history of forests and forestry and on different forest regions, on environmental changes and on the marketing of forest products.

Universities have a growing role in continuing education and are an excellent place to organize events (e.g. summer schools) that will provide insight into the latest knowledge and advanced working techniques.

There is a lot of cooperation between universities, both at national and international levels, that combines an exchange of experiences with educational programmes and that has led to new standards in forest education. However, changes in the educational systems are still outstanding. In many cases, this is due to financial constraints, and a lack of teaching staff and infrastructure.

*There is a need to get connected and to enable the flow of information in the field of forest education, not only between universities but also between universities and employers, and to take into account employers' requirements and expectations of their employed graduates.*



## CONCLUSIONS

Taking into account the importance of forests as a central element for humans' environmental safety, forest education requires more global recognition. Policy-makers should consider the inclusion and appropriate references to forest education in existing international agreements, conventions and development programmes.

There is also the need to establish institutional structures for forest education at the global level, e.g. to have one international organization that is dedicated to forest education. So far, attempts to move forest education into international structures at the level of the Food and Agriculture Organization of the United Nations (FAO) have repeatedly failed.

Developing countries require support and assistance to build their capacity and increase forest management expertise and skills related to sustainable forest management and good forest governance, and in support of REDD+ (Reducing Emissions from Deforestation and forest Degradation), e.g. through funding or the provision of infrastructure.

University level education, in the broadest sense, should be one of the fundamental domains of the state. States should embrace their responsibility more seriously and should formulate and implement an educational system with specific requirements and for all levels of education.

