

● ● ● ● ● ● ● ●

The Danish national forest programme in an international perspective



MINISTRY OF THE ENVIRONMENT

Danish Forest and Nature Agency

**The Danish
national forest programme
in an international
perspective**

Title:

The Danish national forest programme in an international perspective

Edited by:

Division of Forest Policy of the Danish Forest and Nature Agency

Translation:

Hanne Stadsgaard Jensen & Frans Richard Bach

Photographs:

Bert Wiklund: all, except

Jens Nytoft Rasmussen: pages 32, 33 and 36

Erling Buhl: page 11

Torben Hoch: page 10

Lars-Kristian Crone: page 3

Illustrations edited by:

Jens Nytoft Rasmussen & Anna Thormann

Graphic design:

Page Leroy-Cruce

Print:

Frederiksberg Bogtrykkeri A/S

ISBN:

87-7279-456-9

Amount printed:

2500

Printed in Denmark

© Ministry of Environment, Danish Forest and Nature Agency

Haraldsgade 53

DK-2100 Copenhagen Ø

www.skovognatur.dk

sns@sns.dk

Preface

This year, the World Summit on Sustainable Development will take place in Johannesburg, South Africa. This is a good opportunity to assess progress since the Rio Conference on Environment and Development ten years ago and to set up new objectives for the future.

Forest issues were high on the agenda in Rio, and an international dialogue on forests took place in several fora following the conference.

Denmark has actively participated in this process, and we are attaching great importance to national implementation of the recommendations, which have been the result of the process. One such recommendation is to develop national forest programmes. At the same time, we have felt the need, nationally to analyse the situation and to adjust our targets, policies and legislation to the present situation and the future ahead of us.

On this background a Danish National Forest Programme has been developed. The programme takes stock of the present situation of the forest sector in Denmark, it presents policy objectives for the future, and it identifies measures to implement the policy.

The Danish National Forest Programme is aiming at sustainable forest management equally based on economic, ecological, environmental and social concern.

The programme aims at a long-term conversion towards a forest management regime, which



Lars-Kristian Crone

increasingly supports and utilises the natural processes of the forest. Forest management should not only strike a balance between economy, environment and ecology, but also build upon their mutual supportiveness.

In Denmark the forests play a central role in terms of providing opportunities for outdoor recreation. This is a significant social function of great importance for the life quality and well being of most Danes. Consequently, also this aspect of forest management is appropriately addressed in the forest programme.

The programme will now be implemented, which will entail legislation, economic incentives, dialogue, training, information and awareness raising.

It is my hope, that the Danish National Forest Programme will be of interest to others as an example of national forest programming in a developed low forest cover country.

Hans Chr. Schmidt

Minister of the Environment

Background documentation in English

A shared future – balanced development – Denmark's national strategy for sustainable development, The Danish Government, 2002
(available at www.mst.dk)

Biological Diversity in Denmark, Status and Strategy, Ministry of Environment and Energy, 1996

Strategy for Natural Forests and other Forest Types of High Conservation Value in Denmark, The Danish Forest and Nature Agency, 1994

Strategy for Sustainable Forest Management, Ministry of the Environment, 1994

The Danish Forest Act of 1. January 1997
(available at www.sns.dk/skov/Forestact.htm)

List of acronyms

CBD	Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
EU	The European Union
FAO	United Nations Food and Agricultural Organisation
GEF	Global Environment Facility
IFF	Intergovernmental Forum on Forests
IPF	Intergovernmental Panel on Forests
ITTA	International Tropical Timber Agreement
ITTO	International Tropical Timber Organisation
DFNA	Danish Forest and Nature Agency
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests

Table of contents

	Introduction	7
1.	Background	8
	1.1 Historical background	8
	1.2 International forest policy processes	11
	1.3 National implementation	11
2.	Visions for the national forest programme	12
	2.1 Main objectives and specific objectives	14
	2.2 Guidelines for sustainable forest management	16
3.	Legal and institutional framework	17
4.	Nature values, physical environment and basis for forest management	18
	4.1 Status and existing policies	18
	4.2 Future efforts	22
5.	Forest resources and economy	25
	5.1 Status and existing policies	25
	5.2 Future efforts	25
6.	Outdoor recreation	28
	6.1 Status and existing policies	28
	6.2 Future efforts	28
7.	Afforestation	30
	7.1 Status and existing policies	30
	7.2 Future efforts	30
8.	Capacity building and awareness raising	32
	8.1 Statistics	32
	8.2 Research and development	33
	8.3 Education	33
	8.4 Information sharing and dissemination in the forest sector	34
9.	International activities	35
	9.1 Existing objectives and means	35
	9.2 Future efforts	36
10.	How the Danish national forest programme was developed	38
	Annex I: Danish guidelines for sustainable forest management at management unit level	39



Introduction

Denmark is a developed country with a low forest cover. The economic importance of the Danish forests is presently declining, while other aspects and benefits of the forests are of increasing importance to the Danish society.

In 2000, it was decided to develop a National Forest Programme based on the changing conditions for the Danish forest sector and the obligations outlined in the various international agreements and conventions to which Denmark is a party.

This is a condensed and adapted version of the Programme, with a specific focus on the ways and means through which Denmark is responding to the internationally agreed obligations and priorities for forest management.

The main objective of the National Forest Programme is full implementation of sustainable forest management, which incorporates economic, ecological as well as social considerations.

The specific key objectives include:

Nature and environment

Long-term conversion to near-to-nature forest management principles and 10% of the national forest area having biodiversity as the most important management objective by 2040.

Economy

Development of sustainable economic framework conditions for the forest sector.

Social concern

Maintain and develop the forests as a benefit for public welfare through opportunities for outdoor recreation and nature experience in the forests.

Afforestation

Forest landscapes should cover 20-25% of Denmark after one tree generation (80 – 100 years) – and the scope and potential for natural habitats and processes should be strengthened in this effort.

Knowledge

Effective information sharing – access to updated and relevant knowledge as a basis for forest policy development and implementation through research, education, awareness raising and dissemination of information.

International objective

Promotion of sustainable forest management at global and regional levels.

Main instruments to achieve these objectives will be:

- Adaptation of legislation
- Dialogue
- Research and development
- Awareness raising, dissemination of information and training
- Economic incentives
- International co-operation

Near-to-nature forest management has a clear financial aim and builds on the gentle moderation of the natural processes of the forest ecosystems

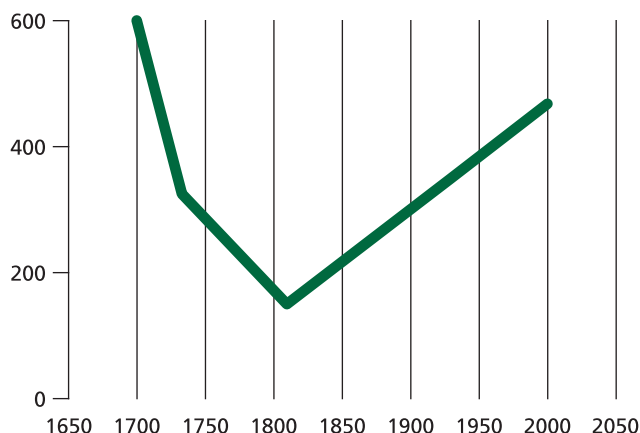
1. Background

In Denmark, forests cover approximately 486,000 ha, corresponding to around 11% of the total area. The forests are fragmented and often very small. Out of a total annual wood consumption of 8 million m³, around 25% are produced nationally. 72% of the forest area is privately owned, while the remaining 28% are publicly owned, mainly as state forests. Around 2000 people are employed in the primary forest sector, while the secondary wood product industry employs around 14,000 people and is a major export business. It is estimated that on average each of the 5,3 million Danes goes for a walk in the forest 11 times per year.

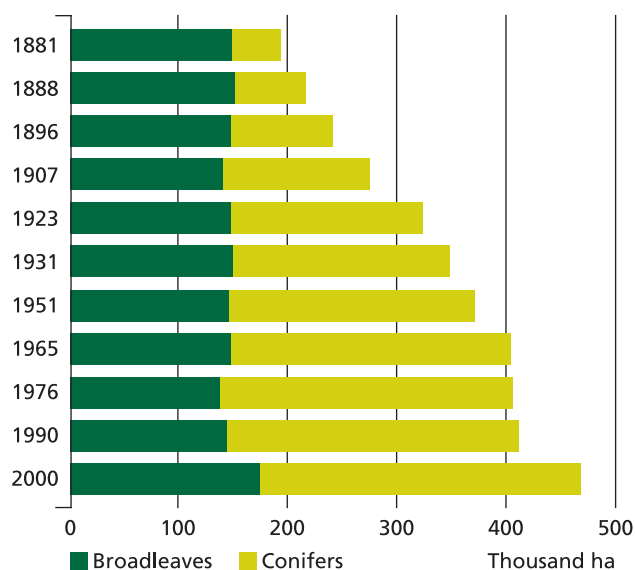
1.1 Historical background

If left entirely to itself with no human disturbance, Denmark's surface area would eventually be covered almost completely by forest, as it was when the first hunters arrived after the last Ice Age. When they settled down and became farmers, they started clearing the forests, and as the centuries passed, the forest cover was gradually reduced to 2-3 % some 200 years ago. Since around 1800, large-scale plantings have taken place, and the forest cover has gradually increased to around 11% of the total area mainly located in areas with low population density and with soils vulnerable to erosion. These planted forests were dominated by imported tree species, and their main purpose was wood production. During the last 200 years, forest management in Denmark has thus been intensified and rationalised through for instance draining and use of highly productive but also less adapted and thus unstable non-indigenous tree species in large, even-aged monocultures.

Development in the Danish forested area since 1700



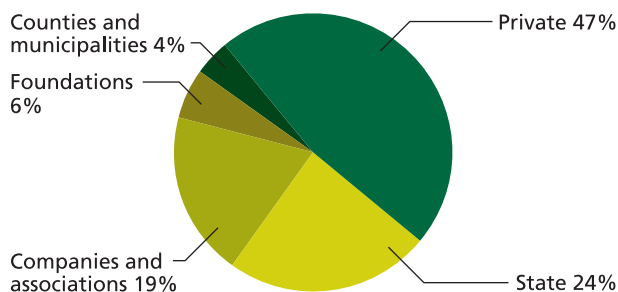
Danish forest area and tree species 1881-2000



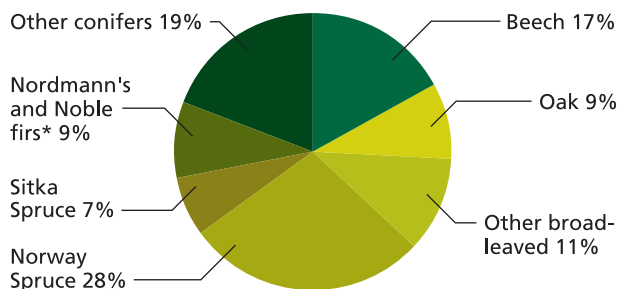
Facts on Danish forests

Danish forest area	486.000 hectares, 11 % of the total area
Forest area pr. capita	0,1 hectare/cap.
Volume	45 million m ³ conifer, 28 million m ³ deciduous
Average annual increment (forecast 2000- 2009)	3,8 million m ³ conifer, 1,3 million m ³ deciduous
Annual felling (1999)	1,1 million m ³ conifer, 0,6 million m ³ deciduous
Annual wood consumption	Approximately 8 million m ³
Tree species	63,2 % conifer, 36,8 % deciduous
Ownership	72 % non-public and, 28 % public
Recreation	More than 50 million annual visits in the forest

Ownership of the Danish forests



Tree species in the Danish forests



*Mainly for production of Christmas trees and greenery.



Historically, segregation of forest and agricultural land has served as a successful tool in the reestablishment of the Danish forest cover

There is now only little natural forest left in Denmark, and large parts of the forests are quite uniform and often with limited value for biological diversity protection and recreational purposes. 36,8 % of the forests are deciduous, while the remaining are planted with non-native coniferous tree species. A recent development during the last 10 years is that the fraction of deciduous forest is now increasing, while it previously used

to be decreasing. This development is triggered through state afforestation, financial incentives and a negative development in soft-wood prices. The Danish forest cover is still increasing through public afforestation and private afforestation promoted through incentives. But still, Denmark is a relatively forest-poor country, with only around 0,1 ha forest per capita, compared to Sweden, where the number is 2,8 ha.

The fact that Denmark is intensively cultivated for agriculture means that the forests act as a refuge for the natural plant and animal life. Many of the endangered plants and animals in Denmark live only inside or in connection with the forests. The relatively extensive management regimes in the forests as compared to agriculture, with limited use of fertilisers and pesticides, also means that they protect vital groundwater reserves. And the forests can also act as climate-stabilisers by CO₂-sequestration and by providing CO₂-neutral fuel.



The national forest programme was developed in dialogue with the forest users

1992: The United Nations Conference on Environment and Development (UNCED), which adopted a Forest Declaration, outlining principles for a global consensus on the management, conservation and sustainable development of all types of forests. Forest issues were also addressed in the Rio Declaration and in Agenda 21 Chapter 11.

1992: Adoption of the Convention on Biological Diversity, which includes directions for conservation and sustainable use of biological diversity, including in forest ecosystems.

1992: The United Nations Framework Convention on Climate Change, and its Kyoto Protocol from **1997**, including forests as a sink for greenhouse gasses, notably CO₂.

1993: The Helsinki Pan-European Ministerial Conference on the Protection of Forests. Resolution acknowledging the need to carry out sustainable forest management and developing pan-european criteria and indicators for sustainable forest management. The conference was followed-up by the Lisbon Conference in **1998**. Next conference will be in Vienna **2003**.

1994: The United Nations Convention to Combat Desertification, including forest measures in combating deforestation.

1994: The International Tropical Timber Agreement (ITTA) following-up on the previous agreement from 1983 and focusing on linkages between tropical timber trade and sustainable forest management.

1995-1997: Intergovernmental Panel on Forests (IPF). Recommendations and proposals for action.

1997-2000: Intergovernmental Forum on Forests (IFF). Expanded recommendations and proposals for action, including on national forest programmes.

2000-2005: United Nations Forum on Forests (UNFF), focus on implementation of IPF/IFF recommendations.

2002: Adoption of an Expanded Work Programme on Forest Biological Diversity under the Convention on Biological Diversity.

1.2 International forest policy processes

During the last decade, forests have been high on the agenda in various international fora, and sustainable forest management is now widely recognised as an objective, which should be integrated into national forest policies, including national forest programmes.

The main international processes providing guidance to national forest management planning and operations are highlighted at page 10.

Not all recommendations emanating from the many processes are equally relevant to the particular national situation in all countries, which is also recognised in the text of the agreements and recommendations. The specific Danish setting has made the Danish National Forest Programme focus on recommendations relating mainly to:

- sustainable forest management in general;
- protection of forest nature and biological diversity;
- public participation and use of the forests through outdoor recreation;
- improved economic framework conditions for the forest sector;
- international forest issues.

The Programme also constitutes part of the Danish response to the recommendations of developing a national forest programme before the World Summit on Sustainable Development in Johannesburg August-September 2002.

1.3 National implementation

In 1994, Denmark developed a National Strategy for Sustainable Forest Management, based on the principles and guidelines laid out in the Rio Forest Declaration and the resolution from the Helsinki Conference. This Strategy also constituted the basis for a paper put forward to the Danish Parliament outlining the Danish forest policy in light of the Rio and Helsinki Conferences. The Strategy underlined that the Danish model for sustainable forest management is not directed towards individual forests or forest properties, but towards the country as a whole.



Myth, history, experiences, science: The cultural values will be conserved in the forest

But society as well as forestry is constantly changing. More and new international agreements and recommendations are developed, the UNFF-process clearly recommends development of national forest programmes, and an increased participation of the general public in the development of national programmes and strategies is a national priority. Therefore, it was decided to up-date and expand the National Strategy and develop a national forest programme. The present document is a condensed and adapted version of the Danish National Forest Programme, which has been developed over a period of 2 years (2000-2002).

It has been developed with the recommendations from The Intergovernmental Panel on Forest (IPF) from 1997 in mind, in particular the ones directly relevant for Denmark. These are: 1) development of a national forest programme involving all stakeholders; and 2) development of a national forest programme including criteria and indicators for sustainable forest management. The increased knowledge and the experiences at national and international level gained since 1994 in the field of sustainable forest management have also been important to the process.

2. Visions for the national forest programme

Even though the Danish forest cover is relatively small, the forests are of great national importance. The forests are islands of nature in a sea of agricultural fields and urban areas. They produce high quality raw materials for industry, and harbour cultural heritage, landscape amenities and biological diversity, which is a part of the national identity.

The ambitious overall goal of the Danish forest policy is a combination of nature, production and recreational opportunities, which at the same time increases biodiversity protection, consolidates the possibilities for outdoor recreation, and ensures the future production potential of the forests.

The National Forest Programme is developed with due regard to the Ecosystem Approach, as recommended in the CBD Work Programme on Forest Biodiversity (Element 1, Goal 1), including considerations for agriculture and provision of “environmental goods”. It is also a direct follow-up to the IPF/IFF recommendations on development and implementation of holistic national forest programmes, where an appropriate combination of legislation, economic instruments and tax policies are utilised to promote sustainable forest management, and which is consistent with national, sub-national and local policies and strategies. (IPF 17a, 58b(i); IFF 115a,b and c). The programme is also responding to the call for codes of conduct to the private forest sector consistent with the principles for sustainable forest management (IFF 69a and 128c), and has both through the process leading to the programme and in the programme itself responded to the call for improved co-operation, co-ordination and partnerships in support of sustainable forest management by involving relevant stakeholders in forest decision making (IPF 17b,f,h,i, 40e; IFF 19b, 64b, 66, 140a).

Before 2040, a minimum of 10% of forest cover will have biodiversity as the most important management objective



Forests will be developed as a national welfare benefit through their role for popular health



Innovative use of wood will be promoted

Based on the specific setting in Denmark and in the light of the above international recommendations, the Danish National Forest Programme has the following visions for the Danish forests:

- Forests which can deliver high quality wood products to society;
- Forests which offer good opportunities for outdoor recreation, particularly near urban areas;
- Forests which harbour and conserve biological diversity;
- Forests which, by creating economic possibilities and rendering the rural areas attractive with regard to nature and recreation, contribute to maintaining residence in the rural areas;
- Forests which strengthen landscape functions with regard to biological diversity and landscape amenities; and
- Forests which have environmental protection functions, for instance protection of groundwater, production of renewable raw materials, and acting as CO₂-sinks.

The vision for the forests emanating from the public debate and the policy is developed into six main objectives of the programme as listed in table A on the following pages.

Table A Main Objectives and Specific Objectives

Main Objectives	Specific Objectives
<p>Environmental objectives <i>Promote efforts for the protection of biological diversity and secure the physical environment and the basis for forest management</i></p>	<ul style="list-style-type: none"> • Develop and promote a conversion to near-to-nature forest management • Conserve natural forest and nature in the forest, including wetlands and key biotopes • Before 2040, 10% of the total forest area has biodiversity conservation as the primary management objective • Develop the potential of the forest sector to contribute to a number of environmental objectives, including policy objectives in climate and energy, e.g. limitation of the greenhouse effect (as per the Kyoto Protocol), provision of renewable energy, ensuring clean groundwater, etc.
<p>Economic objectives <i>Development towards increasingly economically sustainable framework conditions for the forest sector</i></p>	<ul style="list-style-type: none"> • Develop forest and wood products, markets and the industrial and trade sectors • Increase the use of forest and wood products and improve the pricing and secondary values of these, among others through niche-productions and increased visibility of the environmental qualities of the forest production • Increase the awareness and knowledge about the economic possibilities in near-to-nature forest management – including clarification on issues relating to the conversion phase
<p>Social objectives <i>Development of the role of the forests as a national welfare benefit through the opportunities for the population for using the forests to develop health and awareness</i></p>	<ul style="list-style-type: none"> • Strengthen the opportunities for experiencing nature in the forests • Conserve the cultural values in the forests • Develop dialogue, knowledge and awareness about the functions and importance of the forests • Promotion of physical and mental wellbeing through the interaction between forests and citizens, including the opportunities for outdoor recreation and the use of forest products

Main Objectives	Specific Objectives
<p>Afforestation</p> <p><i>The objectives for afforestation are maintained and developed with a view towards strengthening of the potential for natural habitats and processes in afforestation</i></p>	<ul style="list-style-type: none"> • Increase the forest area so forest landscapes cover 20-25 % of Denmark after one tree-generation (80-100 years) • The concept of multiple use forest management will be further integrated into the afforestation with due consideration to production, biodiversity, outdoor recreation, cultural heritage, landscape and environmental protection • Increased co-operation with local actors, including citizens, organisations and authorities in the afforestation efforts
<p>Knowledge</p> <p><i>Efficient capacity building and information sharing in the forest sector. Access to updated and relevant knowledge and experience as a basis for the forest policy through research, education, dissemination and information</i></p>	<ul style="list-style-type: none"> • Strengthen and apply knowledge-building and knowledge dissemination on biological diversity, economy and social aspects of the forest, here-under needs and priorities of users and consumers • Use the state forests to test and further develop management methods and operational principles, which can perform multiple tasks within a number of areas, with a concerted and coherent strategy for operations, cultivation, biological diversity, outdoor recreation, cultural heritage etc. • In a longer perspective, the objectives will be strengthened by developing the forestry education curricula and adapting to the needs of the sector as well as new trends in society • Strengthening of a coherent monitoring of the forests
<p>Internationally</p> <p><i>At global as well as regional scale to promote the development towards sustainable forest management, where protection of forest biological diversity and environment is integrated into the contribution of the forests to social and economic development</i></p>	<ul style="list-style-type: none"> • Coherent efforts of a still more binding character in international negotiation fora supported by bilateral, regional and multilateral co-operation, trade, research, information and public information nationally as well as internationally • Coherence between national and international efforts, thus underlining positions on international forest relations with national actions

2.2 Guidelines for sustainable forest management

In accordance with national forest policy objectives, all Danish forests are now encouraged to aim towards sustainable management and development.

This process was initiated in the beginning of the 1990's as a follow-up to the Forest Principles adopted in the UNCED Forest Declaration. During the following almost 10 years, the follow-up process has developed a set of guidelines and indicators for different levels. In Denmark, broad consensus was reached in 2001 on a set of operational guidelines for sustainable forest management at management unit level, based on the Pan-European guidelines developed in ministerial forest conferences. The guidelines are attached in Annex I.

The guidelines are based on the principles for near-to-nature forest management, which has an overarching economic goal in concert with a nature-friendly management approach. One of the central elements of the near-to-nature forest management practices is to utilise the natural processes, such as natural regeneration, to the maximum extent. This can be done through:

- Selection of species well adapted to the local conditions, especially native species;
- Single tree management among the larger trees;
- Maintenance of the productivity, stability and regeneration potential of the forest by avoiding interventions which damage the climate, soil conditions and biodiversity of the forest – for instance clear-cutting and the use of pesticides;
- Utilisation of natural regeneration and natural differentiation in the forest management;
- Development towards forests with a mixture of different tree species in different age groups.

Danish forest management has thus obtained a common frame of reference for the management of the Danish forests, which in this way have taken a major step towards sustainable management.



The policy is to introduce and promote a conversion of Danish uniform forest systems into near-to-nature forest management

The guidelines are a practical tool for the individual forest owners who wish to use sustainable forest management practices in his/her forest. Conversion to near-to-nature forest management is seen as a long-term exercise, where conversion of specific areas only takes place for instance at optimal rotation age or when stands are to be logged anyway, i.a. due to instability, health etc. Consequently, it will take one or more tree generations before a full conversion to near-to-nature management practices has been achieved and even longer before the expected ecological effects have occurred.

3. Legal and institutional framework

In general, in Denmark there are rather detailed rules for what any given forest owner is allowed to do in his/her forest. For instance, 85% of the forest area is registered as forest reserve and must not be converted to any other land use.

The first Danish forestry regulation was issued in 1805. The present Forest Act from 1997 has four primary objectives:

- Conserve and protect the Danish forests.
- Improve the stability of the forest sector, the ownership structure and the productivity.
- Contribute to increasing the forest cover.
- Strengthen the advisory service and information on good and multiple use forest management.

It is thus to a large extent still based on the overall objective to preserve the forest resource and its production potential, and reflects the historical background, which was a major forest resource breakdown in 1805. But from 1989, the purpose of the Act is also aiming at multiple use of the forest, i.e. inclusion of nature, cultural heritage and recreational considerations. Multiple use forest management was introduced in the Forest Act in 1997 as a mandatory provision.

The Act also established specific protection of oak thickets and particular nature types (bogs, lakes etc.). All subsidy schemes for forest activities were at the same time gathered under the main objective of attending to multiple use considerations in forest management.

In Denmark, the forest sector is under the jurisdiction of the Ministry of Environment. The responsibility has been delegated to the Danish Forest and Nature Agency, which also includes 25 forest districts, which manage the 24% of the forest area owned by the state. The Ministry of Environment also includes three public sector

research institutions with relevance to forestry. These institutions contribute significantly to knowledge building in the forest sector.

Among other ministries of relevance to the forest sector is the Ministry of Food, Agriculture and Fisheries, particularly due to the co-ordinating role of the ministry in the fields of land use and plant genetic resources. The international co-operation is mainly the responsibility of the Ministry of Foreign Affairs, and the work of the economic ministries is of importance to the economic framework conditions of the forest sector.

The 14 Danish counties have a role in terms of forest management due to their responsibilities and authority in accordance with the Nature Protection Act and the National Planning Act. They are for instance responsible for designation of potential areas for afforestation. The private forest owners are well organised in various local and national associations. These associations provide consultancy services to the forest owners (partly supported by the state) as well as practical assistance and forest policy activities. A wide range of NGOs are active in the national forest debate, for instance WWF Denmark, the Danish Society for the Conservation of Nature, the environmental organisation Nepenthes, the Danish Outdoor Council, the Danish Hunters Society, and the Danish Ornithological Society.

4. Nature values, physical environment and basis for forest management

The forests have an important function as protectors of biological diversity and the ecological cycles, in particular those of nutrients, water and carbon.

The main objective of the National Forest Programme is to promote efforts for the protection of biological diversity and secure the physical environment and the basis for forest management.

A particular effort will be made to develop and disseminate information on the conversion to near-to-nature forest management, and to conserve and improve the nature of the forests, including wetlands, key biotopes, natural forests and nature in the forests in general.

4.1 Status and existing policies

The Danish forests are generally small and fragmented and with a mixed ownership structure. The forests predominantly consist of planted forests dominated by conifers (mainly pine and spruce) which are intensively grown and leave little room for biological diversity. These forests have furthermore turned out to be unstable, and the management regimes have effected a significant deterioration of specific nature types and decline in species, particularly for those attached to old growth deciduous forests and wet forest types. On some poorer soils loss of nutrients has eroded the basis for forest management activities. However, compared to agriculture, forestry activities are still quite environmentally friendly due to the low intensity of tillage and use of pesticides and fertilisers.

By the ratification in 1993 of the Convention on Biological Diversity, Denmark has obliged itself to conserve and sustainably use the biological diversity of the country. The implementation



The remaining *natural forest* will be conserved, including wetlands and key habitats

The forest fringe is an important habitat to be managed gently





is primarily through national legislation and strategies and international (mainly EU) acts and directives.

The Strategy for Sustainable Forest Management from 1994 outlined a policy framework for achievement of sustainable forest management at national level. The general principle behind the strategy was that economic, ecological and social objectives could be accommodated at the same site at the same time without major conflicts, leading to the concept of multiple-use forest management. This is important in a low forest cover country, where only small forest areas will be available for each function, if the forest area is divided into fractions each serving a specific function. However, also some exceptions to this general principle were introduced. One important exception occurs in the Strategy for Natural Forest from 1992, which provides guidance on how to conserve the biological diversity of the forests, including the genetic resources. The primary means of implementation were designation of untouched forests and old forest management systems, for instance grazing forests, coppice forests and selection method cutting.

The Forest Act from 1997 contains general objectives for the functions of both private and publicly owned forests in protection of nature and the environment, including conservation of biological diversity. More specifically, the Forest Act regulate land-use and contains provisions regarding good and multiple use forest practices and, in concert with the **Nature Protection Act**, the Forest Act ensures a general protection of specific nature types, such as lakes and bogs.

The special provisions in the Forest Act for nature and environment protection in state owned forests have resulted in a range of particular guidelines for management of these forests, including conservation of natural forest, old trees and dead wood in the forests, guidelines for the use of pesticides and fertilisers, for mixed forests, etc.

Natural forest is often restricted to marginal lands, slopes etc.

Economic incentives aiming at management regime changes have played a major role in Danish nature protection policies. The Forest Act from 1997 holds provisions for all the subsidy schemes for promotion of multiple use forest management. These include: afforestation; regeneration and management planning; outdoor recreation; mapping of local soil conditions; key biotopes and cultural heritage; and special management regimes (untouched forest and traditional forest management systems such as coppice), with the primary goal of biodiversity conservation. At present, more than 6,500 ha are designated as untouched forest, and more than 10,000 ha are designated for traditional management regimes, such as grazing forests, coppice forests and selective cutting.

Through the implementation of the EU Directives on protection of birds and habitats (Council Directive 79/409 on the Conservation of Wild



Coppice is a traditional forest management system which should be maintained – in particular on locations where it contributes to a rich biodiversity

Birds, and Council directive 92/43 on the Conservation of Natural Habitats and of Wild Flora and Fauna), Denmark has designated nature protection areas, which include forest areas.

4.2 Future efforts

The main task ahead for the Danish forest sector is to maintain and support the development of the natural ecological structures and functions of the forests, including species adapted to the local conditions, and in particular native species. Habitats for flora and fauna and the ecological and genetic processes taking place in the forest should equally be protected and supported. A rich biological diversity will contribute to a strengthening of the ability of the forests to resist natural or man-made disturbances, for instance climate change. It is thus important to reduce the stressing impacts on forest ecosystems.

The efforts will mainly be concentrated on development and dissemination of a conversion to near-to-nature forest management and conservation and improvement of the nature values of the forests, including wetlands, key biotopes, natural forest and nature in the forest in general.

4.2.1 Near-to-nature forest management

The concept of near-to-nature forest management is central to the forest programme. It is not synonymous with the concept of sustainable forest management, but the two concepts are closely related. Near-to-nature forest management is a narrower concept, which only relates to the actual forest operations. If this forestry concept is supplemented with a number of special considerations to ecological, economic and social factors, what is more broadly defined as sustainable forest management is obtained.

The primary goal of near-to-nature forest management is to ensure an economically sustainable wood production through selection of species adapted to/adaptable to the local conditions. Maximum utilisation of the natural processes in the forest ecosystem, such as natural regeneration and continuity in the forest cover, are other principles to be applied. In this way, maintenance



Near-to-nature forest management is about establishing a structure of various species and ages

Hunting – recreational activity and human predation to maintain the ecological balance in the forests



and improvement of the forest climate and soil conditions, genetic resources and consequently natural regeneration potentials and productivity will be supported. A forest managed under these principles will typically consist of a mixture of different tree species in different age groups, with a limited use of pesticides and other ancillary materials. It will be more robust and resistant to climate change, more biologically diverse and have more functions in environmental protection.

Furthermore, the near-to-nature forest management concept has a pronounced economic objective. However, the Danish experience with the concept is at present limited, and the possible economic and environmental advantages and disadvantages are intensively debated and in need of additional research and development efforts.

In the state forests, an action plan for near-to-nature forest management will be ready by 2004. It is estimated that full conversion to near-to-nature forest management can take place over a period of one tree-generation (80-100 years), and that the near-to-nature management principles can be implemented in 24% of the total state forest area within the first 10 years. This will be an important contribution to the total national development efforts.

For the private forests, the conversion period is recommended to be longer. The means to achieve the conversion will be based on voluntary action, dialogue, dissemination of information and knowledge, timber certification and in some cases voluntary agreements. A revision of the Forest Act will aim at providing a more flexible legal framework, and at the same time secure forest resources and a continued land use for forestry. This is expected to promote both economic and ecological objectives in forest management by giving forest owners the possibility to fully utilise and develop the potentials in near-to-nature forest management.

The voluntary certification schemes, which at present are under development in Denmark, prescribe near-to-nature forest management. These market-based schemes are expected to gain more widespread use in Denmark in the coming years, which will at the same time promote near-to-nature forest management.

4.2.2 Conservation of biodiversity in the forests

Beyond the nature values of the forest areas *per se*, the Danish forests harbour smaller or larger patches or elements, where the biological diversity is particularly valuable or have particularly good opportunities for developing. Natural forest, valuable genetic resources, untouched forests and old forest management systems with particular nature qualities (grazing forest, selec-



Traditional silvo pastoral systems provide biodiversity and amenity values in the forests

tive cutting and coppice forests), key biotopes and wetlands etc. constitute an important part of the particularly valuable nature elements in the forests. Several of these nature types, for instance in forest fringes, are also of great value to wildlife.

The Danish Strategy for Natural Forests from 1992 set up a long-term objective for designation of 40,000 ha of natural forest, untouched forest and old forest management systems by 2040. This objective will now be further developed by working towards before 2040 designating 10% of the total forest area to be managed for nature and biological diversity purposes as the primary management objective. This "biodiversity-forest" will harbour particularly valuable forests, which will be protected, as well as areas, which are sought developed with nature, biodi-

versity or cultural heritage conservation objectives in mind. Also EU Habitat-areas will be considered within this context. Designation of untouched forest and areas subject to old forest management systems will be applied in these efforts.

The main steps towards designating biodiversity-forest will be:

- by the end of 2003, an account of the specific nature values to be protected by designation of biodiversity-forest will be drafted, including an assessment of the present Danish nature forest concept aiming at a more focused implementation with clear priorities and broad support among forest owners and managers;
- by 2004, a report which identifies and evaluates a gross list of potential areas for designation as biodiversity-forest, including considerations on implementation of international conventions and EU directives;
- by 2010, 10% of the state forests will be designated as biodiversity-forests, and the progress towards 10% biodiversity-forest at a national level in 2040 will be evaluated.

5. Forest resources and economy

A major element of the forest policy is to secure a sustainable economic framework for the forest sector. The results of forest management activities must at least pay-off the resources in terms of capital and manpower, which have been invested into these efforts. This will enable the forest sector to implement sustainable forest management, including objectives for outdoor recreation and biological diversity.

5.1 Status and existing policies

At an international scale, the Danish forest sector is small in scale and non-homogenous with regard to tree species composition and quality. The resource is not subject to any significant strategic interest from international forest industries. During the last years timber prices have been declining in the region eroding the economic conditions for the sector.

Small units and a low degree of refinement dominate the primary Danish wood processing industry, and generally it has a low competitive power. The secondary wood processing industry (furniture, building materials, energy etc.) is economically more important, but also less dependent on domestic wood production. If primary wood processing industries are closing due to increasing economic constraints, timber from Danish forests need longer transports from forest to industry, which will increase costs and thus further erode the economic basis for forest management activities in Denmark.

In this situation, many private forest owners are opting for production of Christmas trees and decorative greenery as a major alternative source of income. However, even this market seems to approach a state of saturation, and the production is less environmentally benign than tradi-

tional forest management and can only take place on a limited fraction of the forest area.

Central to the development of the economy of the forest sector is the question whether it is possible to introduce new lifestyle and niche productions in the Danish forest and wood industry which can ensure a sound economic basis for the trade. The "Product Development Scheme", which was initiated in 1994 and is directed towards the primary forestry and wood industry, has so far yielded good results. Furthermore, subsidies have been provided for afforestation activities and promotion of multiple use forest management, including conversion from conifers to deciduous tree species and protection of natural forest.

The Danish state forests are an important actor in the national timber market, and the economy of the National Forest and Nature Agency is closely linked to timber prices. Therefore, the state forest operations also have an interest in the development of the market situation, and the state forest districts often act as a buffer in times of turbulent market conditions, for instance after extensive windfalls as it occurred in December 1999.

5.2 Future efforts

The Forest Act will be revised 2002- 2004 aiming at more flexibility and degrees of freedom in forest management activities. This is expected to have a positive effect on the economy of the forest sector through enabling forest owners and managers to develop and take advantage of the full economic potential of near-to-nature forest management. For instance, the revised forest legislation will promote natural regeneration.



5.2.1 Practical implementation of near-to-nature forest management

While the state forests will be obliged to implement the principles for near-to-nature forest management, the conversion will be voluntary in the private forests, though the Forest Act will encourage the concept aiming at a long-term conversion phase. In this context some considerations need to be addressed in the follow-up:

- the limited experience in Denmark with mixed species stands, particularly in areas in Jutland dominated by recently planted forests;
- the long-term changes in the availability of timber;
- the possible changes in quality of timber from the forests;
- the increased diversity of timber products;
- the changes in production- and transport conditions;
- the need for development of new planning systems;
- the fact that natural regeneration in some areas can be hampered by high numbers of game;
- production of Christmas trees and decorative greenery will be maintained, but should be developed towards being environmentally friendly.

5.2.2 Economic incentives

Economic incentives available for the forest sector will be targeted at promoting the objectives of the forest programme. Timber certification is gaining ground as an instrument for promotion of sustainable forest management. Certification is an instrument based on private initiative. However, the government may promote transparency and participation in the processes through dialogue with the certification organisations. It is important that the certification schemes are cost-effective and appeal to the consumers to an extent where compensation for the extra costs in



Grazing as weeding. Sheep can reduce the dependence on pesticides in the greenery production

connection with certification can be achieved through better pricing.

Several of the environmental advantages associated with forest cover, for instance groundwater protection, carbon sequestration and access to outdoor recreation close to urban areas, need to be promoted, and the economic potential of these benefits should be explored, notably:

- as the negotiations on implementation of the Kyoto Protocol are progressing, all modalities on how CO₂-sequestration in the forests is to be included in CO₂-accounting will be clarified, and subsequently national measures will be set up in order to take advantage of this instrument;
- the possibilities for co-operation between water plants and the forest sector in terms of afforestation and reduced application of pesticides and fertilisers in particularly sensitive areas will be further explored;
- efforts to re-establish forest which fell in the hurricane in December 1999 will continue in the coming years, including the subsidy schemes.

6. Outdoor recreation

One of the objectives of the National Forest Programme is to develop the forests as a national welfare benefit through their role for popular health and awareness by providing opportunities for nature experience and outdoor recreation. This is particularly important since most Danes live in densely populated areas – 85% live in urban areas. In this context, the state owned forest and nature areas – covering 4% of Denmark – play a key role.

6.1 Status and existing policies

In publicly owned forests public access is permitted by foot all over the forest 24 hours a day. Since 1969 private forests have been open for public access on roads and pathways from 7am to sunset. Today even access by horse and bicycle is permitted.

In the 25 state forest districts, outdoor recreation is a highly important management objective. The state forest districts, and many private forest districts, have established various facilities for public use such as playgrounds, simple camp sites, information boards, visitor centres, barbecue sites, bird watching towers etc. In general, dissemination of information and guidance are important elements of the daily work of forest staff. Each year, more than 500,000 people participate in ranger activities focused on forests. Around 40 nature schools have been established in the state forest districts, forest kindergartens are increasingly popular, and a concept of “school forests”, where forest owners – private as well as public - on a voluntary basis make their forest available for local schools for education purposes, has been developed.

6.2 Future efforts

The objective is that forest landscapes shall cover 20-25% of Denmark after one tree generation (80 – 100 years). In this process, considerations for outdoor recreation should be taken as early as possible. Establishment of forests near to urban areas will be promoted, and particular attention will be given to establishment of forests with a greater nature content and more species variation than in traditional planted forests.

Outdoor recreation opportunities should be integrated into the overall spatial and urban planning exercises through dialogue and public participation, also in order to prevent negative influence on nature and the environment.

In 2001 a commission under the Danish Forest and Nature Agency analysed existing rules and procedures for public access to nature, and came up with a set of recommendations, including increased access to private forests. These recommendations are currently subject to further dialogue and voluntary implementation.

The increased focus on nature and forest as a welfare benefit is an additional challenge for the state forests districts. Most guidance, education and dissemination of information on nature are presently based in the state forests. However, also private forests are participating. Particular focus will be put on children and youth, and the Internet will be used increasingly for information and dissemination purposes. Local authorities, institutions, schools and associations will be involved including involvement in specific on-the-ground projects linked to forest management tasks. Special attention will also be paid to the particular requirements of disabled people.



Easy access to the forest is a prerequisite for nature experience and outdoor recreation

7. Afforestation

It is an objective of the forest programme to increase the forest area so that forest landscapes cover 20-25 % of Denmark after one tree-generation (80-100 years). Since 1989 it has been a forest policy objective to double the forest area – corresponding approximately to obtaining a 20-25% forest cover. While this objective was originally triggered by agricultural over production, the focus is now on nature values and opportunities for outdoor recreation. Action proposal 129a from IFF deals with encouragement of cooperation and co-ordination of activities with regard to forests and trees in environmentally critical areas. This is well integrated into the Danish afforestation efforts.

7.1 Status and existing policies

In 2000 the past 10 years of the Danish afforestation efforts were evaluated. It was concluded that while the overall quality was rather good, more emphasis should be put on nature considerations. Furthermore, the afforestation efforts are running behind schedule. If the forest area is to be doubled within a tree generation, 40,000 – 50,000 ha should be afforested over a period of 10 years, but afforestation has only reached 30-35% of this target. This is mainly due to the high cost level associated with afforestation activities in publicly owned as well as private forests, and competition with other land-uses, mostly agriculture, which eventually constrain afforestation efforts.

7.2 Future efforts

The efforts to achieve 20-25% forest landscapes will continue. But biodiversity and recreational

objectives will to a larger degree be taken into consideration, and the principles of near-to-nature forest management will be used as the basis for afforestation operations. It is thus recommended that a larger proportion of the areas designated for afforestation should be left to natural succession and regeneration processes. When planting new forests, seeds and plant material of preferably indigenous species, and species which are well adapted to the local conditions, should be selected. The location of the new forests should also be decided with due consideration to the need for landscape corridors and amenity. These principles are well in accordance with the proposals for action from IPF and IFF, in particular IPF 58b (i,iii and v) and 58c, and IFF 30b and 129c dealing with requirements of countries with low forest cover.

Previous experience has shown that economic incentives are a prerequisite for afforestation on privately owned land. The challenge now is to reduce the costs and mobilise alternative financial sources. Natural succession and regeneration may reduce costs. Alternative financing may include CO₂- sequestration, groundwater protection measures and co-financing in order to achieve recreational values, air quality improvement and protection of the aquatic environment.

Future subsidised afforestation efforts will continue to prioritise size, continuity with existing forests, localisation, landscape considerations and proximity to urban areas. In the state forests afforestation areas will, in addition to the previously mentioned priorities and considerations for cultural heritage and nature content, also take into consideration areas where the forest cover is relatively low. A larger proportion of the afforestation will take place via natural regeneration and succession processes and using minimum tillage.



The availability of land for afforestation is highly influenced by market prices and European Union agricultural policy



The national policy of increasing the country's forest landscape to 20-25 % of the surface will be maintained and the multipurpose approach will be emphasised

8. Capacity building and awareness raising

Forest research and development are important issues within the context of international forest policy. Considering the limited size and economic importance of the Danish forest sector considerable efforts have been put into research and extension services. The Forest Programme aims at a well functioning capacity building system and information sharing in the forest sector. Access to updated and relevant knowledge is seen as the basis for the forest policy, and will be achieved through research, education, dissemination and information efforts.

The linkage between forest research and forest policy processes is seen as particularly important for a sound development of the forest sector. This is well in accordance with proposals for action from IPF (58b(vii)) and IFF (96c). Furthermore, the resolutions from the Ministerial Conferences in Helsinki (1993) and Lisbon (1998) also establish that the European countries are obliged to improve and adapt the national forest monitoring programmes to the need for documentation of sustainable forest management operations. This will be put into practice through for instance:

- following and documenting the conditions and development trends in the forests;
- documenting the multiple functions of the forests (wood production, forest health, biological diversity, outdoor recreation);
- substantiate that the established goals have been fulfilled.

8.1 Statistics

Currently, statistics of import and export, logging, prices, employment etc. in the forest sector are made available annually. Forest health is

Man and nature in the past, at present and in the future. The dynamics of land use and landscape is an important issue for nature interpretation



also monitored. A national forest inventory compiled every 10 years is the most important statistical tool in the Danish forest sector. The status of the latest inventory is from 2000.

A new National Forest Inventory will now be implemented. This inventory will be based on a grid of permanent plots, where not only data related to production is recorded. Also data related to nature content and species and habitat conservation of various forest management practices etc. will be included. The resulting system will comply with the action proposals from IPF (89b) and IFF (17a, 121a and b) regarding preparation of national information on sustainable forest management.

8.2 Research and development

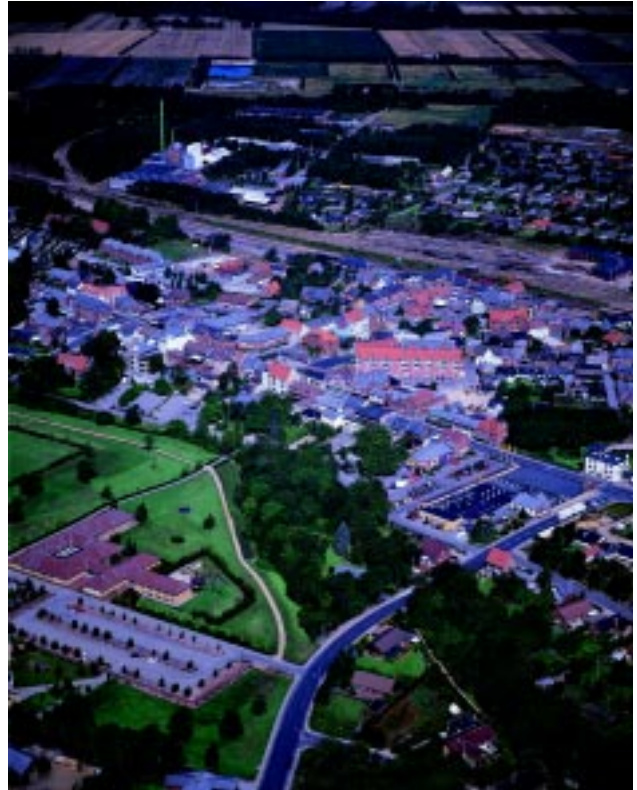
During the past 10 years a number of Danish forest research institutions have been merged into one, the Danish Forest and Landscape Research Institute, under the Ministry of Environment. In parallel to this, most of the forest-related research at the Royal Veterinary and Agricultural University are merged into one institute in close collaboration with the Forest and Landscape Research Institute. Additionally, the two institutions have entered into a partnership with the Forestry College, which trains i.a. forest and landscape engineers, in order to create a coherent capacity building and research effort in the Danish forest sector. This partnership has recently been appointed European knowledge centre for urban forestry under the European Forest Institute.

In the coming years, forest-related research will in particular be concentrated on:

- Environmental economics and environmental sociology;
- Environment and health, including outdoor recreation;
- Sustainable use of natural resources, including development of near-to-nature forest management practices;
- Environment and energy technology;
- Consequences of climate change.

8.3 Education

A wide range of training and education institutions services the Danish forest sector. In general, the research and training institutions are well adapted to the general trends in the sector and have gradually been moving away from only focusing on production towards a wider range of topics with a broader relevance to society. The spectre from basic vocational training to Ph.D. is covered by one continuous system. The continuation of the adaptation to present and future challenges in Danish forest management are the main task ahead for the educational sector related to forest management. The international outlook should also be maintained and further



In a country with 85 % of the population living in cities, *urban forestry* becomes an important feature – in policy, local administration and research



The holistic approach to forest management should be further researched, developed, disseminated and taught to students

developed, including carrying out high level courses in English, thereby facilitating the participation of foreign students. These efforts are also well in accordance with the recommendations from IFF and IPF with regard to capacity building in national forest programmes as well as technology transfer recommendations.

8.4 Information sharing and dissemination in the forest sector

In spite of the modest size of the Danish forest sector, many dissemination and information sharing activities are taking place. Owners, administrators and managers of forests are the primary target groups, and as most of the private forest owners have no forestry related educational background, a particular challenge is to cater for professionals and non-professionals alike. A wide range of publications (printed as well as Internet-based) from various sources are targeted at different interest groups.

One of the major means to achieve the changes in the forest sector outlined in the Forest Programme will be information and dissemination. Mutual trust and dialogue are essential to the success of the implementation of the objectives of conversion to near-to-nature forest



Low soil pressure and excellent manoeuvre performance of the felling equipment is an important element of sustainable forest management when it comes to operational terms

management practices, protection of forest nature and biodiversity, and strengthened opportunities for outdoor recreation in the forests. This is particularly important in the $\frac{3}{4}$ of the Danish forest area, which is privately owned. It will thus be a major challenge for the Danish forest consultant organisations to integrate into their activities information and dissemination about near-to-nature forest management and the economic potentials the concept offers.



Small dimension timber originating from coppice management can be utilised as firewood or other products for local consumption

9. International activities

The overall international objective for the Danish National Forest Programme is to promote the development towards sustainable forest management at global as well as regional level. Protection of forest biological diversity and environmental considerations should be integrated into the contribution of forests to social and economic development.

Forests cannot be seen solely as a national concern. Their importance to biodiversity, climate and development are of global interest. The present rate of deforestation in developing countries is of serious concern, but even though the awareness of the importance of conserving the forests is gradually increasing, the capacity to cope with the problems is often very limited.

At present, important fora for global dialogue are the United Nations Forum on Forests (UNFF), the Convention on Biological Diversity (CBD), the Convention to Combat Desertification (UNCD) and the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol. Denmark is also actively participating in discussions in the UN Food and Agricultural Organisation (FAO), the International Tropical Timber Organization (ITTO) and in various programmes within the context of for instance the Consultative Group on International Agricultural Research (CGIAR) which among other things includes research institutions dealing with forestry, agroforestry and plant genetic resources, and the Global Environment Facility (GEF) which finances projects related to conservation of forest biological diversity. As a member state of the European Union Denmark is co-ordinating with the other EU member states in international negotiations on forest, and Denmark is actively participating in forest policy activities within the context of the EU.

9.1 Existing objectives and means

The Danish National Strategy for Sustainable Development from 2002 states that "Denmark will continue the efforts towards a still more binding international co-operation within the forest sector through international agreements and conventions. Denmark will follow up on international agreements, promote sustainable forest management and make Danish experience available to others. The Danish development- and environmental assistance shall contribute to the implementation of international conventions, agreements and recommendations with regard to forests and nature in the recipient countries. Furthermore it is to be ensured, that the consumption and import of wood products will appropriately consider products, which have been sustainably and legally produced. One measure in this context would be strengthening the efforts towards timber certification"

In the international negotiations, Danish key issues have been promotion of national forest programmes, criteria and indicators for sustainable forest management, and evaluation of the possibilities for financing sustainable forest management. Certification of wood and other forest products is recognised by IFF, IPF, UNFF and CBD as a useful means to promote sustainable forest management, and Denmark has worked for a greater co-ordination of the international certification schemes.

The Danish development and environmental assistance is closely co-ordinated with the recipient countries. Environment is a crosscutting issue in the ordinary development assistance and the primary objective of the environmental assistance. The forest sector in developing countries has been supported through capacity building and institutional strengthening, awareness



raising, training and education, demonstration and pilot projects, and support to legislative processes and protection of particularly valuable and vulnerable forest areas. In Eastern and Central Europe, the Danish support has focused on biodiversity protection, sustainable forest management, outdoor recreation, public participation, consultative services, urban forests, etc. The wide range of Danish forest educational institutions and extensive research capacity has also been employed in twinning arrangements with institutions in developing countries.

9.2 Future efforts

The objectives of the new Danish National Forest Programme with regard to the international aspects (outlined in Table A) do not differ much from previously agreed objectives. They are also well in accordance with various recommendations from IPF and IFF, in particular IPF recommendations 71a and b. Denmark will thus also in the future be working internationally based on the following principles:

- Concrete implementation of international recommendations and resolutions, in an increasingly binding co-operation;
- Strengthening of the co-operation between conventions and organisations etc. in order to ensure more efficient efforts and exploit the possibilities for synergy;

Denmark will take an active role in the dialogue on the promotion of sustainable forest management – nationally, regionally and globally

- Promotion of the connection between trade and sustainable forest management;
- Continue the use of sector-integrated development and environmental assistance;
- Continue to ensure that sustainable forest management benefits poor local communities, including indigenous people;
- Realising that Denmark is a small country with limited resources, relevant fora will be scrutinised in order to select those in which Denmark can pursue its goals most efficiently.

It is furthermore of high priority to contribute to the establishment of clear criteria of success for the work of UNFF, further promote the development of national forest programmes focusing on sustainable forest management, ensure that the work in UNFF for sustainable forest management is integrated into the framework of the

Kyoto Protocol, the CBD and the Convention to Combat Desertification, and to work towards strengthening the co-operation in the Collaborative Partnership on Forests.

With regard to the Kyoto Protocol, Denmark attaches great importance to developing implementation modalities which ensure that future CO₂ sequestration in the forests does not undermine the overall objectives of emission reduction. Denmark supports the interaction between climate policy and forest policy and sustainable development goals. In the framework of the Convention on Biological Diversity, a forest work programme has recently been adopted (April 2002). The programme is well in accordance with the Danish priorities for action and implementation. It is also of high priority for Denmark to integrate the forest sector in other relevant policy areas in the European Union.

10. How the Danish national forest programme was developed

In accordance with the principles in the Aarhus Convention for openness and dialogue in environmental decision making and the recommendations from IPF and IFF, the Danish National Forest Programme has been developed through extensive consultations involving all relevant stakeholders, including a public hearing process. The process was initiated by a broad public debate (including Internet debate) on how we want our forests to look, and how we want to use them. Thematic meetings, a conference, excursions and discussions have been undertaken with participation of a wide range of stakeholders, and the Programme has been widely circulated for comments in a public hearing process. Results from recent research projects were also included in the programme development.

The debate revealed that the general Danish public is more interested in the recreational as-

pects than the production related aspects of forest management. Forests with a varied structure, a rich fauna and calmness seem to be the preferred type. The more professional part of the debate revolved around protection of natural forests, designation of untouched forest areas and forest grazing.

The experiences from this exercise show that efficient methods for public participation in the forest sector have to be developed, and this should be taken into consideration in the implementation of the programme.

The National Forest Programme was developed 8 years after the Strategy for Sustainable Forest Management. Probably modern forest policy making requires updating at intervals of less than 10 years. Thus the National Forest Programme is expected to be replaced or revised before 2012.



Annex I: Danish guidelines for sustainable forest management at management unit level

The guidelines for sustainable forest management are based on the principles for near-to-nature forest management.

Near-to-nature forest management has a clear financial aim and also entails that forest management can be planned in support of continuity of the forest through facilitating natural regeneration in the future. This means that the choice of species will be based on ecological adaptability to the site, a fact which will promote use of site-adaptable trees and shrubs, particularly indigenous ones. A forest where near-to-nature forest management is applied will typically consist of a mixture of many different tree species, comprising many different age groups. Near-to-nature forest management also means that use of ancillary substances and materials is minimised or avoided altogether. Near-to-nature forest management supports and strengthens general forest health and durability, resistance against climate change, biodiversity, and environmental protection.

Finally, near-to-nature forest management will create attractive forests with a high degree of continuity, thereby strengthening the social functions of the forest, e.g. their use for outdoor recreation and general awareness raising on nature.

It is, however, clear that even “nature-friendly”, near-to-nature forest management cannot stand alone in its classic form. It must be supplemented by a range of special measures aimed specifically

at promoting the economic, ecological, and social aspects of sustainability.

In general, it is recommended that conversion should only commence when a stand reaches its optimum rotation age, or in connection with necessary felling of existing stands, when conversion is technically feasible and financially beneficial. As a result, it will take one or more generations of trees before a full conversion of all forests into near-to-nature structures has taken place. Correspondingly, it will also take a long time before the expected ecological effects fully materialise.

The ecological aspect is to be strengthened by designating stands or forests as “untouched” areas, by taking steps to secure key biotopes, by rehabilitating “natural” wetlands, and by letting dying and decaying dead trees remain in the forest (guideline 11).

Among other things, the social element entails steps to preserve cultural heritage (ancient monuments, old management regimes, etc.), good working conditions for employees and excellent scope for outdoor recreation. It is a well-documented fact that forests are an important setting for people’s outdoor recreation, which means that they constitute a significant aspect of Danish welfare. This function should be strengthened by means of good access conditions in forests, e.g. by establishing and maintaining roads and pathways, by establishing open-air facilities and areas for more intensive outdoor pursuits (guideline 12). Finally, the economic aspect is addressed through the opportunity to use parts of the areas for intensive management systems, which are not in accordance with near-to-nature principles (guideline 13).

The guidelines are voluntary. They can be applied at stand, forest, or management unit level; i.e. to forest reserves as well as to areas where

For historical reasons, the Danish forest forms mosaic patterns in the agricultural landscape. The forest cover is 11% of total area

no forest reserve restrictions apply. The guidelines can also be applied to forests established on farmland (afforestation).

The forest management should be based on the concern for the multiple uses of the forest, i.e. the forests should be managed with a view to maintaining or improving production of wood and other products, as well as maintaining or improving the nature, the historical and cultural values, and environmental and recreational functions of the forests.

Guidelines 1-10 describe a range of principles and considerations which will ensure that day-

to-day forest management activities develop in a near-to-nature direction. These guidelines are then supplemented by a number of specific social, ecological and economic elements in guidelines 11-13. These are special considerations, which do not necessarily form part of the day-to-day routines of standard working. Guideline no. 13 also addresses special, intensive management systems. Through near-to-nature forest management and by observing a number of social, ecological, and economic considerations, these guidelines will pave the way for sustainable forest management.

Guidelines:

- 1) **Ensuring production and the basis for forest management**
 - a) The permanent forest cover and forest climate can be maintained and improved by reduced use of clear-cutting and by retaining sufficient biomass on the site.
 - b) The tree species selected should ensure a high and stable production of wood and other forest products while maintaining the fertility of the soil.
 - c) The potential of the soil to yield nutrients through decomposition of minerals must be taken into consideration when nutrients are extracted as a consequence of logging. However, such extraction of nutrients may be compensated, including loss of nutrients caused by leaching. Nutrients received from the surrounding environment must be included as a part of this compensation.
 - d) During the conversion phase the fertility of the soil may be re-established if it has previously been degraded as a result of overexploitation, and where no particular interest is depending on the poor nutrient status of the site.
- 2) **Establishment of a broad and stable supply of various products**
 - a) Forest management should encourage the production of high-quality timber and other products. However, exceptions may occur on low-productive sites and on locations where particular concern to nature or cultural interests makes production less feasible.
 - b) The forest should be structured to comprise various tree species of varying ages on each site.
- 3) **Use of locally-adapted species and provenances**
 - a) The use of indigenous species and locally adapted provenances should be encouraged as much as possible.
 - b) Non-indigenous species may be used where they are adapted to the site and do not pose a threat to the biological values of the forest.
- c) Advantage should be taken of the natural variation of the site in obtaining a varied selection of tree species.
- 4) **Promotion of species mixtures**
 - a) Natural succession processes and a mixture of tree species, including species associated to the main species, should be promoted.
 - b) Rare indigenous species should be protected or supported.
- 5) **Promotion of natural regeneration**
 - a) Where species and provenances are adapted to the site, natural regeneration should be applied.
 - b) Where local experience and site conditions are in favor of a change of species and/or provenance or enrichment with additional species, planting or sowing should take place.
 - c) Forest stands with a potential for natural regeneration should, in principle, be regenerated without clear-cutting. However, open spaces in the forest may be established, where particular conditions make it desirable to initiate regeneration, or where this is beneficial for recreative or aesthetic reasons.
 - d) Where clear-cutting still takes place, negative effects should be reduced through, for example, maintaining natural regeneration in the area.
 - e) Logging aiming at regeneration should not take place until the stand has reached normal rotation age, unless the area is subject to special management regimes as for example coppicing. Where the stands consist of trees of various ages and heights logging should be carried out on a tree by tree basis.
 - f) The aim is that natural regeneration with a potential to develop into new forest will permanently be present in each area forming a basis for the forest generation to come.

6) Improvement of forest structure, including forest fringes

- a) Forest management should, in general, promote types of forest regeneration, which will ensure permanent canopy cover.
- b) Forest management should support development of a natural variation in species and structure.
- c) Where local conditions make it feasible, near-to-nature and stable forest fringes or similar structures with a high fraction of indigenous species neighboring open fields, along roads, firebreaks, streams and lakes, etc., should be established and maintained as a natural and integrated part of forest management.
- d) Characteristic old trees from original forest fringes should be maintained when the forest is delineated by afforestation.

7) Organic and biological plant protection

- a) With the aim of gradually eliminating application of pesticides¹, management systems relying on pesticides should be subject to development in this direction during the conversion phase.
- b) The use of silvicultural and biotechnical methods for the control of pests should be promoted.
- c) Recreational activities causing stress to the forest may be regulated in order to protect particularly vulnerable areas.

8) Ecosystem-adapted wildlife management

- a) Wildlife management should comply with multiple use management. This also applies to selection of locally adapted tree species and natural regeneration.
- b) Fences may be raised when required for a stable and varied high-quality regeneration.
- c) Possible measures to benefit wildlife, such as feeding crops and pastures can be applied as part of normal forest management practices, possibly associated with cutting

vegetation in open areas, along tracks, and through using coppice forest and untouched forest as wildlife refuges.

- d) Feeding crops should be grown on arable land. Where exceptional needs are present, feeding crops could be grown at storage sites for timber, in firebreaks and other small open areas.
- e) Fencing for grazing livestock in the forest should not block or hinder the passage of wildlife.

9) Ecosystem-adapted forest management techniques

- a) Logging, transport and regeneration techniques which spare/protect the site and the stand should be applied.
- b) Soil preparation should be limited to the extent possible.
- c) Litter and humus layers in forest floors should be preserved to the extent possible during regeneration and other forest management activities
- d) Due regard in management should be paid to historic sites and cultural heritage.
- e) Attention should be paid to nature values, environment, historic sites/cultural heritage and outdoor recreation activities when establishing and maintaining forest infrastructure.
- f) Good working and transport lines in the forest and in individual stands should be ensured.
- g) Fire protection schemes are recommended and firebreaks should be established at vulnerable sites.

10) Registration, planning, information and training

- a) The owner of the forest and his employees should hold the best possible knowledge for supporting sustainable forest management. One measure in this context would be to register 1) the utilisation of the forest (production as well as recreation), 2) public

¹ "Pesticides" in these guidelines are primarily industrially manufactured substances which have a documented, toxic effect on certain living organisms, plants, animals or fungi. Not included are such substances approved for use in organic farming, spread-on repellants which involve only a limited exposure to the surrounding nature, and pheromones, which are only used as a source of smell.

regulations (conservation areas, etc.) 3) key biotopes 4) historical sites etc.

- b) The forest owner and his employees should be ready to enter into a dialogue on forest management with the local community aiming at the optimal use of knowledge available on the ecology and history of the forest and dissemination of information on the objectives of the forest management.
- c) The owner of the forest supervises and monitors forest management and must ensure that employees as well as contractors carry out their tasks in a safe and qualified manner in compliance with current guidelines for forest management, including the relevant legislation.

11) Special measures to promote and ensure biological diversity

- a) Areas should be designated as untouched forest where 1) the conservation of unique biological values requires that the forest is left unmanaged, 2) where untouched forest supports networks (e.g. corridors) in the landscape and 3) where it is to be considered feasible based on an ecological and economic assessment.
- b) A number of trees should be left naturally dying and decaying in managed forest (nesting trees and deadwood).
- c) Key biotopes should be considered when planning and carrying out forest operations.
- d) Lakes, ponds, streams, bogs, heathlands, coastal meadows or marshes, water-meadows and commons associated with the forests, which have been altered through draining or other interventions, should be re-established to their original state, taking into consideration the economic possibilities. However, if the established drainage system is of importance for the stability of the existing forest system, it may be maintained.

12) Securing and improving particular forest features

- a) Particular features and functions of the forest should be secured and improved. For example, scenic views may be kept free of growth, and the landscape features must

be considered when planning for afforestation.

- b) Forest management must ensure protection of important historical relics.
- c) Coppice forest and other old forest management regimes of particular cultural, historical, biological value, or value for the landscape, should be continued according to the original principles.
- d) Opportunities for outdoor recreation and nature experience in the forest should be secured and improved by i.a. easy access, including the establishment of roads and pathways, clearing of scenic views and designation of particular sites for more intensive recreational activities.

13) Particularly intensive types of operation

- a) At smaller areas intensive management regimes could be applied, e.g. production of Christmas trees and decorative greenery. Location and management of such activities should be developed towards more nature and environmentally friendly principles. Use of pesticides and compensation fertilization should be minimized. This type of production cannot be considered as being in accordance with near-to-nature principles.

