Sustainable Forestry

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Sustainable Forest Management in a European Perspective

The Large Value of Forests

Forestry and forest-based activities are important parts of rural income-generating activities but are also extremely important for many different types of ecosystem services. Examples of goods and services provided by forests are: Raw materials for timber, pulp and other fibre-based products, fuel wood, berries, mushrooms, herbs, recreation, tourism and ecological values such as biodiversity of plants and animals, filtering air pollution, cleaning water, protect against soil erosion, moderate drought and other natural hazards.

The long-term horizons in forestry, with rotation periods of up to 150 years and more in the cooler climates, require special attention to be given to planting methods, forest management and careful selection of tree species for various habitats.

European Forests

In all Europe, 44% of the land area (about 1 billion ha) is covered by forests. This is about 25% of all forests of the world. More than 80% of Europe's forests are found in European Russia. In 2006, about 3.8 million people worked in the European forest sector (including forest industries). Employment is slowly declining, the decline being mostly in the pulp and paper sector (FAO, 2009).

Many of Europe's forests are planted, but this started in many cases a hundred years ago or more. In the north the species composition is rather limited due to the cool climate and mainly native species (boreal forests) are planted.

The major threats to forest resources are environmental (fires, pests, storms). The area of forests has increased by almost 13 million ha in the past 15 years. The area of protected forests has also expanded by about 2 million ha and now comprises 5% of Europe's forests. Furthermore, wood volumes and forest biomass carbon reserves are also increasing (UNECE and FAO, 2007). All this is good news and indeed partly due to the intensified European cooperation in this area.

Criteria for Sustainable Forestry

On a European level, a set of pan-European Criteria and Indicators for Sustainable Forest Management were established by the Ministerial Conference on the Protection of Forests in Europe (MCPFE) in the early 1990s. MCPFE has 46 member states including all states in the Baltic Sea Region. Within the borders of these member states are located 98% of the forests on the European continent.

MCPFE has agreed on the following definition of sustainable forestry (UNECE and FAO, 2007):

> *Sustainable forestry is the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels, and that does not cause damage to other ecosystems.*

Furthermore, MCPFE has developed six criteria for sustainable forest management to safeguard the ecological,

Box 13.1. Forests and Sustainable Development

Forests have a key role in sustainable development. The most telling example may be Easter Island in the middle of the Pacific Ocean, where a once vivid society after destruction of the forests only could house a small and desperate population in a barren landscape. The story has been told repeatedly, but a most convincing version is in the book *Collapse* by Jarred Diamond. In his book Diamond analyses a dozen societies which collapsed, all of them characterised by the loss of forest resources. Most of these examples refer to the history but some are contemporary, e.g. the development in present day Montana, USA, is on a track reminding of the ancient collapses.

Forests in Europe today are increasing; the forested area reached a minimum around the beginning of the 20th century, when agriculture expanded to use also less profitable, previously forested land; much of this has later been reforested. There was, however, a previous deforestation crisis in Europe, which occurred in the beginning and mid of the 1700s. Large area of forests was then almost clear-cut, due to the large demand for timber, mostly in the mining industry. In Saxony (today a state, bundesland, in Germany, then a kingdom) timber was used in the silver mines for building shafts and heating the ore. Carl von Carlowitz, head of the 'Oberbergamt' (Royal mining office) in the Erzgebirge district of the Kingdom of Saxony, was given the job of solving the problem. Carlowitz made a number of proposals for resolving the resource-crisis:

- Practising "Holtzsparkünste" (the art of saving timber) by applying energy-saving stoves in housing and metallurgy and by improving heat-insulation of buildings.
- Searching for 'Surrogata' (substitutes) for timber, such as peat.
- Cultivating new forests by "sowing and planting of wild trees".

In 1713 von Carlowitz published the book *Sylvicultura oeconomica*, the first comprehensive handbook of forestry. The 400 page book deals with the question, how to achieve 'Conservation and cultivation of timber, a continuous, steady and sustained use'. The concept of *Sustainability* (Nackhaltigkeit) appears for the first time in his book on forestry.

Also in mid Sweden forest was a critical resource. Wood was burned to heat the rock and crack the mountain to mine the iron ore; it was used to reduce iron from its oxides, and to melt it in the blacksmiths' ovens. Sweden was then the largest iron exporter in the world, feeding the wars in Europe. Here Count Carl Johan Cronstedt of the newly (1739) formed Swedish Academy of Sciences, was asked to tackle the problem. Cronstedt was architect and highly active in mining affairs. After experimentation Cronstedt together with General Fabian Wrede introduced in 1767 the 'kakelugn' a channelized stove, which very efficiently took up and stored the heat. It made Swedish energy technology the best in Europe, and meant much to reduce wood use for heating. Swedish homes got a reputation for being warm and nice.

It is interesting to see that the ways to deal with the resource crisis were then the same as today. Management skills - as in the handbook on forestry - and technological solutions - such as the channelized stove and insulation of buildings - and substitution for example by the use of peat are all on today's agenda.

Figure 13.1. A planted forest in mid-Poland. plantation of forest monoculture have been a state priority since the 18th century. Today for example only 10% of forests in Sweden are so-called natural. Photo: Krzysztof Ciesielski.

Today again forests are in focus in the sustainbilty discussion. Half of the original forests of our planet are gone. In the climate negotiations deforestation in the world have been recognised as a main source of emissions, accounting for up to 25 % of global greenhouse gases, and in the discussion on a global treatment the out-phasing of the fossils fuels are accompanied by the so-called RED, REDD and REDD+ Programmes which address "reduced deforestation and forest degradation" in developing countries. Almost the entire deforestation dilemma refers to tropical forests on the southern hemisphere. The boreal forests in northern hemisphere, including northern Europe, may however significantly contribute to reducing the emission by serving as a sink of atmospheric carbon dioxide, and they are included in the REDD negotiations.

Lars Rydén

Box 13.2. Carbon Nutrient Circle

A growing tree uses its above-ground parts (mainly leaves and needles) to capture CO_2 from the air. Each tree over its lifetime can capture about 1 ton of CO_2 in North European climate. However, in colder climates forests grow slower and are less effective in taking up CO_2. Photosynthesis converts solar energy, CO_2 and water into carbohydrates which remain in roots, stem and branches throughout the lifetime of the tree. The CO_2 remains captured if the stem and/or branches are converted to products such as timber, paperboard, paper and other fibre products and can be stored for several hundred years.

Furthermore, a large proportion of the forest industry's products are recycled and/or reused, which also prolongs storage. If the tree dies and is left to break down naturally, it releases its carbon, which is oxidised into CO_2 again. This happens rather slowly. A faster conversion to CO_2 occurs if the forest burns down or if the tree is purposely cut down and used as fuel wood. An equivalent amount of CO_2 is taken up by growing trees. The cycle is thus almost closed if the cut areas are quickly reforested (nutrients and some CO_2 are released into water and air for about 5-6 years after cutting, but good forest management strives to minimise these leakages). CO_2 accumulation is maximised by maintaining longer forest rotations (Paul et al., 2002).

Thus, using renewable forest products instead of non-renewable oil, gas or mineral resources as raw material helps to counteract the greenhouse effect which warms up our planet. Europe's forests will be increasingly valued as a carbon sink in the light of the climate change threat.

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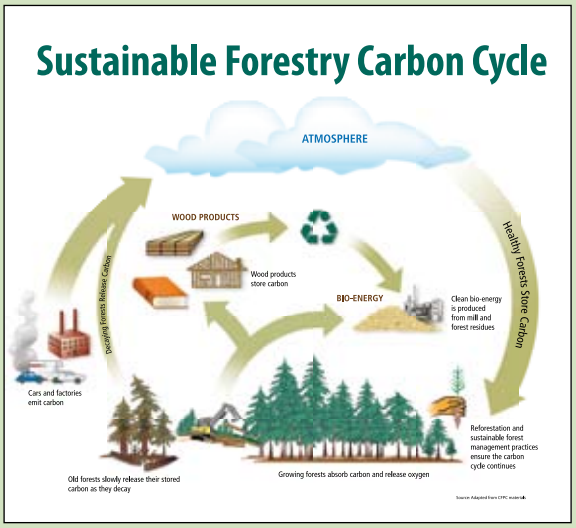

Figure 13.2. The forestry carbon cycle. Source: http://www.bcclimatechange.ca/media/documents/Sustainable-Forestry-Carbon-Cycle.pdf

economic and socio-cultural functions of forest (EFI, 2009):

1. *Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles.*
2. *Maintenance of forest ecosystem health and vitality.*
3. *Maintenance and encouragement of productive functions of forests (wood and non wood).*
4. *Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems.*
5. *Maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water).*
6. *Maintenance of other socio-economic functions and conditions.*

The Use of Forests

There is an increased demand for wood fuel in Europe. Since the mid-1990s, the EU and its Member States have introduced policies to increase the share of renewable energy in total energy consumption to combat climate change, meet Kyoto Protocol targets and address concerns about rising fuel prices. Energy security has also become an important issue on the political agenda (FAO, 2009). Chapter YY (p. xx) provides more information on different forms of bioenergy.

Socio-economic functions are of special concern for rural employment in logging and timber industries in the countryside, but also in relation to the production, processing and trading of non-wood forest products (NWFP; for instance Christmas trees, berries, mushrooms, tourism and hunting). Ten percent of European forests are managed primarily for the protection of soil and water.

Multiple functions of forest are dependent upon people's traditions, values and knowledge about the forests and on how to find their way in the forest. More attention should be given to increasing biodiversity and to keeping the different types of natural ecosystems for economic reasons, since NWFP is increasing in economic importance. This in turn needs society's support in the form of information, education, legislation, economic incentives, infrastructure investments, etc. This of course needs policies with strong cross-sector coordination.

Certain aspects need to be given more attention, such as gender issues and indigenous people's rights to their traditional forest use. The power relations when using the different natural resources in the forest have very often been to the disadvantage of women and minority groups. In some cases recent National and European initiatives have been taken to counteract these disadvantages, for instance in securing the Scandinavian Sami people's rights to land for reindeer grazing. These issues are sometimes controversial and public debate is intense at times.

Free access rights for the public to forest land is either common practice or protected by law with some exceptions in North Europe. More than 90% of the forests in Europe are open to public access (FAO, 2009). This is described below in more detail for each country in the Baltic Sea region.

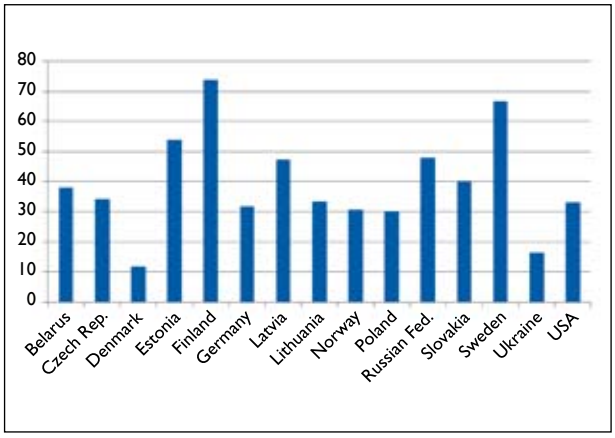

Figure 13.3. Forest area as % of total land area. Source: FAO, 2005; Appendix 3, Table 3.

Sustainable Forestry in the Baltic Sea Region

The Baltic 21 Forestry Sector

As can be seen from Figure 13.3, the rural areas around the Baltic Sea are to a large extent forested. Only Denmark and Ukraine have less than 30% of their total land area covered by forests. The Baltic Sea region is one of the most forested and least populated corners of Europe. In the chapter on land use history (p. xx), maps show the gradual decrease in forests in Europe during the last centuries.

On the Baltic Sea Regional level, a Forest Sector was established within the Baltic 21 framework in the year 2000. A Baltic 21 Forest Action Plan 2005-2008 was decided in 2005 (Baltic 21, 2005). The four most important

Table 13.1. Ownership of forest land in 2000. Source: FAO, 2005 Appendix 3, Table 5.

Country	Public	Private	Other	Total forest area (1,000 ha)
Belarus	100	0	0	7,894
Czech Rep.	76.7	23.3	0	2,648
Denmark	28.4	71.6	0	500
Estonia	37.5	22.4	40	2,284
Finland	32.1	67.8	0.1	22,500
Germany	52.8	47.2	0	11,076
Latvia	54	45.1	0.9	2,941
Lithuania	77.3	22.7	0	2,099
Norway	14	86	0	9,387
Poland	83.2	16.8	0	9,192
Russian Fed. (European part)	100	0	0	808,790
Slovakia	52.4	43.2	4.4	1,929
Sweden	19.7	80.3	0	27,528
Ukraine	100	0	0	9,575
USA	42.4	57.6	0	303,089

Table 13.2. Percentage of total forest used for different functions (Source: Olmos et al., 1999; FAO, 2005; Appendix 3, Table 6)

Country	Production	Protection	Conservation	Social Services	Multiple purpose and others
Belarus	51	28	6	15	0
Czech Rep.	75	6	7	12	0
Denmark	39	7	16	0	39
Estonia	72	2	6	0	0
Finland	91	0	7	0	2
Germany	0	22	19	42	17
Latvia	0	6	14	2	79
Lithuania	70	10	9	3	8
Norway	63	28	2	0	8
Poland	64	21	5	11	0
Russian Fed.. (European part)	77	9	2	2	11
Slovakia	10	18	5	13	55
Sweden	73	0	12	0	15
Ukraine	48	30	3	19	0
USA	12	0	20	0	68

themes for the Baltic 21 Forest Sector's work according to this plan are:

- *Sustainable management of private forests*
- *Multiple use of forests*
- *Transparent timber flows in the Baltic 21 region*
- *Increased use of wood as a renewable and environmentally friendly resource*

Ownership of Forests

When analysing the impact of forestry on rural development, it is important to consider ownership of forest land. Differences within the Baltic Sea Region have very little to do with climatic or other 'natural' properties of the forest. The ownership, e.g. the power over how to use forest land and its natural resources, has been decided for political and economic reasons. According to some researchers, state forestry lacks incentives for economically efficient timber harvesting and forest management in general (Lazdinis et al., 2009).

Historically, forests were considered public areas. With an increasing need for arable land and increasing possibilities to make money from forest products, privatisation of forests has taken place. Some interesting comparisons can be made from studying Table 13.1. For instance, in Norway and Sweden more than 80% of forest land is in private hands, while the US has close to 60% and Germany has about 50% of private forest land. In Russia, forest resources have remained publicly owned to 100% even since 1990, when the Soviet Union was dissolved. Russia has huge resources of arable land and forest land – on a global scale, Russia has 25% of all forest land in the world (including both its European and Asian parts).

Ownership differences are highly important when discussing rural development and people's possibility to earn their living in the countryside. Practical livelihood decisions are very much dependent on how to interpret international human right laws, private ownership, and the principle of state sovereignty over natural resources (see Table 13.1 and Table 13.2).

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