

Outlines of Finland's Forestry
and
Forest Policy
by
Viljo Holopainen

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PREFACE

The purpose of this booklet is to give a short, overall picture of forestry in Finland in order to help foreign visitors orientate themselves. This, the second edition of the booklet, has been updated by the original author, Prof. Viljo Holopainen. The Society of Forestry in Finland hopes that the booklet will fulfill these

aims and, at the same time, extends its sincere thanks to Prof. Viljo Holopainen for his excellent work.

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INTRODUCTION: THE INDUSTRIAL REVOLUTION REACHES THE FORESTS OF FINLAND

Finnish forestry and forest policy form close links with both forest industries and agriculture. The forest industries have decisively influenced the general motivation and intensity of forest policy whilst agriculture and agricultural policy have greatly affected the pattern of forest ownership and indirectly the means of forest policy.

The idea of protecting forest resources was introduced as early as the 17th century but forestry in its present form did not materialize until the middle of the 19th century. The advent of the Western European industrial revolution increased the demand for sawnwood in Finland. The barriers to sawmilling introduced during the era of mercantilism — mainly log quotas and a ban on building steam sawmills — were abolished by 1861 and a rapid expansion of sawnwood production and exports took place. The basis of the wood-processing industries was strengthened by mechanical and chemical pulping in the 1860's and 1880's respectively. The forest industries quickly became by far the most important export industries of the country and they provided a powerful stimulus to the Finnish economy.

As a result the forest resources of the country were seen in a new light. Concern over their depletion was no longer unjustified as it had been in the period of mercantilism. *Forestry now assumed a new and valuable function as the base for the country's most important exports and forest policy became an integral part of national economic policy.*

The gradual growth of new thinking during the latter half of the 19th century is shown by the organization of a permanent forest administration (1859), the introduction of higher forest education (Evo Forest Institute 1862), the establishment of several forest committees (1873, 1876, 1881, 1896) and the enactment of the first forest law (1886).

New branches of the forest industries have been established during the 20th century. The first plywood mill was erected in 1912, the first mill manufacturing fibreboard in 1931 and particle board in 1957. The 20th century has also seen the development of a versatile paper and paperboard industry.

Forest industries in Finland are typical *export industries*: at present about four fifths of their products are exported. Figure 1 illustrates the development of the *exports* of the main categories of forest industry products and their share of the total value of exports in 1960–1981. It can be seen that the forest products accounted for 75 per cent of the exports in the early 1960's. Since then this share has decreased to less than 50 per cent due to the more rapid expansion of other industrial sectors (e.g. metals, engineering, shipbuilding and textiles). When considering Finland's role in the *international* forest and timber economy one quickly realizes that while our contribution to the world production of forest products is very modest, it is much more conspicuous in terms of world trade. At the European level, Finland's role is quite appreciable both in output and exports as shown in the following statistics from 1981.

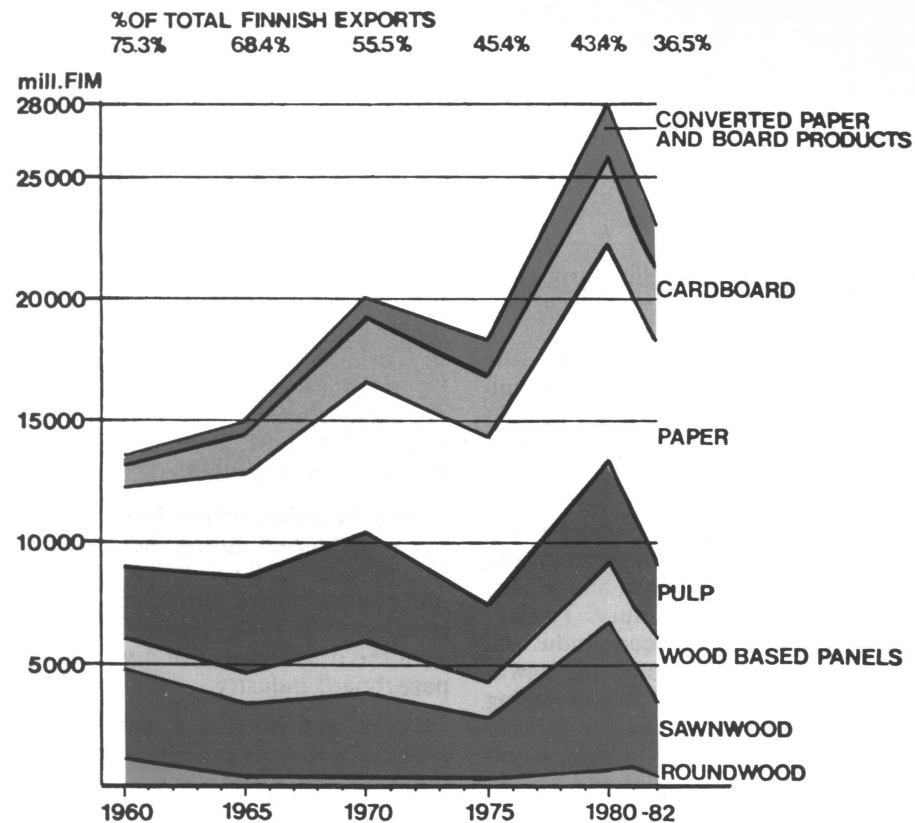


Figure 1. Exports of forest products and their contribution to total exports 1960–1982 in 1982 prices (The Central Association of Finnish Forest Industries).

Finland's contribution to the output and exports of some forest products in 1981 (FAO: Yearbook of Forest Products)

	Sawn soft-wood	Ply-wood	Wood-pulp	Paper and paper board
	Finland's share %			
World Output	2,7	1,6	5,8	3,5
Exports	8,8	7,4	8,2	13,8
Europe Output	12,5	17,9	24,2	12,3
Exports	27,4	37,4	25,0	26,0

It can be seen from figure 2 that Europe and particularly the EC region is the main market for Finnish forest products.

The growth of forest industries has indirectly stimulated the development of the Finnish *engineering industries* by creating a demand for wood-processing machinery and by encouraging research and development activity in this field. At present Finnish machines for forestry and the wood-processing industries enjoy a world-wide reputation and their exports play a substantial role in Finnish trade.

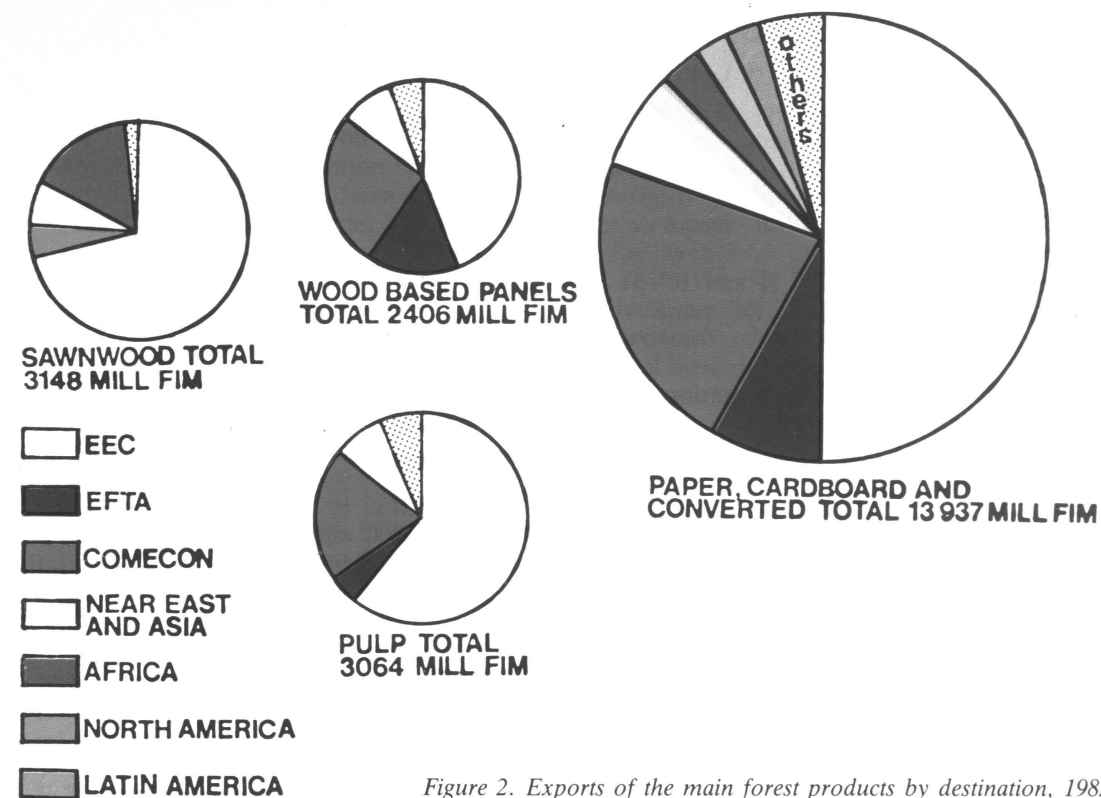


Figure 2. Exports of the main forest products by destination, 1982.

The export of "know-how", i.e. expertise in the field of forestry and wood-processing has made much progress in recent years and special consultant firms have been established to carry out market and resource surveys, fea-

sibility studies and to make detailed plans for mills and industrial communities. The market for this activity is world-wide and includes the industrialized as well as the developing countries.

1. NATURAL CONDITIONS FOR FORESTRY — GREAT REGIONAL VARIATIONS

Finland's location (60°–70° N and 19°–31° E), particularly its considerable latitudinal range creates particular problems for forestry and forest policy. Finland has a sub-arctic location and is at the limit of human habitation. A considerable part of the country, about one third of its total length, lies north of the Arctic Circle. Its position in relation to other countries is illustrated by the fact that the northernmost part of Finland lies in the latitudes of central Greenland, the northernmost borderlines of the Northwest Territories in Canada, and Alaska in North America and north of Verkhjansk in Siberia. The latitude of the southernmost tip of Finland intersects the southern tip of Alaska in North America and Yakutsk in Siberia.

The surface area of Finland is 337 000 square kilometers (130 000 sq. miles), of which 31 600 square kilometers are lakes and rivers.

Most of the country lies below an altitude of 400 m. The terrain is of low relative relief, characterized by small hills. There is an abundance of inland lakes and rivers, which have served as natural floatways for timber transportation to the mills, while numerous waterfalls on the rivers have provided energy at reasonable costs to the forest industries.

Natural vegetation is essentially boreal coniferous forest with a zone of treeless tundra in the north and small areas of temperate mixed forests in the south-west. Despite the sub-arctic location, the climate is relatively warm thanks to the North Atlantic Drift bringing warm water to the Atlantic coast of the Scandinavian peninsula and to the frequent penetration of mild winds from the south-west and west. However, conditions for timber growing are

determined by the coldness of the climate. The mean temperature in the warmest month, July, is between 13–17°C, the length of growing season between 120–170 days and the time needed to grow a mature stand of native tree species in the forestry areas proper is 60–100 years, and in the most severe areas and sites 140–200 years.

Precipitation is 700 mm per annum in the South and 400 mm in the North. Because of the coldness of the climate evapo-transpiration is low and there is enough water for vegetation. On flat terrain and hill sides excessive stagnant water and swamp peat are the worst factors decreasing or impeding forest growth. Swamp peatlands account for about one third of Finland's land area.

As a result of the climatic conditions described above, the number of native *tree species* is small, in fact there are only four species of economic importance, i.e. Scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*) and two species of birch (*Betula pendula* and *B. pubescens*) as shown by the following table.

Growing stock volume and annual increment by tree species (6th National Forest Inventory, 1975–1982)

	Growing stock mill. cu. m over bark	%	Annual increment mill. cu. m.	%
Pine	723	44,1	25,74	39,2
Spruce	620	37,9	25,02	38,1
Birch	242	14,8	12,00	18,3
Other deciduous species (Alder and Aspen)	53	3,2	2,94	4,4
Total	1638	100,0	65,70	100,0

Moreover, the introduction of exotics is greatly limited by the severe climate. Of the species which can be successfully grown in Finland Siberian and European Larch (*Larix sibirica* and *L. decidua*) and Lodgepole pine (*Pinus contorta*) deserve special mention.

Finland is one of the most forested countries in the world. Forest land proper accounts for 65 per cent and total forestry land for 88 per cent of the land area. Forest area per capita amounts to 4.5 hectares.

The population of Finland is 4.8 mill., of which 92 per cent are Finnish speaking and 8

per cent Swedish speaking. Up to 1950 more than half of the population were employed in small scale farming. Since then rural depopulation has been rapid and the agricultural population now accounts for only 10 per cent of the total. Typically, the farms are widely scattered throughout the countryside. Income from stumpage and labour has been essential for the livelihood of the farming population and up to the late 1950's this population has provided an advantageous labour force for forestry.

2. LAND-USE POLICY

Land is an essential factor in timber production. Due to its extensive nature forestry has generally been in a weak position when competing for land with other sectors such as agriculture, industry, building, transport and communications. Forestry's main competitor has been agriculture and Finnish land-use policies have until the middle of the 1960's encouraged land-owners to extend agricultural land by clearing woodland. In 1931 a special law was enacted to promote the clearing of land for fields and pastures by means of state subsidies. The arable area increased during the interwar period by approximately 600 000 hectares totalling about 2,5 mill. hectares (8 per cent of the land area), so that Finland reached self-sufficiency in agricultural products by 1938.

World War II upset the balance between the demand for and the supply of foodstuffs, since about 12 per cent of the cultivated land was ceded to the USSR. The population from the ceded area (420 000, of whom 230 000 were farming people) emigrated to the territories still under Finnish sovereignty. The target was then to regain the lost arable land area within the remaining area of the country. A system of land clearance grants, more effective than before, was introduced in 1945 as a part of the resettlement activity initiated under the *Land Acquisition Act of 1945*. A special *Act on Land Clearance Grants* was passed in 1950.

The Land Acquisition Act was replaced in 1958 by the *Landuse Act*. Its aim was to improve the economic and social structure of agriculture by, for example, providing loans for the acquisition of land and the clearing of fields including the removal of forests. This law also

contributed to the increase of agricultural land.

The increase of the arable area (approximately 300 000 hectares in 1945–70), together with other developments, such as increased productivity and a rapid decrease in the number of horses to be fed, resulted in surpluses of certain agricultural products. With the severe agricultural marketing problems of 1960's a new course in land use policy had to be adopted. Grants for land clearance were abolished and since the end of the 1960's various measures have been introduced to *reduce the agricultural area*. Of these the *Field Reservation Act (FRA, 1969)* deserves special mention. Its aim was to subsidize the suspension of cultivation for periods of three to nine years. The subsidy was originally 250 Fmks per hectare for the first 14 hectares of the farm and a little less for any additional field area. The Act was amended several times and it expired in 1975.

The FRA provided for the afforestation of reserved fields, with the permission of the agricultural authorities. The subsidy then applied for 15 years. The farmer also received public support for afforestation process under the terms of the *Forest Improvement Act* (Chapter 4).

According to the FRA the whole arable area of the farm had to be suspended. However, almost simultaneously with that Act, the *Forest Improvement Act (FIA)* of 1967 was amended by introducing paragraph 6a, which enabled the forest improvement subsidy to be used for the afforestation of parts of fields and, if necessary, for subsequent replacement of those seedlings damaged or destroyed by natural elements within six years of the original afforestation. In addition, a grant equal to two

years' subsidy according to FRA was promised. The normal FIA restrictions with respect to the wealth of the land-owner no longer applied and certain tax exemptions for afforested fields were also introduced.

Despite the fact that the FRA provided exceptional encouragement for the afforestation of fields the results have been rather modest. The FRA together with the amendment of the FIA led to approximately 50 000 hectares afforestation of arable land. The achievement is particularly modest compared with the total area of "excess" agricultural land (according to expert estimates about 400 000 hectares at the beginning of 1970's) and even when compared with the total area suspended from programme (240 000 hectares). In fact the area afforested by natural regeneration may be larger than the artificial regeneration achieved by the two Acts discussed.

The modest achievements in field afforestation can largely be attributed to farmer's difficulties in accepting the rapid changes in land use policies. An additional factor was that the neglected land (agricultural land in poor productive condition) was excluded from the terms of both the FRA and FIA § 6a.

The afforestation of fields is also mentioned in some of the most recent pieces of agricultural legislation, e.g. the 1974 *Farm Closure Pension Act*. The aim of this legislation is twofold: — first, a rationalization of agriculture by acquiring farm land for redistribution to those farmers, whose arable land area is too small; — second, a reduction of land in agricultural production by afforesting less suitable fields. Farmers over 55 years of age, qualified to apply for pensions, provided that they sell their arable land to the National Board of Agriculture or to a neighbouring farm. This pension will then carry them over to the age of 65 when they receive the normal pension. When fields are afforested the land-owner will enjoy, with certain exceptions, state support according to the terms of 6a § in FIA.

The *Farm Act* was introduced in 1977 to replace the 1958 Land Use Act. The new Act

contains a broader view with respect to agricultural rationalization and it outlines the future "farm policy" in general. According to the Act, the National Board of Agriculture is entitled to purchase for afforestation any agricultural land which is not well suited for continued cultivation.

Also in 1977, the *Agricultural Production Regulation Act* was introduced to restrict field cultivation. The Act can be seen as modern version of the FRA with greater flexibility. The area to be fallowed is decided annually, and the fallow subsidy contract runs only for one year at a time. Fallowed fields are specifically not exempted from the workings of the revised FIA § 6a and they may therefore be afforested.

Farm Closure Compensation Act (1974) was also designed to reduce the arable land area and encourage its afforestation according to the terms of FIA.

It must be added that no legislation yet exists to prevent forest land being converted to other more intensive forms of land use. Despite the fact that the grants for land clearance have been suspended, new arable land is still being cleared to some extent at the owners' expense. Considerable areas of woodland have also been removed for roads, building sites, electricity transmission lines and various public and private works.

Thus Finland's land utilization policy has not particularly favoured forestry. For decades in the past it was possible to clear woodland for agriculture and other uses, in many cases with state support. In the recent "emergency policy" designed to reduce excessive agricultural production, forestry has been seen as an "escape route".

On the other hand, a successful endeavour has been made in Finland to reclaim forest area from waste land, especially by the drainage of swamps. Approximately 0,8 mill. hectares have been drained in 1900–1950 and 4,7 mill. hectares in 1951–1982, making a total 5,5 mill. hectares. The main part of this area has been drained either by the State on its own lands

(about 0,5 mill. hectares) or by state support on privately-owned land under the Forest Improvement Act to be discussed in Chapter 4. The major part of the reclaimed area had some kind of tree cover even prior to draining. Hence, the actual forest area has not increased greatly although the wood production potential has improved markedly.

Problems connected with agricultural surpluses have continued to be current topics in the 1980's, and they were more severe than ever in 1983. Up to now measures of a mainly temporary character have been applied to solve the problems. They have included the fallowing of cultivated land for a certain period of

time and the encouraging of farmers to concentrate on the production of commodities which are not surplus to requirements. The afforestation of cultivated land has been less pronounced than during the early 1970's.

Since these measures have not been adequate to deal with agricultural surpluses other policies are being introduced. Thus, investments intended to expand the output of "excess products" are prohibited temporarily and the introduction of production quotas for individual farms is being considered. If overproduction continues to increase, Finland may again witness the introduction of schemes to promote the afforestation of cultivated land.

3. FOREST OWNERSHIP — THE PREDOMINANCE OF SMALL PRIVATE FORESTRY HOLDINGS

By the middle of the 19th century steps had been taken to define the limits between public and private land ownership in Finland. This was achieved through the division of state "surplus land" in compliance with "Isojako" — a wide-ranging land consolidation and enclosure programme, which started in 1750. The size and borders of each individual ownership were also defined in connection with "isojako". Laying claim to land by occupation, a practice inherited from the earliest days of land settlement was no longer possible after the "isojako". The development of forest ownership thus became a matter of *settlement policy*.

The Forest Statute of 1851 prescribed that state woodlands were to be used primarily as public forest and surrendered for settlement when not required for that purpose. The official declaration issued by the Senate in 1877 and the Forest Act of 1886 adopted a similar principle. Furthermore, settlement was effected in the form of leases (so-called crown tenant farms) so that in its initial phase land was not surrendered permanently to private individuals.

In the course of time, the number of leased holdings both in private and public lands became such an acute social problem that it had to be settled. The solution came in laws enacted during the period 1918–1922. Approximately 120 000 farms and small cottage holdings were then made independent with the co-operation of the state. About 16 000 of these holdings were on State land.

Finland's independence (1917) brought a distinct change to the policy favouring settle-

ment and private ownership especially with regard to *state land*. Several laws embodying the new attitude were enacted during the years between the two world wars and the state is estimated to have lost about 860 000 hectares through settlement activities, the main part of which was forest land. Purchases of land by the State Forest Service were relatively modest in comparison.

The spirit of liberalism which characterized Finland's land ownership policy in the latter half of last century led to other changes in land ownership. The expanding *forest industry* enterprises started to buy forest land from private landowners. The main part of the forest now owned by companies was purchased around the turn of the century as the following statistics show:

		1000 hectares
prior to	1869	35
in	1870–1894	341
"	1895–1904	804
"	1905–1914	977
"	1915–1938	473
		Total 2 630

The principal motives that encouraged companies to acquire forests of their own have been

- an endeavour to ensure the supply of raw material
- desire to reduce the risks inherent in purchasing roundwood
- the possibility of influencing the price formation of roundwood
- the low prices of forest lots and
- the view that timber prices were bound to rise in the future.

The transfer of land from private to company ownership resulted in a number of social

problems. For instance, the owners of the holdings often remained as tenants on the farms bought by companies or were entirely dispossessed. Hence the growth of land ownership by companies was criticized and a law was eventually issued in 1915 under which companies engaged in woodworking industry and the timber trade were allowed to purchase only such forest land that was not considered desirable for agriculture. As the companies continued to get round the law, for example, by establishing auxiliary companies to handle the deals, a restoration law, the so-called *Lex Pulkkinen*, was enacted in 1922 and became effective in 1925. Under this law the lands acquired by companies in circumvention of the Act of 1915 had to be surrendered, with certain exceptions, either to the state or to local authorities or to such a person or corporation whose right to acquire land was not affected by the 1915 Act. As a result, companies had to surrender approximately 64 000 hectares of the land they had purchased.

The freeing of tenant farms and voluntary sales have also contributed to some extent to the transference of company-owned land to private owners (about 250 000 hectares during the period 1918–1938). Despite these "losses" company forest ownership increased until the outbreak of World War II.

Local authorities and ecclesiastical congregations also started to buy forest from private owners during the 19th century.

World War II caused an important change in Finland's forest ownership. *The Land Acquisition Act of 1945* mentioned above classified public bodies and companies as primary relinquishers. In addition, the Land Acquisition Act's concern for ownership was emphasized by granting woodland to new farms not only for domestic use — as was the case in earlier legislation — but also to commercial forestry (so-called auxiliary forests). The application of this principle doubled the forest area of the new farms compared with farms established earlier. About one million hectares of the forests owned by public bodies and companies

were transferred to private ownership through Land Acquisition Act.

The Land Use Act of 1958 was designed mainly to improve the economic and social structure of the existing farms by amalgamating very small farms or by providing them with additional land. Approximately 500 000 hectares of State owned land and 20 000 hectares of company owned land were used for settlement purposes in the execution of this Act.

The state has therefore surrendered 2,7 mill. hectares for settlement during the time of independence (including land in the ceded areas), while communes and church congregations have relinquished about 150 000 hectares and companies 340 000 hectares.

These trends in forest ownership have only been slightly counterbalanced by land purchases by the state while the companies have almost compensated for their previous woodland losses.

It can be seen, that the *general feature of Finland's forest ownership policy since the country's independence has been the favouring of private and especially farm forestry*, at the expense of corporations and public bodies. The settlement policy described above has also led to the acquisition of the most fertile and accessible forests by private owners. It is largely because of settlement activities that the majority of the State's forests are situated in northern Finland or in the remote areas of southern Finland.

An endeavour has been made to establish *forests in collective ownership* mainly for the purpose of avoiding the drawbacks associated with small-scale ownership. These attempts have met with only minor success. At present collective forests number about 130 units and have an overall area of only 225 000 hectares.

It must be emphasised that the landownership policy pursued has been dictated not by the interest of forestry but primarily by socio-political considerations. The principal motivation has been to secure the existence and well-being of agriculture and the farm population. The State, the local authorities and especially

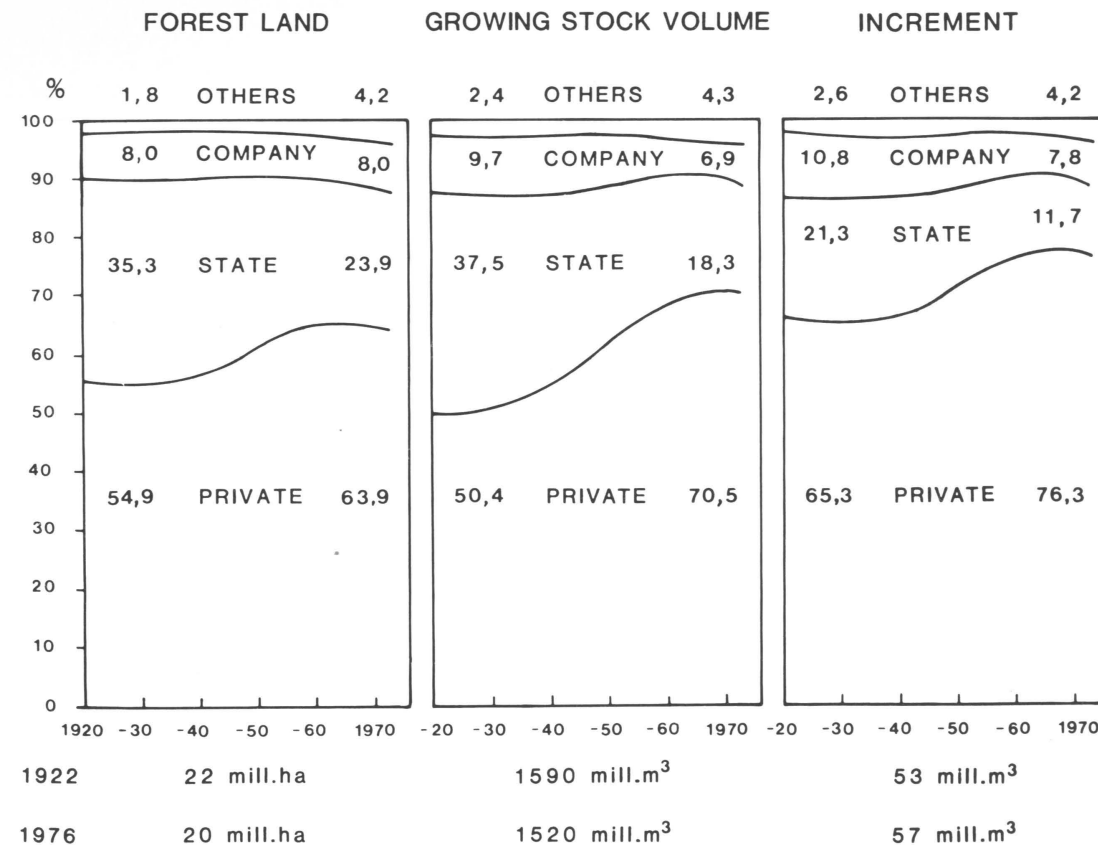


Figure 3. Development of forest ownership, 1920–1976. (The Finnish Forest Research Institute, National Forest Inventories).

the forest industry companies have managed their forests well and there has been no call to interfere with their ownership on these grounds.

The recent decades have seen a marked increase in the *non-farmer private ownership* of Finnish forests. In 1975 approximately 20 per cent and in 1982 almost 40 per cent of the private forest area was owned by non-farmers. In quantitative terms, the proportion of the private forests owned by farmers is expected to decrease further in the near future. Most of the

decrease is due to the division of farm property through inheritance. A current social problem in Finland is rural depopulation. Many heirs have settled jobs or professions in the towns and do not wish to return to small, divided family farms offering hard work and modest returns. Inherited land is either retained as an additional source of income, for recreational purposes or for reasons of prestige. Forest land is readily purchased by individuals for recreation or for investment purposes. It has been demonstrated that investment in forestry land

compares favourably with other forms of investments, particularly savings accounts or government bonds.

It is generally held in Finland that the forest creates for a farmer a valuable additional source of income and employment while stumpage from the forests owned by non-farmers often benefits people in cities more than those living in rural communities. The living conditions in the developing (rural) areas are therefore weakened. Consequently special legislation (the *Agricultural and Forestry Land Procurement Rights Act*) was introduced in 1978 to protect farm forestry and farm ownership in general. According to this Act companies and private individuals other than farmers must have special permission from the authorities to purchase land. Permission can be refused when land is required for farming.

Figure 3 illustrates the development and present pattern of forest ownership in Finland.

The majority of forestry holdings established by settlement activities have been small. A simple illustration of this fact is that about 120 000 independent farms were established in connection with the freeing of leased areas in 1918–1922 and 45 000 new holdings (excluding dwelling sites, building lots and additional land) were formed by the end of 1958 at the execution of the Land Acquisition Act. In addition, about 22 000 parttime small holdings and farms were formed in the period between the World Wars.

The development of forestry holdings has also been affected by the *laissez faire* policy which has gradually gained dominance with regard to the partitioning of existing farms. The oldest regulations and even those in force at the beginning of the modern era restricted the division of farms among the owners' heirs.

It has been estimated that the average stumpage income of Finnish farmers was between 1971 and 1980 about 2800 mill. Fmk (500 mill. US\$).

In the course of time legislation concerning the partitioning of holdings became more liberal and in 1916 all restrictions on the division of holdings were lifted. Since then the creation of new holdings and additional land parcelled under the settlement legislation, legacy divisions and land sales have contributed to the process. Thus some 75 000 farms were established by division alone during the years 1919 to 1950.

Because of the settlement activities and other farm dividing processes *Finland's private forestry is dominated by holdings of less than 50 hectares*. The average size of forestry holdings, which was 45 hectares in 1929, is at present only 34 hectares.

It can be seen that present structure of Finland's forestry — the domination of small private holdings — is the result of a complexity of factors and policies. Its repercussions are similarly complex. One must admit that the farms and farm population scattered all over the country have created an infrastructure, which benefits forestry by providing labour and living conditions for the workers near the forests, and by making the forests more accessible. The problems have become pronounced particularly during the last two decades, i.e. during the period of mechanization. Small holdings involve small working units and are not well suited to modern techniques characterized by heavy machines. Hence the problems of smallscale forestry and of too small farms have become an object of active debate in Finland and the imposition of restrictions on the division of holdings has been suggested. The first step was reached in 1982 when the Diet on the basis of lengthy committee work, passed an Act designed to prevent further splitting of farms which are large enough to support one family. According to this Act, inheritance rights should belong only to one of the children, i.e. to the child who is considered to be most capable of managing the farm.

4. THE ROLE OF LEGISLATION AND PROMOTIONAL ACTIVITIES IN TIMBER PRODUCTION

The principal object of forest policy has been to ensure sustained or even increased yield. The implementation of the forest policy goals is a simple task in state forestry, as in public forestry in general. It requires the establishment of an expert administration and a national management plan and resources to meet the goals of the plan. The task becomes more complicated in private forestry where there are about 300 000 holdings. There have been two main approaches to achieve the established goals in private forests: legislation stipulating the treatment of forests, and promotional activities.

Finland's first *forestry law* of significance dates from 1886. It endeavoured to ensure the natural regeneration of forests by decreeing that when timber was being cut over an area of not less than 5 hectares or on an isolated island seed trees had to be left on the felling site, or other measures taken to promote the regeneration of the forest.

The 1886 Forest Act did not achieve the desired result. Consequently new legislation was introduced in 1917. This, like the previous law, forbade the devastation of forests. The concept "devastation", however, was extended to cover the felling of young coniferous forests for small-sized timber in a way which was contrary to rational thinning. Transgression of the law was followed by a ban on cutting for a certain period. Provincial forestry boards were set up to supervise the enforcement of this legislation.

The *Law Concerning Private Forests* enacted in 1928 differed little in its fundamental fea-

tures from the 1917 Decree. It, too, prohibited the devastation of forests but extended the application of the regulation concerning young growing forests so that the treatment of young hardwood forest was also subject to rational thinning. Section 1 of the first paragraph of the law reads as follows:

"The forest shall not be devastated; hence, it shall not be cut so, neither must the ground be left in such a condition after cutting nor be used so that the natural regeneration of the forest will be endangered.

If a young growing forest is cut so that the cutting is contrary to rational thinning it too shall be regarded as devastation of the forest".

The provincial forestry boards established to supervise the 1917 Decree were replaced by *district forestry boards* with responsibilities extended to cover promotion activities. Municipal forestry boards had to assist them in the supervision of the Law. The first significant step in *promotional activity* was taken in 1898. The Government budget of that year included an annual appropriation of 50 000 marks for the promotion of private forestry over a ten year period. The funds were distributed to the Finnish Forestry Association and the agricultural societies that would actually manage the field work. With these funds agricultural societies employed experts to organize courses and lectures in forestry, excursions and other items of an educational nature. These specialists also gave advice on the proper management of forests. The Finnish Forestry Association concentrated mainly on publishing activities.

The 1928 Law Concerning Private Forests meant a fairly distinct shift in the emphasis of

the policy for private forestry from legislative to promotional activities. The regulations concerning the treatment of forests did not differ a great deal from those in the 1917 Decree, but an entirely new law enforcement and instructional organization was established. It had as the provincial organs 18 district forestry boards, 16 for Finnish-speaking and 2 for Swedish-speaking areas. Two central forestry associations, the Central Forestry Association Tapio and — in the Swedish-speaking areas — the Central Forestry Association Skogskultur, became the connecting links and executive information centres of the forestry boards.

The emphasis laid on promotional work is made clear in paragraph 6 of the Law Concerning Private Forests:

"Observance of this law will be supervised by district forestry boards which will also be entrusted with the task of promoting private forestry by disseminating information on rational forestry, by directing and assisting the execution of forestry operations, by promoting and supporting co-operation in the sphere of forestry and by taking other measures to develop forestry".

It is worth noting that the State began to realize its policy for private forestry through free organizations controlled by the forest owners themselves. The members (3–5) and deputy members of district forestry boards were elected by provincial agricultural societies with the exception of one who was appointed by the central forestry association concerned. The central forestry associations, on the other hand, were independent societies. It was considered desirable that the organizations engaged in promotion work enjoyed the confidence of forest owners.

Law enforcement, however, was considered an official responsibility and it was decreed that the members of district forestry boards act as responsible civil servants with respect to their law enforcement tasks. Moreover, the district forestry boards and the central forestry

associations were subject to the supervision of the National Board of Forestry in matters concerning the enforcement of the forestry law and the administration of their financial resources.

Public funds have been employed to a considerable extent in maintaining the activities of the organization in question. State support has varied at different times, but has accounted for about 70–90 per cent of the total expenditure on the average.

The district forestry boards have employed professional staff, mainly forest officers and foresters of lower grade. The staff devoted most (70 to 75 per cent) of their working time to forestry promotion work: "forestry days" occasions, excursions and lectures, as well as personal advice and literature.

An important aspect of the promotion work of the district forestry boards was the expert assistance given to forest owners in marking trees for sale, making working plans, carrying afforestation projects, timber sales etc. As the demand for these services has grown strongly from year to year and as the number of trained foresters at the disposal of district forestry boards has been insufficient to meet the demand, the boards have tried to promote co-operation among forest owners by encouraging the establishment of *forest management associations* (FMA). The initiative for the establishment of these associations came originally from the forest owners themselves. Some were established between 1908 and 1910, but it was not until the late 1930's that they acquired national importance. The activities of the district forestry boards and the State grants contributed markedly to this movement.

The objective of the FMA is to improve professional knowledge of forest owners, to guide and develop the management and utilization of their forests and to provide professional assistance to them in various forestry activities. Each FMA employs at least one professional forester to carry out the practical functions of the association.

The economic foundation of the associations was ensured by the 1950 *Act Concerning Forest Management Associations*. It stipulates that every forest owner whose assessed annual yield exceeds 20 cu.m. is obliged to pay a *forestry fee* of 2 to 6 per cent of the taxable forestry income to the FMA concerned. Each FMA decides the percentage annually within these limits. The fees cover about 60–70 per cent of the annual expenditure of the FMA; the rest of the income is received in the form of fees levied on the services they carry out.

The central forestry associations achieved a prominent position as leaders of provincial organizations. Their esteem was to a great extent due to two former managing directors, *A. Benj. Helander* (1929–1946) and *N.A. Osara* (1947–1953).

A very important tool of Finnish forest policy has been the state-supported *forest improvement activity*. Legislation concerning this activity (the *Forest Improvement Act*, FIA) was introduced in 1928. A great deal of the credit for this must go to Mr. *Väinö Tanner*, then Prime Minister and to *Mauno Pekkala*, then department chief at the National Board of Forestry, and Minister of Agriculture, later to be the Director General of the National Board of Forestry and Prime Minister (1947–1948).

Under the Forest Improvement Act beginning in 1929 the Government budget had to include a fixed appropriation for the support of forest improvement projects. Half of it was to be used for the benefit of state forests and half for private forests.

A number of amendments have been made to the FIA in subsequent legislation, which was renewed generally for 5-year periods, from 1937 up to 1967 when a permanent Forest Improvement Act was passed. One of the major changes took place in 1953, when the law was limited to private forests only.

The afforestation of waste and underproductive land and the draining of swamps for wood production were the original measures

envisaged by the Forest Improvement Act. In 1948 its application was extended to include forest roads and in 1968 fertilization of woodlands. According to the amendments made in 1977 natural regeneration can also be supported.

The funds discussed above are applied by means of low interest *loans and subsidies*. A loan may be granted up to a maximum prescribed by an approved cost estimate. In most cases, loans must be repaid in annual instalments of 6 per cent, 3 per cent being interest and the rest amortization. The repayment does not start until the beginning of the third year and in the northern parts of the country not until the beginning of the eleventh year, after completion of the work. The annual instalment is 10 per cent for forest roads. There are some minor exceptions from these regulations.

Subsidies are most often granted in the form of work plans and the supervision of the execution of a project, and free provision of tools, seeds and seedlings. Working expenses also qualify for subsidies with certain exceptions.

Regional and even social aspects are involved in the forest improvement policy. The country has been divided into four "forest improvement zones" according to the climatic and economic conditions for timber growing. The maximum subsidy varies in these zones from 15 to 65 per cent of the total expenditure.

The granting of state support for forest improvement work has been advocated not only because of the national importance of forest production but particularly because private forest owners are seldom in a position to invest in operations from which the repayment comes in many cases only after several decades. In addition, most drainage and road projects are possible only by the combined efforts of several forest owners. Initiative and economic support are of special significance in this respect.

The execution of The FIA in private forests was entrusted in 1929 to the Central Forestry Associations (Tapio and Skogskultur). For

practical work, so-called forest improvement districts were established. Side by side with them district forestry boards have carried out small and middlesized afforestation projects. The twin administration in the promotion of

private forestry has been recently the subject of active debate and it has been decided that the forest improvement districts will be amalgamated into the district forestry boards in 1985.

5. RECENT PROBLEMS AND DEVELOPMENTS — HOW TO COPE WITH RAPID INDUSTRIAL EXPANSION

A new industrial revolution

The Finnish forest industries grew little during the first decade following World War II as firms had to concentrate on repairing damages caused by the war and replacing obsolete machinery. Furthermore, the loss of the forest area to the USSR in the peace treaty involved uncertainty in the supply of roundwood to industry.

The situation changed during the latter half of the 1950's. First, it was discovered — on the basis of the 3rd National Forest Inventory (1951–1953) — that the forest resources and the annual potential cut considerably exceeded the estimates made immediately after the War. Secondly, the first European Timber Trends Study, carried out by FAO (1953) indicated a marked increase in the demand for forest products in Europe. Thirdly, there were improved opportunities for financing new investments both by self-financing and by foreign loans especially from the International Bank for Reconstruction and Development (IBRD). Hence a host of factors contributed to an industrial expansion more powerful than ever before in Finland. Expansion mainly concerned the wood pulp industries, whose capacities more than doubled in 1955–1970. Also, plywood and particle board industries expanded considerably. In addition, new industrial capacity was built up to make paper and paper board from wood pulp.

It has been estimated that the wood requirements of Finnish forest industries increased by approximately 60 per cent during the years 1955–1970 as a result of the capacity expansions.

A period of intensive planning and programming

Expansion of forest industries — as such very beneficial to the country's economy — resulted in a situation in which forestry had to be reviewed in a new light. The problem was how to supply the expanded and continuously growing industries with wood. Various official and unofficial bodies considered the problem and four major ways were suggested and applied:

- 1) The pattern of wood utilization had to be changed to provide more timber for forest industries. Roundwood exports and domestic use of fuelwood were considered as potential roundwood reserves for industries.
- 2) Waste wood in the forest and in the industrial processes had to be eliminated or kept to a minimum. This meant that timber of smaller diameters than previously had to be utilized for industrial purposes and that the residues from sawmills and plywood mills had to be used more intensively than before for the production of fibre board, particle board and cellulose.
- 3) Imports of raw wood had to be considered.
- 4) Potential cut had to be increased by means of improved silviculture and particularly by increasing various basic improvements such as afforestation, drainage of swamps and forest fertilization.

The reserves of wood mentioned in points 1 and 2 were available without increasing annual drain at all, and they could be realized fairly speedily. Furthermore, since the means to utilize these resources were largely in the hands of forest industries no major public action was necessary.

Imports of raw wood, mainly from the USSR, have contributed markedly to the wood

supply of the Finnish forest industries. In fact the changed attitude to foreign trade in raw wood is one of the most substantial changes of the post-war forest and timber economy. In 1961 Finland *exported* 6 mill.cu.m. of roundwood; in the 1970's it has annually *imported* about 4 mill.cu.m.

The goals mentioned in points 1–3 have largely been achieved and even exceeded; from 1955 to 1970 about 17,5 mill.cu.m. of raw wood have been made available annually to forest industries from these sources.

The increase of *roundwood production* and potential cut by means of intensified silviculture (point 4) is a long-term undertaking but it was considered desirable in view of the future growth possibilities of the forest industries. The first step was to make plans and to *formulate programmes*. This was done on the basis of existing information concerning the forests, derived mainly from the 3rd National Forest Inventory (1951–1953), and on the estimated wood requirements. Research results made it possible to assess the influence of various forest improvement activities — mainly afforestation and reforestation, drainage and fertilization — on the future timber production. Programmes were made mainly for a ten-year period, but the development of forests up to the year 2000, and even to the 80-year rotation were taken into consideration. This was desirable in view of the continuity in timber production.

During the 1960's a number of successive programmes were proposed:

- 1) HKLN-programme proposed by the Forestry Planning Committee in 1961 for 1963–1972.
- 2) Teho-programme initiated by the Agricultural Committee (1962) for 1963–1972.
- 3) Expanded Teho-programme at the request of the Economic Council (1964) for 1964–1975.
- 4) MERA-programme composed by the MERA-Committee (Forestry Financing Committee) for 1965–1970.
- 5) MERA-programme II (1966) for 1966–1971.
- 6) MERA-programme III (1969) 1970–1975.

Each programme stated the annual targets of various forest improvements and in most cases measures to be taken to achieve the targets. The annual cost (inputs) and the influence on potential cut (output) were also estimated.

The succession of forestry development programmes of the 1960's primarily demonstrated the rapid changes of the situation in forestry and the timber economy. Roundwood requirements increased continuously and each programme had to be more ambitious than the previous one. Thus, they similarly demonstrated the lack of adequate coordination between industrial expansion and forest policy.

None of the six programmes listed above was explicitly accepted to be the basis of official forest policy. However, the action taken by the political decision makers — Government and Diet — were designed to contribute to the execution of the HKLN-programme and later on (1965–1975) the MERA-programme I — which was almost identical to the Teho-programme concerning the various forest improvements.

Reform of forestry legislation

New legislation on private forests passed the Diet in 1967 and came into force from the beginning of 1968. The existing *Law Concerning Private Forests* (from 1928) was divided into two separate laws: the *Law Concerning Private Forests* and the *Law Concerning Forestry Boards*.

The *Law Concerning Private Forests* states the rules regarding the treatment of forests with respect to fellings. They are basically the same as in the previous law. The felling of a mature forest must be carried out so that



Pine stand approaching maturity (80 years) in Vilppula. Photo E. Oksanen.



A 10 years old plantation of Norway spruce in Middle Finland. Photo E. Oksanen.



A 12 years old plantation of birch (*Betula pendula*) after the first thinning. Photo T. Heiramo.



The breeding of forest trees is closely associated with efforts to increase yield by seeding and planting instead of natural regeneration. The picture illustrates the controlled pollination of birch (*Betula pubescens*) at Ruotsinkylä experiment station. Photo J. Lehtonen.

regeneration either naturally or by means of planting or seeding is secured and in young and middle-aged stands ("stands capable of development") only rational thinnings are permitted.

When planting or seeding is desirable after final cutting — as is the case in most clear cuttings — a cutting and regeneration plan must be made. Cutting is permitted only after the respective district forestry board has accepted the plan and a guarantee — normally a bank deposit — proves that the regeneration will be carried out according to the plan.

The *Law Concerning Forestry Boards* defines the organizational framework of private forestry. This is described in figure 9. On the national level there are the Ministry of Agriculture and Forestry (prior to 1971 the Ministry of Agriculture), the National Board of Forestry and two Central Forestry Boards (Tapio and Skogskultur). On the provincial level are the district forestry boards and on the local level the municipal forestry boards.

The most striking change in comparison with the previous organizational structure (1928) was that central forestry boards, previously independent associations, were given board status. The Law stipulates that forest industry and forest workers must be represented on the central and district forestry boards. Previously, practically all members were nominated by forest owners.

No change in the status of municipal forestry boards took place. Nor did the Law Concerning Forestry Boards affect the status of the forest management associations, whose activities are based on the 1950 Law.

It may be added that in 1966 the *Law Concerning Forestry Administration* was passed, according to which the National Board of Forestry was reorganized by dividing it into two departments, one (larger) for state forestry and the other one for private forestry. This Law also outlines the main principle to be followed in the management of forest resources in Finland.

The revision of forestry legislation in 1966 and 1967 touched principles rather than concrete matters. Its influence on existing practices was therefore modest.

In the field of forestry administration and organization certain duplication of activities on the national level (Central Forestry Boards and National Board of Forestry) has occurred. These problems have sometimes been the object of active debate. The existence of the Central Forestry Boards must be seen in the light of the historical development of the policy towards private forestry in Finland. The participation of forest owners in decision making has been a tradition which — according to the opinion of forest owners — had to be maintained.

Financing improvements in private forests

The more intensive the forest management programme, the more inputs are required for its execution. Therefore the financing of the programmes of the 1960's has become a key issue of forest policy in the 1970's.

It is perhaps appropriate to start from the case of the first MERA-programme. The MERA-Committee (The Forestry Financing Committee) was composed of representatives of the various interest groups in forestry (forest owners, central forestry boards, State forestry and forest industries). The Governor of the Bank of Finland was invited to chair the committee. The aim was to stimulate forest improvements with the targets of the Teho-programme in mind.

The Committee proposed that forest improvements in State forests were to be financed by the State in its annual budgets and that industrial companies should be responsible for financing their forest improvement projects.

This practice had also been followed previously. As to the private forests, the MERA-Committee stressed that additional public money should be available for forestry improvements and proposed that a bond loan of 20 mill. Fmks should be floated annually between 1965 and 1970. State support for various projects should be provided according to the stipulations of the existing Forest Improvement Act. The proposals were accepted by the Government and subsequently by the Diet.

The stimulus given at that time to the forestry improvement programme can be largely attributed to the fact that the Committee was chaired by the Governor of the Bank of Finland, who by the virtue of his skills and powers in financing problems and his interest in forestry was in a position to contribute to the solution of financial problems. Furthermore, the non-political Government then in office considered forestry programmes a national issue rather than a problem of income distribution.

Additional money for forest improvements was provided by the Governments and Diet between 1966 and 1969 as proposed by the MERA-Committee in its second programme. This time the aim was to eliminate unemployment.

Problems arose in 1969. The MERA-Committee proposed that the annual bond loan should be increased from 20 to 40 mill. Fmks. This proposal was not accepted. In the State budget proposal for 1970 the Government declared that it would study other alternatives for the realization of expanded forest improvement programmes in private forests.

Hence the years of the 1970's passed without any major progress in financing and execution of the forest improvements except for fertilization, for which state support was provided in the 1967 Forest Improvement Act. However, the International Bank for Reconstruction and Development (IBRD) provided a loan of 20 mill. US dollars for the Finnish forestry programmes, to be used during the period 1973–1975.

The promised study of alternative financing

methods did not yield any major result. In 1973 the Government set up two Parliamentary Committees to formulate forest policy mainly in the field of legislation and administration. The Committees' reports in 1975 reflected the political controversies; they did not contain any new proposals.

Concerning the further development of forest policy, a comparison of the four alternative forest production programmes — the Minimum programme, the Basic programme, the MERA-programme (slightly modified MERA III) and the Maximum programme — formulated by an expert working group on the request of the Economic Planning Centre (1970) is of interest. These alternatives were presented to provide a basis for decision-making in the Government and the Diet concerning forest policy. The maximum programme is intended to be an assessment of what really intensive forestry can produce under Finnish conditions. According to it the annual growth and potential cut could be raised during the rotation of 80 years to the sustained level of 88 mill.cu.m. compared with 57 mill.cu.m. at the beginning of the 1970's.

Since 1975 the outlining of the timber production programmes has been the responsibility of the Ministry of Agriculture and Forestry and particularly of its Forestry Council. This body is composed of the representatives of the various forestry interest groups, government departments and forestry research, and works under the chairmanship of the Minister. So far, five-year programmes have been worked out annually. Each programme contains a review of the results achieved, annual targets for the next five-year period and proposals as to how the targets should be achieved. All of these programmes have been less ambitious than MERA-programme II and III, but each has aimed at a modest annual increase in timber production. None of them have been explicitly accepted as the basis of forest policy but the Government has referred to them in its annual budget proposals and expressed its intention to promote forestry in the spirit of these

programmes. The estimated costs of these programmes are 780 mill. Fmk (US\$140 mill.) for 1981 and 850 mill. Fmk (US\$150 mill.) for 1985.

Increased activity in forest policy in the 1960's had also resulted in a *permanent* Forest Improvement Act (1967). In addition to afforestation, drainage of swamps and road-building, *fertilization* of woodlands was included in those improvements for which public money could be provided. This greatly stimulated forest fertilization in the late 1960's and early 1970's.

The Law was amended in 1977. Two particular aspects should be mentioned:

- 1) State support is to be extended to natural regeneration in certain cases, and
- 2) support is to be increased in the regions (mainly North Finland) where the climatic and economic conditions for investments in timber growing are less favourable.

In 1982 a special Law Concerning the Improvement of Underproductive Forests in *Lapland* was introduced. Its main purpose is to facilitate the regional planning of forestry and the afforestation of underproductive lands, including planting and seeding and the subsequent care of afforested areas. These activities will be financed completely from the state budget.

Generally speaking, the 1970's have been characterized by a hesitant approach to forest policy. The attitude to the development of forestry was positive but less progressive than in the climax of "MERA-policy" during the latter half of the 1960's. Statistics on forest improvements (Figure 4) illustrate the changed attitude. Figure 4 shows that the targets set by the Ministry of Agriculture and Forestry for forest improvements, during the latter half of the 1970's, are far below those of the MERA-Committee. This implies that the MERA-targets had perhaps been unrealistic; they have not been reached. The declining trend of the

achievements in the 1970's and the fact that they have been slightly below even the reduced targets of the Ministry illustrates the reduced intensity of forest policy in the 1970's.

As regards drainage, the declining trend is quite natural after the high level of activity in the 1960's because the most suitable peatlands have now been drained. This trend will continue even in the 1980's: the target for 1987 is only 60 000 hectares. Regarding seeding and planting, the situation is different, and efforts are being made to regain in the near future the level of activity which was reached at the beginning of the 1970's: the target for 1987 is 160 000 hectares. In forest fertilization about the level of 100 000 hectares is foreseen.

Financing has not been the only handicap in the execution of the forestry development programmes. Forest owners' attitudes are also increasingly involved. This is indicated for example by the modest achievements in the afforestation of uncultivated fields (See Chapter 2). One cannot expect that even increased state support would activate all forest owners to carry out improvements. Some additional means of forest policy may be required to stimulate investments in the forests of those owners who have so far been passive.

Experiences gained during the early years of the 1980's indicate that, besides potential cut in physical terms the attitudes of forest owners play a decisive role in the raw wood supply of forest industries. For a number of reasons the private forest owners' willingness to sell timber has tended to decline in recent years. One reason is inflation, which makes it more profitable to use the growing stock as a "savings bank" than to sell roundwood and deposit money in bank accounts. Furthermore, as a result of increased productivity, of guaranteed product prices, and of improved opportunities to get loans the farmers' increased income from agriculture makes it possible for them to postpone timber sales. Among non-farmer forest owners there are many who look upon their forest lot as much or even more as an amenity than as a source of income.



Figure 4. Achievements in the forest improvement activity, 1965–1982. (The Finnish Forest Research Institute).

Consequently, the problem of realizing the potential annual cut has become an important issue of forest policy, and it has been intensively discussed in the 1980's. The introduction of working plans has been found to be one solution and much effort has recently been made to increase their number in private forests.

Uncertainty regarding the roundwood supplies initiated the Bank of Finland to adopt a critical attitude towards *further expansion in the forest industries*. Since 1969 the Bank of Finland has declined to provide financial support for further industrial projects unless there is guarantee for sustained raw wood supply. In

1970 an agreement was made between the Bank of Finland and the Central Association of the Finnish Forest Industries (CAFFI) on procedures for dealing with further capacity increases. According to this agreement all investments which require additional raw wood must be handled in the Executive Boards of the CAFFI. On the basis of its report the Bank of Finland will decide whether or not to support the project. In the event of the company not being satisfied with the decision of the CAFFI, it is entitled to take its case to a special arbitration board composed of three impartial experts. It may be added that new investments

were virtually "frozen" during the recession years of 1975–1978. Recovery in 1979 and 1980 has again provided financial opportunities for capacity expansions. These have taken place — mainly in the sawmilling and paper industries — at a magnitude that will have some bearing on forest policy.

In 1979 the Government appointed a new committee to review and outline forest policy particularly in the field of legislation, administration and taxation in the 1980's. Its report, submitted at the end of 1981, includes a large number of proposals, of which the following carry the most weight.

- 1) An official target for timber production should be defined. The annual increment of Finland's forests should be raised to 72 mill. cu.m by the year 2000. Annual potential cut could then be 69 — 70 mill. cu.m..
- 2) The present Law on Private Forests and the Law on Forestry Administration should be replaced by a new law, which would cover all public and private forests and would contain the main principles concerning the treatment of forests.
- 3) A permanent parliamentary committee named the Forestry Council should be established for the planning of forest policy.

Three working groups have been appointed to develop the Committee's proposals in detail.

6. FOREST TAXATION

The taxation system may substantially affect forest owners' attitudes concerning forest management and especially their willingness to invest money or labour in timber production, as well as their incentive to cut and sell timber. Hence taxation constitutes an essential part of forest policy.

In Finland a forestry enterprise is taxed annually on the basis of both income and property. Income tax is levied both by the state and local authorities (communes), but property tax only by the State.

a. *Income tax is based on assessed income.* The procedure is as follows:

1. Forest soil is classified into five site classes according to its wood producing potential. Each site class is characterized by a "forest taxation figure" i.e. average annual yield expressed in cubic metres per hectare.
2. Since climatic and growing conditions vary greatly in Finland, increment figures of the site classes are determined separately for each commune on the basis of the National Forest Inventory.
Consequently, the forest area, its site class composition and location of the commune determine the annual taxable yield (in cubic metres) of each forest holding.
3. The next step is the determination of the unit value of the assessed yield. For this average assortment composition (the amount of various wood utilization categories: coniferous sawlogs, hardwood logs, pulpwood of the various main species and waste wood) is determined for each forest taxation district on the basis of the wood utilization surveys and statistics.

The net price of the yield unit ("taxation cubic metre") is then determined in each commune. This is done on the basis of annual price data for various timber categories collected by the Finnish Forest Research Institute. The average value for three successive felling years is used in the valuation of the

"taxation cubic metre" in order to smooth the effect of the annual fluctuations in timber prices. The ultimate price of the taxation cubic metre is a net price or stumpage. Allowance is made not only for extraction costs but also for the costs of management and administration. The percentage of management and administration costs is determined for various counties or groups of counties by a decree (statute) which is again determined on the basis of research work done by the Finnish Forest Research Institute. The forestry fee based on the 1950 legislation (Chapter 4) is similarly deductible.

The taxation system described above does not consider all individual characteristics of the forest holding in question. Only the forest area and its site class composition are relevant to each holding. All other characteristics are averages for a commune or even larger area. Furthermore, income tax is levied irrespective of whether fellings and sales are carried out in the year concerned.

What is the role of this taxation system in forest policy? First, one can conclude that the system benefits those forest owners whose felling potentials are higher than the average. It may also be an incentive for a farsighted forest owner to intensify management in order to exceed the average and enjoy income which will escape taxation.

On the other hand, the system penalizes those forest owners whose felling potentials are markedly lower than the average and who must undertake immediate investments in the growing stock and in silvicultural improvements in order to raise the level of production in the future. They have to pay tax for income which will not actually be immediately forthcoming and they have to pay expenses which will exceed the average.

The Act Concerning the Taxation of Farm Income (1967) with its subsequent amendments (the most recent in 1979) permits the following *exemptions*:

1) Afforestation of agricultural land by seeding or planting is tax exempted for 25 to 35 years depending on the location of the afforestation site (in Lapland 35 years, in most other provinces 25 years).

2) Regeneration areas where successful regeneration has been secured, are tax exempted for 10 to 25 years depending on the location. This exemption is applied only to private persons and their partnerships.

Originally, this exemption applied only to the afforestation of waste land and to the reforestation of forest land which was earlier covered with a growing stock of little value. According to the 1979 amendment all regeneration areas will now be subject to exemption. It is expected that this will induce forest owners to take better care of the regeneration sites than previously.

3) Drainage of peatland for forest production is tax exempted for 15 to 25 years provided that the investment has been financed at least partially by the forest land owner in question.

4) Tax exemption may also be applied when the growing stock is substantially damaged for reasons beyond the owner's control, such as storms, forest fires or insects. Exemptions in these cases can be applied for up to 15 years.

b. *Property tax* is based on the *assessed value of forestry capital*. The valuation of the property is based on the net income of the holding to be assessed by the method explained above. This net income is capitalized with a coefficient of 10, which means an interest rate of 10 per cent. The exemptions mentioned above also apply to property tax through the deduction of the net income.

7. NATIONAL PARKS AND OTHER NATURE RESERVES

The growth of population, industrialization, urbanization, increased income and freetime have resulted in two opposite trends in relation to forestry. They have increased demand for wood for various purposes but they have also resulted in the increasing need for the conservation of forests for recreation, research etc.

Special legislation concerning nature conservation was introduced in Finland in 1923. It has been amended five times since then. The conservation areas can be divided into three main categories:

1. Strict nature reserves. They are left completely untouched for scientific reasons, and public access is restricted. However, some reserves have open trails for use by the public.

2. National parks. Finland's national parks are protected areas kept as public attractions and examples of the country's most precious natural features. Their most important role is to preserve the indigenous wildlife and the various ecosystems typical of Finland — the entities formed by soil, flora and fauna.

Nature conservation is, then, the main purpose of the national parks, but they also serve

- scientific research
- general knowledge and education about nature
- recreation, because they offer potential for excursions in a natural setting, for hiking and camping.

3. Other nature protection areas. These can include both privately owned and state lands.

Privately owned protection areas are generally small and range from bird sanctuaries to man-made manor parks. While the establishment of a strict nature reserve and national park requires Government action, the private areas are protected mainly by order of the provincial administration.

On *state-owned* land conservation areas (other than national parks and strict nature reserves) have often been set up by order of the National Board of Forestry or the Finnish Forest Research Institute. They include

- primeval areas which are kept completely untouched as examples of primeval nature. Their wildlife is therefore comparable to that in national parks and strict nature reserves;
- special conservation forests set up for social, scenic and often biological reasons. They are often established specifically for hiking and recreation and may contain primeval areas which are maintained untouched, areas managed for their scenic value, and sometimes also ordinary forestry areas. Many of these areas have service facilities for the public, such as camping and campfire sites, and trails;
- peatlands protected from drainage.

In 1977 there were 15 strict nature reserves and 9 national parks in Finland with a combined area of 3270 sq.km. Most of them were established at the end of 1930's.

Since 1977 activity in the field of nature conservation has been intense. A number of committees and working groups have made proposals concerning nature reserves of various types and a substantial part of their proposals have been realized. The following table illustrates the number and area of various nature reserves in the middle of 1983.

	number	area, sq.km.
National parks	22	6 529
Strict nature reserves	20	1 501
Peatland reserves	59	697
Other nature reserves		
on state-owned land	11	8
on private land	477	476
Total	589	9 211



The original nature of western taiga forests is preserved in the nature conservation areas of Finnish Lapland. Riisitunturi National Park seen from Fell Kirkkotunturi. Photo Hannu Ormio.

According to official plans (Government decisions) by 1990 there will be 28 national parks with combined area of 6 680 sq.km, 22 strict nature reserves (2 084 sq.km) and 600 peatland reserves (4 900 sq.km).

National parks, strict nature reserves and peatland reserves have been established mainly on state-owned land. Less than 10 per cent of their total area was in private hands at the time of establishment. In most cases private land to be used for nature reserves by public action has been purchased or will be purchased to the state. When that is not the case compensation will be paid to the land-owner.

In Lapland, the so-called *protection forests*, based on legislation from 1922, constitute a special category of conservation. They are composed of a forest zone in the northern timber-line region where special protection is desirable in order to prevent the spread of the tundra. Management of these forests is under the control of professional foresters and commercial fellings are permissible only in special cases.

It has been estimated that the entire programme of national parks, strict nature reserves and protected peatlands will result in a reduction of about one mill. cu.m. (1.7 %) in

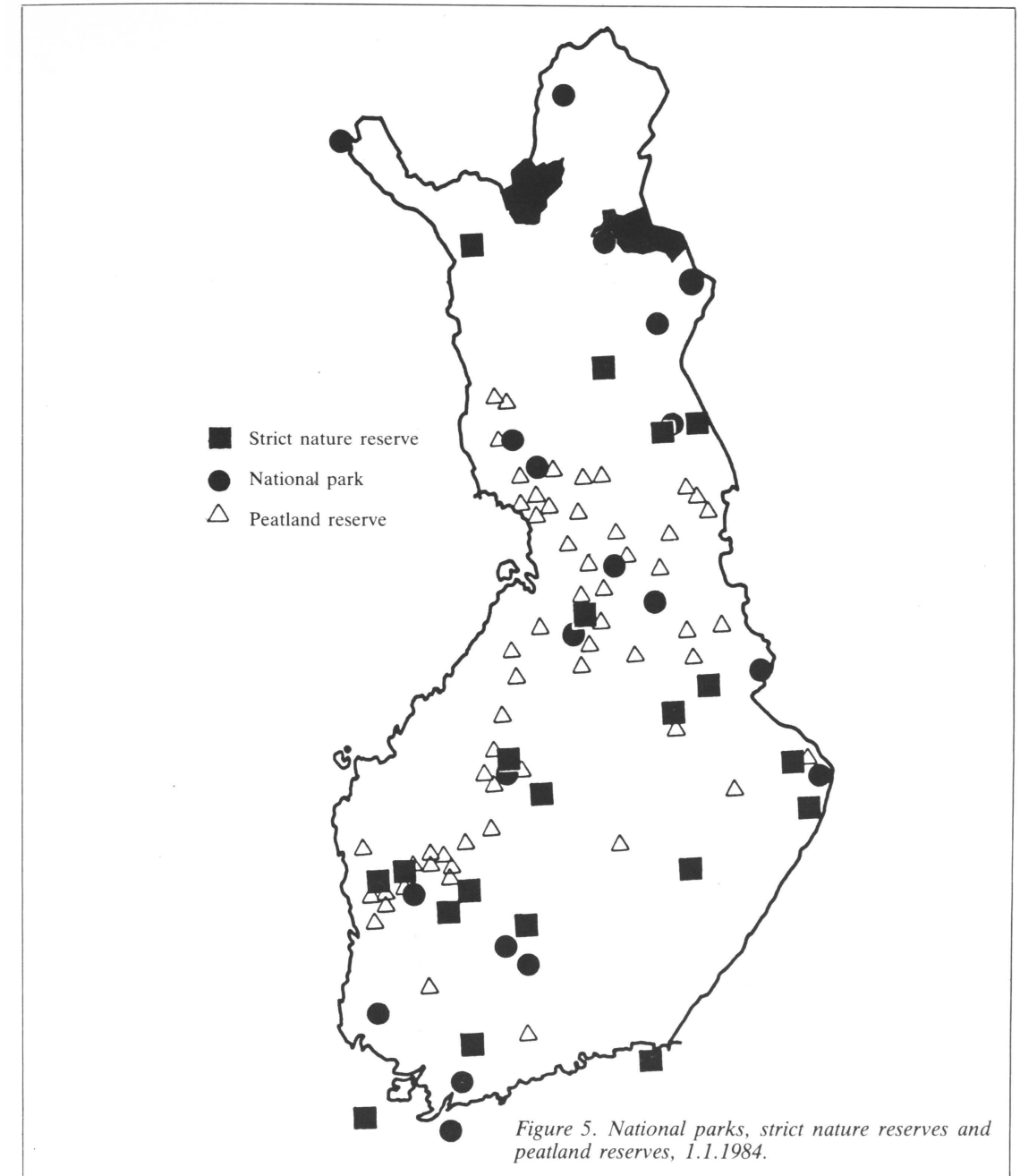


Figure 5. National parks, strict nature reserves and peatland reserves, 1.1.1984.

the annual potential cut. This is rather reasonable in compared with the area (approximately 1.4 mill. hectares) involved. The sacrifice to commercial forestry is not greater because the main part of the area is located in Lapland and often on treeless soils (Figure 5).

However, there are other plans, which may have repercussions on forest production. Of these plans, the so-called regional planning programmes deserve special mention because they involve areas of productive forest in the southern half of Finland which are to be reserved for recreational purposes with certain restrictions on fellings. The need for these areas

is not considered to be as acute as for the actual conservation areas since people in Finland have traditionally free access to all forests ("everyman's rights").

The Ministry of Agriculture and Forestry has been responsible for nature conservation down to 1983. In 1983 a *Ministry of the Environment* was established and nature conservation was transferred to it. Nature reserves on state-owned land are administered by the National Board of Forestry with the exception of three strict nature reserves and two national parks, which are under the administration of the Finnish Forest Research Institute.

8. RESULTS OF FOREST POLICY

The achievements of the "MERA-period" (1965–1975) can be summed up as follows:

	State	Companies	Private & other	Total
Afforestation and reforestation, 1000 ha	296	179	1 010	1 485
Seedling-stand improvement, 1000 ha	651	607	1 658	2 916
Forest drainage, 1000 ha	533	240	1 879	2 652
Fertilization, 1000 ha	663	235	828	1 726
Construction of forest roads, km	4 600	6 900	16 500	28 000

Figure 6 illustrates the development of the annual growth (increment), allowable drain, annual drain of the Finnish forests and the annual use of wood by main categories in 1960–1983.

It can be seen that the annual growth and the annual allowable drain have gradually increased despite a high level of wood utilization during the first decade of this period. Annual growth was, in 1983, about 23 per cent larger than in 1938 in spite of the fact that Finland lost 12 per cent of its forest resources to the USSR in World War II.

The present high level of timber production is a result of many factors. First, various forest improvements should be mentioned. Among them, the drainage of peatlands is perhaps the most characteristic for Finnish conditions. It is estimated that the area drained to date has increased the annual increment of Finland's forests by approximately 7 mill. cu.m. Seeding and planting and in particular the replacement

with conifers of areas occupied previously by grey alder and other deciduous species of little value, have contributed greatly to timber production. The influence of fertilization is less pronounced though it will become increasingly apparent in the future. Improved management of existing stands and successful regeneration, both natural and artificial, must also be mentioned.

Since 1970, the growing stock of Finland's forests has increased by approximately 140 mill. cu.m. and is at present about 1 640 mill. cu.m. Accumulation of timber stock is largely the result of "under-cutting", i.e. annual drain has been less than annual increment practically every year since 1970. This trend in the development of growing stock is a further factor which explains the increase in annual growth, which is now about 66 mill. cu. m.

One can conclude that *forest policy has successfully contributed to the sustained raw wood supply for the expanding forest industries in Finland*. Other contributory factors are

- reduction in the domestic use of wood, particularly the use of fuelwood by the rural population
- more effective use of the available annual cut by reducing waste of wood in logging and industrial processes
- reduction of roundwood exports
- raw wood imports.

The most recent information promises a new period of moderate growth for the Finnish forest industries provided that the high level of activity in wood production, sufficient willingness to sell timber and the competitiveness of forest industries in the world market can be maintained.

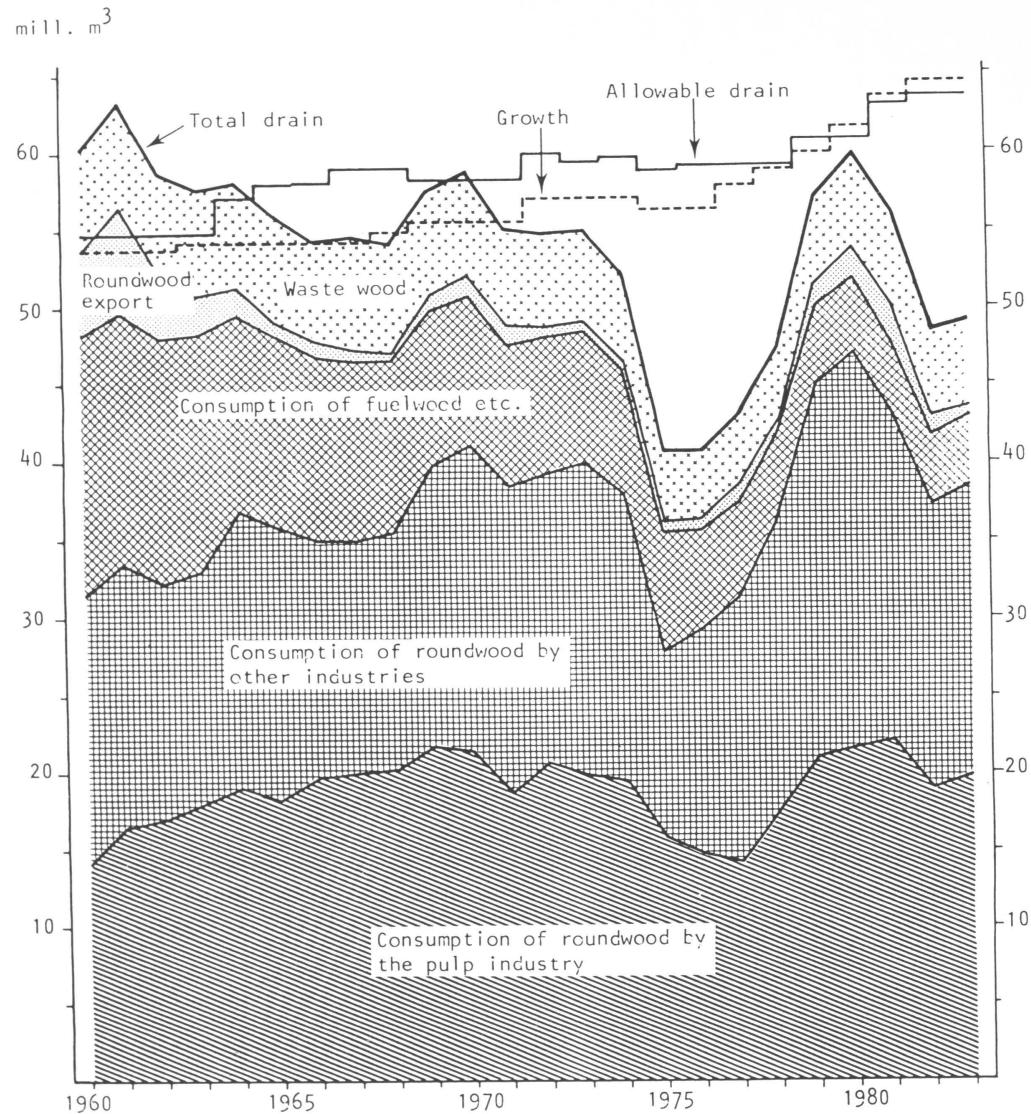


Figure 6. Forestry balance (annual drain in relation to annual growth and to annual allowable drain), 1960–1983. (The Finnish Forest Research Institute).

9. OUTLOOK

When looking to the future, one must bear in mind that the period after World War II and particularly the last three decades have been marked, all over the world, by substantial technical, social and economic changes which will have a bearing on the forest and timber economy in the future. Some of the major trends will be outlined in this chapter.

1) Perhaps the most striking change in forestry has been the *mechanization* of most operations. This took place in Finland somewhat later than in most industrialized countries. In fact it was largely stimulated by the mechanization of agriculture. At present the trend is towards heavy and expensive machines which have been developed for the requirements of large-scale forestry and are not so well suited and viable for normal farm forestry holdings with small working units.

2) Mechanization has considerably changed the traditional nature of Finnish forestry. For example it has

- largely eliminated the traditional collaboration between forestry and agriculture in the use of agricultural labour and equipment by introducing a professional and permanent forest labour force and specialized machines in logging;
- reduced the supply of labour from farm sector and raised the wage rates in forestry (Figure 7)
- decreased the share of floating in the long distance transport of roundwood (Figure 8)

3) A steep increase in the demand for roundwood since the end of the 1950's, a rise in the standard of living of the farmers and the increasing role of the non-farmer forest owners has reduced the private forest owners' need and willingness to sell roundwood in certain regions of the country. This in turn has tended to raise the level of *roundwood prices*. Hence, Finland is facing the problem,

familiar to Norway and Sweden some years ago, namely, how to realize the physical allowable cut.

4) The "oil crisis" (in 1973–1974) with its aftermath of steeply rising oil prices and uncertainty concerning oil availability in the future has raised the question of alternative *energy resources*. Many oil importing countries have adopted a policy of decreasing their dependence on oil and increasing their self-sufficiency in one way or another.

In Finland, hydro-electric power, wood, and imported coal were the main sources of energy supply up to the beginning of the 1950's. Since then dependence on oil, natural gas and nuclear power has increased and oil accounted for about 50 per cent of the energy produced in 1978. Only 27 per cent of the total energy supply came from domestic resources. In 1981 the figures were 42 and 32 respectively.

The current energy policy intends to increase the share of domestic resources to 40 per cent by 1990. Since most waterfalls have been harnessed for power production, wood, together with peat, will have to contribute increasingly to Finland's energy supply. Intensive research and development activities in this field have therefore been started. Wood which is not suitable for industrial use — for example wood from early thinnings as well as logging waste — is a potential source for energy production. In addition, special plantations — fastgrowing hardwood species with short rotation periods — will be established at least for the sake of experimental purposes.

Since energy is a vital factor of production in the forest industries, the present energy problems have bearing on the future of these industries. It has been estimated that the forest industries at present account for 1/4 of the electricity consumption in Finland. But the forest industries are also producers of energy. Traditionally the wood working companies have been the first to make use of water power, and nowadays they generate heat and electricity as by-

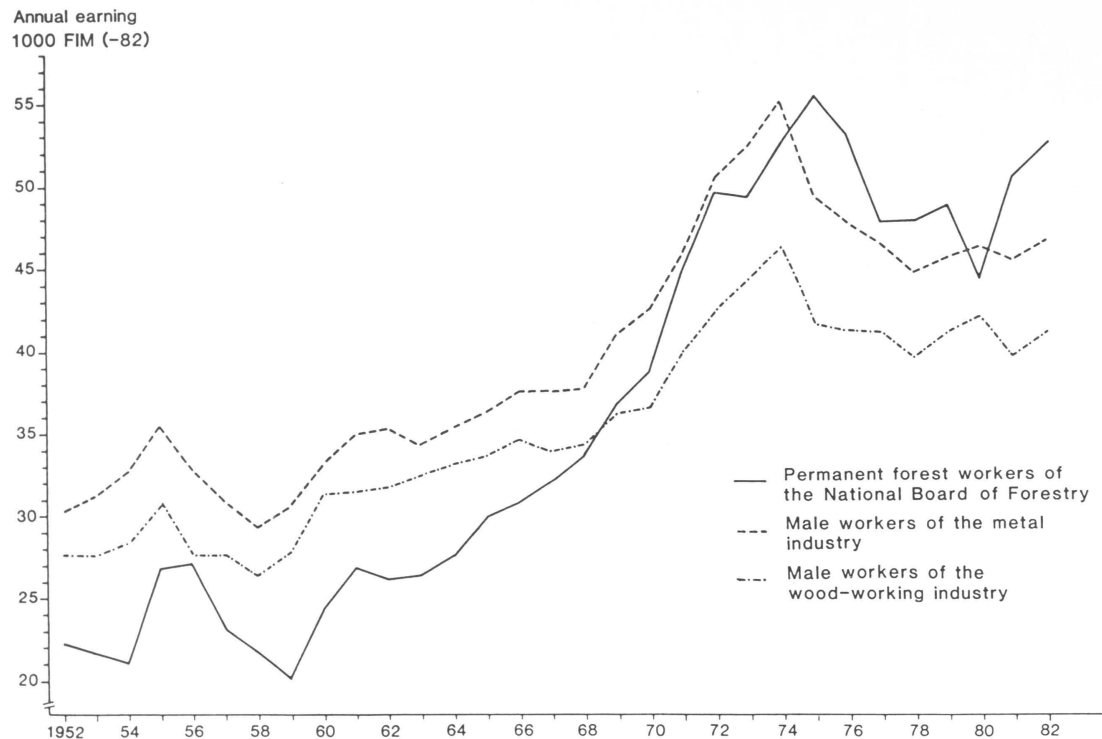


Figure 7. Real annual earnings of the permanent forest workers of the National Board of Forestry and the male workers of the metal and woodworking industries, 1952–1982, at 1982 prices. (The Finnish Forest Research Institute).

products of the production process. This applies particularly to sulphate pulp mills which are self-supporting with regard to both heat and electricity. As a result, approximately 50 per cent of energy used in forest industries is domestic in origin and efforts are being made to increase this percentage using wood which is unsuitable for other processes for the production of energy.

It must be stressed, however, that oil is still required by these industries and that both the steep rise in oil prices and the substitution of oil by wood involves increases in the cost of production. There will also be some competition for wood between these two sectors (energy and processing).

All these trends, together with the present ownership pattern — dominance of small holdings — tend to weaken the competitive position of Finnish forestry and forest industries in relation to those countries who enjoy the advantages of economies of scale both in forestry and wood processing industries.

It has perhaps not been possible to entirely compensate for the unfavourable developments. Some positive trends should be stressed, however.

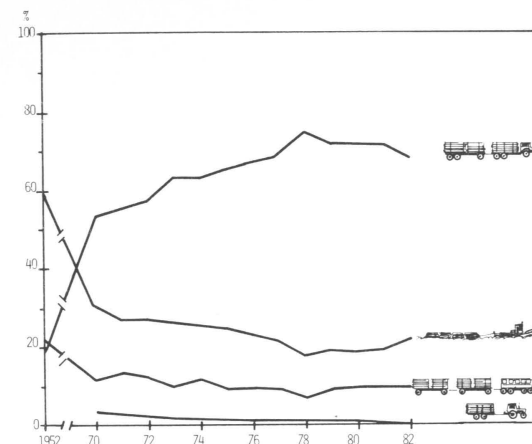


Figure 8. Roundwood deliveries to the mills by long-distant transport, 1952–1982. (Data from Metsäteho).

1) First, successful efforts have been made to encourage co-operation between private forest owners. In addition to collective forests and forest management associations (discussed in Chapter 4), so-called *co-operation regions* have been recently introduced. This form of collaboration involves collective action in working plans, collective sales of timber, collaboration in road construction, often even in felling and reforestation, etc. These activities cover nowadays 10–20 per cent of the private forest area.

2) Another development is the improvement of the *infrastructure* especially in the form of road building. This has markedly eased both primary and long-distance transport of timber and made forests more accessible for various activities, such as drainage, fertilization and silvicultural operations. Road building has also been an important prerequisite for the mechanization of forestry operations.

3) Intensified vocational *training* has improved the skills of forest workers and forest owners, and reduced accident rates. Furthermore, systematic training in conjunction with the mechanization of forest work has resulted in a considerable increase of productivity in Finnish forestry. This in fact has made it possible to carry out various operations in forestry with a labour force much smaller than 20 years ago.

4) In a market economy it is not possible to completely eliminate the discrepancy between the roundwood requirements of the forest industries and the forest owners' willingness to sell their timber. However, collective efforts are being made by the organizations of forest owners and forest industries to make better use of domestic cutting potentials. Negotiations on a national agreement on roundwood prices are becoming an established practice and in five recent felling years agreements have covered all major assortments of roundwood. In addition, the 1980/81 and subsequent agreements stipulate a quantity target for sales and special working groups have been established to monitor this stipulation.

Regarding forest industries, at least five trends of interest should be mentioned:

1) The *vertical integration*, i.e. the combination of successive production phases — in most cases sawmilling associated with pulping and paper-making — is making progress and will soon be the dominating feature of Finland's forest industries. This makes the use of raw wood more effective and creates improved opportunities for marketing.

2) The second feature is the *raising of the degree of processing*. In spite of the fact that pulping capacity has almost trebled since the middle of the 1950's the exports of wood pulp have not markedly increased during the 1960's and 1970's. Pulp has been increasingly processed into various kinds of paper and even into converted products. As a result, the value added per unit of roundwood has increased markedly, which eliminates to some extent the negative effects of the high level of roundwood prices.

3) Since the products of the highest degree of processing have been protected by tariffs in a number of importing countries, Finland has expressed great interest in *free trade agreements*. In 1962 Finland succeeded in negotiating a special agreement with EFTA (European Free Trade Association) and — when UK joined the EC (European Community) — in 1973 with the EC to secure tariff free export to her industries in this most important market. Paper products proved to be a sensitive issue in the-



Vertical integration of forest industries has resulted in industrial communities composed of the various phases of woodworking. The picture shows one such community, i.e. Varkaus, composed of the establishments of the firm of Ahlström (sawmill, plywood mill, mechanical and chemical pulpmill, imp-plant, board mill, paper mill and packaging plant). Photo T. Heiramo.

se negotiations and consequently the elimination of tariffs could not be accomplished within the normal transition period (5 1/2 years). Consequently, it was decided in the Finland-EC agreement that the duties on paper products would be removed stepwise by January 1, 1984. However, even in the transition

period tariff free export was possible within the frame of the agreed quotas.

4) A marked *technical development* has taken place in the forest industries since World War II. Finland has contributed to research and develop-

ment in this field and has also applied innovations made elsewhere.

Some examples of the recent advancements are now outlined:

After intensive research work it was discovered at the end of the 1950's that birch can be used as a "normal" raw material for chemical pulp. This innovation has markedly contributed to the raw wood supply of the Finnish cellulose industry and has successfully compensated for the considerable decline in the use of birch as fuelwood.

Since the early 1960's the growth of the Finnish cellulose industry has been almost entirely due to the expansion of sulphate mills, while a number of sulphite mills have ceased production. The sulphate process permits the recovery of a major part of the chemicals from the cooking process and is therefore more economical than the sulphite process. It also permits a wider raw wood base and lower rate of pollution.

The most recent innovation in pulping is the thermomechanical method. Its particular advantage is a higher yield per unit of raw wood than in the conventional chemical pulping methods. In the paper and paperboard industries a great variety of new products have been developed to meet the very diversified needs of the consumers. Greaseproof papers, condenser paper, cigarette paper, kraftliner, fluting (processed by a semi-chemical method from birch and other hardwood species), and — in the field of paper and cardboard processing — various printing and household papers, sacks and cardboard boxes for the retail trade may be mentioned. In sawmilling, production techniques (including mechanical sorting) and delivery methods have developed during the last 20 years.

In the plywood industry, the development of mixed plywood made of spruce and birch should be mentioned. Concerning plywood and other wood-based panels (chipboard and fibreboard) coating and various other surface treatments have made them more versatile and attractive to final consumers and improved their marketing capabilities.

In practically all sectors of forest industries *computers* are increasingly applied to control and monitor production processes.

5) Recent development in the field of *marketing* has been the establishment of sales offices and daughter companies in major importing countries. This means an increasing market orientation in the management of the companies and more effective control of marketing channels than previously. A close contact with the customers and final consumers and improved knowledge of their particular needs is perhaps the main purpose of the new orientation. In the field of paper making, the daughter companies carry out further processing of exported goods in order to secure an outlet for the products and adequate service to the customers.

The multitude of problems which Finnish forestry and forest industries are facing at the moment, has resulted in an acute need to plan them as an integrated part of the country's economy. Hence a special project, *Forest 2000*, was initiated by the Economic Council in February 1983. It will review the present situation, and outline a programme for ensuring the successful development of the Finnish forestry and timber economy up to the end of this century. The project is guided by a special management group composed of the representatives of the Government, the Bank of Finland, various interest groups and research institutions. The work itself is done in a special programme body and in four working groups set up for timber production, the multiple use of forests, roundwood marketing and forest industries. The project will be completed by the middle of 1984, and the programme will then be presented to the Government for further action.

10. FORESTRY ADMINISTRATION

Finland's official forestry administration was reorganized in 1967–1968 as a result of new legislation (Law Concerning Forestry Administration in 1966 and the Law Concerning Forestry Boards 1967). The changes were not revolutionary.

Forest administration can be divided into two main branches.

- a) State Forestry
- b) Private Forestry

For both categories there are two connecting links on the national level: the Ministry of Agriculture and Forestry and the National Board of Forestry.

The general structure of organization is described in Figure 9.

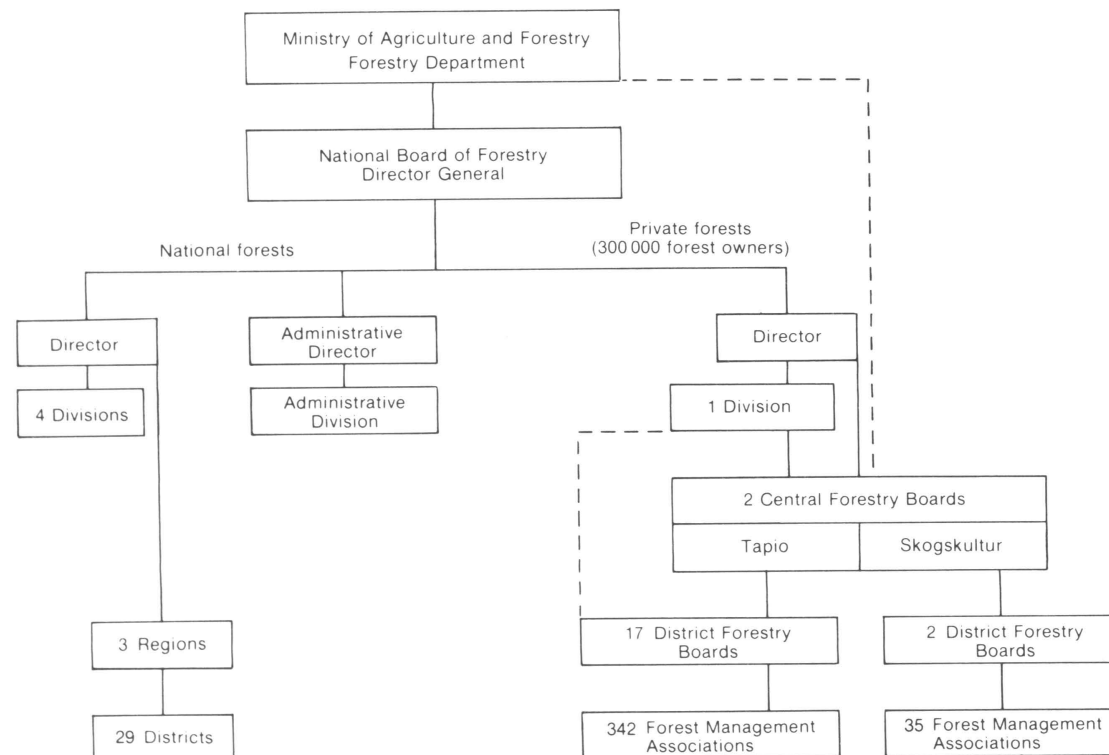


Figure 9. Public forestry administration in Finland.

State Forestry

State forests are administered and managed by the National Board of Forestry which has a special department for state forests with two directors: director for operations and director for administration.

For operations, there are four divisions to run the various operative functions: i.e. divisions for planning (working plans and land-use planning), silviculture (including drainage of swamps), engineering (construction of roads and buildings and transport economy) and business (responsible for timber sales and logging).

The administrative director deals with personnel administration, legal questions, real estates, accounting, budgeting and statistics.

In addition there is an office for multiple use and an information officer, both under the Director General.

For regional administration the country is divided into three state forestry regions headed by a regional director. His staff includes 2–3 inspectors and other officers to plan and carry out various forestry operations in the region. The regions are divided into c. 10 state forestry districts which are led by the district forest officers. Each of them has a staff of 7–10 persons to assist in the execution of practical operations.

In recent years the number of districts has been greatly reduced by amalgamating two or even three districts. Hence the average area of districts has increased. Simultaneously the staff has been trained to take responsibility for specialized functions, such as silviculture, logging, planning etc.

Private forestry

Figure 9 describes the official administration of private forestry on the basis of the 1967 legislation (Law Concerning Forestry Boards).

The most active functional line is composed of

- two central forestry boards (Tapio in the Finnish speaking and Skogskultur in the Swedish speaking regions) on the national level
- 19 district forestry boards (two of them in Swedish speaking regions) on the provincial level
- municipal forestry boards and
- forest management associations (based on the 1950 legislation) on the local level.

The composition of these bodies is as follows:

Appointed/nominated by:

Central Forestry Boards
(Tapio and Skogskultur)
4 representatives of forest owners

district forestry boards
Ministry of Agriculture and Forestry

2 representatives of the forest industries

2 representatives of the forest workers
1 managing director

—"
central forestry board

District forestry boards (19)
4 representatives of forest owners
1 representative of the forest industries
1 representative of the forest workers
1 expert

forest management associations
National Board of Forestry

Municipal forestry boards
(about 450)
3 members

municipal council

Forest management associations (377)

the board of management is elected by the general meeting of the association

The duties of the central forestry boards are twofold: they

- a) control the observance of the Law Concerning Private Forests
- b) promote private forestry on the national level.

The practical functions are carried out by the district forestry boards together with forest management associations. They are assisted on the local level by municipal forestry boards in questions related to the control of forestry law. The central forestry boards guide, coordinate and control the activities of the district forestry boards. In addition the central forestry boards are responsible for the execution of the Law Concerning Forest Improvements, especially in the field of drainage of peatlands and construction of forest roads. For this purpose the central forestry boards have established a pro-

vincial organisation, i.e. *forest improvement districts*. They will be amalgamated into the district forestry boards in 1985.

A conspicuous feature of the Finnish system is that the self-governing bodies (central and district forestry boards) are entrusted with the key role in the execution of forest policy. State control is reduced to a minimum, and is carried out mainly by the National Board of Forestry, which has to

- a) control the activities of the central forestry boards
- b) agree to the annual work programmes of the district forestry boards and control their finances.

11. SECTORIAL INTERESTS IN FORESTRY

Forest owners

Finnish forest owners form two major sectorial groups:

- (a) those pursuing general economic interests and
- (b) commercial organizations.

a) The *forest policy organization* of the private forest owners is organized of three levels. They are

- forest management associations on the local level, i.e. on the level of communes;
- leagues of forest management associations on the provincial level and
- the Central Union of Agricultural Producers (CUAP), particularly its Forestry Council on the national level.

Major activities in the field of policy are carried out primarily on the national level by CUAP's Forestry Council, which was founded in 1942. It consists of the representatives from the provincial leagues, from the CUAP and from Osuuskunta Metsäliitto. Its major operations can be divided into three:

- (1) It guides the long-term and current interests of the forest owners in the roundwood marketing by
 - negotiating and making agreements with the buyers' organizations on the quality requirements of various roundwood categories, on the grading and measuring principles of timber and on the general terms of contracts in roundwood marketing;
 - negotiating annual agreements on timber prices (price recommendations) with the buyers' organizations and
 - market information.

Hence CUAP is a partner representing the supply side on the negotiations concerning timber prices and terms of contracts in roundwood marketing. In 1950 a special committee was established between the CAFFI (Central Association

of Finnish Forest Industries) and CUAP to develop contract forms on equal basis.

It is important to note that collective agreement on roundwood prices has not become as established practice in Finland as it is in Norway, where agreements are made almost every year.

(2) CUAP protects the forest owners' interests in the field of general forest policy, particularly with regard to legislation, taxation, tariffs etc.

(3) CUAP's Forestry Council makes efforts to promote co-operation between forest owners both in the field of forest management and marketing. CUAP is also a strategic centre for the commercial activities of forest owners.

The role of the forest management associations and their provincial leagues is limited. The chairman of each league is simultaneously a member of the Forestry Council and may in this capacity exercise some influence at the national level. However, the main responsibility of these organs is the dissemination of information in two directions, i.e. from the Forestry Council to forest owners and vice versa.

b) Commercial organization

The centre of the commercial organization is the so-called Metsäliitto Group. It originates from Metsäliitto Ltd established in 1934 by CUAP to export roundwood — mainly pulpwood and pitprops — and thus to control roundwood prices. The firm soon became the largest exporter of roundwood in Finland. In 1947 Metsäliitto Ltd was reorganized into the Co-operative Society Metsäliitto based on direct membership of forest owners. At the end of 1948 there were some 50 000 members and in 1980 125 000 members.

After the acquisition of some minor sawmills and plywood factories, an industrial company Metsäliiton Selluloosa Ltd — now Metsäliiton Teollisuus Ltd — was set up in 1953 to manufacture pulp and paper. The company immediately acquired an extensive and versatile forest industry enterprise in central Finland (Äänekoski) which made a major contribution to the Finnish forest owners' industrial activity. A number of other mills have been acquired or built up subsequently so that the activities of Metsäliitto now cover all major forest industrial fields.

After reorganization in 1974 there are two main lines in the activities of Metsäliitto group:

(a) Osuuskunta Metsäliitto, the parent company, which functionally concentrates on roundwood marketing and its development. In this field it acts in two principal ways. First it is responsible for the supply of roundwood to the mills of the Metsäliitto Group. Secondly, in certain regions it acts as a middleman in the roundwood market by purchasing roundwood from forest owners and by reselling it to other companies. In these activities Metsäliitto often uses the services of the forest management associations.

(b) Metsäliiton Teollisuus Oy, the biggest and most important subsidiary company of Metsäliitto group, operates extensive and versatile forest industries.

The supreme administrative power of the organization is vested in the Representative Body of Osuuskunta Metsäliitto, which consists of 76 elected representatives. Under it operates the Administrative Council and the Board of Directors.

The original goal of Metsäliitto (1934) was to affect roundwood prices by stimulating demand and competition in various parts of the country and by exporting roundwood. Later on the same goal was assumed to be achieved through the processing of roundwood in the mills owned by the organization. Some shareholding forest owners may also expect profits from processing industries and other business.

Forest industries

The Central Association of Finnish Forest Industries (CAFFI) was founded in 1918, soon after Finland gained its independence. Its purpose is to further commercial and industrial operating conditions of the forest industries and safeguard its common interests. Labour market matters are managed by the Employers' Association of Finnish Forest Industries. The Central Association of Finnish Forest Industries is a member of the Confederation of Finnish Industries, which began its activities in 1976.

CAFFI follows economic development, legislation and administration by making initiatives and proposals relating to these spheres and by issuing statements. It represents the forest industries in State committees and boards, in trade and tariff agreement negotiations, in commercial and industrial organisations, and it participates in the forest industries' international cooperation. The Association is also responsible for general information and for economic research.

CAFFI is a central organ of approximately 60 enterprises engaged in forest industries and of associations formed by them. The corporate members — either sales or branch associations — are as follows:

Sales associations:

Finncell (wood pulp, founded in 1918)
Finnpap (paper, 1918)
Finnboard (paper board, 1943)
Puutalo, Sales Association for Prefabricated Houses (1956)
Converta (converted products of paper and board, 1944)

General branch associations:

The Finnish Sawmill Owners' Association (1895)
Association of the Finnish Plywood Industry (1939)
Finnish Particle Board Association (1960)
Wallboard Association of Finland (1953)

The member companies and associations cover the entire industry that processes wood on an

industrial scale, with the exception of some sawmills and the nonintegrated paper and board converting establishments.

CAFFI is governed by an administrative board of 30 members. The 11-man executive committee of the administrative board directs the Central Association in the intervals between board meetings. The administrative board and the executive committee have five advisory committees to assist them in: commercial policy, forest policy, environmental protection, energy and purchasing. Their members are experts from the member companies and associations.

The bureau of the Central Association consists of a general department, a forestry department, a commercial policy department, an economic research department, a purchasing department and an information department.

Forest labour

Up to the 1960's, forestry and timber transport work was mainly carried out by small farmers as a part-time employment. The practice was appropriate while logging operations were done manually and in winter time; farming people and their horses were then easily available for the job. In fact, there was a high demand for seasonal work and additional earnings among the owners of small farms. Even larger farms used their hired labour for forestry work in winter time.

A professional labour force gradually came into existence in the 1960's for a number of reasons:

1) Mechanized forestry work, introduced to Finland at that time, required skilled labour. Mechanization was desirable for two reasons: first because work in farming was mechanized and there were not enough horses to carry out haulage of timber in forest; second, to increase labour productivity in forestry.

2) Rapid industrialization resulted in rural depopulation, which — together with emigration of labour especially to Sweden — caused scarcity of labour in rural communities. Mechanization of work in farming contributed to rural exodus by reducing the need for farm labourers.

3) Intensive timber production programmes increased the demand for labour in silviculture. This together with the introduction of the all-year round logging practices has made it possible to provide permanent employment in forestry.

As a result of these and some other trends the timber companies and the State Forest Service realized that professional permanent forest labour had to be created and employed in order to secure adequate long-term supply of timber. In the middle of the 1960's the systematic training of forest workers was introduced. This development does not mean the complete elimination of seasonal labour. It is still used in logging and especially in silvicultural work, which in farm forestry is still largely carried out by the farmers themselves. It is estimated, however, that 70 per cent of logging is done at present by professional labour.

The brief history of forestry work described above may explain the fact that the organization of forest labour is a very recent development. The professional forestry workers belong — together with agricultural workers — to the *Finnish Rural Workers' Union*, which was established in 1945. The membership of this Union is 36 000 workers of which 18 000 are forestry workers.

The Union negotiates and makes agreements on wages and other terms of work with the Employers' Association of Finnish Forest Industries. Also the State Forest Service participates in the negotiations as an employer.

Before the forest workers' organization was created, the Government used various means to secure a certain level of wage rates and working conditions. These included the official inspection of wages introduced in 1934,

minimum wage rates, stipulations concerning temporary work camps, etc. Recently, the Government has given much attention to safety in forestry work.

In comparison with forest labour, the organization of the workers engaged in forest

industries has a fairly long tradition. The first trade union was established in 1906. At present there are two major trade unions in this field; one for pulp and paper industries and the other one for mechanical forest industries.

12. FORESTRY EDUCATION

Higher forestry education

Higher education in forestry began in 1862 at the Evo school of forestry, located about 120 km north of Helsinki. The principal task of the school was to educate forest officers in the service of Finnish forestry but some members of the teaching staff were also able to initiate forest research.

It became increasingly clear that the remote location of Evo involved numerous disadvantages and particularly hindered scientific development. It was therefore decided in 1907 to move forestry education to the *University of Helsinki*, to which higher education in agriculture had been transferred in 1896. Forest and agricultural education were amalgamated as a special department of the Faculty of Philosophy, and in 1924 as an independent Faculty of Agriculture and Forestry.

At the outset two professorships in forestry were founded in the new faculty: one for silviculture and the other for forest mensuration. At present there are eight professorships in forestry and four in common with agriculture.

The present stipulation concerning the examination requirements for forestry dates from 1978, according to which the successful execution of the required examinations entitles the students to proceed to the degrees of

Master of Forestry
Licentiate of Agriculture and Forestry
Doctor of Agriculture and Forestry

The curriculum in forestry (Master of Forestry) comprises two major programmes:

- a) General forestry examination
- b) Commercial examination in forestry and timber economy

In the general forestry examination the student can choose a great variety of combinations of subjects — silviculture, forest mensuration, peatland forestry, forest entomology, forest pathology, genetics, forest technology, social economics of forestry or business economics of forestry — of which one is the main subject. In the commercial examination the main subject is always forest products marketing, for which a professorial chair was created in 1959. Practical training in silviculture, forest technology and peatland forestry is organized by the University mainly in its training center Hyttiälä.

The number of students who study for Master of Forestry examination is limited. At present a total of 60 new students are admitted for the general forestry examination and 20 for the commercial examination annually. It normally takes four to five years to pass the master's examination.

In 1981 it was decided to establish a Faculty of Forestry at the *University of Joensuu*, North Karelia, about 450 km northeast of Helsinki. The degrees are similar to those in Helsinki but the curriculum is more specialized: particular stress is laid on the production of wood and peat for energy, and there is a chair for this subject as well as for silviculture. No curriculum for the commercial examination exists at Joensuu. Education started in 1982 with 20 students.



As a result of systematic vocational education and experience the Finnish forest workers have achieved a high level of professional competence, which has been proved in a number of international competitions. The picture shows the Finnish team who won world championship in chain sawing in Norway, 1980. Photo J. Routa.

Vocational and technical education in forestry and forest industries

The education given at the forestry schools or institutes is, according to the regulations

- 1) basic forestry education and training
- 2) courses for youth and further training
- 3) extension in forestry excluding the extension services for the private farm forestry sector.

There are 30 forestry and forest industrial institutes under the Office of Forestry Education of the National Board of Vocational Education, 36 separate training centres under the main institutes; one saw training station and 18

training forests with the total area of about 16 000 ha. The Office also supervises the forestry training organized within the Office of Occupational Training Courses of the same board. Forestry education is also provided at some 45 agricultural institutes under the Office of Agricultural Education and primary wood conversion (sawmilling and wood-based panels) at 7 institutes under the Department of Technical Education.

The short course activity has been operational since 1907. During the 1960's and 1970's it was centered to the 19 course departments which were established at the forestry institutes. At the moment, a reform of both general and vocational education is underway.

Forestry education will also be reformed. The latter will be completed during the 1980's. The objective will be to provide an opportunity for every young person to acquire either high school or vocational/technical education and eventually a chance to continue to university level studies from the vocational schools.

Forestry colleges provide education at the upper technical level for those who will be working in planning and supervisory positions. Secondary school qualifications are required for entry. The duration is four years, in addition to which comes a 1 1/2 years practical training. There are 120 graduates per annum. The teacher training is taken care of by a special forestry college in collaboration with a number of other institutes designated as training schools for the teacher candidates.

Between 40 and 70 teachers graduate annually.

The Colleges of Forestry and Forest Industries provide for the technical levels for planners, production supervisors and foremen within the primary mechanical woodworking industry, i.e. sawmilling, wood-based panel manufacture and marketing of wood products. The entrants must have secondary school qualifications; the duration of education is four years, except for foreman, three years of which one year practical training. The annual output is about 100 technicians and foremen and 20 from the marketing side.

The College of Forestry and Forest Industries, at Kotka, has provided training in sawing and planing of sawnwood for small entrepreneurs since 1950. Since 1976 this sector has been taken care of by a separate department of the college.

The forest foreman schools educate those who will work in supervisory field duties in forestry. Entry qualifications include comprehensive school. The duration of training is being lengthened from two to 2 1/2 years. The annual output has been about 220. — The special training of peat production foremen takes place at Tuomarniemi Forestry College.

The forestry schools provide training for pri-

ivate forest owners in management, silviculture and mensuration of forests as well as in logging techniques. The duration of the basic course is 700 hours: training can also be taken as a series of short courses each of which is 40–70 hours. Annually about 14 000 private forest owners take part in the courses of the forestry schools.

Forest workers' schools produce forest workers after completion of one year's orientation education followed by one year's specializing period. The education covers all round-the-year tasks of a forest worker: logging, reforestation and tending of seedling stands. The annual output is 700 to 800 forest workers.

Forest machine schools are providing training in the following fields:

- 1) Forest machine operators who operate and maintain forest machines in logging and forest improvement work. The duration is two years and output 200–300 drivers annually.
- 2) Forest machine mechanics who are maintaining and overhauling forest machines both at workshops and in field conditions. The duration of the course is now being lengthened to three years. The output per annum is 30 to 40 mechanics.

Further training in the form of short refresher courses has been arranged at the forestry institutes during the 1970's with an annual number of trained persons from 15 000 to 20 000. Partly it has been a question of "modules" of basic training for forest workers, forest machine operators and mechanics. One important area is the supplementary training organized for the teachers of the forestry institutes.

Forestry training for the developing countries has been organized since 1966 under the auspices of the Office of Forestry Education according to assignments from the Ministry for Foreign Affairs. The training, in the form of seminars and training courses, has taken place both in Finland and recipient countries. The major fields covered have included the operation and maintenance of forest machines, planning of logging, sawmilling and wood-based panel industries as well as the maintenance of machines and equipment of the woodworking industry. Since 1969 the training

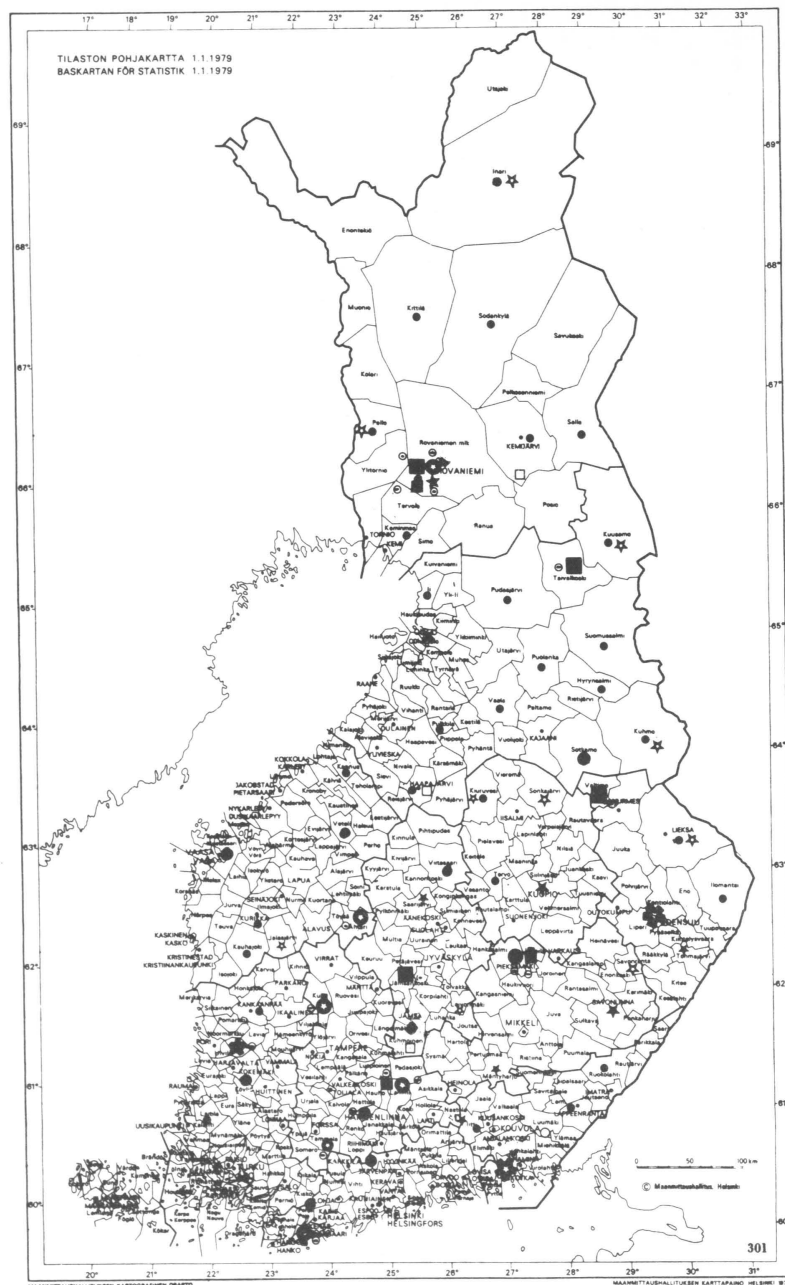


Figure 10. Location of the vocational training institutions.

THE EXPLANATION OF THE MAP

- | | | |
|--|---|--|
| ● | Forestry colleges + course departments (3) | Evo, Tuomarniemi, Rovaniemi |
| ● | Forestry college + course department, Swedish lang. (1) | Ekenäs |
| ● | Forestry college + teacher training centre (1) | Kuru |
| ● | Forestry college (1) | Nikkarila |
| ✱ | Colleges of Forestry and Forest Industry + course departments (2) | Kotka, Joensuu |
| ● | Forest foreman school + course department (1) | Tammela |
| ● | Forest foreman school (3) | Korsholm, Rajamäki, Sotkamo |
| ✱ | Forestry schools + course departments (4) | Itä-Savo, Pohjois-Savo, Lappi, Vallinkorva |
| ✱ | Forestry schools (5) | Selkola, Saarijärvi, Lounais-Suomi, Onkamo, Etelä-Savo |
| ✱ | Training center of Forestry and Forest Industry + course department (1) | Kullaa |
| ■ | Forest machine schools + course departments (4) | Hirvas, Valtimo, Jämsänkoski, Taivalkoski |
| ■ | Forest workers' schools + course department (2) | Nikkarila, Hirvas |
| ■ | Forest workers' school (1) | Evo |
| □ | Separate training centres for forest workers (3) | Kemijärvi, Kuhmoinen, Haapajärvi |
| ● | Separate training centres for forestry basic courses (33) | Haapajärvi, Hyrnsalmi, Ii, Ilomantsi, Isokylä, Ivalo, Kannus, Kankaanpää, Kausala, Kittilä, Kiuruvesi, Kuhmo, Kuhmoinen, Kurikka, Kuusamo, Laitila, Lappeenranta, Laurila, Lieksa, Peipohja, Pello, Pojo, Pudasjärvi, Puolanka, Pulkila, Ruokolahti, Salla, Sodankylä, Suomussalmi, Tervo, Vaala, Veteli, Viitasaari |
| ○ | Saw training station (1) | |
| ○ | Training forests (18) | |
| <u>Forestry Training of the Occupational Training Centres:</u> | | |
| ✱ | Training for forest workers (7) | Pello, Kuusamo, Kuhmo, Sonkajärvi, Savonranta, Lieksa, Inari |
| ✱ | Training for peat production workers (3) | Leivonmäki, Kiuruvesi, Jalasjärvi |

has been planned and organized by a special group (Forestry Training Programme for Developing Countries, FTP) attached to the Office of Forestry Education.

Personnel. The education for forestry and the forest industries is taken care of by some teachers with university level background (100

with M. Sc. For. and 30 M. Sc. Eng, B. Sc. Eng or equivalent); about 200 teachers with forest or machine technician's background; c. 200 work instructors and a number of visiting lecturers of various specialities.

The locations of the training institutions are illustrated by Figure 10.

13. FORESTRY RESEARCH

State Institutions

Faculty of Agriculture and Forestry of the University of Helsinki. The Evo School of Forestry and its successor — the Faculty of Agriculture and Forestry at the University of Helsinki — were the first research institutions in the field of forestry in Finland. The role of the University in research has been and will continue to be twofold:

1. The training of research workers.
2. Research projects carried out by the staff of the faculty.

The research potential of the University has increased considerably since World War II with an increasing number of professorial chairs and other appointments.

The University's annual budget does not provide funds for research. Therefore research at the University is financed from other sources. The main sponsors are the National Research Council for Agriculture and Forestry, the Foundation for Research of Natural Resources in Finland and the Finnish Cultural Foundation.

The Finnish Forest Research Institute. Towards the end of the 19th century initiative was taken by the practising foresters for the establishment of a special forest research institute. This idea was realized in 1917 — after certain preparatory work by A. K. Cajander. The Finnish Forestry Experimental Institute — the

present Finnish Forest Research Institute (FFRI) was then founded and it started its activity on the first of July, 1918.

FFRI is subordinated to the Ministry of Agriculture and Forestry. Originally it comprised three departments (Silviculture, Forest Inventory and Yield and Soil Science). Gradually the number of departments has increased to nine. Each department is headed by a professor. Besides there are four departments with two professors.

The Institute itself is located in Helsinki and shares the same building as the forestry departments of the University of Helsinki. In addition the Institute operates research stations and experiment stations outside Helsinki. Experimental forests of 17 units with a total area of approximately 80 000 hectares are directly administered by the FFRI.

At the end of 1983 the research staff at the FFRI comprised 13 professors, 10 senior research specialists and 179 researchers. Altogether about 680 people were engaged in research activities. General co-ordination of the activities rests with the Director, a post founded in 1962.

The National Research Council for Agriculture and Forestry. This institution is one of seven research councils founded in 1961 to promote scientific research in Finland. It employs research workers: senior and junior fellows and research assistants for periods of one to three years. In 1983 there were 36 such researchers of whom 17 were engaged in forestry research. The Council has no laboratories or institutes. Its researchers carry out their work

Forestry research is described in greater detail in the booklet "Research in Forestry and Wood Science in Finland" available from the Society of Forestry in Finland.

in universities or research institutes.

The Council also distributes grants and fellowships particularly to the scientists at the universities and makes contracts for the financing of long-term research projects. The main role of the Council is therefore to act as a financing channel. It also acts as an expert body to authorities concerning various problems in agriculture, forestry and home economics. All research councils are subordinated to the Ministry of Education.

Research in *Wood Science* is mainly carried out by two state institutions: Technical

Research Centre of Finland and Helsinki University of Technology.

Technical Research Centre of Finland was founded in 1942. Three of its 32 laboratories are devoted to wood science, namely

Wood Panel Products Laboratory
Timber Laboratory and
Wood Preservation Laboratory

Research in wood chemistry is carried out in the Chemical Laboratory. This institution works in close collaboration with the Helsinki University of Technology.

Helsinki University of Technology is the main institution in higher technical education in Finland. Its Department of Forest Products has professorships in mechanical wood technology, paper technology, printing technology, wood chemistry and pulping technology.

Besides teaching, the staff of the Department carries out research work sponsored by the National Research Council for Technology and a number of private foundations.

Private institutions

Some private institutions make significant contributions to the research in Forestry and Wood Science in Finland.

Metsäteho (the Forest Work Study Section of the Central Association of the Finnish Forest Industries, founded in 1945) and the *Finnish Pulp and Paper Research Institute* (founded in 1916) are organized and maintained by the Finnish forest industries.

Metsäteho aims at providing services (research, development and information) to increase effectiveness and to promote rationalization in the field of logging, transport and silviculture. The Finnish Pulp and Paper Research Institute is the main research institution of the pulp and paper sector in Finland. The aim of the Institute is to carry out research concerned with chemical and mechanical pulp and with the manufacture of paper and board, with a view to promoting progress of the technology in these fields.

The Work Efficiency Association (*Työteho-seura*) was founded in 1924. It aims at the rationalization of agriculture, forestry and home economics by performing research, experiments, product development and educational work. Its forestry department (founded in 1942) concentrates mainly on the problems of farm forestry.

The Foundation for Forest Tree Breeding (*Metsänjalostussäätiö*) was established in 1947 by a number of Finnish forestry organizations to apply the results of scientific research to forest tree breeding and particularly to produce and supply genetically superior seeds and plants for afforestation and reforestation.

The Society of Forestry in Finland was established in 1909 to promote forestry research in Finland and to serve as a link among those who devote themselves to this research. It endeavours to attain its objectives principally by holding meetings and seminars, issuing and exchanging publications (*Acta Forestalia Fennica* and *Silva Fennica*) and by participating in international activities in forestry research.

The Work Efficiency Association, the Foundation for Forest Tree Breeding and the Society of Forestry in Finland receive regular financial support from the State budget.

The Finnish institutions in forestry and wood science work in close collaboration with the corresponding institutions in a number of other

countries, particularly in the Nordic countries and the USSR. Most of them are members of the International Union of Forestry Research Organizations (IUFRO) and their individual researchers work actively in the various research groups of IUFRO.

