



Danish forest research in brief

Denmark is the last country to be portrayed in the series *Forest research in the north*. In terms of forest production, Denmark is the "little brother" among the Scandinavian countries. However, it contributes significantly to the diversity in Nordic forestry.

In Denmark, only 11% of the land area is covered with forests, and the economic importance of the Danish forests is low and declining. The wood-processing industry is characterized by small units and generally has low competitiveness.

The secondary wood-processing sectors (e.g. the furniture-making, building materials and energy sectors) are economically much more important, but also less dependent on domestic wood production.

However, if visions presented in the Danish National Forest Programme in the year 2000 are fulfilled, the role of the forests will be markedly upgraded. According to these ambitious plans, the forest area is to be increased to cover 20–25% of Denmark within a single tree generation. The forests will also be multi-purpose, supplying high

Danish forests in figures

- Productive forest land: 486,000 hectares (11% of the land area. 0.1 hectare per capita).
- Annual increment: 5.1 million m³
- Annual harvest: 1.7 million m³
- Growing stock: 76 million m³ (63% conifers, 37% broadleaves)

Tree species, land area

- Norway spruce: 28%
- Sitka spruce: 7%
- Nordmann and noble firs: 9%
- Other conifers: 19%
- Beech: 17%
- Oak: 9%
- Other broadleaves: 11%

Ownership, land area

- Private individuals: 47%
- Companies, associations and foundations: 25%
- Public: 28%

Forest industry

- Wood consumption: 8 million m³ (6 million m³ imported)
- Sawnwood industry, value: Dkr4 billion/year
- Furniture industry, value: Dkr14 billion/year

Employees

- Primary forest sector: 2,000
- Wood product industry: 14,000

Source: *The Danish National Forest Programme*. www.sns.dk

quality wood, while offering diverse opportunities for outdoor recreation, conservation of biological diversity, landscape improvement etc.

Although the economic importance of Danish forestry is relatively minor, it is diverse with respect to both species composition and forms of utilization.

This is also reflected in a relatively strong research input. One single actor – *Skov & Landskab*, which has 300 employees – dominates forest research in the country. Several other bodies are also involved in more industrial aspects of forest research, such as building and furniture-making.

Skov & Landskab

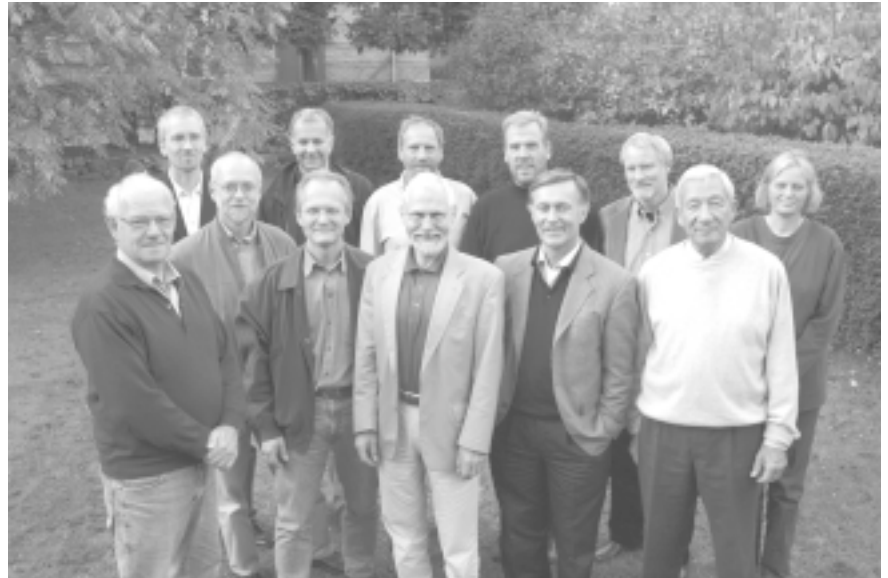
The main forest research body in Denmark

The Danish Centre for Forest, Landscape and Planning (*Skov & Landskab*) dominates forest research in Denmark, and also serves as a centre for education and extension concerning forest, landscape issues and planning.

Skov & Landskab has been in existence for three years as an officially recognised organisation composed of the present Danish Forest and Landscape Research Institute, the Danish Forestry College and part of the Royal Veterinary and Agricultural University. From 1 January 2004, these elements, together with Danida Forest Seed Centre, will be merged formally into the independent centre *Skov & Landskab* under the Royal Veterinary and Agricultural University. The main areas of activity are:

- Research and development
- Education, training and refresher courses
- Monitoring forest status and the National Forest Inventory
- Advisory services and dissemination
- Decision support for official bodies
- Developmental and environmental guidance

Skov & Landskab has a budget of Dkr150 million and about 300 employees. About 150 are researchers, of whom around 100 have at least a doctorate. The staff are currently based in six locations – four in Copenhagen and northern Sjaelland, and two in Jutland in the western part of Denmark. The long-term plan is to transfer most of the staff into a new building at the campus of the Royal Veterinary and Agricultural University in Copenhagen.



The new leadership team of *Skov & Landskab* gathered for their first meeting. Rear row, from left: Bo Jellesmark Thorsen, Henrik Paaby, Ole Quist Jensen, Karsten Raulund Rasmussen, Kjell Nilsson and Gertrud Jørgensen. Front row, from left: Søren W. Pedersen, Søren Fløe Jensen, Lars Graudal, Jens Dragsted, Niels Elers Koch (director of the centre) and Nils Wilhjelm (chairman of the board).

Education

The new centre has responsibility for all levels of forest education – from teaching basic grade forest workers to doctoral level studies. Each year, 30 foresters and 30 landscape architects are awarded masters degrees at the centre.

The research

The research is grouped into six departments

- Gene resources in woody plants
- Applied ecology
- Silviculture, forest operations and wood products
- Parks and urban landscapes
- Urban and regional development, landscape management and recreation

Skov & Landskab is also responsible for monitoring the status of the forests and for forest statistics.

Examples of activities at *Skov & Landskab*

Urban forestry

Since Denmark is a densely populated country, in which forests are seldom located far from the cities, research into urban forestry is also, naturally, important. Through *Skov & Landskab*, Denmark is coordinating EUFORIC: the European Urban Forestry Research and Information Centre. EUFORIC is a regional project centre of the European Forest Institute (see *News and Views* 18.4).

EUFORIC aims to strengthen the European network of urban forestry research through a range of activities, e.g. compiling a database of urban forestry research and education, disseminating research results, organizing workshops, and training.

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Examples of activities at *Skog & Landskab*

Christmas trees and greenery

Supplying Christmas trees and decorative greenery has become a major alternative source of income for many private forest owners in Denmark. Hence, research in this field is important. Since 1991, *Skov & Landskab* and its predecessor have been pursuing an objective to become one of the global leaders in research related to Christmas trees and greenery production. The centre has a budget of Dkr7 million for this purpose per year.

Research is focused on a number of specific target areas, such as provenance selection and genetic breeding, crop establishment, fertilization, damage limitation and growth manipulation. The research is partly financed by the land owners,

through a fee for each hectare with greenery. The research is highly interdisciplinary, and it is divided amongst several departments at *Skov & Landskab* to guarantee scientific quality in diverse fields, such as nutrient application, insect damage and crop establishment.

The most important species are *Abies nordmanniana* and *A. nobilis*. Genetic selection and a breeding programme are ongoing, and specific seed orchards have been established to ensure that suitable seeds are available.

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Irrigation of Christmas trees.
Photo: Ulrik Bräuner Nielsen.



Forest and Water

Because of the intense use of agricultural and urban ecosystems the importance of groundwater from forests is increasing in Denmark, and new forests are being planted on arable land to protect groundwater resources used for drinking water. The quality of forest waters is generally good, but air pollution and some management practices may have negative effects on it. Over the last decade *Skov & Landskab* has initiated national and international projects, as well as long-term experiments designed to elucidate the principal factors affecting nitrate leaching from forests, especially those related to air pollution and management practices. The most recent research efforts have focused on the quality and quantity of water from new forests on arable land. Here,

increased evapotranspiration may lead to lower water yields, while accumulations of nitrogen and heavy metals from the old plough layer may potentially contaminate the groundwater. The aim of the project is to provide guidance on forest management strategies that maintain and develop the protective functions of forests on water.

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Soil water sampling at
Vestskoven near Copenhagen
Photo: Lars Vesterdahl.

Danish wood material research coordinated

The current research within wood science in Denmark is divided among a number of smaller groups. At present, research is ongoing at the Royal Veterinary and Agricultural University, the Technological University of Denmark, Aalborg University and the Danish Technological Institute. However, recently the Danish Center of Excellence for Wood, an initiative to coordinate and strengthen the ongoing research, was launched. As a result of this initiative, it is expected that the area of wood science will strengthen and grow within the next five years. The present funding for research within wood science is provided by the Danish Forest and Nature Agency and the Danish Research Agency. The main focus areas for applied and basic research are wood joints and bearings, new methods for wood preservation, lignin nanostructures and wood/water relations.

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