

Forests and forestry in Denmark — Thousands of years of interaction between man and nature

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Life can only be understood backwards; but it must be lived forwards,” said the famous Danish philosopher Søren Kierkegaard back in 1843. Another old adage says: “He who does not know the past, does not understand the present and can not see into the future”. Both sentiments should fit well to the story about forests and man in Denmark.

Natural expansion of the forest

Although the oldest traces of trees dates back to the age of Jura some 150 to 180 million years ago, numerous ice ages subsequently coming and going have frequently cleared the Danish landscape of practically all types of vegetation.

Since the last ice age, which ended around 13,000 years ago, forest trees have immigrated successively. The pattern has been traditional, with various primarily light-demanding species coming in first (such as birch, aspen and pine) followed by more shade-tolerant types, at first dominated by hazel. Subsequently species like oak, elm, alder and lime arrived — and at a later stage, some 3-4,000 years ago, also beech.



Danish forests are highly appreciated for outdoor life and recreation. Here, a family is having a picnic lunch after a bicycle ride in the public forest Poulstrup

It is assumed that at the peak of its succession, forest covered the vast majority of the country, perhaps up to 80 per cent or more.

Harmony, degradation and deforestation

Human beings took part in the development of forests and landscapes from the beginning. They quickly settled at the coasts and sustained their livelihoods through fishing, hunting and the collection of mushrooms, berries and nuts. The utilisation rate was not high, however, and certainly no threat to the forest.

The influence of man took speed with the introduction of agriculture, approximately 6,000 years ago. Hunter-gatherers were gradually replaced by farmers, who introduced animal husbandry and used axe and fire to clear land for crops.

Gradually the increasing population and economic development caused further pressure on the forests. This was brutally interrupted around the year 1300, when the Black Death (plague) raged throughout Europe, and killed almost a third of Denmark's population. However, after the Black Death, the picture changed again and the forest came under renewed pressure. It was now used for an increasing number of different purposes: It provided nuts, berries, apples and game, hay and grazing for horses and cattle, and beech mast for the fattening of pigs. The timber was used for house building, stables and ships, tools, clogs and pools. In addition, and not least, wood was used for energy — for heating, salt sizzling, baking of tiles and melting of iron.

All of it contributed to overexploitation, degradation and deforestation. A significant contributing factor was the special arrangements for ownership and use rights. The system gave ownership and use rights for squires and lords of manor to the mature stands of high boled trees, whilst the use rights for the underbrush was given to tenants. Although intending the opposite (protection of high boled stands), the system instead encouraged usage patterns among the tenants that rarely allowed any young trees to fully develop into maturity. Extensive grazing and coppice methods prevented the forest to regenerate it self.



Image: ©Nis Lundmark Jensen

Biodiversity conservation is a key priority in the Danish NFP. Eurasian Pygmy Owl (*Glaucidium passerinum*) seen resting after a successful mouse hunt in “Rude Forest”

Around the year 1600, the forest cover was reduced to 20-25 per cent. It dropped further down to 8-10 per cent in 1750 and reached a low of only 2-4 per cent around 1800.

Apart from running short of timber and non-timber forest, parts of the country now also suffered severely under storms and sand drift. Crops and fertile agricultural lands could be buried in thick layers of sand overnight, thereby destroying decades of hard work by farmers.

Evidently, the situation had become out of control and there was a growing understanding of the need for radical change.

200 years of recovery

Four major changes have paved the way for a slow, but steady recovery of the Danish forests:

Firstly, a new regulatory mechanism for forest management and use was adopted in 1805. The key elements included a new division of ownership and use rights. They were now given to one party only, not split between different groups. The squires and lords of manor got the rights to the best forests, whilst rights to own and use the poorer, low quality forests were given to the former tenants. In addition, grazing in forests was abandoned and – not least – the principle of permanent protection of classified forest reserves was established. It applied to the majority of forest land at the time and prevented conversion of forests to other land uses. To this very day, this key principle has remained the backbone of Danish forest legislation. The Forest Act of 1805 also established that forests had to be properly managed, with a view first and foremost to secure the long term production of timber.

Secondly, forest management systems were introduced and promoted, with assistance of the then highly acknowledged German forestry expert, Johan Georg von Langen. He introduced systematic replanting after clear cuts and the introduction of a number of high yielding exotic species.



Image: ©Bert Wiklund

A plantation of exotic conifers aimed for the production of Christmas trees – a popular and economically high yielding production both within and outside forest areas in Denmark

Thirdly, afforestation was promoted. It began at slow rates, led by state planting activities, and was rapidly increased by the late 1860s. Various factors triggered this. One of these was the bitter loss of one third of the country’s land area to Prussen and Austria in the war in 1864. Based on the slogan “What is outwardly lost must be inwardly won,” the Danish patriot and enthusiastic agitator Enrico Mylius Dalgas managed to turn afforestation into a national movement with broad public support. The positive will was underpinned by public grants and a general believe in the positive contribution of timber production to the economic development, benefitting both the lands owners and society as a whole.

A large share of the afforestation was allocated alongside the coastline in order to mitigate sand drift, in particular in the western parts of Jutland. In the 1930s, during the recession, afforestation was also welcomed as a good means of job creation. It was promoted and remained high until the 1960s, when high employment rates and a booming agriculture industry slowed down afforestation activities again.

Fourthly, but not least, the replacement of timber with coal as the main energy source did unquestionably help reducing the pressure on the forests during the industrial revolution in the late 18th and early 19th century. According to some historians this might have been the most significant factor of them all.

A new era in 1989 – long term goal to double forest cover

In 1989 new visions, new measures and new regulatory mechanism were introduced both for forest management and for afforestation.



Image: ©Bert Wiklund

Early May, when the beech burst into leaf the character of the forest changes dramatically. Here, a boy is collecting fresh beech leaves for his mother on Mothers Day

A new Forest Act saw the light of day introducing the promotion of “good and multifunctional forestry” as the primary objective. Other new regulatory mechanisms paved the way for a reinforcement of both private and public afforestation, including the provision of new and additional financial resources as well as new instruments for spatial planning.

The key principle governing afforestation in the new era of 1989 was the division of the country into three key categories of land:

Category 1 constituted areas, where afforestation should be given the highest priority. State afforestation was primarily allocated into this category and private land owners could receive grants for afforestation 50 per cent higher than the rates available in areas of category 2.

Category 2 constituted areas where private afforestation would be encouraged with a standard rate public grant. However, in case of shortage of grants (if demand exceeded available funds), priority would be given to areas in category 1.

Category 3 constituted areas where afforestation would not be allowed at all (unless in rare and exceptional cases and only after concrete exemption). This could be areas with particular scenic beauty or high conservation value nature sites.

It was established that the spatial planning for afforestation should be based on a list of specified criteria aiming to ensure that the new forest would be truly multifunctional. Thus, category 1 areas should be allocated in particular where afforestation would promote one or more of the following functions: 1) Recreational opportunities for citizens, in particular in larger cities; 2) Ground water protection, in particular sensitive resources suitable for drinking water; 3) Ecological connectivity, aiming to enrich biological diversity and reduce impacts of fragmentation.

The designation of the areas followed the normal Danish procedures for spatial planning, implying broad public consultation before final designation.



Image: ©Bert Wiklund

Former coppice forest attacked by Honey mushroom (*Armillaria mellea*), by some seen as a pest in the forest, but by some mushroom collectors seen as a delicate contribution to the mushroom basket

At the same time, in 1989, the Government formulated a long term goal for afforestation in Denmark, namely “to double the forest cover in the course of a tree generation” (from 11-12 per cent in 1989). It has later, in the National Forest Programme of 2001, been formulated as a goal to “obtain approximately 20-25 per cent coverage of forest landscapes during a period of 80-100 years”.

In line with the objectives of multifunctional forestry, incentives were provided for a high share of domestic broadleaved trees in the new grant schemes for afforestation. This was in order to enhance the recreational value and improve both biological diversity and groundwater protection, still maintaining a long term potential for high value timber production. As a result, the vast majority of new forests became dominated by domestic broadleaves, a radical shift compared to the former afforestation, which had been dominated by various fast growing exotic conifers.

Strategy for Sustainable Forest Management

In 1994, following the ‘Forest Principles’ adopted at UNCED in Rio 1992, and further building on the outcomes of the pan-European ministerial collaboration on forests (nowadays ‘Forest Europe’) as well as other international commitments, the Danish government developed a national Strategy for Sustainable Forest Management.

The backbone of the strategy was the identification of 18 sub themes (or criteria) relevant for promoting SFM as outlined in relevant international commitments and recommendations. It was underpinned by a number of proposals for action working in support thereof in a Danish context.



Image: ©Bert Wiklund

Nowadays many Danish landscapes are characterized by a mixture of dune plantations and heather, like here in the Danish National Park at Fanø, an island west of Jutland

New National Forest Programme

In 2002 the Government developed and adopted a new national forest programme.

The main objective was to promote the principles for sustainable forest management, with due consideration for both economic, ecological as well as social values and needs. The programme included a package of voluntary operational level guidelines for sustainable forest management in Denmark. It was developed through a transparent and consensus based process of broad involvement of stakeholders.

Key objectives included (but were not limited to) the promotion of:

- Conversion to close-to-nature forest management principles
- Development of viable economic framework conditions for forestry
- Opportunities for recreation and nature experience in the forests
- Afforestation aiming for 20-25 per cent coverage of forest landscapes in the course of 80-100 years
- Effective information sharing and improved access to knowledge
- International cooperation in support of SFM.

Key instruments to promote and ensure the implementation of the programme included:

- Adaptation of new legislation, including a new national Forest Act in 2004 (establishing promotion of SFM as the key objective)
- Dialogue and stakeholder involvement
- Research and development
- Awareness raising, dissemination of information and training
- Economic incentives, including grants schemes
- Further engagement in international cooperation related to forests
- Special obligations and action plans supporting SFM in state forests (including an action plan on 'close-to-nature forestry' as well as certification of all Danish State Forests, against both FSC and PEFC standards).

Denmark: facts and figures

- Population: 5.5 million
- Land area: 4,239,000 hectares
- Forest area: 587,000 hectares (14 per cent)
- Net annual change rate (2005-2010): +1.25 per cent
- Growing stock: 113 million m³
- Net annual increment: 5.8 million m³
- Annual fellings: 2.4 million m³
- Privately owned forests: 69 per cent
- Contribution of forestry to GVA: 0.1 per cent
- Contribution of manufacturing of wood and articles in wood (in per cent of total GVA): 0.4 per cent

Source: State of Europe's Forests 2011

State of play and future challenges

Although still applicable and relevant for many of today's activities, the Danish National Forest Programme might not sufficiently cover all relevant challenges for sustainable forest management in 2011. New and emerging focus areas that have gained in importance include:

- Utilization of the forests for different recreational purposes and for nature experiences (many and sometimes conflicting types)
- Enhanced focus on the role of forests in a green economy
- New demands for forest products, not least wood for renewable energy, which provides both opportunities and challenges (where lessons from the past will be kept in mind)
- Protection of nature sites with high conservation value ('Natura 2000' areas), where new legislation and new measures are currently being implemented
- Increased focus on demand side measures as a means to promote legal and sustainable forest management, including implementation of new EU-regulation on forest law enforcement, governance and trade as well as the promotion of voluntary guidelines for public procurement of legal and sustainable timber
- New developments in the international cooperation related to forests, including on REDD+ and LULUCF and not least the very recent Oslo ministerial mandate for negotiating a legally binding agreement on forests in Europe.

In 2010, the former Danish Government established an advisory board with a broad composition of members, representing a number of different stakeholder groups. The board got the mandate to provide recommendations for a future forest policy in Denmark. The board finalized its work in 2011 by delivering a report with more than 40 concrete recommendations.

After the report has been launched, a new government has taken office in Denmark following a general election in September 2011. At the time of writing, no decision on the report and the recommendations from the board has been taken.