



A report prepared for the project

Lessons Learnt on Sustainable Forest Management in Africa

LESSONS LEARNT FROM THE EVOLUTION OF FOREST POLICY IN SWEDEN IN THE LAST 150 YEARS

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**Lessons learnt from the evolution of forest
policy in Sweden in the last 150 years**

by

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(October 2004)

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1.0 BACKGROUND – BOREAL SWEDEN IS VERY DIFFERENT FROM TROPICAL AFRICA

The soils of the Scandinavian forests rest on bedrock almost two billion years old. The mountain chain running through the length of Scandinavia had a period of folding and deformation 400 million years ago which resulted in a considerable variation in mineral nutrient content, in weathering and finally in wood production capacity. In addition, the present land surface in Scandinavia is formed by huge ice sheets from several glacial periods. During the last one, an ice layer several kilometres thick covered the country. It started to melt away towards the north more than 10,000 years ago, crushing and tearing the bedrock and leaving boulders, stones, gravel, sand, silt and clay along its way, mostly mixed up in the typical moraine soils but sometimes sorted by water and sedimentation. The recent period of glaciation also means that the boreal regions have a very young forest cover compared to tropical areas.

As the ice had melted away, green vegetation and forest followed. Initially lichens and mosses, later different species of *Salix* (willows) and *Betula* (birch). Soon the first herds of reindeer appeared, followed by human hunters. Some thousand years later the Scotch pine (*Pinus silvestris*) came in and, later, the Norwegian spruce (*Picea abies*), today our totally dominating species. These two conifers alone make up 84 % of the growing stock in Swedish forests. The remaining volume is made up of broadleaved trees, mostly birch.

When regarding the forests of Sweden one has to distinguish between the southern and the northern half. Due to its more favourable climate and higher growing capacity, the southern part was populated first, and the majority of people still live in the south. The southern forests were used early and already during the 18th century there are reports on local wood shortages. In the northern half of the country, with modest areas of cultivated land only along the Baltic coast and the big rivers and some lakes, there were vast areas of virgin conifer forests up to the middle of the 19th century.

One might distinguish a third forest area in the middle of Sweden with a distinctly different history. The forest features are similar to the north, but contrary to northern Sweden, heavy wood utilisation for iron and copper making has taken place with vast forest areas cleared already many hundred years ago. From these areas we learnt the importance of forests for different types of successful industrialisation and the need for sustainable forestry in order to maintain the industries. Most early Swedish forestry research, training and education took place in this central region of Sweden, often inspired from Germany.

In the southern parts of the country people lived mostly in small villages, always surrounded by enclosed arable land. In every field each farmer had one or several strips to cultivate. The system depended on all farming activities being handled in close cooperation, both sowing and harvesting had to be made at the same time. The fields all had to be carefully fenced to keep cattle outside (cows, goats and sheep). Animal husbandry was the most essential pursuit and a necessity for surviving. The amount of cattle was limited by the feed that could be collected for the long, cold winters. The cattle had to graze outside the fenced fields, in the outlying land. Generally this was forest land; the closer to the village, the more thinly trees were growing. Around the village there were also fenced meadows. After the hay harvest, they could be used for grazing as well.

During the 20th century, the Swedish countryside was completely transformed. The villages were split up and farmers had to take up residence on individual farms situated on their own holdings – today, only the biggest farms survive as farming enterprises. The forest has regained once cultivated or grazed land that was abandoned. The growing stock of wood in the forests of the southern half of the country has doubled. In the northern half, practically all productive forest land is under sustained management.

A common feature in regions with a scarcity of forests was County Forest Commons. In these every farmer with a shortage of wood for his own use could, following certain rules, collect what he needed. Such commons still exist and are of very old origin, their rules are stated in the first written regional laws from the 13th century. Today, their number and area are relatively small. They are mentioned here mainly because they represent a very early case of successful “community forest management”, an approach of great interest in Africa today.

The following is by no means a kind of short of history of Swedish forestry. Instead, we have tried to find examples of failures and successes in the broad field of forestry and especially in forest policy. While

giving such examples we have used a “critical eye”. If the same tasks were given to the responsible authorities, fewer failures would probably turn up and more successes.

2.0 THE FRUSTRATING OAK BUSINESS

If the highest valued tree species throughout European history would be mentioned it certainly would be the Oak (*Quercus robur*). And no other species have been so much involved in politics. In the early years, Oak had a strategic importance, especially for the big military powers to which Sweden belonged for more than a century (1600-1720). No other material than wood from Oak could be considered for the big navy ships. The Oak had other good properties as well. It was very suitable for wine and beer barrels and few other species had such high energy content. In the royal courts it was well known that no other meat was as tasty as from pigs fed on acorns found under the big oaks. A growing scarcity of well shaped oaks soon became a threat to many governments, from the 18th century this was a fact even for Sweden.

In the early Middle ages Sweden had evolved to a united nation. King Gustav Vasa is regarded as the founder of modern Sweden. As many other strong nation builders he had started as a “freedom fighter”, saving Sweden from “the bloody Danes”. In 1558 he simply stated: “Every Oak wherever it is growing belongs to the Crown”. At the same time, he also included mature Beeches, *Fagus sylvatica* (also with tasty acorns for the royal pigs). Throughout history, the state has often tried to restrict the rights of landowners; on the other hand, they always tried to guard their freedom, at times they even revolted. In old times there was no democracy as we define it today. The nobility, with vast areas of land, had few restrictions. On the other hand – they had to fight for the King when needed and offer him their own lives together with riders and soldiers when called upon.

In 1789, the Swedish King (now Gustav III) was in sharp disagreement with the nobility. As he needed strong support from the farmers he had the parliament institute new laws strengthening the rights of the common and taxpaying farmer. In this matter the Oaks were much involved. Of all the Oaks growing on farmers’ land, only a small number had the size, shape and quality that were suitable for the navy. Now it was stated that only the useful ones should remain the property of the crown. Accordingly they were marked by axe including a royal stamp. If such a tree was cut by the landowner he got in trouble. Even when cutting their own Oaks, farmers had to comply with some bureaucratic procedures.

Among farmers the crown’s Oaks were obviously not very popular. The best Oaks are growing on good soil and they develop a wide canopy. That is the main reason why the crown’s Oaks were nearly all found on the farmers’ good fields or on their meadows, so important for the hay harvest and the cattle-grazing. A widespread illegal habit developed by which the branches of big Oaks were continuously cut in order to reduce the shade from the leafy foliage that seriously hampered the growth of grass and crops. The foliage cut could also give some winter feed for the livestock. Among farmers the old hatred for Oaks grew. Even Oak-seedlings and young Oaks were cut. With continuous inventories, the navy noticed that the number of useful Oaks declined, soon to a seriously low level. The situation did not become better when it was noted that the axe-marks on the good Oaks often developed rot in the wood.

Obviously two interests competed – the nations interest of building material for its battle ships and the poor farmers interest of survival. In the beginning of the 19th century, ideas for better forestry practices were slowly growing. The wood production on the outlying land should not only be left to nature, it could be improved by man. The first generation of trained foresters soon convinced the navy and the government that good quality Oaks would continuously decline with the current system and they had the solution. The state should develop its own plantations of good Oaks on state land. Oak timber production must be separated from agriculture.

After long discussions in the parliament there was an agreement on establishing Oak plantations on crown land and at the same time to leave the Oaks on private land free to the landowners. As the time for an Oak to mature economically could be more than 150 years, some parliament members questioned if Oak wood after such a long time would really still be the best ship building material? They were silenced by the majority. Some less responsible people abroad had started to try iron sheets for shipbuilding. But everyone could easily understand that the smallest leak “would send both ship and passengers to the bottom of the

see”. No, the independence of a country surrounded by water for a long future would stay with the supply of good Oak timber!

In the 1960s, 150 years after the plantations were established, the Director General of the crown forests allowed himself to a small innocent joke. He sent a very formal note to the First Admiral of the Navy: *“The Oak timber earlier ordered by you is now ready for delivery. Please specify suitable places for such delivery”!*

Lesson learnt

Government and legislators will, in the long run, have difficulties to uphold laws and regulations that are contrary to important interests and needs of the majority of the people. Especially with a long rotation time, a good advice is just to choose species that will best utilise the site where growing. Nobody knows the best use of the wood a century or more in advance. Fertile soils and good climate mean shorter rotation, but still 20-25 years is a long time. Production of fuel wood from shrubs and fruits are easier to predict and make plans for.

3.0 THE MOOSE ISSUE

A similar case to the one above, this time concerning moose hunting, could also be shortly mentioned. The moose is the undisputed “King” of the Swedish forest. Today, in each hunting season, about 100,000 moose are shot from a total population of some 300,000. Among Swedish hunters it is *the* festival of the year. Since a moose can yield 200 kg or more of good and tasty meat, moose hunting definitely has a big economic value. The moose has profited from modern forestry. In the dense secondary vegetation coming up on large clear-felled areas they find a lot of good feed, Pine and Birch being the favourite browse species. However, it has not been like this always.

As long as people have lived in Scandinavia there has been moose around. Even close to the northern mountains, primitive systems of 1500 years (or more) old hunting pits can be studied. The previously mentioned founder of the Swedish nation, King Gustav Vasa, decided in the mid 16th century that moose hunting was a business for the King and the nobility only. Naturally, illegal hunting was practised among starving crofters living in the deep forests. But if disclosed the crime was severely punished. Even to pursue a moose on skis was strictly forbidden. It was effective hunting but easy to detect.

So, again we see the same story as with the oaks. And again, the same 18th century king mentioned above, Gustav III, wanted to release the farmers – who at the time supported him politically – from unpopular restrictions. He removed the ban on moose hunting in 1789. Because of the earlier ban, common people living in or near the forests had bad feelings towards the moose. Thus, quite predictably, the moose nearly disappeared just a few decades after the hunting restrictions were lifted. Once again the parliament had to take action. A total ban on moose hunting was introduced in the periods 1808-1817 and 1826-1835. And the moose recovered, later with the help of strictly regulated and short hunting seasons. Less poverty among crofters living in the forest was probably another reason for the moose recovery. Still, it takes time for a game population to recover - in the last decades of the 19th century, less than 2,000 moose were felled per year. But, as already mentioned, there is a very big moose population in Sweden today. In fact, there are too many according to everyone who is responsible for the silviculture and regeneration of a forest. But according to the dedicated hunter it is just enough, an often “schizophrenic” type of conflict since it is normally the same persons who are forest owners and hunters!

Lesson learnt

Throughout times, the moose has been a valuable asset for people in the forest, for the Kings political power play and, not least, for nature itself and its diversity. As always, there is a risk that a few individuals or groups may overuse a valuable natural asset like the moose. In such cases, it must be the responsibility of authorities to carefully regulate hunting. History has shown that an absolute ban often can be less effective – it may be Oak or it may be Moose. Today the moose population is a tourist attraction for “moose safaris”.

4.0 CHANGE IN USE AND VALUE OF FOREST LAND

Since early days of agricultural society, the life and rules of the village were most important for every farmer. The village influenced the life and work of the farmer and his family from cradle to grave. Arable land surrounded the village with all its houses. In each field every farmer had his own strip, sometimes several. Outside the fenced fields, generally meadows were normally found where hay for the winter was cut and later collected in the barns. Fields and meadows were surrounded by the “outlying land” – mostly forest. Until the 19th century, farmers did not care too much about the forest. The main uses were as grazing for the cattle and goats and cutting of firewood and building material.

Another important use of the outlying lands in some parts of the country was “slash and burn” – cutting down the forest, burning the debris, a couple of years of good rye or barley harvests, later beet-roots or potatoes, and finally some years of good grazing before the forest took over again. In earlier days, old stumps of Pine, rich of resin, were broken up and recovered, especially in the bogs. The stumps were then split, piled in long pits, covered and burnt to get the tar, an important export product from Scandinavia already in the Middle Age. Another important produce from the outlying land was potash. It had many important uses and was a produce mostly from the wood of Beech and Birch. Outlying land could also be made available for new settlers as long as the entire village agreed.

Timber from the forest, for building and as material for tools and fences, was important for the farm households. From early times, all trees in the forest (except oak!), small and big, were regarded as a free asset. Anyone who had done the heavy work of cutting and transporting the logs was also regarded as the owner. The same rule applied in the far away located crown forests, mainly found in the north of the country. If trees were cut, everybody could profit from better grazing. Farming and animal husbandry, into which forest land and trees were intimately integrated, were conditions for survival. For a long time forests appeared to be unlimited and mostly a hindrance to the farmer. This situation must be understood as a background to the controversial matter labelled “illegal logging” by the authorities. The different points of view became a hot political issue in the Swedish parliament during the 19th century.

Up to the beginning of the 19th century, there was, with very few exceptions, no professional silviculture practiced in Sweden. Forests were in abundance, the problem was more to get rid of all trees and stumps for new settlements and for better grazing. In southern Sweden the population doubled during the 19th century – the reason was said to be “peace, medicine and potatoes”. The last real war Sweden was engaged in ended in 1809. When small crofters cleared outlying land in a more widespread way and their cattle kept all new tree seedlings down, there could evolve a local shortage of good timber for building and, not least, of smaller wood for all the fencing needed. The threat of a looming wood shortage in the populated areas of southern Sweden was seriously discussed in the parliament. Several actions were taken, e.g. the founding of a national forestry school. Inventories of crown and common forests were also started. Harvesting was done in a more conscious and systematic way. A first step of silviculture was introduced. Like today, the goal was a sustained supply of wood. Measures were taken to get a better forest regeneration. We will return to these efforts.

However, the old practice of free felling of trees on outlying land and crown land continued. With the growing threat of a timber shortage, the forest authorities started to oppose. They started to label “illegal logging” a crime. The courts agreed and introduced hard verdicts. But the popular opposition was strong. A law could not be passed contrary to the general opinion and feeling among the majority of the people - at that time the farmers. Thus, “illegal logging” continued and with only few prosecutions. It took quite a time for the general public – especially the farmers - to change their mind and opinions.

In the northern half of the country, the situation was different. Still at the beginning of the 19th century, most land was covered by vast, virgin conifer forests (Spruce and Pine), most of them never touched by human hand, and possibly only passed by hunters and a few reindeer herders. Most people lived along the Baltic coast and the big rivers and lakes.

However, at the end of the 18th and beginning of the 19th century there was a fast economic development in Europe and not least in the UK. With the steam engine there were big changes in land and sea transports. Governments also got a much more liberal view on trade and the benefits of cooperation. Newly opened coal mines provided energy in big amounts. All kinds of building activities increased, cities grew. Now, the virgin forests of northern Sweden became valuable. The growing Europe – and especially Britain – could

be supplied with sawn timber of the highest quality. Luckily, tough men and horses for logging were available in the forest areas. Millions of logs could easily be floated down the many rivers and end up at sawmills along the Baltic coast. Between 1825 and 1865, export of planks and boards increased ten times!

Logging was mostly done in the cold winter with snow for the sleds and with bogs and lakes frozen. The crews lived in very primitive log cabins. A kind of selective cutting was done. All the bigger and better trees suitable for sawmilling were felled. The idea was that the smaller and more or less depressed trees should hopefully recover and start to grow, but also give some natural regeneration to form a stand for future development. After some time, this kind of management (or lack of it) proved to be a big mistake.

In those days, a big operation of allocating forest land from the crown to private farmers was carried out. The earlier big surplus of forests, where every farmer or settler could fell and use whatever he needed, had resulted in a situation where farmers saw no special value in owning forest land. However, the general policy in the country had turned liberal – in contrast to the earlier belief in strict regulations. Thus, farmers were allocated very generously sized private forest holdings for their household needs. The state also set aside huge areas of forest land for the Crown, mainly in areas located far from settlements.

When the timber boom started around 1850, farmers, now with big forest holdings, for the first time realised that their growing forest had got an economic value. The common practice that emerged was to sell logging rights (concessions) to sawmill companies. To start with, concessions were given for 50 years, later on for 20 and finally only 5 years was allowed. To secure their timber supply for a longer term, sawmill companies started to buy whole properties from farmers. In a short period the companies took over nearly half of the farmers' forest land in the north. This created social problems later on.

With the great sawmilling boom, good timber was in great demand most of the time. It was not easy to control from where the logs were coming. The sawmill owners had limited interest in such control. Still, among many local people and sawmill contractors the idea that timber was a free asset "like air and water" lingered on. Anyone who invested the heavy work needed to deliver the logs to the buyer was the rightful owner in many peoples' opinion. This can be compared with today's Nordic "right of public access" by which everybody is allowed to pick berries in any forest, but as soon as the berries are in the basket, they belong to the picker. To pick berries in the forest is free - to take picked berries is a theft.

Once again the problem of illegal logging turned up in the north and on a very big scale. The question arose of whether illegal logging was acceptable in the general opinion among rural people or if it was time to act by prosecuting for theft. Illegal logging was eventually stopped. Parliament members advocating for modern silviculture also proposed a ban on goat grazing and on slash and burn on forest land but farmers protested vivaciously and these proposals were turned down.

Following a parliament commission proposal a National Board of Forestry was established in 1859. The task of the board was to look into and guide all forestry matters and give proposals to the government for actions. As the political interest for tough legislation for the care of forests was low, the Board more and more got the task of managing the Crown's own forests. In 1883, it was renamed "the Crown Forest Agency". The country had finally got an organisation to administer the Crown forests, control the felling on private land in the Northern provinces and also handle the widely spread illegal logging. A farmer or settler was allowed to fell trees in his own forest for all his household needs. But as soon as he wanted to fell timber for sale, the trees must be marked by the local Crown forester.

However, because of the fast expansion of wood products export, also illegal logging increased. For decades the matter was discussed in parliament. So far the only punishment for illegal logging was fines, generally much lower than the profit of the offence. But conditions were changing. Delivered logs increased in value and so did the forests. Illegal logging took on a still bigger scale and some enterprising people made really good profits. The discussions went on and there was finally a majority in the parliament for prosecuting illegal logging as a theft that often ended up in prison (1875). Illegal logging decreased but, for long time still, one of the main tasks for a Crown forester was to trace and prosecute these offences that never really stopped in the deep and vast Northern forests.

Lesson learnt

For legislation and for the central administration of a country it is important not to impose laws from above in a top-down and non-participatory way. It is important to know the attitudes and feelings among the

people towards the matter and their opinion on what is right or wrong. If the legislators have different views from all common people involved, a law will normally not work and solve the problem. If differences in opinion among actors and stakeholders exist, then information, education, discussion and preferably a Policy agreement should precede legislation.

5.0 INTRODUCTION OF SILVICULTURE – AND SOME MISTAKES

In the beginning of the 19th century there was little talk about silviculture. When a farmer needed a new house or a barn he brought his horse and sled to the nearest good timber stand in the outlying forest. With increasing timber shortage he had to go further away to find suitable timber trees. He did not see any reason to consider the future growth on a particular site. If he was going to set up a he looked for young, 5 m tall Spruce trees. If he was lucky and found a suitable stand somewhere he brought all of them with him. If he had left every five of them he could have got good timber logs after another 40 years. Perhaps he thought he would not survive for such a long time, and nor would his son. Forest management, especially in Boreal forests, assumes a long view in all thinking.

When wood scarcity became a reality in more and more places in southern Sweden, many people conscious of their responsibility towards the countries economy and natural resources were worried. They had heard - some of them had even seen - how countries around the Mediterranean had “turned into deserts” when the forest cover was wasted. Already 200 years ago, there was also much talk on the importance of forests for local climate regulation. One man in particular, Israel af Ström, made determined and successful efforts to inform people, especially politicians, about the importance for the future of a responsible and sustained forest management. Already at the age of 16 he became head forester of the Royal game-park just a few kilometres from the Stockholm city centre. There, hundreds of his Oaks are still to be admired. Af Ström also fought hard to start an academic training for foresters, and eventually he became the first headmaster of the first School of Forestry in 1828.

In those days Germany was the leading forestry nation and af Ström was sent there for studies. When he returned he had learnt from the German authorities that growth and felling in a forest must be systematically controlled to achieve a sustained and acceptable production. Thus, the Germans had applied a system of partitioning forest estates into parcels of the same number as the years in a normal rotation period. If the rotation was a hundred years, hundred parcels were created. They should all have a form that supported the regeneration of the felled area. Af Ström successfully made a lot of inventories and markings of the annual felling areas in a number of Crown forests, county forest commons and on some big private estates. However, after a while it became more and more difficult to strictly follow such a theoretical plan. For example, windfalls, forest fires or too old stands with much root rot that must be taken care of, constantly made changes of the plan necessary. For the small private forests the system never became realistic because an annual parcel must be very small and often not well adapted to the regeneration technique used. And most importantly – a farmer’s need for timber varied a lot between years.

Though the strict system of annual felling areas was much advocated and discussed, it was used only in some of the bigger forest holdings of the Crown, by some County commons and - especially – by the mining companies. It was difficult also to apply the system to the vast areas of Crown and private company forests in the north, because the annual final felling parcels gave all kinds of log dimensions, qualities and tree species whereas only the bigger and better trees were in demand by the sawmills. At that time, and to make the best of the situation, all trees that could not be used were left standing. They had generally been suppressed by the felled, bigger trees, and the hope was that by leaving them standing with a better space, they would recover and form a new stand for further growth. Eventually, it became clear that this normally did not happen. The depressed trees seldom recovered but they did instead often fall in the first winter storm or they just dried up in a hot and dry summer. After a while, big areas of forests in the north were filled by useless Birch, shrubs and a few slow growing single conifer trees. The recommended system of “selective cutting” turned out to be a disaster for the northern forests. It was not until around 1950 that systematic, sustained yield forestry practices were reintroduced in some of these badly handled areas. Generally, they had to be very radically treated - cleared, burned and planted.

But already at the end of the 19th century, conditions had improved. The pulp and paper industry had recently started and expanded, and now final felling could be practised because all dimensions of logs could be used. For the regeneration seed trees were often left, but it soon proved to be insufficient for achieving a proper regeneration. Unfortunately, for economic reasons, planting and sowing were practised on a very limited scale only and it was not until the middle of the 20th century that these methods became standard practice throughout Sweden wherever natural regeneration did not give acceptable results.

Lesson learnt

Silvicultural practices must be adapted to climate, soil properties and other local conditions. A system of felling in strict annual parcels could be successful in cultivated German temperate forests but less so in natural boreal forests. Still, “the father of Swedish silviculture”, Israel af Ström, had a historical impact. He demonstrated the need for forest inventories and planning and also to find a necessary balance between growth and felling. He stressed the importance of keeping a “good order” in every forest and he started modern education in forestry. Nearly 200 years ago, he was an advocate of sustainable forest management. Not surprisingly, however, it took a long time until his ideas were put into good and general practice.

6.0 A LONG JOURNEY TO THE FIRST FORESTRY LAW 1903

We have mentioned the new trend of liberalisation in Europe at the beginning of the 19th century. Economic life had been quite restricted before. If every man was allowed to act and work more freely, the whole society would gain. In southern Sweden, some Crown forests were sold to private persons, and a new legislation allowed forest commons to be partitioned and distributed to individual owners. However, it did not take many decades until signals of alarm were heard. Many of the new forest owners did not care much for their piece of forest. To a large extent these forests were felled for a small and quick income. Warnings of “a devastation of forests” were heard in the parliament. After a while, the selling of Crown forests and the partitioning of forest commons were stopped. A timber balance for south and mid Sweden had been presented by experts. It showed an annual felling of 19 million m³ but a growth of only 15 million m³ (today, the growth, recorded with modern methods, is about 100 million m³ for all Sweden). Forestry staff and many politicians were worried. A committee to propose needed actions were established in 1855.

The committee proposed a law that would force the forest owner, in one way or the other, to establish a new forest after felling. The proposal was turned down in the parliament because the majority was of the opinion that this was to go too far in restrictions of private ownership. Instead, good practices should be achieved by advice and information. However, the proposal to establish a Royal Board of Forestry was accepted. Its task was to administer all the Crown forests and to assist the government in matters concerning all forests. In 1883, the board was transformed into “The Crown Forest Service” with a more focussed task to manage the Crown forests. At this time, these covered a very large area. A demarcation had been done in the northern half of the country between private and state forests. During this demarcation every traditional farm was offered a substantial piece of forest land. Still, most farmers saw more value in forest grazing than in all the timber.

The next effort of introducing effective forestry legislation was done in a proposal to parliament from the Royal Academy of Agriculture. A change for the better could obviously not be achieved only by advice and information. Legislation with strict demands of an acceptable regeneration after felling was necessary. Both Parliament chambers agreed on this, but they disagreed on the mode of enforcement. The upper chamber (with plenty of landowners) wanted only fines; the lower chamber wanted a ban on further felling, if actions for regeneration were not taken. Consent could not be achieved and the proposal fell once again.

In spite of national and local meetings with intensive discussions, the standard of silviculture did not improve. On the contrary, during the last decades of the 19th century the countryside of southern Sweden experienced a population peak (in spite of a massive emigration to North America) and thousands of small crofters invaded outlying forest land. There they built their small cottages (soon filled with children), cleared and cultivated some stony acres, let their cattle into the forest, felled trees for better grazing and for firewood. More and more of the closed forest disappeared. In many areas just scattered trees were to be seen. Goats, sheep and cattle took every new plant trying to grow.

In the northern conifer forests, the picture was quite different. As already mentioned, there was a demand only for big dimension timber. Selective cutting was practised, but with no effect on the regeneration. On the contrary, the quality of most forests that had been logged was declining. The Forest Service neither had the knowledge nor the resources to regenerate clearcut areas. Still, for some time they hesitated to join the efforts for a national forestry law including compulsory regeneration after felling. However, the situation improved with the growth of the pulp industry, allowing all dimensions and tree qualities to be used. Finally, after long discussions, a new forest committee was selected by the King in 1896. Judging from his personal interest, he understood the importance of the matter.

The committee delivered more or less the same straightforward proposal for a forestry law that had been done half a century before - *“on all private forest land logging must not be done and the land must not be handled in such a way that the regeneration will be at risk; in a mismanaged forest, the owner must take such measures that an acceptable regeneration will be secured”*. Another important proposal was the forming of regional forestry boards in each county. The board had to control that the law was followed; if not, breakage of the rules must be prosecuted. The law stated fines or a ban on further felling as the normal consequences. In serious cases, even prison verdicts were possible. The main task of the County forestry boards, however, was to inform and educate all forest owners on good and safe forestry practices.

The proposal for a forestry act was again discussed in the parliament. This time there was more general acceptance in the society to get legal possibilities to stop the ongoing mishandling of the forests, both in the south and in the north. The most active voices for a legislation were some prominent parliament and government members who themselves were owners of big forest estates. Much of the discussion was on further proposals to make the act still more demanding. There were few reservations this time and the first Swedish Forest act was passed by a strong majority in 1903.

Lesson learnt

Basically, forest owners in the 19th century, as is the case today, did not favour too much legislation in such a practical activity as forestry. Every bit or stand of forest is so special that a prescription in writing which fits all conditions is difficult to make. However, 150 years of experience have taught us that some fundamental legal demands, expressed in general terms, have been well accepted to the benefit of all parties involved. In a country like Sweden the welfare of all people relies to a large extent on the forest and the forest industry. This took some time for most forest owners to understand. Initially, they felt that nobody else should interfere with how he handled his own property. But the fear by society for a future wood shortage always pushed the need for legislation.

Our experience have taught us that it is important to get acceptance from all involved to the need of some simple demands on every forest owner, and that this takes time.

To be effective and respected a forest law must focus on the minimum demand concerning the most essential aspects (in the case of the first Swedish law, the demand to regenerate after felling) and not try to regulate every forest activity in detail. Through information and training, forest owners should then be encouraged to introduce more silvicultural improvements in his forest, more than the law demands. A drawback of the first law was the lack of knowledge and experience on how to accomplish the demands of the law for successful regeneration under different conditions. Fortunately, through continuous research, safe practices have become fairly well established today.

7.0 THE CASE OF COMPANY PURCHASE OF FARM FORESTS

This case occurred in the northern half of the country. We have already set out the background above. From 1850 and twenty years onwards the sawmill production and export increased ten times. Soon after that, the pulp and paper industry followed. A continuously increasing amount of timber was needed.

The sawmill companies started by signing logging contracts with the farmers, generally running for 50 years. During this time, they were allowed to cut whatever they wanted and whenever they needed it. The farmer was allowed to take trees for his household needs but he was not allowed to slash and burn for growing barley and for better grazing. The companies got their logging rights very cheap. To begin with, farmers probably were satisfied. Up to then they had never got any cash income from their forest. Timber

was in great surplus and had no net value to the farmer when standing in the forest. The companies fully controlled the river floating of logs to the industries.

After some years of export successes - of course with some ups and downs - the companies had been consolidated. With the growing demand from buyers abroad, they believed in a bright future for their industry. One of the few threats they saw was the supply of the highly valued timber from the so far mostly virgin northern forests. To secure future supply of timber the companies started to buy not only logging rights (concessions) but whole farms, with the forests belonging to them. The buildings and open farm/grazing land was then leased, often to the former owner, who now became a tenant. For the farmer, there was some logic and short term gains in the selling. Often, he already had got some money for the 50 years logging contract, and he knew that when the contract went out, there would not be many trees of any value left on his land. So he sold the land and got, for the second time, some money for his farm and forest. To give an example: in 1864, Jon Persson sold his 3,000 ha forest farm to a sawmill company and got 40,000 SEK, an awful lot of money for him. He had worked hard to survive on the family farming in a harsh climate. The forest had just given him firewood and timber for building and repair. However, just 10 years later, the company evaluated the land and remaining standing timber to be worth 2.5 million SEK.

A lot of rumours circulated about how company staff duped the farmer to sell his farm with vast forests for a petty price, sometimes with the assistance of cigars and alcohol. In a few decades, large areas of farm forests were passed over to the forest industry companies, first sawmills but soon also to the expanding pulp companies. The purchases were so extensive that, in a few decades, northern Sweden got quite a new balance of forest ownership. Soon the forest area belonging to the Crown, the companies and private farmers were of about the same size. This is to be compared with southern Sweden where farmers owned – and still own – about 80% of the total forest area.

The question has often been asked why so many farmers sold their properties to the companies at such apparently low prices. After some years, many of these holdings were worth much more. We have already mentioned some reasons - forests were in abundance, standing trees had no or little value to the farmer and forests were still a hindrance for farming and grazing. At this time even the government saw the development of farming and new settlements as the main road to save the nation from poverty. Besides, with the “50 years concession contracts”, which many farmers had entered into, most of the property value was, in practice, already sold. One must also remember that many farmers were new and inexperienced forest owners - the excisions of outlying forest land from the crown to farmers were only recently concluded or still going on. The companies, in close cooperation, controlled the necessary river transport of timber from the forests to the sawmills on the coast – for an individual or a group of forest owners it was next to impossible to use the river themselves. Without the river transport the logs had no or little value. All cash salary jobs in forests or river transport originated from the companies, so everybody knew he had to keep a good relation with the company people.

The expanding forest industry considered the purchases of forest land as something natural. The supply of timber must be secured, and this meant employment opportunities and income for the nation. By owning the forests, the companies got the incentive needed to start longer term approaches to forest management, which they actually did. But towards the end of the 19th century, a very aggressive political campaign started in the parliament against the increasing purchases of forest land by the companies in northern Sweden. The main arguments were the social drawbacks of the practice. Against the interests of the nation, the river valleys and lake areas in the north would soon be emptied of its strong and hardy farmer population. Even the industry would then be hurt with the shortage of logging workers when farming, their main summer occupation, disappeared. Free farmers would, in a short time, turn to dependant tenants. The nation needed more settlements in the thinly populated northern areas, not less. According to the rules for communal and parliament elections at that time, a farmer who sold his property even lost his right to vote.

Naturally, the public opinion mostly saw all the social drawbacks. A law prohibiting further company purchases of forest land was proposed. It was passed by the parliament with a great majority in 1906. In the years before this decision, the purchases became more intensive than ever, which suggests that also many farmers wanted to take the last opportunity to sell his forest to a company. Perhaps the chance would never come back. The longest legal duration of a logging concession contract had also been restricted in a few steps at this time – from 50 years, later 20 and finally down to 5 years.

Lesson learnt

Regardless of political preferences, most people in Scandinavia agree with the benefit for the nations of having free and independent farmers. Experience shows that this gives the best conditions for rural development. However, we also have to admit that many other factors in our present time make it difficult to achieve. Today, for example, we have only a small number of forest companies left and, after many mergers, they are very big. People also generally agree on the benefit and importance of having “a living countryside”. Without people and social services in the forest areas, sustained forest management is at risk.

From a silvicultural point of view, the long term concessions in the vast northern forests appeared to be a disaster. The forest owner had no interest to care for his property, nor had the company any economic interest to invest in management for future benefits. These northern areas had a rotation period of more than 100 years. Thus, the long logging contracts delayed the important process of transforming virgin forests to well and sustainably managed forests.

8.0 IMPORTANT ACTORS – THE NON-GOVERNMENT FORESTRY ORGANISATIONS

The first initiatives for improvements of forestry laws and regulations have rarely, or ever, come from the government. Instead, they have come from people directly involved in forest management, often foresighted forest owners. They have realised and considered what is going on and what is needed. They have had a long perspective and have, at an early stage, understood the danger of misuse of forests, both for the forest owners themselves and for the nation. The first forestry NGO was started in 1883 for the northern part of the country where a brutal industrial exploitation of the forests took place. Later on, in 1902, there was a similar forestry NGO founded for the southern half of the country, with somewhat other problems. They were amalgamated to The Swedish Forestry Association in 1965.

These first NGOs started in a very practical way. They organised team leaders in all villages. They tried to interest the forest owners to plant or seed areas where the forest cover had been lost; they taught people how to collect seeds and organise local nurseries, etc. However, these activities had a limited effect. Increasingly, the NGOs worked with general information of importance to the forest owners, the industry and the nation, such as better forest practices and the importance of using all forest land up to its potential. Soon the NGOs started their own journals where research results of practical use were published as well as reports, findings and proposals from forest practice. Crucial problems were advocated and discussed. Forest excursions were organised for members, always with very lively discussions on practical and general problems and opportunities.

In this way the interest in good forestry practices was stimulated, especially among leading forest owners, civil servants and politicians involved in forestry. When the parliament and the government took legal actions, the general opinion was prepared and aware of the problems and suggested solutions, even if opinions often differed, for example on how national and individual interests could be reconciled.

Another important NGO in the south western part of the country – The Forestry Society – was founded in 1912. At that time there were large areas of heather moors, originally covered by forests but cleared and used for sheep grazing over the last hundreds of years. When sheep-raising lost its importance, the Forestry Society and its sponsors could buy large and smaller areas of heath land at very low prices. With some difficulties the moors were planted, mostly with fast growing Spruce (*Picea abies*). When the planted areas had closed canopy and the forest started to grow well, they were sold to new owners - private people, commons or communities. By showing on a practical scale what was possible, the Forestry Society was very successful, and it is today a flowering enterprise working with forest management consulting and with managing its own forests.

NGOs of another kind are the Forest Owners' Associations and Forest Producers' Cooperatives which started in the late 1920s. There was one in each county and mostly with “non profit” activities like information and excursions on good forestry practices and for pushing forest policy matters for the private forest owner members on the agenda. Soon, however, the associations were transformed to “economic” associations. Now the idea was to collect logs, pulpwood and other forest products from the members, then

negotiate the best possible prices with the industry and sell. Later on, partly as a tool for better pricing, they started their own industries. The basic activity for the Forest Producers Cooperatives was to organise cooperation among small owners. Later on, with the necessary mechanisation of Forestry activities, the Cooperatives organised and administered the use of heavy and cost saving machines among the members. General information and education in planning, silviculture and forest economics are also important activities, often in good partnership with the County forestry boards. Today, the Forest Producers Cooperatives are among the biggest forest industry owners in Sweden.

Lesson learnt

NGOs have been of decisive importance in the history of Swedish forestry. Through the forming of NGOs, ideas, interests and opinions have been channelled and discussed, public opinions have been formulated and agreed upon, and solutions have been proposed and pushed further to parliament and government for final discussions and decisions. This process has been of great use for the government itself. It would have been hard to reach agreements and decisions for new acts and regulations without all the voluntary preparations and evaluations among the NGOs.

The big number of small forest owners is typical for Scandinavian forestry. The average size of the holdings is around 40 hectares. In most parts of continental Europe it is even smaller – in many countries the average may be only 4 hectares or less. A general experience is that the organisation of cooperation among small forest farmers has been of great importance. Not only economic but also social cooperation is involved. When many owners are acting together, they acquire the same strength as the big commercial actors. Still, the advantages of the private ownership remain. The Forest owners' cooperation has also proved to be an effective power in forest policy matters. With the rapidly declining number of active farmers today, the political power in policy matters also declines, a trend that is countered by the economical power the forest owners have through their forests and forest industries.

9.0 PROTECTING THE GROWING FOREST – THE ACT OF 1923

The forestry act of 1903 just concentrated on the regeneration of clear-felled areas. As today, a natural regeneration was accepted if it was achieved within reasonable time and on suitable land. The main body of the new stands must be conifers for economic reasons. Today, also broadleaves are accepted as the main species in regeneration, in many places they are actually even preferred – a result of the present interest in biodiversity. Only 30 years ago, natural regeneration of broadleaves was, as a rule, killed by herbicides!

Long before 1903 forestry people understood that regeneration was important. But there were also other issues of importance to sustained forest management. One was the need of protecting young and growing stands. They were often threatened as the poles were suitable for fencing, miles and miles of fences were always needed around the villages. Smaller trees could also be used for charcoal, firewood, pulpwood or pit props for the underground mining industry. For the holder of a logging concession, it was often tempting to fell and use even very young stands. Even more so for the farmer who could avoid long transports. The problem of over-harvesting of young stands was well known already in 1903 but the majority among the politicians did not take the risk to include too many regulations and restrictions in the very first forestry act. It would have been too much for the strong conservative wing among the politicians to accept and too much for the implementing machinery to check.

The act of 1903 had other weaknesses too. It could not stop all bad forestry practices by companies in the north and among the farmers in the south. After felling all good timber, small and depressed trees were left to form a new stand. Soon these practices turned out to be a disaster. The left trees rarely recovered, many were felled by wind or dried up. In the north, bad quality Birch often took over. The law did not help since regeneration efforts could only be demanded after “normal” logging of mature stands, not for misused land left from earlier operations.

Another threat to the forests at this time was the purchasing of forest holdings by certain private buyers to make a quick profit by immediately cutting all timber with any value, including younger trees and stands. After such “robbery” of the forest the holding was again sold. Generally, such operations were very profitable. In these early years, another problem for a sustained management turned up. The First World

War 1914-18 meant trade problems even for countries that were outside the war like Sweden. With the stop of coal import to Sweden, huge amounts of firewood were required. Again, a lot of young forests were exploited. After many proposals in the parliament, a forestry committee was appointed (as usual) to look into the matter. After suggestions and long discussions, a new forestry act passed the parliament in 1923.

This new act starts by a principal statement: *“All land without other productive use should be used for forestry”*. On such land it is a duty of every owner to grow wood. This principle has remained and has especially been stressed when there have been anticipated shortages of wood.

The main aim of the 1923 act was to protect young forest stands. To fell younger trees was only allowed by thinning “that favours the further growth of the stand”. But what was a “young” forest? The forestry board concluded it was in practical terms less than 2/3 of the optimal rotation time for the species. The new act also widened the regeneration duty. When too few trees were left to get an acceptable production from the land, a regeneration operation had to be made. The responsibility to take action, which had earlier been the loggers’, was now moved to the formal owner of the forest.

The new act became a start for handling another big problem for forestry – the free and traditional grazing of cattle, goats and sheep in the forest, once the base for the old village system. The new act stated the duty of the forest owner to protect his newly planted areas from animal grazing, if necessary by enclosing them. Still more important was the ambition of the forestry boards to completely abandon forest grazing. Instead, every farmer was encouraged to clear sufficient areas of grazing fields and meadows for his cattle and leave the forest for wood production. This issue was controversial only for a short time because soon the farmers learned that the system was to the advantage of both their animal farming and their forestry. They had come to understand the growing future value of their forest.

With the new act, another important institution in support of Swedish forestry was founded – the National Forest Survey. It very quickly became an important instrument for the national economy and the ability to make forecasts. With accurate figures for timber volumes and growth, and a lot of other forestry facts, calculations and decisions for the forestry and the forest industries could be based on facts, felling could continuously be compared to growth, etc. To start with, a few counties were surveyed each year. Later on, samples were taken each year in a grid covering the whole country. Thus, every year the survey gave new and fresh nationwide figures.

Lesson learnt

Legal regulations for forestry must take all aspects of forest operations and conditions into consideration. If just one aspect is regulated – in this case regeneration after clear felling – there will be many possibilities for unwanted alternatives and for different interpretations. The experiences gained in the period between the first and the second forestry act have taught us that a general understanding of the importance of good forestry also resulted in an understanding of the legal regulations needed. How to handle a forest was no longer a matter only for the forest owner. Accurate statistics is necessary for responsible Forest Policy Development work.

10.0 OLD SINS, FINALLY BROUGHT TO DAYLIGHT

With the two forestry acts of 1903 and 1923, good and sustained forest management should be expected. Unfortunately this became far from true. The time between the two World Wars was economically weak in most European countries, with unemployment figures high. In northern Sweden – in those days the centre of the forest industry – neither the Crown, the companies, nor the private forest owners could afford the regeneration measures after final felling demanded by the forestry act. As a result, final fellings were avoided. For the vast areas of Crown forest the Director General even issued a formal directive against any final fellings. The economy of his organisation could not meet any costs for planting, sowing or cleaning. There was also another reason behind this, viz. methods for successful forest cultivations of bigger areas were so far not fully developed. For example, there was a lack of knowledge about suitable provenances of seed to use in the northern, high altitude locations. When final felling and cultivation was not possible, the simple answer was selective felling.

Thinning in younger stands was successfully practised. But, in spite of more than 50 years experiences of the drawbacks, problems arose when it came to “thinning” the old, mature stands. All over northern Sweden there were destroyed stands (so called “green lies”) after earlier selective logging, when only the big trees were felled. Every forester was aware of the risks and had tried to make the selective cutting in a more constructive way. They tried not to open up the forest too much by felling fewer trees and by felling not only big trees. Another alternative was to leave smaller gaps in the forest with potential for natural regeneration. This sometimes worked, but only on more fertile sites. As a result, the felling system varied between regions, sites and individual foresters in charge.

Something that made selective felling more attractive among foresters, who certainly were aware of the risks, was all the enthusiastic promotion the method got from some well known forest leaders and scientists. They had mainly had positive experiences from very good sites in other geographical regions and with species suitable for selective cutting. In the cold northern sites a seedling generally needs a lot of warmth and light and little competition for water and nutrients from big trees to grow. Before man arrived in the boreal forest, new forests were established after big wild fires which gave new small trees a chance to regenerate over large tracts.

In the 1930s in southern Sweden, the condition of the forests was not much better but for other reasons. There, the small scale farming economy still prevailed. Timber and wood from the forest had a low value. For many farmers the forest still had a bigger value as grazing land for cattle. The grazing prevented a good result from any cultivation of trees. The forest of course was important for the household supply of firewood, fences and building material, but felling was mostly done in a simple way without any consideration of the future development of the stand. Smaller and bigger gaps with no trees or tree seedlings, but hopefully with some poor grass for the cattle, were typical for the farm forests. The forest itself was mostly of uneven age and of low quality because of its open character. To be fair, after the 1903 act and the establishment of the County Forestry boards, conditions were improving. The board’s ambitious advisory activities had given results.

Nevertheless, taking the whole country into account, the condition of forests was far from acceptable. During the Second World War not much happened. Everyone working in forestry was occupied with bringing huge amounts of firewood to the cities, mostly from thinnings. It was positive for the standing forests but had no impact on the long term regeneration. The only forests in acceptable condition were those of some bigger estates and those belonging to the many mining companies in central Sweden. Because of their dependence on huge amounts of charcoal they had several centuries of silviculture traditions.

The County Forestry boards were responsible for all private forests. Gradually they made more and more forest owners interested in good forestry practices and more competent to manage their forest land. A County Forestry board was very independent. It often had the Governor as chairman and some good forest owners round the table. They worked less with legal means, more with advice, training, competence building and creation of good examples. It was not until 1941 that a National Board of Forestry was formed. It dealt mainly with common national matters, whereas the County boards remained fairly independent in their regional work.

The National board started by proposing a new committee for a revised forestry law and in 1948 a proposal was presented to the parliament. Within its limited scope, the 1923 act had worked as intended. The new act would not change much but add on new aspects. Some new concepts were introduced, for example that the goal of every measure in the forest should be to create more value. This meant, among other things, that a forest owner was not forced to invest more in regeneration than he one day could recover from the mature stand. This concept was accepted, but in its practical application it soon turned out to be quite theoretical and difficult to handle. After heated debates it was finally broken down into simple tables for how much regeneration costs could be legally demanded.

Another issue in the new act causing some political turmoil was the demand for “even” felling on every single forest property, i.e. that the owner should fell roughly the same area every year. There were many arguments against this. First of all because it simply did not make sense to the individual forest owner to fell the same amount every year, because he did not need the same income every year. There were years with very low prices and small demand, another owner wanted to save timber for a coming change of ownership to the next generation, etc. In the end, the formulation of this particular demand became fairly

soft. There were naturally many good arguments for “even” felling as well. Probably the idea was influenced by the political ideas of the then socialist government that had been influenced by the “plan economies” (like the Soviet Union’s 5-year plans!). In practice, the new rule of even felling had a limited impact and the market economy prevailed with demand and supply setting the price of timber from year to year and thereby influencing how much each forest owner felled.

As pointed out above, some voices maintained that the forest situation in vast areas was next to a catastrophe. The new forestry act of 1948 was of limited help. When the economy improved for the forest industry, forest managers both in companies and with the crown understood that the future rested in their own hands. The most extensive Forest restoration project ever in Sweden started. Vast areas of “green lies” were cleaned and burned. When burning an area it was good economy to get as many natural borderlines as possible, like rivers, lakes, swamps, or even roads. The regeneration areas could be very big. The burns with their black cover of ash and burned debris were planted. Sometimes seed trees of pine were saved from the fire. They gave an acceptable natural regeneration on suitable sites.

When, after some decades, most of the “green lies” had been taken care of and rational practices for seed collection, tree nurseries and plant production were at hand, the big owners of forest land in northern Sweden continued the restoration work. Now, the low producing and over-mature stands were felled and the cleared areas planted with improved seedlings of good provenances. As these rationally established forests grew into their “middle ages” (in the 1980s and onwards) it turned out that they produced about double the timber volume compared with the old and unevenly closed forest. So, in the long run, “the great restoration” proved to give a lot of more timber and be a very good business.

Lesson learnt

A forestry law should keep a good balance between the interests of the society and the forest industry and, at the same time, give enough freedom for the individual forest owner in his management. It is very healthy for all stakeholders if changes in Policy and Legislation are preceded by broad participatory discussions. That normally results in a good understanding and acceptance of consequences that are not obvious at a first glance. Such discussions also give possibilities for ideas and viewpoints from all interested actors to be heard.

The dramatic revolution in Swedish forest management in the middle of last century also shows that a good and fair legislation alone will not always solve some of the fundamental forest problems of a country. In addition, every responsible forest owner must take risks and not hesitate to invest in the long term future, where rewards will often only come to future generations. But meanwhile the potential sales value of the forest property will increase. Thus, successful sustained forest management demands a combination of good policies and legislation with a strong belief in forestry and in forest products as a long-term economic pursuit.

11.0 ”CUT OUT AND GET OUT!”

The forestry act of 1948 was aiming at a high and sustained timber production. All land not used for anything else should produce wood. All stands with too low production must be replaced by well growing new stands. Investments could not, however, be demanded from a forest owner that would not give an acceptable return. The forest owner should also aim at an even felling rate of timber over the years to provide even employment and supply of timber to the industry. World War II was not, as many feared, followed by a recession. On the contrary, in the early 1950s the forest industry experienced better markets than ever before, the so called Korea boom. For a short while prices of pulpwood were higher than ever. In company and Crown forests, the progress in silviculture and logging mechanisation was impressing - in the farm forestry slower. However, when the minister of agriculture in the social democratic government proposed a “half state/half private” organisation to support more rational farm forestry, protests from the forest farmers were very strong. Instead, a closer cooperation among the forest farmers was organised within short. And soon they met demands for higher production and efficiency in their small woodlots.

The government had ambitious ideas for further expansion of the forest industry. In the 1960s, a new forest policy committee was formed. After eight years of work it proposed a forest policy aiming at an increased

return from the forestry sector by increased felling of all slow growing mature stands. To encourage forest owners to do so, the committee proposed a system with annual compulsory charges (taxes) based on the value of the forest, combined with some contributions to cover costs for regeneration – a typical “whip & carrot” approach! There was a heavy outcry over this strongly interfering proposal and the official report soon disappeared in a drawer. The forestry act of 1948 remained and the goal was still a sustained management, not “cut out and get out”.

Lesson learnt

When an official committee proposed to fell all old forests in a short time and regenerate all stands which did not give the demanded annual return, the opposition among all actors, forest owners and forest industry alike, became strong. Forestry is a long term enterprise, they argued. Every forest owner has an obligation also to the generations to come. The principle of Sustainable Forest Management should not be given up and replaced by popular but short-sighted ideas favoured by some noisy economists and politicians.

12.0 THE THREAT OF A DECLINING TIMBER SUPPLY

The timber volume in the Swedish forests increased steadily during the 20th century. Due to the lack of reliable inventory methods, the nation was initially not quite aware of this. But from the middle of the century reliable figures could be presented by the National Forest Survey. The timber volume had, for example, more than doubled in the southern half of the country during the century, a little less in the north. But still, for many years, the forest industry did not react. The leaders were of the opinion that the industrial capacity and the sustained production capacity of the forests were in balance. The first to react were the forest farmers in southern Sweden. They understood that the value of their growing timber was dependent on the demand for timber and that an oversupply would result in lower prices. In order to strengthen the future value of their forests they started something that was never done before, they cooperatively developed and built industries of their own - sawmills, mills for prefab houses, boards and for pulp and paper, the last ones among the biggest in Europe. The private industries immediately reacted on this unexpected action from the Forest Producers Cooperatives and started to expand their own capacity as well by also building new mills. This happened mostly during the 1960s and because of the rapid expansion of industrial wood requirements, doubts started to be raised on the possibility of a sustained supply of wood for the industry. In 1973, for the first time ever, the volume of wood felled in Sweden was bigger than the growth.

Eight years of committee work now resulted in a proposal quite different from what the sector had expected. The increased timber demand had brought the problem to its head. Perhaps fellings were already exceeding the sustained growth capacity of the forests. To add to this fear a report from the inventory experts indicated that the age-distribution in the forests was such that in the next 20-30 years a temporary “dip” in tree harvesting could be anticipated. Reduced felling must be accepted for a while. The government, expecting future losses of export incomes, again formed a committee. A first task was to investigate if the present rate of felling was sustainable and what could be done to increase future wood production. In other words, the policy now became contrary to previous ideas to “cut out and get out”.

The committee proposed a long list of actions:

- Three different levels of intensity in forest production were presented. The committee recommended the most intensive one. But still it could only supply the industry with 90% of its full capacity wood demand. This intensive level was accepted and included the following:
- The forest owner must fell all slow growing or low density stands and replace them with fast growing and well stocked ones.
- The forest owner must, after advice from the forestry board, fell and replace older, mature stands and replace them with fast growing ones.
- The thinning/clearing of too dense young growth should be compulsory.

- The committee proposed a compulsory annual deposit into a forest account to be used for regeneration costs after final felling. This proposal was turned down as being too complicated in administration. As expected it got the forest farmers furious.
- The National forestry board should make a rough survey of the silvicultural position of all forests.
- The State should support a number of actions aiming at a higher timber production, such as development of working plans, planting of abandoned farm land, and draining and fertilising of bogs and wetlands.

In 1979, after negotiations with all parties involved (the forest owners, the industry, the unions, environmental groups, etc.) the government proposed a new Forest act that included most of the proposals above. However, detailed regulations for increasing the production of wood had still not been added. The supply of timber to the forest industry was still in apparent danger. The government, eager to increase production and export, and also pushed by the trade unions, added new demands on the forest owners, again proposed by an official committee. A demand on thinning of all dense stands was introduced. The demand on felling older, slow growing stands was sharpened. And now it also became compulsory that every forest property should have a comprehensive forestry plan. With these amendments to the act, it became the most production oriented and the most regulated and detailed ever. It seemed more like a silviculture instruction book than a legal act. It also included fines and possibly even prison if the forest owner did not comply.

In the 1980s that followed, the general attitude towards forests changed. A few bad years for the forest industry resulted in less felling. Added to this was the fact that there was actually a higher growth in the forests than was anticipated. An increased import of timber from Russia and the Baltic states softened the pressure for increased felling. The future “dip” in timber supply was suddenly no longer a threat. Apparently the dynamics of the forest had been underestimated by all actors.

At the same time, something else of great importance had happened. The environment groups – often supported by the State agency for nature protection – had been very active during the 1970s in several much noticed and dramatic actions against the use of herbicides in the forest and against the vast “and ugly” new areas of clear-felled land. During the 80s, the environment ideas got their real break through and became a strong force in society. Consequently, the criticism against the radical methods practiced in the forests continued to grow, normally with the support of media, sometimes reaching the force of full storm. Many of the environmentalist opinions were diametrically opposite what the parliament had just decided. A striking example: instead of state subsidies for drainage by ditching wet forests to doubled wood production, the environment groups proposed, and got, a strict ban on all ditching. “Swamps and wet forests are most important for the biodiversity, especially for birds, herbs and insects”, they argued. A new committee was formed and it soon delivered a proposal for a new forestry act, in place in 1994.

Only fifteen years after the forestry act with the most detailed regulations and directions ever, Sweden got a new act with very few directions concerning silviculture. The public opinion had now turned more in favour of good environment and of biodiversity conservation than of high wood production. The committee also reported that all the detailed directions had not led to increased fellings. Timber prices had by far a much stronger influence. In the new 1§, the management of forests in Sweden had two equally valued goals – to maintain a high and valuable wood production and to preserve a rich biodiversity. Most of the earlier very detailed directions were abandoned, no more legal duty of cleaning young growth and of thinning younger stands, no more protection of younger stands from final felling, and restrictions on felling or keeping mature stands were abandoned. All these restrictions had not been wrong but the idea was that they should not be needed in a law, but rather be formulated as recommendations. Most of the forest owners now had the competence to implement good management without legal regulations. Biodiversity is also enhanced if forest management vary between different estates.

It would be wrong to give the impression that the Forest act of 1994 is a short and poor text, not really needed at all under the liberal policy of “freedom and responsibility” for the forest owners. On the contrary, the act is full of recommendations, reminders and examples to assist the forest manager. Not least, there are detailed sets of advice and comments about forest environment and biodiversity. There is also advice on forest regeneration and protection - especially against damaging insects – and on the protection of special habitats and of the cultural heritage found in the forest landscape.

Lesson learnt

To grow a forest is a long term enterprise, especially in northern Scandinavia where a seedling may be ready for harvest only after 120 years or more. For many external observers it may be astonishing to follow the history of Swedish forest policy as outlined above. Instead of being guided by solid ideas with a perspective of at least 100 years, policy ideas and policy makers have come and gone, sometimes with very short intervals. It would be easy to accuse politicians and their “four-year view“of things, i.e. the time between parliamentary elections. But in this case they alone should not be blamed. Swedish forest policy is normally formed by many actors inside and outside the Forest sector – forest owners, law makers, researchers, professional staff, industry, unions, environment groups, etc. Only to a limited extent were forest policies created by the political parties.

The lesson learnt is to hold a steady and sustained line in forest policy, start by replying to the questions “what are we going to use the trees for, Forestry for what”? The main policy of the County Forestry boards is to train and stimulate the forest owners, also to give them both responsibility and freedom. This policy has proved to be more successful than a battery of detailed legal demands because they are difficult and costly to control and they do not enhance diversity. No site in the forest can be found that is an exact copy of another.

13.0 ENVIRONMENTAL ISSUES

From a cautious beginning in the 1960s the debate on forest management practices increased. Environmentalists criticized many of the practices in modern forestry. Among the most prominent issues was the increase in clearfellings in northern Sweden and particularly the vast size individual clearings. This was mainly the result of the ambition to restore vast areas of low productive stands as a result of selective cutting over many decades, and do it within a short period of time. In the 1960s – when selective cutting was totally abandoned - the clearfelled area doubled. Some local people were among the critics, as was the reindeer trade (the same people), nature conservancy groups and even the government environment agency.

The issue of the vast desolate clearfelled areas became so “hot” that the government was politically forced to do something. As usual, a special committee of politicians and experts was formed and they worked from 1972 to 1974. Their report brought the discussions to a more factual and less emotional level. The committee concluded that clearfelling followed by planting was indeed the most appropriate method when regenerating the boreal conifer forest, but also that much could be done to make the felled areas smaller and better adjusted to the landscape. For a period it had been a virtue among forest manager in northern Sweden to make the felled areas as big as possible. Costs could be lowered both for logging and regeneration by applying an “economy of scale” and forestry was under economic pressure at the time. From the mid 1970s, however, each felled area became smaller, but the number of clearfellings increased. There were also increased efforts to get a more natural adjustment of the fellings to the landscape. The practice of ploughing (deep scarification) with heavy equipment before replanting the felled areas, which improved survival and early growth of the young seedlings, was much opposed by other interests, not least by the reindeer trade. The committee proposed that the ploughing practice be restricted by a compulsory need for permission from the County Forest board. Another proposed restriction was the demand that the forest owner give notice to the County Forest board in good time about plans for final felling (still valid), the idea being that the board would then have a possibility to act if the plan for any reason could not be accepted. All these proposals passed the parliament. To get a good and sustained yield on normal boreal sites, the land has to be prepared - burned or scarified - and planted. Natural regeneration from seed trees could be utilised wherever feasible.

In Sweden, like in many other forest countries, the biggest controversy between forestry and environment interests during the 70s and the 80s was about the use of chemicals – insecticides and herbicides. As in many European countries the Pine weevil – if not controlled – caused serious damages, often fatal for the newly planted seedlings. DDT was widely used and it was effective even in very small amounts and concentrations. The damage on the habitat, if any, was marginal because of the very small doses over huge areas. However, DDT had been intensively used by people for a long time, both for other commercial and household purposes and often in high concentrations within limited areas, and it had gradually become a

threat to public health. A total ban, without any exception for forestry, was introduced. Unfortunately, forestry was not prepared for this ban and it took a couple of years before an alternative was developed. On most felled areas the survival rate for seedlings went down from 70-80 % to half of that resulting in costly losses to the forest owners and the national economy. After a while, less dangerous insecticides were developed together with other methods. But the pine weevil is still a major threat and the presently used insecticide, permitrin, is banned from 2005.

However, the debate on plant protection insecticides was peaceful compared to the issue of herbicides at the same time. The private companies and the Crown in the northern half of the country – where they dominated the ownership of forest land – had serious problems with all the broadleaved brush (mainly birch and aspen) that suppressed the newly planted conifer plants on most clearfelled areas. The spraying from aircrafts or helicopter with low concentration herbicides was widely used and effective. Soon, however, a strong resistance against the practice developed among local people and the general public. A visitor to Swedish forests has the right of public access to private land - to walk in the forest and pick berries and mushrooms irrespective of owner. They did not want “their” berries or themselves to be sprayed with chemicals from above. Harvesting sites and air strips were “occupied” by demonstrators. Although there was no proof of damage from the herbicides to humans, they were banned for use on any forest land in 1984. In practice, very small amounts of chemicals had been used in forestry since 1980 (the same kind of chemicals are still widely used in agriculture and horticulture!). Today, broadleaved weed growth on clearfelled areas has to be mechanically removed with hand- or tractor-carried tools. Despite being much more expensive than the previous air spraying with herbicides, there still is an advantage with the mechanical methods - some hardwoods are now left among the conifers, where they fill in gaps in the canopy and foster the conifer tree quality by competition. Nowadays, hardwoods are also accepted by the industry, mainly for pulp production, a development that is valued by both environmentalists and foresters.

Finally, another issue of special interest. In the forestry act of 1979, the one that aimed at increased production, there was a regulation concerning stands with few or low quality trees, badly utilising the potential growth of the sites. Such stands must be removed and replaced by good conifer trees and the Government subsidised that replacement. Among these stands there were, unfortunately, former grazing meadows with scattered big broadleaved trees. To the urbanised Swedish people, such landscapes were memories of the way their grandfathers had practised farming and animal husbandry. The replacement of such beautiful, but economically useless, meadows with dense, dark spruce plantations caused a storm among the general public and strong calls for banning such actions.

The different issues mentioned above are some of the most noticed in the intensive media debates between production and conservation interests. Foresters, both in the private and public spheres, were normally on the defensive trying to explain to the general public the benefits and sometimes necessity of many of these practices. However, it comes as no surprise that the public, the vast majority of whom today are urban non-forest owners, value the recreational and aesthetic aspects of the forest higher than the economic benefits, and therefore that the public, with strong support from media, often took the side of the environmentalists.

Lesson learnt

The forestry sector learnt a lot during the bitter debates with the environment interests, a very motley group ranging from the state environment agency via “normal” environment NGOs to revolutionary left wing activists organisations. To start with, the forestry side – often represented by the big companies and the producers cooperatives – met their critics by telling them that they were wrong and that only forest managers had sufficient knowledge, competence and experience on how to handle forests. They invited their critics to be informed and educated on “true forest practices”, not for dialogue.

Naturally, the critics were not very impressed. They had very limited interest in scientific proofs for this or that, they were just anxious about the spraying of chemicals and the felling of trees for as long as an eye could see - “this is an act of violence against nature”, they claimed. The two sides could not meet; they simply talked too different business languages.

After some years, however, the forestry side understood that the problem was not lack of factual knowledge about forestry among the environmentalists. It was more a lack of trust between the two sides. Even if the risk of damage to humans from insecticides was negligible when picking berries in the woods, people’s anxiety was real. “Violence against nature would sooner or later hit back and punish mankind”, the

environmentalists asserted. During the discussions, forestry representatives understood that they had to listen more carefully and try to better understand the other side. Gradually, the two sides could start a dialogue as the understanding for the views of the other side grew. The forestry side even considered the possibility of changing some of the criticised practices, even if it would increase their costs. Forestry could adjust its practices, and in the end such changes sometimes turned to advantages, not least from PR and public trust points of view.

To listen to the people on the other side of the table, to try to understand their viewpoints, to start a dialogue, and to adjust practices in response to wishes of other legitimate interests – these are some of the lessons learnt during the long period of confrontations between forestry and nature conservation interests.

14.0 THE CROWN AND THE COMMONS

The oldest documented type of forest properties we know about are the commons. They are of different kinds. The most typical from many aspects are “the District Commons”. They are mentioned already in the first Swedish laws we have some knowledge about, documented in writing during the 13th century. These commons were owned by all farmers in an old legal land and legal unit (“district”) regulated by a district court that included many parishes. From time to time, the legal ownership of a common was questioned, however. The great nation builder Gustav Vasa (1496-1560) had plans to put all commons under the Crown but he gave up the idea because he already had a lot of trouble with stubborn farmers.

During the following centuries, further detailed regulations were included in the laws also for the commons. In a longer perspective, many of these regulations were to the benefit of the farmers because they aimed at preventing destruction of the forest. In some areas, timber and firewood were much needed and so was forest grazing for the cattle. The law stood for a sustained management. In the 18th century, the restrictions for the farmers increased and the resulting bureaucracy flourished. It was decided that the management of the commons should be under the responsibility of the Crown forestry staff. In practice the commons were looked upon as a kind of Crown land by the state, but not so by the farmers. They still regarded themselves as the only and legitimate owners.

In the beginning of the 19th century the situation started to change, following the general trend of liberalisation in that time. All kinds of trade restrictions should be abandoned. Also the state would profit if everybody were allowed to work and handle his own enterprise in freedom it was argued. So, the state no longer laid any claim on the commons. A new law even permitted farmers to split their common and distribute the land among them. About 40% of the commons took the chance. But very soon even the liberal politicians realised that it was a mistake. The small pieces of forest land that every partner in the common got were often soon cut and cleared. Forestry leaders, governors and others now stopped further distribution of commons to secure sustained management.

As late as in the first decades of the 20th century, land tenure experts once again disputed the proper legal ownership of the District Commons, today over 60 in the country. In 1934, finally, a new law and regulation stated that the commons are owned by every farm in the district but managed in common. Today, there is no state forest agency involved any longer! The commons have their own management board and forest organisation. They often use consultant firms for the activities. Naturally, the commons have to follow the forestry law, like all other forest owners. There are different kinds of commons but they are all regarded as a rational and democratic kind of ownership. Previously, owners got their dividends in the form of precisely prescribed amounts of wood and grazing. Today all the logs harvested are sold and dividends are paid in cash.

Lesson learnt

Throughout history there are many examples of cooperative ownership. The commons presented above are of very old origin. When land was first settled the farms and villages occupied the better land while forest was left on poorer sites, sometimes far from the villages. For a long time, forests were regarded as common assets. They could be used by every farmer but under strict and agreed rules to avoid misuse. During their often more than 800 year long history, the District Commons have been regulated by the state in various forms, often for control of state property inside the commons (the protected trees). In the last two centuries

the state had another ambition – also guided by national interests - to establish a sustained forest management. This was also to the benefit of the owners.

Thus, the state involvement has had some positive effects, even for the owners. At the same time, to stay independent has become an advantage for the many owners today. The owners today elect members with good forestry experience to the board of a common, and many commons have a higher timber volume per ha than corresponding Crown forests, an effect of good sustained management. The district commons have proved to be a rational alternative for a forest enterprise.

15.0 SMALL OR BIG SCALE FORESTRY

Up to 1950, logging was done in a traditional way – felling, limbing and cross cutting with axe and handsaw, skidding and transport to a landing site by sledge and horse, preferably during wintertime. Small and big scale forestry used the same simple harvesting technology. The small scale forest farmer had an advantage, however. He lived near his forest; he used his own horse during the winter for timber transports and for farming in the summer. He himself worked with agriculture in the summer and with forest (his own or some others) in the winter. However, from around 1950 things changed. Big scale forestry (the Crown and the companies with 50% of the total forest area) started a well organised and purposeful rationalisation of methods and equipment. Chainsaws were introduced as well as tractor transports. The harvesting costs could be controlled in spite of fast growing manual labour costs. The small forest farmer could not easily use the new, expensive (and labour saving) methods. Small scale forestry was regarded as old-fashioned and lacking a future. A government minister supported by the labour unions proposed an organisation administrated by the state to make it possible even for the small forest owners to gain from the fast technical development. The proposal was loudly opposed. Through the history Swedish farmers have always been suspicious to all kinds of state interventions.

At the same time, the forest owners and their organisations understood that they had to present a better alternative of their own. To avoid being bound by the state or by the big forest industry companies, they started to organise cooperation in so called “forestry districts”. Through these, the small forest owners could also use modern logging methods and jointly hire personnel for silviculture and planning. Soon, the forestry districts covered all private forests and became the basic local unit for the Forest Producers’ cooperatives. As the membership is voluntary, the forestry district did not include every single owner but a majority of them.

In 1950, the opinion was that the forest farmer family should be able to have the farm as the base for their living also in the future. The farm should give the farmer couple full time occupation and feed a family. Mechanisation should make work more productive. Unfortunately – or fortunately – logging equipment became more and more efficient and to give an owner a year around occupation the forest area worked on must be bigger and bigger. This was economically made possible by logging becoming a very specialised activity which today is mostly handled by private contractors with their own and very expensive machines rather than by the individual farmer. The forest farmer is still left to do some physical work, such as planting, replanting, clearing, cleaning, the first early thinning and perhaps some pruning.

But to be fully occupied on the family property alone will today need very big farm and forest areas. Instead, small farmers have to take jobs of any kind outside his/her farm, and the same for the spouse. Today, the most common situation is that the forest owner has another full time occupation; he/she often lives in a city and uses the farm more as a hobby and for holiday living. There is little discussion on whether big or small scale forestry is best for the nation. The present distribution on ownership of the Swedish forests is regarded as a good balance and as a historical fact. If any type of ownership today is looked positively upon, it is the smaller private holdings. If the owner and the family permanently live on the farm, they contribute to keeping the countryside alive which is appreciated by the government today when well over 90% of people live in cities and towns and the shrinking population of an already thinly populated countryside is considered one of the crucial problems for the society.

Lesson learnt

Technical and social developments are not always easy to predict. In the 1950s and -60s great efforts and big amounts of public assets were used on making the configurations and sizes of forest holdings more rational for management, e.g. by clustering several smaller farms into bigger ones. Today, such endeavours are only of limited use. Nowadays, management and logging operations are often planned across property borders by cooperating owners (or their contractors). To change old and sometimes odd property configurations has proved to be both costly and time consuming. With the very sophisticated methods and tools of today for surveying, planning and the geographical position systems which the logging machines are equipped with, the problems with small farms and odd property configurations can be handled easily today.

16.0 GOALS FOR THE FORESTRY SECTOR

For many years, Sweden supported some developing countries with the goal to assist in building a modern forestry sector. As a first step, such a country had to make a national forest plan and clearly set out the goals for the forestry sector. These documents were normally compiled by consultants in cooperation with the domestic forestry staff. In the planning offices of many capitals piles of such plans covered with dust can still be found. Often, an ambitious plan has been a condition for further support or loans. With this in mind it should be expected that Sweden must be an outstanding example of having well elaborated plans and goals for its forestry sector. However, we can not find much of this.

In our history, however, there are some examples of very tough and practical planning of the forestry sector by the government. During the great wars in the 17th and 18th century – in which Sweden unfortunately took a very active part – the export earnings from the mining industries (mainly iron, copper and silver) had a decisive importance for victory or loss on the many battlefields. Thus, the government had to give exclusive forest concessions to mining companies – and to nobody else – to use large, specified areas for their supply of charcoal and timber. In areas with no mining industry, concessions for exclusive timber rights could be given to a sawmill company. At the same time, the common “slash and burn” practices among poor crofters and settlers were often banned to save the forests for more “important” uses (than just keeping poor people alive). These periods of hard regulations and planning of the use of the forests were later on replaced by very liberal rules. But sometimes these became a serious threat to the forests, and therefore harder restrictions had to be reintroduced.

The present official position when it comes to plans and goals for the Swedish forestry originate from when the parliament passed the present forestry act in 1993. The Government then ordered the National Board of Forestry to work out more precise goals for the forest sector. This was done but these goals did not become very precise. They are more general good intentions and they were instead called “goal outlines”. Most of them could be found in any good handbook on forestry and several reflect the present general policy giving more priority than before to environment issues and nature conservation. To illustrate this, we cite a few examples of the “goal outlines”:

- The forest must sustainably produce a multitude of values.
- Wood production will continue to be dominated by conifers but with more broadleaves than today.
- Silviculture will result in a wood production that allows a sustained higher level of future felling.
- Regenerations will have a density and a quality that will utilise the capacity of the site, the same with young growth forests.
- Cleanings and thinning are carried out in the right time and way.
- Consideration is given to the environment and to cultural values.

From the “goal outlines” a number of more specific “sector goals” are presented, such as:

- Actions for regeneration must be taken three years after felling.

- Natural regeneration from seed trees are used on suitable sites.
- The annual area of young growth cleaning will be at least 275,000 ha (about 1.2 % of the total forest area), this is the only “goal” expressed in figures.
- At least 90% of the thinned area will have a basal area that corresponds to the recommendations of the forestry board.
- Clearfellings must fulfil at least the demands by the forestry law concerning considerations for environment and cultural values.
- The amount of dead wood and big, old trees left standing after felling (especially broadleaves) should be bigger.
- A larger part of the forest land is left untouched. (When these goals were presented there were already 800,000 ha reserved and protected forests. The present goal of the government is another 500,000 – 800,000 hectares reserved and protected, mostly on a voluntary basis).

None of these “goal outlines” or sector goals is, in principle, controversial. They have been agreed upon after deliberations between the forestry board, forest owners and other actors. They also mirror the public opinion’s support of a good environment. The Swedish forest policy has gone through spectacular changes. Less than twenty years ago, everything should be done to favour an increased wood production, whereas today many new restrictions have been put in place that actually substantially limit wood production.

The emphasis on environmental goals is not only a result of opinions in the parliament. The strongest pressure is coming from some environmental groups like Greenpeace and the Swedish Association for the Protection of Nature (SNF). One of the biggest customer countries of the Swedish forest industry is Germany where, some years ago, environmental NGOs invited to a press conference where they announced that the Swedish Forest industry delivered paper to the big German newspapers made from the last remaining virgin forests of Europe. If the German papers did not cancel such purchases, the NGOs would start a protest campaign among the millions of their readers. The campaign was started by a few clever activists in northern Sweden.

The Swedish forest industry was naturally chocked. Even if the statement “Europe’s last virgin forests” was far from correct, the company directors soon ordered their forest departments to comply with the environmental groups. Later, a dialogue started between the two sides that finally resulted in an agreement on a Forest Certification Scheme. Together, the parties agreed on detailed rules for a forest management that preserved biodiversity. These voluntary agreements went somewhat further than the goals and recommendations from the national forestry board and what was demanded by the forestry law. The harder restrictions have been estimated by the forest companies to correspond to 15 % of an optimal wood production from the forests. For a private forest owner, to get a forest certification, the rules are a little bit different.

To stress environmental issues, the government – not the national forestry board – presented a special environment bill in 2001. It covered all sectors of the nation and was another kind of “plan”. A few examples of relevance to the forestry sector can be given on what the government wants to be accomplished before 2010:

- Another 900,000 ha should be excluded from active forestry operations.
- The amount of dead wood should increase by at least 40 %.
- The area of mature broadleaved forest should increase by 10 %.
- Old, mature stands should increase by 5 %.
- All kinds of broadleaved stands must increase.

Forest owners have not really protested so far. Some are even aiming at higher targets. They probably do not take the presented figures too serious; they are regarded more as an expression of long-term intent. Everybody understands that a follow up will not be easy. Demands on the environment are, unfortunately, unevenly distributed geographically and “socially”. Forest owners with their forests in the Baltic

archipelago could, for example, lose a big part of their forest to nature reserves and, even if they are paid some compensation, the farm may no longer provide a basic living for a family. However, among private forest farmers today there is a growing feeling that the government, to satisfy a perceived popular opinion, is ready to risk enough wood production to keep the nation's forest industry competitive.

Lesson learnt

Forestry today is in a phase of transformation and so are the goals – from an orientation towards high timber production to a management with more emphasis on nature conservation and other environmental values. Therefore, it might be too early to evaluate “lessons learnt” from this development. Compared to the earlier, hard confrontations between the production and the conservation interests, the process so far has been fairly uncontroversial. Certainly, one reason is the continuous dialogues between the two interests, often in connection with the agreements on Forest Certification. In its cooperation with developing countries, Sweden has often demanded plans and goals as a condition for its support. As commented above, Sweden itself has apparent difficulties to set up clear, quantitative and qualitative goals for its own forestry sector. They are all formulated in quite general terms. In practice, it is no specific actor's responsibility to develop and implement plans and goals, and this has reasons. Swedish forestry and forest industry are active parts of the global market for forest industry products where the normal position is one of ever changing business situations. Periods of high production and good profits can change to low output and bad losses in a short time.

The first paragraph of the present forestry act also support the difficulties to compile more concrete goals: “The forest shall be managed in such a way as to provide a valuable yield and at the same time preserve biodiversity”. Thus the goal is not to achieve certain quantities or values; instead it is to achieve a good balance between the two sides of forestry – wood production and a sustained biodiversity. The actual balance achieved is, in the end, a political question – some will always ask for a higher production with better employment and export incomes. Some will always ask for more conservation.

One lesson so far learnt is that too much time should not be invested in computing quantitative plans and goals for the forest production to come. Most actors agree that, as before, priority should be given to information and training in the noble art of producing high quality timber and still preserve an acceptable biodiversity. A good help to proceed towards our very general goals is also to continue the friendly dialogues between production and conservation. New ways may be found in the future that favours all interests in the forest debate.

17.0 FOREST GRAZING – A COLLISION BETWEEN FARMING AND FORESTRY

Less than 150 years ago, the more populated areas of rural Sweden had a different structure than today. As is still the case in most parts of Europe, farmers normally lived in small villages, often in a dense cluster of barns and farm houses. Around the village were arable fields, mainly on good soils. In every field each farmer in the village had a certain part which he managed himself, often in a fairly narrow strip. The system made it necessary for the village to cooperate after strict rules.

Much of the subsistence relied on the animals - cattle, sheep and goats. During the summer season they were let to graze in the outlying common land of the village, mostly a thin and mishandled forest. The most crucial problem for the farmers was to collect enough fodder in the barns for the long and cold winters when all land was frozen and covered by snow. The cattle had to be kept out even from the meadows before the hay was harvested.

A crucial task for the farmers was to keep the cattle outside the arable fields and meadows. Another problem was also to prevent that the cattle from disappearing into the woods of some neighbouring village. To herd the animals was not common and not easy. The most reliable solution was to fence the different kinds of land to keep the cattle out from the fields and meadows, and at the same time to keep them inside the joint outlying woods of the village. The task took a lot of work and resources from the village. Every farmer was given a strictly stipulated length to fence. All over Scandinavia the same and peculiar kind of fence was used – the so called “split rail fence”.

This kind of fence has probably been used for nearly 1000 years in the Nordic countries. It is a pure wooden structure. The rails – mostly of thin and split stems of spruce – are set in a sloping position between pairs of stakes that are fixed into the ground. The height of the fence and the distance between the pairs of stakes used both to be around 1,2 meter. The necessary standard of the fence was already given in the first Swedish national law of year 1350. Not much changed over the years.

The organisation of farming remained the same throughout the centuries until 1827. A new Enclosure act passed the Parliament and it had a heavy impact on farming. Instead of having scattered strips in every field, now every farmer got all his land in – if possible – only one plot. Farmhouses and barns were moved out to the new properties. The villages were split. The outlying woodlands were split; every farmer got farmland and woodland of his own to manage. The reform was initially resisted by the farmers. Especially the social values of life in the villages were missed. But after a while, most people understood and appreciated the great advantages of the reform. The agriculture got a stimulation never seen before.

A less desired result of the reform, however, was the influence it had on the forests. To start with, still more fences had to be built. Previously, the farmers were responsible to fence the animals out of the arable land. With a new fencing act the farmer was now responsible for his animals never coming out of his property and into the land of a neighbour. Now he had to keep his cattle inside his fence. The need for wood increased and by that the pressure on the forest. Building of new farmhouses and barns took a lot of good timber, already in many places in scarcity. The new houses were often built bigger than the old ones, more firewood was needed. With bigger herds of cattle on more restricted woodland areas the grazing became more aggressive. Seedlings had less chance to survive. The forests of the farmers lost in wood volumes and quality, but farmers did not care very much. Fewer trees gave a better grazing, they figured.

But towards the end of the 19th century the nations and even the farmers' opinion of the potential of forestry slowly changed. The forest industry – sawmills and pulp mills – had grown fast and successfully, logs were increasingly more valued. Grazing in forests owned by the state or by the forest industries was more and more stopped from the foresters' side. They generally claimed that the grazing was actually illegal; farmers on their part said they just maintained an old right. In 1903, the first Forestry act was introduced and the County Forestry boards were formed. One of their main tasks was to separate forestry from farming. Intensive forest grazing and sustained and well producing trees, did not match, was their message.

The tension between animal husbandry and forestry was especially strong in many of the District Forest commons. For the many owners it was an old right to use their common for grazing. However, normally a common by law had a state forest officer to overlook the forest management. They tried to convince the farmers that cattle grazing in the long run would be a serious loss for themselves as tree growers. At the end of the 19th century the professional foresters managed to stop most of the grazing in the commons.

Luckily there was a similar trend on the agricultural side. Cattle, running all day long in poor and stony woodlands looking for any straws of grass, remained bad milk and meat producers. Given water and good grazing from cultivated fields and meadows, or stalled in the cowshed even during summer, the milk and meat production was much higher, both in volume and quality. With more and more areas of cultivated grazing, this fact became obvious to more and more farmers. The controversy between forest grazing and wood production slowly faded. Especially information campaigns and field visits organised by the County Forestry boards had good effect. During the 1930s, the forest grazing almost disappeared. It was never made illegal but it was soon regarded as old fashioned. The problem was solved. Both sides were satisfied. Especially satisfied were the many farmers, because after some decades of good forest management – with no cattle around - many of them got a higher net income from their trees than from the farming and animal husbandry together!

Lesson learnt

There are many good possibilities to combine farming and forestry. Traditionally, the Swedish farmer used to work on farmland summertime and in forest wintertime - on his own forest land or hired as forest worker by somebody.

We are fully aware of the success in the tropics of the Agro Forestry concept. In all such cases crop and animal husbandry on the one hand and tree growing on the other are well planned and adapted. Instead of competing, they support each other. However, in the case of forest grazing in the Nordic countries, animal

husbandry and forestry were destructive for both - the cattle got poor grazing, the forest bad regeneration. The combination was once used when the forest had a low value and the animals were the main means of survival.

With the expansion of the forest industry, good long term prospects for wood production increased. It was quite understandable that peasant farmers initially looked more at the short term benefits than at the gains in a distant future. The responsible authorities would perhaps have preferred stricter laws to improve the situation at an early stage. Instead, information, persuasion and exposure of good examples were the pedagogic means used. The responsible authorities were convinced that all involved soon would realise their own best because future income would benefit the owner, or his children. Thus resistance and bad feelings were avoided. Trusted ownership of land is very crucial.

Another example where many forest farmers have divided interests is hunting versus forestry. Good hunting requires optimal and healthy populations of game. If the game populations – in our case mostly moose and roe deer – are just a bit too big, the damages on young conifer plants can be very expensive for the forest owner. Often, however, the forest owner himself is a hunter or gets a good income from his hunting tenants. In most places, the problem of a good balance between game populations and forestry is not really solved. The present general opinion in Swedish forestry is that damages from game quickly must be brought down.

Another, more odd, combination of grazing and forestry is quite successful considering the big areas involved. It is the reindeer management handled by the same people. During summertime, reindeers graze in the open mountains on high altitudes. During the long, cold winters, with the land covered by snow, the herds of reindeer slowly moves through the forest down to a line not far from the Baltic coast. During this half year of moving, the reindeer mainly feed on lichens from trees and from the ground deeply covered by snow. Few damages can be found on the seedlings, but the same people sometimes complain about forestry measures that decrease the amount and availability of lichens.