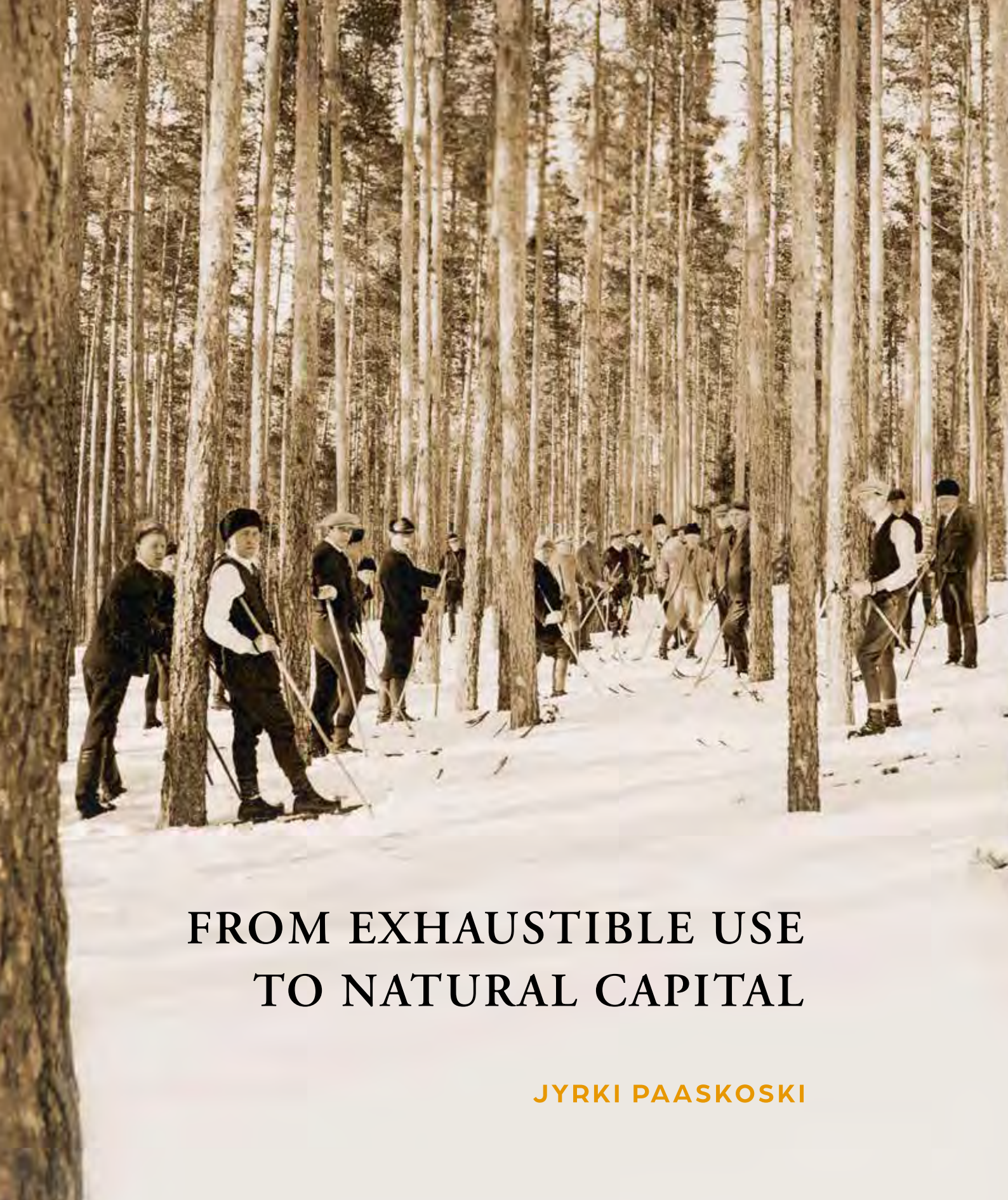

FROM EXHAUSTIBLE USE TO NATURAL CAPITAL

JYRKI PAASKOSKI

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THE STORY OF FINSILVA'S FORESTS

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**FROM EXHAUSTIBLE USE TO NATURAL CAPITAL –
THE STORY OF FINSILVA'S FORESTS**

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TEHTY SUOMESSA
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Finsilva

Finnish
Forest Museum
LUSTO

Marked spruce trees ready for selective harvesting in Keuruu in 1926. The Metsähallitus collection, Lusto.

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FOREWORD

A stone ruin sits in the middle of an autumnal forest in central Finland; about two metres edge to edge, it is naturally a point of focus. Rocks patinated by time and covered in moss and decaying leaves are surrounded by dense, rising trees. The coniferous forest is dominated by Norway spruce, with some stately silver birches here and there. The trees here are slightly more rampant than is typical for forests in the areas of the Mänttä water divide.

If the stones here were cleared by slash-and-burn cultivation in about the mid-1800s, the current trees represent the fourth generation since that time and the third generation since ownership of the forest changed in the early part of the last century and the estate was incorporated into what is now Finsilva Plc. The first forest inventories carried out in the area indicate that when ownership changed more than a hundred years ago the growing stock was mature but sparse: roughly a third of its current density in terms of cubic metres per hectare.

Forests are a key production asset on the balance sheets of Finsilva Plc, now essentially a natural capital company. As well as time, generations of silviculture are materialised and embodied in the current trees, growing stock and natural capital. What is the story of the company's forests, and is there anything it can teach us for the future? What role have the forest's owners played and what external factors have affected its story? It was questions such as these that underlay the writing of this book and inspired the research within on the history of Finsilva Plc.

While people have always needed wood, their need for land has been greater still. In Europe, about half of all forests had been converted into agricultural land as far back as 150 years ago. Indeed, as Finland's industrialisation gathered momentum in the 1800s, the country's forests were already a scarce natural resource. It was in search of not only hydropower but also wood that one of Finland's first and leading industrialists G. A. Serlachius sailed over 100 kilometres from Tampere to distant Mänttä. His arrival at Mänttä in 1868 triggered a chain of industrial developments, eventually leading to the formation of a natural capital company known today as Finsilva Plc.

The forests in the Mänttä region in the 1800s were surprisingly under-stocked and, at least in terms of timber production, in poor

◆ *A Day in July* (A landscape in Northern Savo, 1891) by Eero Järnefelt features a view of slash-and-burn areas and hills in Eastern Finland. The focus of the painting is a young boy who sits on a rocky outcrop, symbolising a new generation and a brighter future. The remnants of an old swidden can be seen in front of him. A hilly landscape marked by slash-and-burn clearings stretches into the background. Reima Määttänen, the Viipuri Friends of Art Association, Hämeenlinna Art Museum.

condition. Hundreds of years of slash-and-burn cultivation, dry distillation of tar and extraction of wood for household requirements had depleted the forests. Ideally, forests would be considered a farmer's bank, but lending and deposits were not in balance. Economic perspectives were commonly myopic, and harvesting decisions paid hardly any regard to long-term biological growth.

Serlachius' investments in paper machines required longer-term thinking. The supply of wood had to be ensured for the lifespan of a capital-intensive mill – decades at least. Serlachius' company developed an interest in acquiring peasant-owned forests; at the same time, it had an incentive to invest in developing better forest management techniques, even with long payback periods. Fortunately, strong private property rights were established in the national legislation of the country, forming a basic and necessary precondition for forestry investment. Over the next hundred years or so, the forest assets of the future Finsilva Plc were accumulated through numerous acquisitions, mergers and deals.

The need to incorporate assets into a single company began to emerge in the 1990s. From a business administration perspective, the incorporation of forests into a separate company facilitated a transparent position with respect to other forms of capital, such as buildings (real estate), machinery and equipment.

Gradually, the incorporation of forests provided an opportunity to consider alternative models of company ownership – a wood processing company was no longer the only viable option. With rapidly developing capital markets looking for new investment opportunities, forest assets presented a number of interesting investment features.

Forestry had long been known as a good inflation hedge. The price of wood typically rose in line with the amount of money circulating in the economy, as the supply of forests and wood is relatively fixed. For the first time, capital markets also took note of the nature of biological growth, crucially that forests continue to grow during a downturn. In addition, biological growth does not correlate with the prices of shares or bonds listed on stock exchanges, implying a diversification benefit. Furthermore, risk assessment was essentially enhanced by forest science – which had developed in leaps and bounds over the decades – producing mathematical models that could be used to calculate biological growth far into the future.

As a result of this evolution in the relationship between forest holdings and capital markets, the strategic interests of the company eventually changed from wood-processing to financial investment. Finsilva Plc became a fully independent profit-seeking limited liability company.

The change from strategic to a non-strategic ownership encouraged a fresh look at the company's operations and product portfolio. In its new strategy, Finsilva Plc established the goal of developing into a comprehensive forest and natural capital company. In-depth expertise in forestry and wood production remains at the core of its operations, but it is now also seeking growth through environmental, climate and biodiversity markets and by offering opportunities for renewable energy investments.

As a concept, natural capital emphasises the role of the land, trees, nature, biodiversity, carbon sequestration and social environment of a company's forests. Further transition phases are likely to be expected as the natural capital market continues to take shape.

Although there are 600,000 forest owners in Finland, the history of forestry from an asset perspective has been scarcely documented, if at all. In March 2021, Finsilva Plc's Board of Directors decided to conduct a study on the history of the company's forests.

The country's leading experts were commissioned to carry out the project. On behalf of Finsilva Plc, I would like to thank historian PhD, Docent Jyrki Paaskoski for writing the company's forest history and for his in-depth focus on weaving the story of the forests.

A history committee was established to support the work and provide background support, the members of which included Finsilva Plc's CEO Juha Hakkarainen, Docent Jaana Laine PhD, Docent Jyrki Paaskoski PhD, Docent Leena Paaskoski PhD, Forester Harri Viitaniemi and myself. I would like to thank the members of the history committee for their valuable work and particularly inspiring and enlightening discussions.

The book was produced and published by the Finnish Forest Museum Lusto, which provides a historical writing service. At Lusto, the project was carried out under the guidance of Development Director Leena Paaskoski. Kimmo Heikkilä MA (graphic design), Iiris Kankaanpää MA (picture editor), Marko Rikala MA (editor) and Heidi Pitkänen MA (archivist), participated in the implementation. On behalf of Finsilva Plc, I would like to thank the above-mentioned people for their contributions to the final publication. On behalf of both the company and all those who participated in the work on this project, I would also like to thank all the interviewees and those who donated archive material.

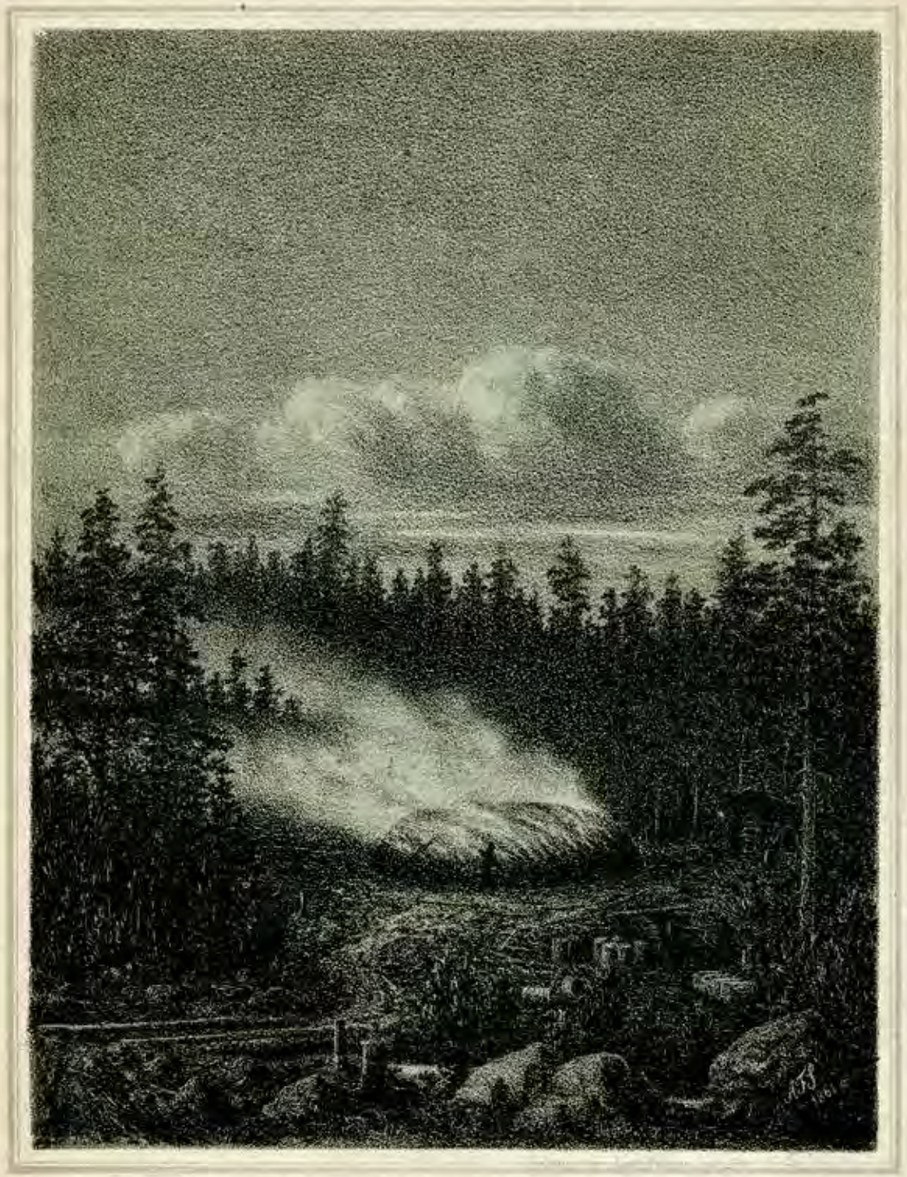
This book presents the story of a sizeable forest asset, even in a European context. It is based on research, numerous interviews, extensive archival work and written sources. The company's archives were an essential resource, containing forest plans and numerical data on the company's forests from more than a hundred years ago.

From Exhaustible Use to Natural Capital – The Story of Finsilva's Forests is an incredibly exciting business history, rich in the spectrum of events it documents but likely also instructive on a broader scale.

In Helsinki, 16 December 2025

Olli Haltia
Chairman of Board of Finsilva Plc 2015–2025

INTRODUCTION



FORESTS AND MAN THROUGH THE AGES

Founded in 2005, Finsilva Plc, a forest and natural capital company, is a young enterprise, but the forests it owns have regenerated countless times over thousands of years. The saying "a forest's owners change, but the forest is forever" says something essential about the different life cycles of human beings, societies and forests. A human lifetime is shorter than that of a society, and both are far shorter still than the lifetime of a forest.

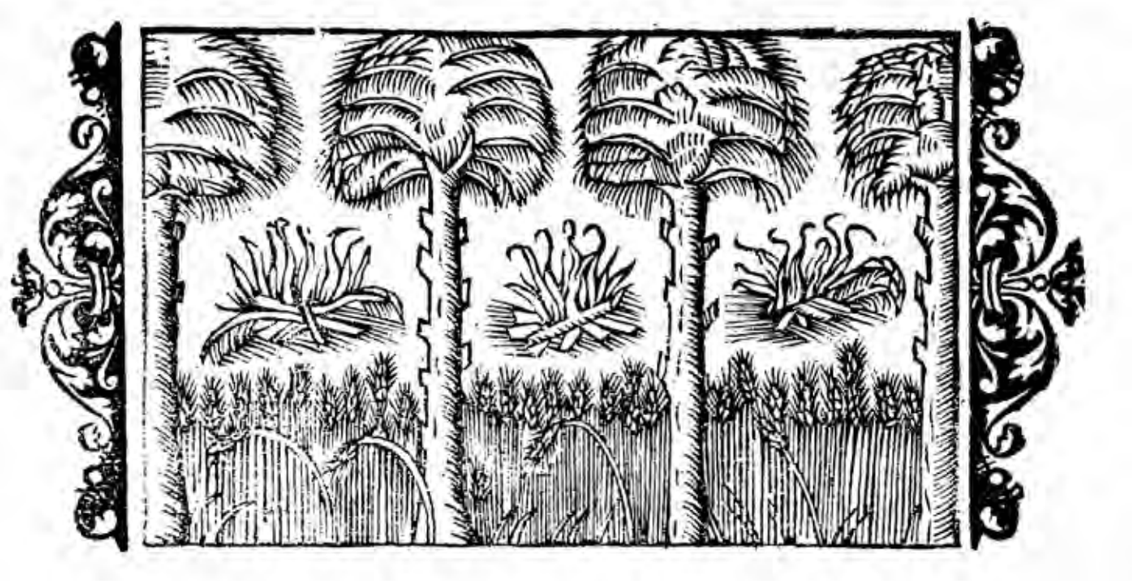
Forests have naturally regenerated every couple of hundred years on average after events such as fires started by lightning. Even if a forest was destroyed, it grew back. In the past, the regeneration of forest was beyond our understanding and perception of time. The vitality of forests was and still is a biological phenomenon that is difficult to comprehend. Wood is time in materialised form.

Forests and humans have always interacted. Each has impacted the other. Do forests need humans? And do humans need forests? The latter question is easy to answer, the former much more complicated. The particular nature of a forest and people's relationships with it at any given time determined the interactions between these two entities.

People try to control the life of the forest in various ways to benefit from the resources it provides. The rotation period of Finsilva's commercial forests is currently 70–80 years, after which trees are harvested and seedlings are planted in their place to grow a new forest. This was not always how Finsilva's forests were managed. Even 170 years ago, Finnish

◆◆ Previous spread: Humans need forests, but do forests need humans? In Ireland, Scotland and Iceland, people destroyed forests that are now being replanted. In Southern Finland too, only small areas of virgin forest remain. Erkki Oksanen, the Finnish Forest Research Institute Collection, Lusto.

◆ In 1862, A. F. Soldan published *Suomen terwapoltosta ja kuinka se olisi parannettawa*, a study on tar burning in Finland and how the process could be improved. Its first page features an image of a tar-burning pit smoking on a summer night. While tar burning was key to the livelihoods of peasants in Ostrobothnia and Kainuu, the failure to regenerate the forests resulted in their widespread destruction.



Historia de gentibus septentrionalibus (*A Description of the Northern Peoples*, 1555) by Olaus Magnus features the first drawing of slash-and-burn activities. Swidden fires burn behind lopped and partly debarked trees, and swidden rye grows in the foreground. The National Library of Norway, Oslo.

people commonly believed that trees grew from the ground, not from seeds, which meant that they could do nothing about forest regeneration; as they saw it, trees simply emerged from the soil. This explains why people did not plant seedlings or sow seeds to replace felled trees, instead being happy to wait for nature to grow a new forest to replace the one that had been felled. The modern science of forestry that emerged in the latter half of the 19th century provided methods to promote forest growth, but its effects were slow to manifest.

It is fascinating to observe the speed and pace of the changes that have affected forests. When human communities were small and relatively isolated from each other, as in prehistoric times, for example, changes required in forests were geographically restricted and short-lived. Communities had little impact on forest biodiversity or tree populations, except in localised, established settlements.

As the population grew, settlements expanded into previously untouched areas. The mobility of communities that derived their livelihood from slash-and-burn farming is a good example of such a change. The impacts of slash-and-burn agriculture on forest environments were still limited in the 16th century, but by the early 19th century, they had become much more significant. Farmers' use of forests for household purposes was selective: they cut the best trees, which also had an impact on forest composition.

The human impact on forest environments intensified as wood products became a staple of the global economy and international trade, although the severity of the impact varied from region to region. In the 17th and 18th centuries, Finland's role in the global economy was not as harmful to its forests as it would later be in the 19th and 20th centuries. While tar burning practices and charcoal burning at ironworks impacted forests in some areas in the 17th and 18th centuries, intensive tar burning between the 1820s and 1860s changed the forests in the watershed areas in central Finland and the upper courses of the Ostrobothnian rivers in Kainuu significantly. These changes accelerated in the second half of the 19th century, when the forest industry adopted new technologies and expanded operations to areas that had previously been untouched by large-scale human activity.

The history of Finsilva's forests reveals how various landowners have used the forests at different times and what marks they have left in the long term. The question of what the impact of human activities has been on forest biodiversity over a period of five hundred years (from the 16th century until the start of the 21st century) is a challenging one. A forest is not just a source of timber or an economic resource but a sensitive and diverse ecosystem that both impacts and is impacted by humans and human activity.

For forest-owning companies, forests were an economic resource in which capital had been invested and whose productivity had to be managed. Hence, they assessed the annual growth of their forests and the maximum number of trees that could be harvested. Changes in the method and scheduling of forest management over the past 150 years, and an analysis of the consequences, serve as a background to the history of Finsilva's forests.

Current trends are weak and much more difficult to study than historical ones, but they are important to examine as they may portend a significant paradigm shift in humans' relationship with the forest. One example of a growing trend is the concept of *natural capital*, which refers to the value of all the elements of the environment (soil, air, water and living organisms). Measures aimed at strengthening biodiversity and the creation of financial incentives to support them are examples of markets created by natural capital. The commercial market for carbon sinks must be considered a weak trend as this market is yet to open.

PART I

THE OWNER

EARLY OWNERS OF WOODLANDS

The long-term history of the forest land now owned by the forest and natural capital company Finsilva Plc is a unique story that follows a variety of developments. Most of the forests date back to G. A. Serlachius Ltd, whose land acquisition activities were determined by the company's financial resources and strategic priorities, as well as the societal characteristics of the era.

In historical contexts, the notion of forest ownership was often ill-defined. In prehistoric times, for example, the concept of ownership had not even been established. We could describe the idea as a right to use land based on occupation, covering an area defined by a community's settlements and its farming and hunting practices. When these communities were small, there was plenty of land for them to coexist and thus no disputes over rights of use.

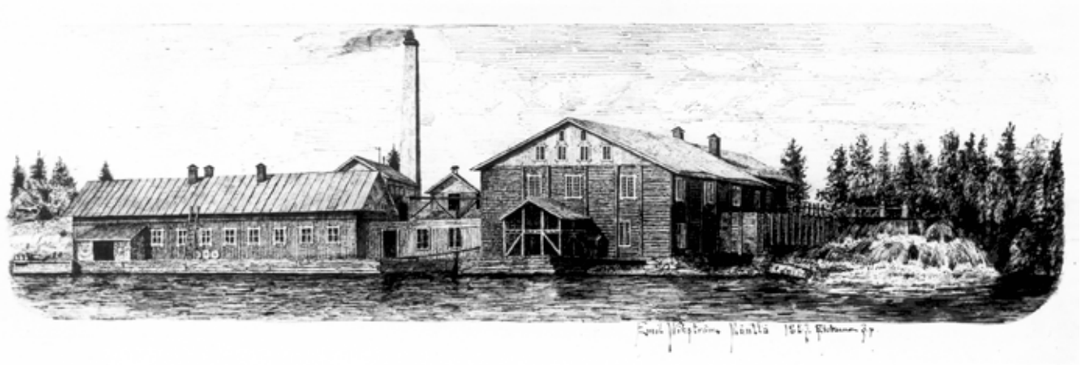
This situation changed when the ruler started to collect various taxes. In the territorial state of the mid-16th century, a distinction was made between the lands of village communities and wilderness, which King Gustav Vasa of Sweden seized on behalf of the Crown. Peasants had the right to use fields and forests for domestic purposes, but hereditary ownership only applied under exceptional circumstances. A nobility was formed of mounted soldiers, who were granted titles that conferred tax exemptions and hereditary property rights.

In 1789, to gain the support of the peasants, King Gustav III of Sweden introduced the Union and Security Act, conferring on them hereditary property rights to their fields and nearby forests. The Crown retained ownership of uninhabited regions away from permanent settlements.

Following the Union and Security Act, another factor that affected property ownership was the land reform known as the Great Partition. It started in southern Finland in the mid-18th century, expanding to central Finland during the late 18th and early 19th

◆◆ Previous spread: G. A. Serlachius Ltd invested in the systematic management of its forests. In the 1920s and 1930s, the company employed several foresters educated at Imperial Alexander University (University of Helsinki) and supervisors trained at the Evo Forest Ranger School. This image shows company foresters and supervisors on an excursion in 1928. Metsätaloudellinen Valistustoimisto, the Finnish Forest Association Collection, Lusto.

◆ Before the rise of the sawmill industry, tar was Finland's most important export. Tar was burned in Kainuu and North Ostrobothnia as well as in the watershed areas in Central Finland and transported to coastal towns of the Gulf of Bothnia. In this image, a boat can be seen transporting tar in Pälli, Muhos, in 1892. I. K. Inha, the Ethnographic Picture Collection, the Finnish Heritage Agency.



◆ G. A. Serlachius launched his industrial operations by setting up a mechanical pulpwood mill and a paper mill on the bank of the Mäntänkoski rapids in 1868. His friend, sculptor Emil Wikström, made a pencil drawing of the Mänttä mechanical pulpwood mill in 1887. G. A. Serlachius Ltd, Serlachius Museums.

centuries and to eastern Finland in the 1830s and 1840s. The implementation of the reform slowed down as it spread to the northern parts of the country and in regions such as Kainuu, land was not divided until the early 1860s. The Great Partition abolished the previous system of landownership by which farmers owned several different strips of land around the village. Instead, every farmer was given ownership of a single self-contained area of farmland, meaning they were no longer forced to coordinate cultivation with other landowners who owned contiguous strips of land.

The property rights laid down in the Union and Security Act and the Great Partition enabled the purchase and sale of peasant farms. Previously, only land owned by nobility could be bought and sold. Even in the first half of the 19th century, forest land was rarely purchased except near the ironworks of western Uusimaa and Southwest Finland, but from the 1860s onward this changed.

In 1868, Gustaf Adolf Serlachius moved from Tampere to Mänttä in northern Pirkanmaa and built a mechanical pulpwood mill on the bank of the Mäntänkoski rapids. After overcoming a multitude of difficulties over a number of years, he was granted the honorary title *kauppaneuvos*, which is conferred for merits in business. It was his heirs who built the industrial empire whose history of ownership and forest use is the subject of this book.

◆ Well-managed forest land owned by Finsilva behind Lake Keurusselkä. Sturdy deciduous trees grow on the shores, behind which rises a forest of robust coniferous trees. The contrast to the selectively logged forests of the early 20th century is striking. Finsilva.

A portrait of G. A. Serlachius' family from 1884. The factory owner is in the background with his daughter Thyra. His son Axel Ernst is on the left with little Sissi in his arms. G. A. Serlachius' wife Alice, née Maexmontan, is on the right. Sigrid (Sissi) Serlachius married her cousin Gösta in 1899. Private collection, Serlachius Museums.

G. A. SERLACHIUS LTD BEGINS TO ACQUIRE LAND

At the time of his death in 1901, G. A. Serlachius only owned five forest holdings in addition to the industrial hub in Mänttä. Forest reserves were not the primary motivation for the acquisitions, rather the rapids rights they provided. These five farms had a combined area of less than 2,000 hectares, which included the nearby Mäntänvuori.

Serlachius struggled to access financing and failed to purchase as many farms as competing forest companies. In 1899, these companies owned about 720,000 hectares of forest land. The companies were eager to acquire forests partly because they needed to stabilise the prices of logs and pulpwood during economic booms, and partly because they wanted to invest profits from the paper and cardboard markets in real estate. The companies were also concerned about the sufficiency of their forest resources. Increased competition for raw materials accelerated their land acquisition.

Having taken over the management of G. A. Serlachius Ltd, Gösta Serlachius started to systematically purchase forest estates in the early 20th century. By the end of 1908, the company had acquired almost 13,000 hectares of forest holdings, which also encompassed cultivated land and peasant and tenant farms. Estates in forested regions were relatively easy prey for large companies like Serlachius, which obtained them at a bargain price.

Land acquisition by forest companies soon became a societal issue, however, and attempts were made to limit it through new legislation. As a result, companies acquired as much forest land as they could and in 1908, G. A. Serlachius Ltd established a forest department to coordinate acquisitions and logging operations. By 1914, companies had acquired a total of 2.1 million hectares of land from peasants, amounting to almost eight per cent of the commercial forest land in Finland. It should be stated for comparison that peasants still owned more than 60 per cent of commercial forest land, with the rest owned by the state. The companies mainly purchased land in eastern and central Finland.

By the end of 1914, G. A. Serlachius Ltd owned about 14,400 hectares of forest land, which was still a relatively small area compared to other companies. Some examples of the heavyweight companies of 1915 and their land holdings include Aktiebolaget W. Gutzeit & Co, 434,000 hectares, A. Ahlström Ltd, 200,000 hectares, Hackman & Co, 130,000 hectares, and Halla Aktiebolaget, 120,000 hectares.

In 1915, Russian Emperor Nicholas II signed a decree that restricted the acquisition of land by wood-processing and timber-trading companies. The decree resulted in dissatisfaction among all parties concerned and ultimately proved unsuccessful. Its main objective, i.e. limiting the acquisition of land by forest companies, failed because the forest companies simply set up dummy companies that operated in agriculture and were also allowed to own forest.

G. A. Serlachius Ltd founded such a dummy company, Mäntän Oy, in 1915. Between 1915 and 1918, Mäntän Oy purchased approximately 42,000 hectares of new forest land on behalf of the G. A. Serlachius forest

Forestry workers on the Mäntänvuori lands near the Mänttä factories in 1926. A foreman measures a felled spruce in the foreground, while workers debarking spruce logs are seen in the background. The G. A. Serlachius Ltd Collection, Serlachius Museums.

department. More than 150 sites were purchases during this period. Vermassalo, in the Virrat parish, was acquired in 1916; at over 2,000 hectares, it was one of the company's largest acquisitions in terms of hectarage. By 1918, G. A. Serlachius Ltd's forest holdings had increased to 57,125 hectares.

After the Finnish Civil War in 1918, three land acquisition acts were ratified, which resulted in the reduction of G. A. Serlachius Ltd's forest holdings. Under the Tenant Farmer Act of 1918, landowners had to sell land surrounding houses to their tenants. The Act on the Acquisition of Land for Settlement Purposes (Lex Kallio), passed in 1922, did not affect Serlachius' land property, but both acts were objectionable expropriation laws from the company's point of view. The hectarage owned by G. A. Serlachius Ltd was reduced by approximately 7,750 between 1918 and 1922 due to the settlement laws. The company had about 49,400 hectares of land in 1922, including the holdings of Mäntän Oy.

The third law concerned the return of agricultural land illegally acquired by forest companies under the 1915 act to the state, to be used for settlement purposes. The law passed in 1925 (Lex Pulkkinen) only ordered the return of those parts of estates owned illegally by forest companies. In practice this applied to agricultural land, which G. A. Serlachius Ltd had already sought to dispose of. The company lost only a few hundred hectares of land as a result of this act. The introduction of Lex Pulkkinen rendered Serlachius' dummy company Mäntän Oy purposeless, and it was dissolved. In 1926, G. A. Serlachius Ltd still owned almost 49,000 hectares of land. The three settlement laws had cut down approximately ten per cent of the total area owned by the company.

Lex Pulkkinen was a compromise that had long-term societal consequences. The act froze the composition of forest ownership for the rest of the 20th century: state ownership remained at 40 per cent and private ownership at about 52 per cent, with the remaining eight per cent owned by forest companies. The act also put an end to the concentration of land ownership among a few large companies, and development towards a system in which large estates dominated came to a halt.

G. A. Serlachius Ltd saw Lex Pulkkinen as the "legal prevention of forest capitalism". It marked a turning point in power relations in society, with forest companies now dependent on the state and private forest owners to sell them roundwood. Seeking to compensate for the steady increase in the price of timber and grow their operations, forest companies built larger and more technologically advanced factories and improved their harvesting methods. They also became increasingly interested in maximising long-term forest yield, evidenced by their active forest management efforts.

ACQUISITIONS AFTER THE SECOND WORLD WAR

Lex Pulkkinen did not prevent forest companies from acquiring land. G. A. Serlachius Ltd, for example, continued to purchase forests from other companies and farmers whose agricultural activities were not adversely affected by the sale of their forests. The company increased its holdings from approximately 49,000 hectares to 62,000 hectares between 1925 and 1939, a significant increase, considering that public opinion was opposed to the acquisition of land by forest companies.

On 30 November 1939, the Soviet Union invaded Finland. It was the start of the Winter War, which ended in a peace treaty between the two countries on 13 March 1940. As a result of the war, Finland lost 9.5 per cent of its territory and more than ten per cent of its forests to the Soviet Union. Approximately 400,000 people fled the ceded areas, and Parliament enacted a law in June 1940 to ensure their quick resettlement. The goal was to form approximately 35,000–40,000 new farms. The implementation of the Prompt Settlement Act began in autumn 1940 and by spring 1941, as many as 13,000 new farms had been set up.

The Prompt Settlement Act also affected the land holdings of G. A. Serlachius Ltd. In 1941, the company owned approximately 62,000 hectares of land, 2,350 hectares of which it was ordered to hand over to displaced people. While a relatively small area, the expropriation was perceived as a harsh measure by the company. The implementation of the law was suspended in summer 1941, which marked the start of the Continuation War,

a conflict through which Finland, an ally of Germany, sought to reclaim the territories it had lost to the Soviet Union the previous year. In practice, the Prompt Settlement Act was repealed when displaced people returned to their homes during the course of 1942 and the farms that had been parcelled out were slowly returned to their original owners.

Finland ended its involvement in the war after fierce battles in September 1944. The country's new border followed that established after the Winter War with the exception of Petsamo, resulting in Finland having ceded approximately ten per cent of its territory to the Soviet Union. Finland also undertook to pay USD 300 million in war reparations and to expel German troops from Lapland. Finland's involvement in the Second World War concluded at the end of April 1945.

The Parliament enacted a new Land Acquisition Act in 1945, under which displaced people and ex-servicemen were entitled to acquire a farm or plot of land. The law required large landowners, such as forest companies, municipalities, parishes, country estates and large farms, to give up land for settlement purposes. The state-owned forest management organisation Metsähallitus ceded more land than any other landowner. By 1957, when the last transfers under the Land Acquisition Act had been made, G. A. Serlachius Ltd's land holdings had decreased from 62,000 to 49,000 hectares. The company had transferred approximately 13,000 hectares, slightly less than a fifth of its total land holdings, for the purpose of settling displaced people and ex-servicemen. The company had turned Mäntänvuori close to its core holdings into a nature reserve in 1945, which prevented it from being handed over for settlement purposes.

In the 1950s and 1960s, G. A. Serlachius Ltd tried to fill the shortage of land that had resulted from the Land Acquisition Act. By 1964, the company and its pension fund had purchased approximately 3,000 hectares of land. Its land holdings were significantly increased the following year, when Serlachius acquired Ab J. W. Enqvist Oy. Through the merger, which took place in June 1966, Serlachius acquired 14,500 hectares of forests, including the Nygård estate in Kuru, a farm complex of almost 5,000 hectares. Serlachius' land holdings increased to 68,300 hectares with this transaction. Over the next 15 years, the company further increased its land holdings so that by 1983 it owned approximately 82,800 hectares of forest land. Between 1957 and 1983, G. A. Serlachius Ltd and its pension fund increased their land holdings by 32,800 hectares.

The oil crisis of the 1970s resulted in an economic recession in Finland, which continued until the latter half of the decade. Many forest industry companies, G. A. Serlachius Ltd among them, faced difficulties. In a search for allies, Gustaf Serlachius began negotiations with Metsäliitto Cooperative to deepen their industrial collaboration. In May 1986, a merger between Metsäliiton Teollisuus Ltd and G. A. Serlachius Ltd was announced. The new company was named Metsä-Serla Ltd, with the merger taking effect on 31 December 1986. The story of the independent family-owned business founded in 1868 came to an end.

The newly formed Metsä-Serla, the result of the merger between Metsäliiton Teol-

Liquid fuels were in extremely short supply during the war, so wood-gas generators were installed on passenger cars, lorries and buses on the home front. The engines of these vehicles had to be preheated during periods of severe frost. The Mänttä Club served as a military logistics training centre during the Continuation War 1941–1944. SA-kuva.

◆ The top of the Mäntänvuori hill offered magnificent views over Serlachius' industrial empire. In 1937, Gösta Serlachius invited about a hundred MPs to admire the scene. The K.-E. Lindblad Collection, Serlachius Museums.

lisuus and Serlachius in 1986, owned just over 100,000 hectares of forest, most of which – about 82,000 hectares – was formerly Serlachius forest. The company also incorporated approximately 20,000 hectares of forest located in central Finland that had previously been owned by Metsäliiton Teollisuus. Some of this forest land had been purchased from Wärtsilä Ltd in 1953, including the 176-hectare Dalkarby estate in Pohja, southern Finland.

Restructuring continued in the forest industry following Finland's recovery from the recession of the early 1990s. Having expanded to West Germany and the United States, the forest industry company Myllykoski Ltd reorganised its holdings in Finland in the mid-1990s to free up capital, resulting in Metsä-Serla acquiring a 35 per cent stake in Myllykoski Paper Ltd.

The companies agreed on a significant sale of forest land in 1999: Myllykoski Paper and Saxo Ltd, the holding company of the Björnberg family, which owned Myllykoski Paper, sold approximately 8,000 hectares to Metsäliitto. A new company, Suomen Metsäosuus Ltd, was established in October 1999, owned entirely by Metsäliitto. The incorporation of Suomen Metsäosuus made the company part of Metsäliitto's major forest property restructuring in 2002.

INCORPORATION OF FOREST ASSETS

Like other companies in the Finnish forest industry, the Metsäliitto Group expanded its operations overseas at the turn of the millennium. It faced a difficult market situation and the profitability of its new factories was low, straining finances. In 2001, the situation for the company, now known as M-real, was so alarming that the owners launched a rescue operation, divesting foreign holdings and restructuring the group's loans to reduce costs.

At the same time, some Finnish forest industry companies were considering divesting their forest assets. This was justified by the view that forests were not sufficiently attractive for investors in terms of return. The risk associated with investing in forests was, in the long term, clearly lower than investing in the paper industry. It was thought this would attract large institutional investors, such as pension funds.

When it came to selling its forest holdings, M-real looked to the United States. It took its model from the Georgia-Pacific Corp (GP), one of the largest forest industry companies in the world, which had previously divested its own forest holdings, establishing a separate forest asset company that it listed on the New York Stock Exchange. The majority of its shares were sold to large American insurance and pension companies in the late 1990s. Companies in Finland watched this development with great interest.

◆ Most of Finsilva's forests are located in Central Finland. The image shows a well-growing pine forest and an old stand of shelter trees, dominated by spruce, left to grow on the shore of Lake Keurusselkä. Aleksi Koskinen, Metsä Group.

In October 2001, M-real transferred its forest holdings, a total of approximately 112,500 hectares, to the cooperative's new subsidiary, M-real Forestia, shortened to Forestia the following year. Metsäliitto Cooperative annexed the forests and waterfront plots it owned through Suomen Metsäosuus, i.e. the former Myllykoski and Saxo holdings, totalling approximately 8,000 hectares, into Forestia in September 2002. At this point, Forestia held approximately 121,000 hectares of forests. M-real owned 94.5 per cent of the company and Metsäliitto Cooperative the remaining 5.5 per cent.

Forestia's 121,000 hectares of forest and approximately 700 waterfront plots were transferred to Forestia Holding at the end of 2004. The new company was owned by Metsäliitto together with Suomi Mutual Life Assurance Company and the Central Union of Agricultural Producers and Forest Owners (MTK). In January 2005, Forestia Holding also acquired the forests of Suomi Mutual Life Assurance Company, a total of approximately 14,000 hectares. These were forests that had previously been owned by Kyro Ltd and Högfors Ltd, mainly located in Pirkanmaa, Satakunta, southern Savo and western Uusimaa.

After restructuring of the ownership in February 2005, Forestia Holding merged with the newly established Finsilva Plc. The new company owned approximately 135,000 hectares of forest land and a large number of waterfront plots. Most of the forest lands were located in central Finland and Pirkanmaa, with some smaller and more scattered sites in Uusimaa and northern and southern Savo. Finsilva's owners were at that time Metsäliitto Cooperative (49.9 per cent), Suomi Mutual Life Assurance Company (39.7 per cent) and MTK (10.4 per cent). Finsilva's first chair of the board was Metsäliitto's CEO Kari Jordan, and the first managing director was Harri Viitaniemi.

DASOS FOREST FUND BECOMES FINSILVA'S LARGEST OWNER

There were further changes in Finsilva's ownership in June 2014, when Suomi Mutual Life Assurance Company sold its Finsilva shares (39.7 per cent) to Metsärahasto II Ky, a forest fund set up by Taaleritehdas Plc. Taaleritehdas (now Taaleri Plc) was a private equity company listed on the Helsinki Stock Exchange, whose funds owned about 13,000 hectares of forest.

Dasos Capital, founded in 2005, was also considering the possibility of engaging in long-term forest ownership. It was a Finnish forest fund company, one of the first in its field in Europe. The company became active in about 2008, and its funds sought suitable investment opportunities primarily in EU countries.

In spring 2015, Dasos Capital contacted Metsäliitto and proposed negotiations to purchase a majority stake in Finsilva. In May 2015, after intensive negotiations, Dasos' Timberland Fund II acquired 50.1 per cent of Finsilva's shares, sold by Metsäliitto and Taaleritehdas, whose holdings both fell to 19.77 per cent after the transaction. MTK continued to hold a 10.4 per cent share.

Control of Finsilva passed to Dasos after the transaction, and Dasos' CEO Olli Haltia was appointed chair of Finsilva's board. Taaleritehdas sold its stake to Etera Mutual Pension Insurance Company in 2016, which merged with Ilmarinen Mutual Pension Insurance Company in January 2018. Dasos Capital and Etera becoming owners in 2015–2016 was a turning point in Finsilva's history and fulfilled the aim of attracting external institutional investors to own forest land.

Dasos was particularly interested in the various value chains associated with forests, and Finsilva offered the company an opportunity to explore how these could be turned into a profitable business. According to Olli Haltia, this was one of Dasos' main motives for acquiring a majority stake in Finsilva.

Finsilva's ownership structure was rearranged in February 2022. Dasos approached Metsäliitto with an offer to purchase its shares in Finsilva (a total of 19.77 per cent), with Metsäliitto also willing to sell its minority stake. Under the terms of the shareholder agreement, Dasos Timberland Fund II also purchased the Finsilva shares owned by MTK, totalling 10.4 per cent. MTK explained its decision as based on a typical portfolio management measure as well as a desire to put an end to the rescue operation for Metsäliitto that had begun some 20 years earlier. After the transactions, Dasos Capital's forest funds held 80.2 per cent of Finsilva's shares and Ilmarinen 19.8 per cent.

The Finnish private equity group CapMan Plc acquired Dasos Capital in December 2023. Following this transaction, Dasos Timberland Fund II and the original investors in Dasos remained the majority owners of Finsilva. The management of the fund, however, was transferred to CapMan. In 2025, Sami Veijalainen, MSc (Agr. & For.), MSc (Econ.), was elected as the new Chair of Finsilva's Board of Directors.

Olli Haltia, Chairman of Finsilva's Board 2015–2025, brought with him extensive experience investing in forests and natural resources. He received a PhD in Economics from the University of London and master's degrees in economics and forestry from the University of Helsinki. Erkki Oksanen, the Finnish Forest Association Collection, Lusto.

PART II

THE FOREST

THE FIRST INHABITANTS

The first people to roam the lands now managed by Finsilva came to hunt game soon after the glacier that once covered the area had retreated northwards, some 8,000–10,000 years ago. The Stone Age climate was warmer than today, and the people who rambled about the forests probably admired large oaks, small-leaved lindens, pine trees and hazel shrubs. It was not until the cooler Bronze Age, around 3,500 years ago, that the first spruces appeared and quickly spread.

Stone Age people set up their dwellings in sheltered coves on sandy shores that faced south or southwest. In addition to offering shelter, their dwelling sites had to have ready access to drinking water and food, and they had to be a convenient location from which to move about. One such dwelling site has been found in the Mäntänvuori nature reserve on the shores of Lake Kuorevesi, now owned by Finsilva. A small group of hunter-fisher-gatherers roamed Finsilva's lands in Kuru during the same period. There were also Stone Age settlements in Dalkarby in southern Finland, where numerous Stone Age artefacts have been found such as fragments of stone axes and ice chisels, spearheads and arrowheads, stone ball clubs, and curved and flat chisels.

During the Neolithic period, i.e. the New Stone Age (2800–2300 BCE), new inhabitants arrived in Dalkarby from the west, traces of whom can also be seen in prehistoric artefacts discovered in Pohja parish. These newcomers also built burial mounds for the dead on higher rocks by the sea. The new inhabitants are known to have practised agriculture and animal husbandry in the Baltic region and southern Sweden, but no definite evidence of these activities has been found in Finland.

Stone Age people travelled across large areas in search of food. It is the current understanding that fishing was the most important source of food for Stone Age people who lived near lakes. Hunter-fisher-gatherer communities moved their dwellings according to the

◆◆ Previous spread: *In Forest* (a study, 1872), Fanny Churberg manages to capture the idea of an untouched primeval forest. Huge spruces, dead and fallen trees, moss and other vegetation form a richly varied green landscape. Jenni Nurminen, donated by Arvid Sourander, the Finnish National Gallery, Ateneum Art Museum.

◆ There are several Bronze Age burial mounds in the coastal areas of Southern Finland. The one on Offerberget, Dalkarby, is rather well preserved. Pekka Kotkatniemi, Vastavalo.

seasons and the essential resources available. For some reason, people in the late Stone Age were no longer as dependent on settling near shores. This may indicate that people began to exploit the forest more extensively during this period, possibly for agricultural and animal husbandry purposes.

The transition to the Bronze Age resulted in the disintegration of Stone Age communities. The exact reason for the decline in settlements is unclear, but the cooling climate may have played a part. No Bronze Age dwellings and very few loose objects have been found in Mänttä or Kuru, for example. The same uncertainty exists when we move into the Iron Age in the 5th century CE. On the basis of a ski found in Multisuo, Mänttä, dated to the 6th–7th centuries CE, it has been assumed that the region may already have been a hunting ground for people who migrated from further south.

In southwestern Finland, the first evidence of agricultural activities based on the analysis of cereal-type pollen dates from the Bronze Age, around 2000 BCE. Agriculture is believed to have been established around 1500–1000 BCE in the coastal areas of southwestern and southern Finland, and around 800–600 BCE in Häme. Further inland, in central Finland and southern Savo, the first signs of agriculture are from around 400–500 CE. In the late Iron Age and early historical period (11th–13th centuries), settlements and agriculture became established in southern Ostrobothnia, Satakunta, southern Savo and the region south of Lake Ladoga.

The Iron Age marked the first changes that affected the history of the Dalkarby forests. According to archaeologists, new populations moved to the area from the Baltic region, and from the 11th century onward also from Sweden, which gradually affected land use in the area. There was good arable land on the shores of Pohjanpitäjänlahti Bay in Pohja parish, and as the population grew, the cultivated area spread to grassy woodlands further from the sea. Several grinding stones dated to the Iron Age have been found in Pohja parish, indicating that grain was ground in the area, but we do not have any detailed knowledge of the extent or nature of agricultural activities practised there.

In 1897, a wooden sculpture of a human head dated to the Comb Ceramic Age was discovered near Dalkarby, now owned by Finsilva. A nose, forehead, chin and mouth have been carved on its face. The Archaeological Artefact Collections, the Finnish Heritage Agency.

The establishment of agriculture meant increased reliance on forests. Slash-and-burn farming was the first method of agriculture. Each family needed vast forest areas in different stages of the slash-and-burn cycle.

In southern Finland, communities grew increasingly dense and burned new swiddens in the fertile grassy woodlands, building permanent dwellings nearby. Forests retreated from around the settlements as people chopped firewood for heating and cooking. They also needed timber to build fences to prevent livestock from grazing on the cultivated fields.

The former slash-and-burn fields, or swiddens, around villages were gradually converted into agricultural land. It is estimated that most of the grain in southwestern and southern Finland came from fields from the 12th or 13th century onward. Slash-and-burn farming also continued in southern Finland, though it became less common as fields increasingly provided the majority of crops. At first, the main cereal cultivated was barley, and from the late Middle Ages, it was winter rye. Overall, the human impact on forests was still insignificant; it is estimated that the population of the entire area of present-day Finland at the end of the Middle Ages was no more than about 80,000–100,000.

SLASH-AND-BURN FARMING AND CHARCOAL BURNING

In eastern Finland, the cultivation of fields was a relatively insignificant practice before the latter half of the 16th century. People practised slash-and-burn farming instead, especially of the type that was carried out in mature spruce forests. In the late 16th century, as a result of the so-called settling expansion of Savo people, slash-and-burn farming in spruce forests was practised in central Finland, Upper Savo, Kainuu and eastern parts of Ostrobothnia, where the large spruce forests were eventually depleted.

The method required vast areas of forests, as each household needed several plots of woodland for the different stages of the slash-and-burn cycle. The process began by stripping some of the bark from the largest tree trunks, which were left standing to dry, while others were felled and left to dry in a criss-cross pattern. Two years later, both the standing and felled trees were burned, and swidden rye was immediately sown into the fertile ash and left to overwinter as seedlings under the snow. An abundant harvest was reaped the following summer, after which barley or oats – and later also peas, broad beans or turnips – could be sown in the clearing, which was then left to regrow with the forest. First, grasses and deciduous trees grew in the clearing, followed later by spruces. The new forest was burned again 40–60 years later. As population growth intensified, old slash-and-burn fields had to be reused after shorter time intervals.

Slash-and-burn cultivation ended in Finland in the late 19th century. Swidden rye grew exceptionally well in the fertile ash. In this image, a man and a woman are seen stoking smouldering slash. The Ethnographic Picture Collection, the Finnish Heritage Agency.

On Finsilva's lands in Pirkanmaa, Satakunta, central Finland, and southern and northern Savo, intensive slash-and-burn farming was practised from the 16th until the late 19th century. It is estimated that, each year, a single large Savonian household required approximately 30 hectares of land for slash-and-burn purposes at various stages of the cycle as well as for firewood and other domestic use. The estimated number of households in Savo in the 1540s was 3,400, which meant that just over 100,000 hectares of woodland was needed every year. The figure seems inconceivable, and if accurate, there would have been no virgin forests in Savo by the mid-16th century except in the most inaccessible areas.

Forest use practices were slow to change as people did not start to clear and cultivate fields for as long as suitable spruce forests could be found for burning. Soil type, unsuitable cultivation tools and the antiquated ways of communities hindered the transition to arable farming.

In central and eastern Finland, however, arable farming gradually became established around small village-like settlements during the course of the 17th century, as the slash-

Fiskars was the most significant ironworks in western Uusimaa. Owned by Johan von Julin, the ironworks flourished, particularly in the first half of the 19th century. In addition to processing iron, agriculture was practised on a large scale in the area. A drawing by Pehr Adolf Kruskopf from the 1840s. The Historical Picture Collection, the Finnish Heritage Agency.

and-burn economy required significant numbers of workers, putting it in competition with the Crown for manpower, which needed men as conscripted soldiers. Slash-and-burn farming continued, nevertheless, though presumably it was not quite as widespread as in the 16th century. The Great Famine in Finland in the late 1690s and the Great Wrath, the Russian military occupation of the country during the Great Northern War in 1714–1721, reduced the population across Finland. On Finsilva's lands around Mäntänvuori, in the barren watershed area of Vermassalo in Virrat and in the lush spruce forests in Nygård, Kuru, smoke from slash-and-burn farming remained a common sight even throughout the 18th century.

The ironworks in southern Finland were, along with slash-and-burn farming, another major consumer of forest resources from the 17th century onwards. Several ironworks were established in western Uusimaa, the most significant of which was Fiskars near Dalkarby. The growing need for firewood and charcoal for the ironworks, together with continued slash-and-burn farming and forest grazing by livestock, had a significant impact on the condition of the forests in Pohja parish. The

demand for firewood and charcoal at the ironworks eventually reduced slash-and-burn activities as many peasants switched to charcoal burning, which they exchanged for grain.

Ore mining was very energy intensive, as a large open fire had to be lit on top of the ore body first. After heating, the rock was quickly cooled, and suitably sized blocks were prised off with sledgehammers and crowbars. This process of heating, cooling and scabbing would be repeated several times, requiring a substantial amount of firewood. The ore was then moved to either bloomery furnaces or blast furnaces, where it was further heated using charcoal, with bellows used to raise temperatures. The molten metal was worked into bars or long rods at the forges in the ironworks.

The growing demand for firewood and charcoal led the ironworks to acquire forest land to ensure that they could continue operating their blast furnaces. As consumption increased, larger charcoal storehouses were built from brick on the ironworks sites. Charcoal was needed in large quantities: producing an iron bar weighing one *kippunta* (170 kg) required almost five cubic metres of charcoal.

By the mid-18th century, the forests of western Uusimaa were in a very poor state, with mainly deciduous trees, ragged spruces and short pines with thick branches growing there. The open landscape was punctuated by large stretches of fields and farmyards, which were surrounded by felled forests that had not started to regrow properly. Many forests in western Uusimaa had turned into impenetrable thickets of deciduous seedlings.

TAR BURNING

The impact of tar burning on the forest environment intensified once tar became a staple of international trade and the global economy. Commercial tar production had begun in the late 16th century around the Lake Saimaa water system, but it was not nearly as harmful to the forest environment as it would become in the following centuries. In the 18th century, tar burning operations were concentrated in areas about 100 kilometres inland from the coast of the Gulf of Bothnia. By the 1820s–1860s, the area had extended further inland, and intensive tar burning activities changed the forest environment, especially in the upper courses of the Ostrobothnian rivers in Kainuu and in the watershed areas of central Finland. Significant areas of Finsilva's forests are located in what were once core tar burning areas in central Finland.

Like slash-and-burn farming, tar burning required several years of preparations. First, pines were partially stripped of their bark and left to stand and produce resin. After three or four years, the trees were felled, with only the lower part, up to about three metres, used for tar production. The felled areas were not regenerated, so the visual scars of tar burning could be severe. The three- or four-year cycle of the tar burning process required considerable areas of forest at different stages of preparation. Even contemporary figures understood that this was a large-scale waste of forests. Elias Lönnrot, who compiled the Finnish national epic, *The Kalevala*, trekked in Kainuu and called the peasant method of tar burning a "cancer of the earth".

By order of the Imperial Senate of Finland, the necessity and impacts of tar burning were assessed under the direction of August Fredrik Soldan, head of the Helsinki School of Technology. According to the study, completed in 1860, it took 50 medium-sized pines to fill a barrel with tar. Soldan estimated that an average of 150,000 barrels of tar had been exported from Finland every year between 1840 and 1859, and producing this amount of tar had required 7.5 million pine trees every year. The barrels were made of pine staves and the hoops of spruce. According to Soldan, up to 1.2 million young spruces were needed each year to manufacture the hoops alone.

During the busiest years of tar burning, a period of just over 50 years between 1820 and 1875, about nine million barrels of tar were exported from the major tar-trading towns along the Gulf of Bothnia – Oulu, Kristiinankaupunki, Kokkola, Pietarsaari and Vaasa – as well as from other, smaller towns. The official tar barrel, stamped by a crown-appointed officer, had a volume of 48 *kannus* (124.8 litres), which means that approximately 1.12 billion litres of tar were exported from the Grand Duchy of Finland in 1820–1875. If it

◆ Hot tar flowed down through a pipe into containers. Once cooled, it was transferred into standard 124.8-litre barrels and transported to ports via rivers and lakes. Samuli Paulaharju, the Samuli Paulaharju Collection, the Ethnographic Picture Collection, the Finnish Heritage Agency.

Tar was exported to Great Britain and the Netherlands from the port towns of the Gulf of Bothnia. This image shows a temporary tar barrel store in Kajaani. Oulu and Kristiinankaupunki were the busiest tar ports in the mid-19th century. H. Renfors, the Ethnographic Picture Collection, the Finnish Heritage Agency.

took an average of 50 medium-sized pines to fill a barrel, approximately 452 million pine trees would have been required to produce nine million barrels of tar over that period. These figures seem almost unimaginable.

In the 1850s, Vermassalo in Virrat, now part of Finsilva's lands, belonged to Simon Anders Wendelin, the tar tycoon of Kristiinankaupunki and the richest man in town. Kristiinankaupunki was Finland's second-largest port for tar exports after Oulu, shipping approximately 30,000 barrels (3.75 million litres) of tar every year. One of Wendelin's large tar-burning pits was located on the edge of the Karhurämäkkö wildwood, part of the Vermassalo estate, and is also marked on the base map. Several other large tar pits have also been discovered in the parish.

There were plenty of pines in the heath forest in Vermassalo that were suitable for tar burning. In the spring, peasants and tenant farmers would select and partially debark the pines chosen for tar production, and after a few years, the dried, resinated trunks were cut down and transported to the burning site. In the winter, the trunks were chopped to suitable lengths, with barrels for the tar manufactured in the spring. It took 5–6 cubic metres

Simon Wendelin was the most powerful tar merchant and shipowner in Kristiinankaupunki. Here, his schooner *Axel* is seen being loaded at the Kristiinankaupunki port. Kristinestad Maritime Museum.

of resinous timber to produce a barrel of tar. The felled forest was not regenerated but left to grow on its own, without being thinned or managed.

There were two types of tar-burning pits. Pits with pipes were used for producing tar for domestic uses, while large-scale production required round, funnel-shaped tar pits, such as the one in Karhurämäkkö. The pit was filled with pieces of resinated wood and covered with moss and soil. Holes were left around the base from which to start the fire, which would be lit on a calm summer night and left to burn for several days.

Tar production in Vermassalo declined after Wendelin's death in 1861, which coincided with the drop in international demand for tar as wooden ships were replaced by vessels with iron and steel hulls. The decline in demand for tar was good news for the forests of central Finland and Kainuu, as the wasteful production process had been extremely harmful to the forest ecosystem. According to the G. A. Serlachius forest department, there were hardly any stands ready for harvesting in Vermassalo in the 1920s and 1930s. The unmanaged forests had become overgrown, and tree growth had slowed significantly.

In the early 20th century, household use of wood exceeded industrial consumption by two and a half times. Most of this was firewood burned in household stoves, but timber was also needed, for buildings, fencing, barrels, stakes and household tools. The N. A. Osara Collection, Lusto.

CONCERNS ABOUT FOREST DEPLETION

The use of charcoal by ironworks and timber by water-driven sawmills, as well as the impacts of slash-and-burn farming and tar burning together with farmers' wasteful use of firewood and timber for other domestic purposes, aroused fears of forest depletion in the early 19th century. Carl Christian Böcker, the secretary of the Finnish Economic Society, published *Om skogarnas skötsel i Norden* in 1829, a paper on forest management considered to be the first scientific study on forestry in Finland. According to Böcker, the consequence of peasants' selective cutting of the best trees was that the weakest trees remained and forest regeneration was prevented. He also noted that there was no one in the Grand Duchy with professional forestry skills and expertise.

Böcker believed that the best management system for Finnish forests was the clear-cutting method developed by Heinrich Cotta, director of the Royal Saxon Academy of Forestry in Tharandt, which was then considered the basis of sustainable forestry. There were sufficient forests, but they could not be wasted; he argued that slash-and-burn cultivation should be completely banned and tar burning restricted. Böcker believed that Finland's future success would be based on the sawmill industry. These ideas were a step in the right direction but did not lead to an assessment of the condition of the forests or the dismantling of mercantile policies.

Interestingly, Böcker did not take into account the significance of firewood and timber used in construction when he examined the overall use of forests. Farmers' use of timber for domestic purposes had a significant effect on the condition of forests, especially in areas with high population density. Fields had to be fenced to protect them from freely roaming livestock, logs were needed for buildings and shingles for roofs. Vast amounts of firewood were burned in inefficient stoves in moss-insulated houses. The cutting and commercial sale of firewood to towns, including St. Petersburg, Tallinn and Stockholm, also affected the condition of the forests. In fact, more trees were cut for firewood than for any other purpose.

The annual output of sawmills was still insignificant in the 18th century and the first half of the 19th century. Transporting logs was labour-intensive and expensive, so timber had to be sourced from areas relatively close to mills. The limited areas of supply meant a shortage of logs near some sawmills.

C. W. Gyldén, Director General of the Board of Land Survey and Forestry, took on the task of calculating the annual use of forests and estimating their annual growth. He published his famous map of forest resources in 1850, which showed that the forests of southeastern Finland and Ostrobothnia were in the worst condition in the country.

In his 1853 study *Handledning för skogshushållare i Finland*, Gyldén calculated that Finnish forests grew 28–31 million cubic metres per year and that consumption accounted for about half of this, i.e., 16 million cubic metres.

TABLE 1. TOTAL ANNUAL FOREST USE ACCORDING TO C. W. GYLDÉN

	Million m^3	Per cent
Exports (timber, tar, pitch, potash)	1.226	8
Timber used in construction, fencing, etc.	2.620	16
Firewood	8.122	50
Firewood used by industries	3.013	18
Slash-and-burn fields	1.362	8
Total	16.343	100

Gyldén said that while the Grand Duchy would not run out of trees at the current use rate, with sensible forest management the forest balance could be doubled. To achieve this goal, Gyldén demanded that selection cutting be abandoned and a rotational clear-cutting system introduced. To ensure that forestry operations were sustainable, the harvesting of timber was not to exceed the annual rate of growth. The principle of sustainable forest use was evident in Gyldén's research: forests should not be destroyed but managed in a rational manner.

◆ Selective logging – removing the largest trees and leaving smaller ones to grow – resulted in low-yielding forests. This photograph, taken in 1915, shows a selectively logged, slow-growing pine stand that is approximately 70 years old. The Yrjö Ilvessalo Collection, Lusto.

To assess the condition of the Crown's forests, the Senate of Finland commissioned Edmund von Berg, director of the Tharandt Forest Academy, to carry out a study a few years later. Von Berg's report, *Die Wälder in Finnland*, was completed in 1858 and concluded that slash-and-burn farming, forest grazing by livestock and tar burning were the main causes of forest depletion in Finland. Von Berg also believed that Finland's future lay in the sawmill industry, which he argued should be deregulated by allowing the construction of steam-powered sawmills and removing annual sawing quotas. Many people were satisfied with these findings, but some, such as Professor J. V. Snellman, thought that there were significant dangers in promoting the sawmill industry.

Contemporary debate could explain Snellman's concerns about forest depletion. In Central Europe, where forest depletion was already a reality, previous mistakes were currently under discussion – a debate that would arrive in Finland via Sweden. It is

◆ C. W. Gyldén's 1850 map of forest resources shows the 'general shortage of forests' that afflicted Ostrobothnia, where the practice of tar burning spread further and further inland. Forests were also scarce in South-Eastern Finland, which was not even a tar-burning region. This can be explained by the use of wood for household purposes and the sale of firewood to St. Petersburg. Areas marked in green indicate abundant forest.

possible that Snellman, who had travelled in Central Europe and actively followed the Swedish press, learned about forest depletion and timber shortages through these channels.

In line with the ideas of liberalism, steam-powered sawmills were permitted in 1857. Even before the 'great logging boom' during the upswing in the international economy in the early 1870s, there were already 70 steam-powered sawmills in Finland. The boundary within which purchasing logs was no longer economically viable moved further north, and many people complained that larger trees had completely disappeared from the forests. Another problem was the lack of efforts to ensure forest regeneration. Farmers believed that trees grew from the ground, not from the seed, and consequently that forests did not need regenerating. The traces of forest use were alarming in some places.

Anton Gabriel Blomqvist roamed the forests in central Finland in summer 1867, having been tasked by Metsähallitus to compile tables on the growth and yields of pine, spruce and birch across different soil types. According to Blomqvist, slash-and-burn farming was still common in Keuruu, Multia, Pihlajavesi and Ähtäri – the core areas of Finsilva's current forest holdings – with no virgin forests remaining in Keuruu, for example. The largest slash-and-burn clearings that Blomqvist saw were 10–20 hectares in size. Tar burning was also widespread in Ähtäri, Multia, Alavus and Kuortane. Two-fifths of the forests in Alavus had been burned for tar, and approximately 25,000 barrels of tar were produced in the Kuortane district every year. Blomqvist classified his growth and yield tables by soil quality as good, moderate or poor. The growth output in the sample areas for 50-year-old pines varied between about one and two cubic metres per hectare per year, depending on the soil, and these figures were quite close to the first comparable output data available, i.e. the results of the national forest inventory completed in 1924.

Blomqvist, too, was concerned about the question of sustainable forestry. He believed that to put an end to farmers' wasteful use of forests for good, all forests should be nationalised. Private ownership was a danger to forests because farmers harvested their forests in a disorganised manner and did not regenerate them after cutting. Managing forests appropriately would significantly increase yields. According to Blomqvist, "care for new growth is the first serious step from the old, destructive forestry methods towards conscious and productive forest cultivation".

Forest researchers paid surprisingly little attention to how much firewood was used in Finland. According to Gyldén's calculations in 1853, households and industry collectively accounted for 68 per cent of all annual forest consumption. In the early 20th century, households used approximately 25.5 million cubic metres of timber every year, 2.5 times more than the forest industry. Of the total consumption, firewood accounted for approximately 21 million cubic metres, timber used in construction approximately 2.5 million cubic metres and timber used for fencing approximately two million cubic metres. The huge amount of firewood used every year is particularly noticeable.

Strip felling in Kuru in 1936. The method was not widely used in the 1930s as most logging was selective. Spruce seedlings have been planted in the area. The Metsähallitus Collection, Lusto.

EARLY FOREST MANAGEMENT PRACTICES

The forest industry grew rapidly in the late 19th century. A stumpage price for timber had been established due to the demand for raw materials from the wood processing industry and export markets, meaning slash-and-burn farming was no longer economically viable. Global demand for tar declined at the same time, and its share of the total value of exports plummeted. The sawmill and paper industries, however, grew steadily, and the boundary beyond which harvesting was no longer profitable moved further north.

By the end of the 19th century, virtually all large saw-timber trees in Vermassalo in Virrat, now owned by Finsilva, had been cut down. Newspapers reported that the forests in Virrat parish had, in fact, been destroyed. The cause of this total destruction of the forests was an economic upswing that resulted in farmers selling their logs while prices were high. However, forest regeneration was neglected, and areas of poor-quality forest stands expanded. Calls to curb the destruction of forests grew louder, but few people took practical action. Privately owned forests were in poor condition and poorly managed at the turn of the century.

There were hardly any large trees suitable for saw logs left in the G. A. Serlachius Ltd forests that are now owned by Finsilva. According to calculations made by the company's forest department in 1908, its forest estates contained approximately 3,250 co-

◆ The largest wood processing companies in Finland were clients of William Thomé's forest agency. Its best-selling products were ten-year forest management plans, which assessed annual forest growth and recommended maximum harvesting volumes. The forest agency's map drawers in Hattula, Hämeenlinna, in 1916. The Historical Picture Collection, the Finnish Heritage Agency.

◆ As the forest industry expanded, logging operations spread ever further inland. In the Virrat region, forests were left in poor condition. In this image, men are seen lopping branches off spruces with axes and debarking logs with bark spuds in a forest in late winter. Matti Luhtala, the Vapriikki Photo Archive.

niferous trees with a diameter greater than 25 centimetres. The remaining stands were "sparse, uneven and culled".

The forest department's task was to increase the productivity of the company's forests by applying prevailing scientific principles of forest management. The aim was to introduce science-based forest management methods to improve productivity and profitability. The establishment of the forest department marked a turning point in the history of the management of G. A. Serlachius Ltd's forests.

The department set to work energetically and without delay. Seeding stands were cleared and thinned, seedlings were planted and conifer tree seeds were sown under the supervision of forest rangers. In 1909, for example, the department managed to plant as many as 300,000 spruce seedlings. Considerable effort was also devoted to digging ditches in the forests: more than 80 kilometres of new ditches were dug during 1909–1910.

At the same time, the science of forest mensuration advanced rapidly. Scientific methods developed in the first two decades of the 20th century provided new tools for both buyers and sellers to measure and assess the actual timber resources of estates subject to trade. Even at the beginning of the 20th century, a major buyer of forest estates such as Gösta Serlachius had no real way of knowing what they were purchasing or could realistically expect from their acquisitions.

Practical forest survey methods were developed primarily by private forest agencies that offered forest-related services. Forester William Thomé set up an eponymous forest agency in 1911. Thomé knew from his own experience that the forests owned by forest companies were in need of systematic management and that he could demonstrate both scientifically and practically the economic effects of methodical forest management. Thomé thought that forest companies should focus on the capital relationship between forest resources and yield, i.e. forest growth. William Thomé spoke in a manner that leaders of the industry, such as Gösta Serlachius, could understand.

Ten-year forest management plans were the flagship product of Thomé's agency. These plans surveyed forest types, tree species composition and growth classes in specific areas and assessed the age, density, volume and growth expectations of forest stands. Thomé proposed practical management measures whereby forests were made to grow and become productive as quickly as possible through human intervention. Thomé's forest agency was highly successful and achieved a dominant position in the competition for clients.

Thomé's agency prepared the first ten-year plan for the G. A. Serlachius forests in 1919. It showed that the company had approximately 52,000 hectares of forest land, approximately 35,300 hectares of which were classed as productive and approximately 14,000 hectares as less productive. The estimated annual growth per hectare was 2.2 cubic metres. Most of the trees were maturing, with an average diameter of 23 centimetres.

FOREST MANAGEMENT IN PRACTICE

Finland's forests and economy became intertwined in the 1920s and 1930s as the country became completely dependent on the jobs and export income provided by the forest industry, which provided income from timber sales for farmers as well as jobs for forest workers in rural areas and industrial and transport workers in industrial towns and ports. The nascent Finnish welfare state was based on the taxes collected from the wood processing industry and other multiplier effects from the sector. Approximately 85 per cent of the total value of Finnish exports came from forest industry products.

The challenge for forest research was to determine how much timber there actually was in Finland's forests. Authorities and industry both needed this information, the latter especially so that future decisions on investments could be based on the most up-to-date data regarding volume, quality and growth. The first inventory of Finnish forests was carried out during 1921–1924. It involved mapping 39 straight lines across Finland from southwest to northeast and using statistical sampling methods along the lines to calculate the tree species composition, the quantity and quality of trees, and to assess growth conditions and outcomes of forest management efforts. This was a unique study, the first of its kind in the world.

The second national forest inventory was conducted during 1936–1938, following which the data collected was compared with the results of the first. The second inventory confirmed the presumption that the total

◆ Forest regeneration by seeding was still rare in the 1910s and 1920s. Sowing was carried out in spring by first tilling the soil with hoes and then scattering seeds. The N. A. Osara Collection, Lusto.

G. A. Serlachius Ltd initiated forest regeneration operations in the early 20th century. At that time, a major challenge was the shortage of seedlings. The company set up temporary nurseries in large uniform areas of forest. In this image, Serlachius workers are seen transporting spruce seedlings. The Johanna Keränen Collection, Lusto.

growing stock volume had increased. The comparison also produced surprises. The second inventory showed, among other things, that only 0.6 per cent of forests had been artificially regenerated, i.e. through seeding and planting, meaning that practically all felled stands had regenerated naturally between 1924 and 1938, when the first and second inventories were completed. This finding led to the establishment of seed extraction plants and nurseries, as well as the initiation of research into the origins of trees. The industry, however, was most concerned about a potential shortage of spruce, which was the most important raw material for the pulp industry. Forest researchers asserted that even with new factories, there would be enough spruce for the pulp digesters.

G. A. Serlachius Ltd's forests were divided into management areas, which were overseen by foresters. The foresters were assisted by district supervisors, who in turn were responsible for the areas in their district. Each area had a foreman. The foresters were responsible for planning the harvesting and regeneration operations. The operations were based on ten-

Forest companies wanted to know the actual volume of growth in their forests. In this image, a team from Thomé's agency is seen at work, measuring a tree's diameter at breast height on the left and determining the direction of the survey line on the right. The Harry Snellman Collection, Lusto.

year plans commissioned from Thomé's forest agency, which were based on the estimated biological growth of the forest and research-based growth and yield tables. The annual maximum harvest volume calculated on these grounds was based on the principles of sustainable forestry. The maximum harvest volume had to be adjusted during the period covered by the plan if the forest area held by the company increased or decreased. In reality, the target for the maximum harvest volume was indicative and commonly exceeded, especially when the market price for purchased timber was high.

Vermassalo, in Virrat, provides a good example of practical forest management operations in the 1920s and 1930s. The assessment in the forest management plan stated that the stands in Vermassalo were "in rather poor condition", but this improved following the implementation of management measures. From a forest management perspective, the problem in Vermassalo was the low proportion of productive land compared to poorly growing and unproductive land. While the average proportion of productive land in the G. A. Serlachius district in Virrat was slight-

ly over 60 per cent, in Vermassalo the figure was less than 50 per cent. The average annual yield from productive land was 2.7 cubic metres per hectare. The current average annual yield from Finsilva's forests is twice that. According to the forest management plan, the rotation period of forests was 80 years.

A number of clear-cuttings had been carried out in Vermassalo, concentrated in the early 1920s. However, these took place in areas that had been clear-cut and not regenerated, from which stunted trees and uneven stands were removed. This is evident in the forest department's annual harvesting statistics, which show that practically all the material harvested was to be used as firewood in the company's factories.

Regeneration activities took place in the summer and included controlled burning, open sowing of pine seeds, planting of spruce seedlings and various clearing jobs. For example, between 1918 and 1926, 680,000 5-year-old spruce seedlings were planted in Vermassalo and pine seeds were sown on approximately 70 hectares. The numbers were not large, but it should be noted that there were few nurseries and seed extraction was also rare. The operations were followed by the clearing of seedling stands, first thinnings and draining of reduced yield stands. In 1919–1938, for example, as many as 842 kilometres of new ditches were dug by hand in the company's forests, and almost 300 kilometres of streams were restored.

Just before the Winter War in 1939, the conditions for timber production in the forests had already improved. According to an inventory by Thomé's forest agency, the Vermassalo holding of less than 1,000 hectares contained a total of approximately 24,570 cubic metres of saw timber (26 m^3/ha). The dominant species were pine and spruce, while the volume of deciduous trees was significantly lower. Compared to today's forests these volumes per hectare are small, suggesting that after the great logging boom of the 1870s the forests had been in poor condition and regeneration efforts had been neglected.

REDUCED HARVESTING DURING THE WAR RESULTS IN FOREST REGROWTH

G. A. Serlachius' plants and logging sites fell silent when Finland was attacked by the Soviet Union on 30 November 1939. The Winter War broke out and ended with the Moscow Peace Treaty on 13 March 1940. The Winter War was also the start of years of hardship for the Finnish wood processing industry. The war years, 1939–1945, would also have a significant impact on the history of G. A. Serlachius Ltd's forests.

The forest industry struggled with worsening shortages of energy, manpower and transport equipment during the war. The Ministry of Supply, founded in September 1939, regulated domestic consumption and dispatched workers where they were needed. However, operations related to rationing and allocation of workers were erratic and uncoordinated, and the forest industry could only watch helplessly the authorities' failing efforts. Women and boys replaced men in factories.

G. A. Serlachius' factories were powered by chipped firewood. Stocks dwindled alarmingly as practically no harvesting was carried out in the 1939–1940 logging season due to the Winter War. The so-called Log Act was enacted in June 1940, which allowed clear-cutting of young forest stands.

Campaigns to harvest firewood carried out by volunteers alleviated the shortage of firewood. In 1943, firewood harvesting became part of the labour obligations for civilians. Women, young people and men who were unfit for military service took part in the campaigns. Antti Pänkäläinen, the Museum of Central Finland.

In the autumn of 1940 and the winter of 1941, cutting efforts focused on the accumulation of stocks of spruce pulpwood and firewood. Harvesting took place on sites that were easily accessible. The concentration of troops along the border in the spring of 1941 led to a new shortage of workers and transport equipment. A new war broke out in June 1941, when Finland, allied with Germany, attempted to regain the territories ceded in the Winter War. On the home front, the industry suffered from raw wood and fuel shortages and households from shortages of firewood. The situation was bleak: Serlachius' stocks of raw wood and wood chips were catastrophically low and hardly any logging was carried out in its forests.

It was suggested that the most acute firewood shortages could be resolved by volunteers. In February 1942, a voluntary firewood-cutting campaign was organised to alleviate the firewood shortage among war widows, disabled veterans and elderly people. During the 1942–1943 logging season, the

All goods were in short supply during the war. Wood was used as substitute raw material to manufacture products such as shoe soles, crepe paper and fodder cellulose. In this image, labour conscripts make slippers from paper rope in March 1944. Ensio Liesimaa, SA-kuva.

Suurtalkoot association took over the organisation of the voluntary campaigns, but with no ease in the shortages voluntary efforts were supplemented by obligatory campaigns, coordinated by the Ministry of Supply.

In addition to securing fuelwood, G. A. Serlachius Ltd faced another serious problem: how to source enough raw wood for its factories when private landowners refused to sell timber? The solution came in the form of timber purchasing cartels, mandated by the Finnish government in 1943, which adhered to fixed procurement prices. After this, pressure from authorities forced private owners to harvest their forests.

The severe shortage of consumer goods affected people on the home front. There was a shortage of all goods, including food, clothes, shoes and animal feed. Bags, wallets and shoes were made of paper fibre and rope. Clothes were made of material that was half wood pulp and half wool. Cars were fitted with wood-gas generators that converted firewood into combustible gases. Soles for shoes were made from birch and birch plywood, and Serlachius, which used birch mainly as firewood at its Mänttä mill, sold birch logs as raw material to the shoe industry. Fodder cellulose for livestock was manufactured in Mänttä, and cellulose wadding was used in the manufacture of gunpowder. Pulp was also used to produce crepe paper for tablecloths and curtains.

The war years of 1939–1944 actually increased Finland's forest resources, as far fewer trees were harvested than in the pre-war years. According to the Serlachius forest department, the annual growth of the company's forest resources far exceeded the annual harvest volumes. Areas that had been clear-cut for firewood had not been regenerated, however, and there was a backlog of other forest management tasks, such as sowing, planting and draining. Out of necessity, forest management was entirely neglected during 1939–1944.

WAR REPARATIONS

The peace treaty between Finland and the Soviet Union was signed on 19 September 1944. In addition to ceding territories, Finland agreed to pay war reparations and expel German troops from Lapland. The forest industry's contributions to the war reparations were front loaded. With the metal industry in Finland unable to obtain all the raw materials it needed due to the war that was still raging elsewhere in the world, the focus of reparations was initially on products produced by the wood processing industry. The lists of goods show that products from the wood processing industry accounted for about a third of the value of reparations.

World War II ended in Europe with the surrender of Germany in May 1945. To everyone's surprise, the 'peace crisis' was short lived, and the global economy started to recover quickly from the summer of 1945 onwards. Demand for products from the wood processing industry increased when post-war reconstruction took off. There was a particularly acute shortage of sawn timber. In 1945–1948, demand for wood processing products was enormous, and the industry sold all it could produce. More men were working on logging sites in 1946 than ever before.

Chainsaws were introduced on logging sites in the 1950s. They were heavy and required two men to operate. Chainsaws were used to fell trees and cut them to length, while branches were lopped off with axes and logs were debarked in the forest using bark spuds and peeling irons. In this image, a five-man crew make spruce pulpwood in a G. A. Serlachius Ltd forest. G. A. Serlachius Ltd, Serlachius Museums.

The payment of war reparations and demand in the West meant that the annual harvesting volumes determined in management plans were exceeded. What had been saved during the war was now harvested in just a few years. The industry alone was not to blame, however, as the front-loaded payments of war reparations and the severe, ongoing shortage of firewood increased the demand for timber. Under the harvesting plan compiled by Thomé's forest agency, an average of 90,000 cubic metres could be harvested from Serlachius' forests every year, which amounted to 1.5 m^3 per hectare. In the three-year period between 1945 and 1947, a total of 401,000 cubic metres of timber was harvested, 131,000 m^3 more than set out in the plan. At the hectare level, the recommendation was greatly exceeded: 2.0 m^3/ha (1945), 2.7 m^3/ha (1946) and 2.4 m^3/ha (1947). In 1948–1949, the harvesting volume was well below the planned figure.

The G. A. Serlachius forest department resumed forest management activities in 1949, the work having been practically suspended for more than ten years. For example, pine seed was sown on 360 hectares that year. Workers earned the highest wages digging ditches, and in that year more than 280 kilometres of old ditches were cleared on Serlachius' lands.

In the late 1940s, forest researchers, economists and politicians discussed how the industry's future need for timber could be met. Everyone agreed that forest use had to be rationalised and the volume of timber in forests increased.

According to forest researchers, all phases of forest management had to be modernised and new research findings and methods adopted in full and without delay. This meant that forest cultivation had to begin with cultivated seedlings or high-quality seed. Natural regeneration had to be limited due to its uneven results and poor productivity. Harvesting also had to be further extended to eastern and northern Finland so that residents of remote areas could also earn additional income. In addition, the export of roundwood had to be stopped, the use of wood for household purposes reduced and the industrial use of birch, previously considered nothing much more than a weed tree species, increased.

Before sowing pine seeds, the soil had to be prepared. The job was done using a simple horse-drawn plough as seen on this regeneration site owned by G. A. Serlachius Ltd in 1955. G. A. Serlachius Ltd, Serlachius Museums.

Mechanical draining of spruce and pine mires and swamps began in the late 1950s. The aim was to increase timber volumes and secure the supply of raw material for the forest industry. Heavy draining ploughs pulled by crawler dozers cut straight ditches at regular intervals. Metsätaloudellinen Valistustoimisto, the Finnish Forest Association Collection, Lusto.

TOWARDS INTENSIVE FOREST MANAGEMENT

A group of forest researchers published an article in *Metsätaloudellinen Aikakauslehti* in 1948 calling for the cessation of sawn-timber selection felling, which referred to the cutting of the largest trees. In practice, this system prevented forest regeneration through cultivation. According to the authors, selectively logged forest stands should be clear-cut and subjected to controlled burning, with the entire area then regenerated with seedlings of the same age or with elite seeds. In effect, this statement on selection felling guided forest management activities in Finland for decades to come.

Selection felling was considered a problem of privately-owned forests. To promote new forest management practices among forest owners, the Finnish Forest Management Society Tapio organised an event, the Forest March, in June 1950. In addition to clearing and tending young stands, owners were encouraged to drain waterlogged forest land, scarify soil, plant seedlings and, if necessary, change cultivated species. These actions aimed to increase future timber production. G. A. Serlachius Ltd abandoned selection felling at the end of the 1940s and began large-scale operations in 1951 to restore selectively logged forests.

The results of the fourth national forest inventory, published in 1963, attracted considerable attention. They showed that Finland's forest resources had diminished, and the number of low-yielding forest stands had increased compared to the results of the third inventory, completed ten years earlier. This information alarmed both political decision-makers and the industry, who believed it to constitute a serious threat to the prerequisites for the Finnish welfare state and growth. The operating environment of the forest industry needed to be improved as the sector provided numerous jobs and generated important export income for Finland. The effort to reverse this worrying trend by increasing the supply of timber combined research activities with regional and employment policies.

Forest researchers emphasised the same measures as in the 1950s: the practice of selection felling by private forest owners had to be stopped once and for all and forests needed to be cultivated. More nurseries and high-quality seeds were needed. Understocked and low-yielding stands had to be quickly regenerated through clear-cutting and by draining waterlogged spruce and pine mires. New methods introduced in the 1960s included forest fertilisation and chemical sprout control to accelerate forest growth. These management measures of the 1960s marked a major upheaval for the forest environment.

The first forestry financing (Mera) programme and the efficiency (Teho) programme were launched in 1964. The former allocated funds for basic improvement works for private forests, while the latter supported employment measures among forest workers. Companies were also granted Mera funding for forest improvement efforts. The Mera programme was assessed to have delivered good results, and twice the decision was made to extend it, in 1966 and 1970.

G. A. Serlachius Ltd shared concerns about the sufficiency of forest resources.

Every year the company harvested an average of 10–15 per cent of the timber that it used from its own forests. The remainder had to be purchased from the private-sector timber market and from the government, so the company was, of course, interested in increasing timber volumes from its own land. When the price of spruce pulpwood used by Serlachius soared or private sellers refused to sell their forests due to low prices, the company increased harvesting in its own forests to cover about one-fifth of its industrial timber needs. The forest department focused on improving the growth and productivity of the company's own forests. Foresters who worked in the Serlachius forest department saw themselves as trailblazers of new forest management practices and believed that they understood the importance of forest management better than private forest owners.

The G. A. Serlachius forest department undertook an incredible amount of forest management work in the 1950s and 1960s. Between 1949 and 1967 alone, the company cleared a total of approximately 15,000 hectares for regeneration, carried out controlled burning on 7,850 hectares, scarified 1,625 hectares from 1954 onwards, sowed pine seed on approximately 9,350 hectares and planted seedlings on approximately 1,850 hectares. A total of 1.48 million spruce seedlings and approximately 2.18 million pine seedlings were planted; from 1954 onwards, 18,700 hectares of young stands were cleared and as many as 34,780 hectares were cleared of grasses. Old ditches and streams were cleaned and slightly over 7,000 kilometres of new ditches were dug and blasted.

The amount of work carried out seems incredible, but it should be noted that forest management jobs were being mechanised at the time. Ditches were no longer dug by hand but using ditch ploughs and thinning, clearing and young stand management tasks were already done using the first chainsaws and clearing saws, which continued to improve and become lighter.

◆ Controlled burning of forest land was a widespread practice in the 1950s and 1960s. The aim was to enhance forest growth. Pine seeds were usually sown on the logging areas after controlled burning. The Metsähallitus Collection, Lusto.

◆ In the 1950s, clear-cuttings were carried out on areas covering several hectares, in Northern Finland sometimes dozens of hectares. After clear-cutting, the soil was burned over and sown with pine seeds. This area was plagued by fast-growing deciduous trees that threatened to choke the seedling stand. The Metsähallitus Collection, Lusto.

The amount of timber harvested from Serlachius' forests varied from year to year, depending on demand, forest workers' wages and the stumpage price of delivery timber. When the wheels of the economy slowed and private forest owners became more reluctant to sell timber, the company had to increase the volume of timber it harvested from its own forests. In the record year of 1954, for example, Serlachius harvested almost 238,000 cubic metres of timber from its forests and later in the 1950s, annual harvest volumes were still in the region of 140,000–150,000 cubic metres.

Serlachius, like the other forest companies, preferred clear-cutting, which was seen as the most efficient, productive and appropriate method of forest regeneration. The structure of forests became more even-aged as trees planted as seedlings or seeds sown on clear-cut areas grew. Growth targets set in the 1950s and 1960s were achieved by the national economy as a whole and Serlachius, but the downside was the prevalence of single-species stands. Although, it should be noted that a significant proportion of Serlachius' forests were located in the barren watershed and upland areas of central Finland, where pine was the dominant species.

HARVESTING RECOMMENDATIONS EXCEEDED REPEATEDLY

Finnish people's confidence in economic growth suffered a severe blow during the 1970s oil crisis. The use of alternative energy sources had to be stepped up. Nuclear power, introduced in 1977, became an entirely new energy source. The use of wood as a source of energy was also increased by chipping logging waste and stumps and by cultivating fast-growing energy willows. At the same time, new pressures arose on forest use in the form of nature conservation, multiple-use forestry and consideration for environmental values, often resulting in friction as the forest industry sought to secure its timber supply.

G. A. Serlachius Ltd's operations were also guided by the need to secure the supply of raw timber. It initiated negotiations in spring 1968 to establish a joint timber procurement company with three other organisations. This proposal was motivated by the intensified competition for raw timber on one hand and on the other the reluctance of the Central Union of Agricultural Producers and Forest Owners (MTK), a representative of private forest owners, to enter into agreements on recommended timber prices that would have satisfied the industry. The purchasing cartel ensured that its members' plants had a steady and reasonably priced supply of timber. The procurement company, Puulaaki Oy, which began operations in summer 1972, was not intended to make a profit but to serve its co-owners.

The volume of timber harvested from Serlachius' forests remained moderate in the early 1960s but started to grow from 1967 onwards. The growth was modest initially and only after the oil crisis, from 1973 onwards, did annual harvests stay permanently above 200,000 cubic metres. The largest annual harvest from Serlachius' forests was in 1974, exceeding 310,000 cubic metres. In 1981, the annual harvest remained approximately 291,000 cubic metres. The high harvest volumes from Serlachius' own forests correlated with the rising stumpage prices for timber purchased from private forest owners. When timber prices were high, more timber had to be harvested from the company's own forests.

G. A. Serlachius Ltd's forests were re-inventoried in 1968, and the recommended annual harvest volume was set at 158,000 cubic metres, or 2.2 cubic metres per hectare, relatively low compared to Finsilva's current harvest levels. Until 1979, when a new recommended harvest volume was established, the annual volume of timber harvested only fell below the recommended figure on two occasions, in 1970 and 1971. For the most part, annual harvest volumes remained just above the recommended level, approximately 2.5–2.6 cubic metres per hectare, but in its record year, 1974, Serlachius harvested 4.0 cubic metres of timber per hectare from its own forests.

The recommended maximum harvest volume amounted to 1.74 million cubic metres over the ten-year period 1968–1978, but when the actual harvested volumes were totalled, they amounted to 2.05 million cubic metres. The excess – approximately 316,000 cubic metres – corresponded to an addition-

Safety regulations required logging sites to be clearly marked. The Puulaki Oy Collection, Lusto.

Timber harvesting became rapidly mechanised in the 1970s. Chainsaws were accompanied by processors, which trimmed and cut stems felled by loggers. Gradually machines were developed that could cut standing stems as well. Puulaki Oy's Pika 75 in operation. Lasse Säteri, the Metsäteho Collection, Lusto.

al two years of harvest from Serlachius' forests at the maximum recommended volume. It is not known which types of forest stands or timber grades made up the excess volume, but it can be assumed that large spruce logs were used in pulp digesters during shortages of spruce pulpwood as it was not profitable to exchange them with the other co-owners or sell them to third parties.

Serlachius commissioned Puulaaki to carry out a new ten-year inventory of its forests in 1978. It showed that the growing stock had increased from 71.4 cubic metres to 80.2 cubic metres per hectare since the previous inventory, and there was approximately six million cubic metres of timber in the company's forests. The annual growth per hectare had increased from 3.5 to 4.4 cubic metres in ten years, which was considered a good return in a comparatively short period of time. The annual maximum harvest volume was set at 225,000 cubic metres, which was exceeded almost every year until 1983. The greatest excess was in 1981, when a total of 290,750 cubic metres of timber was harvested from Serlachius' forests.

Thousands of loggers were still employed by forest companies in the early 1980s, but they were replaced by rapidly improving multi-function machines in the following decade. A Puulaki logger felling a spruce. Lasse Säteri, the Metsäteho Collection, Lusto.

The inventory also assessed the quality of Serlachius' forest lands. Approximately 75,000 of the company's 80,430 hectares were classed as productive. Of these, 26,500 were fresh forest types and 25,800 were dryish forest types, while 2,750 hectares were dry and barren forest types. There were 3,950 hectares of grove-like forest types and 16,000 hectares of spruce and pine mires, as well as 2,900 hectares of poorly productive and unproductive forest lands and 2,560 hectares of other lands. Of the total area, 41 per cent was seedling stands, 21 per cent thinning forests and 16 per cent mature thinning stands. Forests that were ready for regeneration or at the end of rotation accounted for 20 per cent of the area. The remaining small percentage could not be classified. The inventory showed that Serlachius' forests were in good condition, with no backlog of management work. Despite the mechanisation of forest work, workers still carried out almost three quarters of all tasks related to forest management and harvesting.

According to forest researchers, forests were growing well across Finland, and the

forest balance turned positive from the 1980s onwards. From the industry's perspective, however, new problems had arisen. For example, the behaviour of those who sold timber had changed as more forests were owned by city dwellers, many of whom were not interested in forestry or did not appreciate the importance of forest management. Additionally, a mismatch had developed between demand and supply in terms of timber grades. For Serlachius, this meant a shortage of pulpwood spruce. Stands marked for cutting produced pulpwood pine, which the company did not need and sold to third parties. Supply and demand varied from region to region and from species to species, which increased expenses such as transport costs.

Forest-related disputes that had begun in the previous decade intensified in the 1980s. The environmental movement questioned the entire forest sector and especially the forest industry, which was reliant of timber as its primary raw material. New visions emphasised the importance of protecting forest nature and the multiple uses of forests beyond their environmental and scenic value. Environmentalists argued that clear-cutting and forest cultivation upset the balance of nature, triggered forest decline and damaged forest ecosystems. They prioritised intangible environmental values above economic ones, though the issue was not yet being discussed in terms of concepts such as biological diversity or biodiversity loss.

ALTERNATIVES TO FOREST MANAGEMENT METHODS

Interesting changes took place in the management of the forests of Metsä-Serla, founded in 1986, in the 1980s, 1990s and early 2000s. In previous decades, management practices had been rather formulaic, with little room for alternative methods or new perspectives.

For example, the use of woodland ploughs and disc trenchers in soil preparation before seeding and planting became less common in the late 1980s and 1990s. This change did not occur for environmental reasons but because a more efficient inverting method was developed. Another example was controlled burning, a practice that had been discontinued in the 1960s but was resumed in the 1980s and 1990s, albeit on a smaller scale.

The biggest changes in regeneration methods involved reducing pine planting and increasing seeding. Improved seed was used at first, but the company was not satisfied with the results, so used locally sourced seeds instead, which performed better. Planting of pine seedlings resumed after the cultivation of container-grown seedlings became more widespread, but the natural regeneration of pine by leaving seed trees was not practised on a large scale.

Spruce planting was more successful, and the seedlings grew strongly. Mixed planting of pine and spruce was also tested in areas where soil conditions were suitable. Planting birch seedlings proved to be challenging, and supplementary planting was later required in young stands.

The company paid particular attention to tending young stands and first thinnings, ensuring that no backlogs developed. Metsäliitto's forest management department developed guidelines for thinning, which the company trained staff and contractors to follow in the field.

Ash fertilisation became more widely used in the 1990s as the price of artificial fertilisers rose rapidly. In this image, a forwarder-mounted ash spreader is seen in operation. The Metsähallitus Development Unit Collection, Lusto.

Forest fertilisation declined in the early 1990s due to rising prices for artificial fertilisers. This led to increased use of ash fertilisation, which was applied to low-yielding and waterlogged acidic soils. Studies confirmed that tree growth had accelerated quickly. The effects of runoff water from forest areas fertilised with ash on water bodies were also studied. These studies found nothing to justify banning the use of ash as fertiliser.

Metsäliitto proactively protected many of its unique biotopes. Proposals for protected areas came from field staff, who suggested markings for reduced use or felling bans to be added to forest maps. Many old spruce stands, rocky pine forests, herb-rich forests, streamside and shoreline areas, and peatlands were marked as protected. These voluntary protection decisions were made long before the introduction of protection programmes for old-growth forests in southern Finland, and some of them are sites that Finsilva has applied to be protected under the current METSO and Helmi programmes.

Unknowingly, companies made poor decisions in terms of carbon sequestration. There was no talk of combating climate change or carbon sinks in those days, rather the focus was on increasing domestic ener-

Clearing saws made it significantly quicker to manage seedling stands from the 1970s onwards. The first clearing saws were heavy and cumbersome to operate, but over time their design evolved to be easier to use. The Finnish Forest Industries Federation Collection, Lusto.

gy production in the context of security of supply. With this in mind, Metsä-Serla inventoried its peatlands and carried out ditch cleaning and supplementary ditching, leasing some areas to Vapo Oy and other companies for peat extraction. The use of peat as an energy source declined in the 2010s due to climate policy and emissions trading. Current owners, including Finsilva, are still deciding whether to restore these former peatlands (by blocking ditches and raising the water level) or use the areas for renewable solar energy production.

TURNING POINTS IN FINNISH FOREST POLICY

Debate on forest policy became extremely polarised in Finland in the 1980s. The advocates of intensive forestry on one side justified their views with arguments about the national economy, strengthening the welfare state and securing the supply of raw timber for the industry. Such advocates included organisations operating in the forest sector and the supporting timber procurement industry, most private forest owners and their advisory organisations, as well as the majority of forest researchers.

On the other side were environmentalists, who feared that forests would be seen as nothing more than raw material reserves for industry, turned into uniform tree farms. In their view, intensive forest management posed an irreversible threat to biodiversity. This group also included researchers who proposed alternative forest management methods, such as continuous cover forestry.

With forwarders, timber could be quickly transported to roadside landings to await onward transport. In this image, a Valmet forwarder loads spruce pulpwood onto a trailer. Valmet Oy, Lusto.

Air pollution was also a concern. The most ardent sceptics suggested that forests would be destroyed by human activity.

The intensity of criticism of formulaic forest management methods had increased during the course of the decade even among private forest owners, who emphasised the scenic, recreational, environmental and other multiple-use values of their forests in addition to reasonable returns. The polarisation

◆ The ‘forest wars’ started in the 1980s. Here, three young activists confront an excavator at Lake Jerisjärvi during the Pallas–Ounastunturi road dispute in 1991. The Finnish Nature Association Collection, Lusto.

was not eased by the fact that forest researchers themselves were increasingly divided into rival schools of thought. The authority of forest research was in crisis.

A change in approaches and attitudes was also supported by the 1992 UN Conference on Environment and Development in Rio de Janeiro, which produced declarations that emphasised the importance of combating climate change and protecting the forest environment. International forest-industry conferences also produced resolutions calling for criteria for sustainable forestry. Finland, too, joined agreements and commitments on sustainable development.

This led to a temporary easing of the polarisation of the forest debate. Proponents of intensive forest management and environmentalists began discussions on good forestry practices, the wellbeing of forest ecosystems and the promotion of biodiversity.

The prerequisites for new forest policy were developed by the working group for the environmental programme for forestry, which operated during 1993–1994. In its final report, the group proposed the following

◆ Forest debates eased off for a while in the early 1990s. As a result, nature conservation legislation was reformed, a programme for the protection of old-growth forests was created and new financial instruments were developed. Representatives of environmental organisations participated in operations such as assessing the state of forest ecosystems. In this image, Jarmo Pyykkö surveys an old-growth forest in 1993. Matti Liimatainen, the Finnish Nature Association Forest Group Collection, Lusto.

prerequisites: consideration of biodiversity, the creation of deciduous and mixed forests, maintaining tree health, avoiding unnecessary management operations, assessing environmental impacts, and protecting environmental and recreational values.

As a result of the group’s work, forest and nature conservation laws were reformed, financial instruments for protection were created and an old-growth forest protection programme was set up. Models aimed at promoting biodiversity were first adopted by Metsähallitus and the forest industry. Attitudes changed more slowly among private forest owners and their advisory organisations. The turning point was the forest certification system project, from which environmental organisations eventually withdrew in 1997.

The Natura 2000 project was also being prepared at that time, the aim of which was to protect endangered habitats and species. Landowners felt the preparation was neither open nor fair, and the Ministry of the Environment’s protection proposal generated more than 15,000 objections. The main

The protection of forests in Southern Finland was a key turning point in the 1990s. Administrative protection decisions imposed from above regularly resulted in floods of objections, so a voluntary model was developed instead. Now the government paid compensation to landowners for voluntarily protecting their forests. This image shows the Perämäki forest nature reserve in Vilppula. Erkki Oksanen, the Finnish Forest Research Institute Collection, Lusto.

problem in the process was the lack of mutual trust between landowners and environmental authorities.

The disputes over certification and Natura marked a new era, which resulted in forestry organisations distancing themselves from environmental issues and nature conservation organisations. Controversies over forest management and nature conservation then focused on environmental assessment procedures, summer loggings and the protection of old-growth forests in southern Finland.

New initiatives were introduced to the forest debate by the committee for the conservation of old-growth forest in southern Finland, led by the Ministry of the Environment. According to the committee, protection areas on private land in southern Finland should not be established by administrative orders, as these often met with objections. Problems could be avoided if landowners proposed their sites as protection areas, with their environmental value then assessed by environmental authorities. If an area met certain criteria, the government would pay compensation in return for the area being designated protected status. Since the sites proposed for protection were often low yield, landowners' interest in offering their lands for protected designation increased significantly. After testing and evaluation phases, this change provided an effective strategy for increasing the hectarage of protected areas. The development was slowed from 2008 onwards by the financial crisis, but as the recession eased, state funding allocated for voluntary forest protection also increased.

NEW FOREST MANAGEMENT METHODS

Forest companies started to include consideration for biodiversity in their in-house forest management guidelines from the 1990s onwards. This was driven by international customers of forest industry products starting to enquire about the environmental credentials of harvested raw material. The change was reflected in reduction of hectarage of clear-cut areas, abandonment of deep tillage in waterlogged spruce mires with thick ground vegetation, reduced use of fertilisers and increased seeding and natural regeneration of pine. As the quality of planting material improved, pine planting continued where possible. There was little support for ecological continuous cover forestry within the forest industry, however.

Metsä-Serla's forests were managed by Metsäliitto Cooperative's forest management department, which prepared long-term forest management and harvesting plans, organised and tendered harvesting contractors and arranged sowing and planting activities, tending of young stands as well as various clearing and thinning operations. The department still employed forest workers in the 1980s and 1990s, but harvesting was increasingly carried out by forestry contractors. Metsä-Serla was left with a small forest department, which was mainly responsible for matters related to the company's land use. In 1993, all matters related to forestry and land use in Metsä-Serla were transferred to Metsäliitto Cooperative and the department was closed.

Metsäliitto Cooperative set up a company called Metsämannut Oy in 1995. Focusing on forestry expertise, the company offered

A stand of retention trees at the edge of a planted clearing. According to forest certification specifications, large aspens must be spared from logging. Mika Ankkuri, Metsä Group.

the cooperative comprehensive forestry services from planning to harvesting and regeneration operations. Metsämannut invested in the digitalisation of forest data and maps from its establishment, as well as new forest management methods that emphasised sustainability.

Metsämannut was among the first to adopt more environmentally conscious forest management methods. The use of heavy disc trenchers was ceased, and the company was also one of the first to introduce the inverting method for planting seedlings. The usual practice of draining water directly into streams, ponds and lakes was discontinued and ditch network maintenance works were considered more carefully. Stands of shelter trees were left along shorelines and streams. The number of stands of retention trees per hectare was increased, and understanding of the importance of coarse woody debris for the overall wellbeing of the forest ecosystem increased. The company also paid special attention to landscaping and improving the bearing capacity of forest roads to prevent damage during the summer harvesting season. Metsämannut recommended the introduction of new quality certificates. The company also offered forest management advice and services to private forest owners. In the early 2000s, it managed approximately 250,000 hectares of forest.

THE FINSILVA MODEL

As a result of ownership arrangements in Metsäliitto, a decision was made to incorporate the cooperative's forests at the turn of the millennium; after various stages, the forest assets were transferred to Finsilva Plc, which began operating in 2005. Initially the company operated with a flat organisation structure and rather than setting up a forest department of its own made use of Metsäliitto's expertise in harvesting plans and forest management.

One of the first tasks of the newly appointed managing director, Harri Viitaniemi MSc (For.), was to draft the company's forest management strategy. In the early 2000s, the forest debate in Finland was dominated by national macroeconomic perspectives on the one hand and harvesting and forest management practices and conservation of the forest environment on the other. Finsilva wanted to distance itself from the policy of just producing timber, with the ultimate goal for profitability calculations to guide all forest management operations from sowing to harvesting.

Finsilva's forest strategy was not implemented in full in the early years, however. Struggling with financing costs, the company harvested almost the entire volume of the estimated annual growth of its forests, approximately 700,000 cubic metres. The total volume of harvested timber in the first three years reached approximately two million cubic metres.

The company's forest management guidelines, the Finsilva Model, was introduced in 2010. It helped to achieve the objectives of the forest management strategy and outlined

The guidelines for the treatment and management of Finsilva's forests were introduced by the company's Managing Director, Harri Viitaniemi Msc (For.), a forestry professional with extensive experience. Workers, forestry contractors and other parties who operate in Finsilva's forests must thoroughly familiarise themselves with the content of the guidelines, the Finsilva Model, before beginning work. Mika Ankkuri, Finsilva.

the owner's visions of forestry in both the short and long term. The Finsilva Model was the outcome of significant collaboration as professionals from various levels of the forest sector were involved in its preparation. It was specifically targeted at Metsämannut staff and contractors, who, having read the model guidelines, would know how Finsilva wanted to operate its forests. The model has since been regularly updated.

The vast majority of Finsilva's forests were commercial forests. The forest balance

◆ The Mäntänvuori hill, protected by G. A. Serlachius Ltd, rises 190 metres above sea level, standing about 50 metres taller than any other hill in the area. Its northern and north-western slopes are extremely steep. Mika Ankkuri, Finsilva.

also included old protection sites, such as the Mäntänvuori area in Mänttä, and new ones, established from 2012 onwards. It was then that the government first paid compensation for Finsilva's voluntary protection of its forests. Since then, the company has made voluntary protection decisions almost every year.

The forests passed down by G. A. Serlachius Ltd were mainly in good condition. However, the company had carried out intensive harvesting, especially in the 1970s and 1980s, and in 2005, there were still many even-aged forests at the beginning of the rotation. The aim was to harvest the full volume of timber without compromising sustainability. Finsilva also began planting container-grown pine seedlings, a practice in which Serlachius and Metsä-Serla had hardly engaged. The timing of tending young stands was also carefully considered, with the first and second tendings scheduled about five years and 10–12 years after planting respectively.

From the outset, all Finsilva's forests were accredited with both the FFCS (Finnish Forest Certification System) certificate and the international PEFC (Programme for the Endorsement of Forest Certification) certificate, part of an international forest certification system that promotes sustainable forest management that is socially just, ecologically sound and economically viable. The certificate set higher requirements for Finsilva's forest management practices than other regulations at the time.

The pressure to safeguard forest biodiversity increased in the 2010s, and companies in the Metsä Group that purchased Finsilva's raw timber hoped for the adoption of the stricter FSC certificate. Finsilva was granted the FSC certification in 2018.

In addition to timber sales, Finsilva's business operations included real estate development. This covered activities such as selling zoned waterfront plots for summer cottages and surrounding lands, conducting commercial soil material operations as well as leasing and selling peat production areas. The soil material business required the use of sand, gravel and aggregate resources. Criticism of peat use, which began in the mid-2010s, put a stop to Finsilva's real estate development works on peatlands. The possibility of building wind and solar power plants on former peat production areas is being explored.

Juha Hakkarainen Lic.Sc. (Agr.&For.) was appointed managing director of Finsilva in August 2021. Under his leadership, Finsilva has emphasised the importance of natural capital and responsible forestry as a sustainable part of the circular economy and bioeconomy. This image shows restoration burning in Keuruu in May 2023. Finsilva.

FOREST AND NATURAL CAPITAL COMPANY

The Dasgupta Review, published in 2021, examined the impacts of loss of biodiversity and nature loss on the economy, the environment and human wellbeing. The review fundamentally changed discussions on the relationship between biodiversity and the economy, and its significance has been compared to that of the Brundtland Report (1987) on sustainable development and the Stern Review (2006) on climate change.

According to the Dasgupta Review, humanity consumes more natural capital than it can regenerate. This is resulting in nature loss, visible as declining biodiversity, and ultimately to a decrease in human wellbeing. The problem is that the 'market value' of nature is not sufficiently reflected in the economy, despite humans being dependent on natural ecosystems and the services they provide. The review points out that nature should be considered a form of capital since the economy is entirely dependent on nature and the preservation of diversity. The review immediately sparked lively international debate on natural capital and natural capital markets.

Based on the review, Finsilva began to prepare a new five-year strategy in autumn

The Kolmisoppinen area in Vermassalo, Virrat, owned by Finsilva, is an example of what can be achieved through long-term forest management operations, even in conditions of infertile soil. Careful consideration of the site, use of high-quality seedlings and timely clearing and thinning, accompanied by necessary fertilisation, ensure strong forest growth. Mika Ankkuri, Finsilva.

◆ According to the Finsilva Model and the Metsä Group Plus guidelines, some biodiversity stumps must be left in place in harvested forest holdings. These guidelines are based on requirements established in the FSC standard, which have been further tightened through voluntary measures in the Metsä Group Plus model. Mika Ankkuri, Metsä Group.

2021, when Juha Hakkarainen, Lic.Sc. (Agr. & For.), took over as the company's new managing director. The strategy adopted in spring 2022 aims to transform Finsilva into a forest and natural capital company. Finsilva's owners – the forest funds of Dasos Capital and Ilmarinen Mutual Pensions Insurance Company – wanted to use the new strategy to help create domestic natural capital markets around biodiversity.

Finsilva's goal is the sustainable and diverse utilisation of forest and natural capital. The company generates economic, social and ecological benefits from nature and promotes the sustainable harmonisation of natural, human and economic interests. As a natural capital company, Finsilva engages in sustainable forestry, creates preconditions for business from renewable energy, develops compensation markets, supports research that promotes biodiversity and champions the recreational value of the environment.

The sale of sustainably produced timber to the forest industry is still the most significant part of Finsilva's ecosystem services in financial terms. To obtain market approval for the wood it sells, Finsilva committed in 2018 to the FSC standard that guides its forest management practices. The latest FSC standard came into force in 2023 and is valid until further notice. It sets more strict guidelines for forest management than previous standards and sets requirements for safeguarding and restoration of biodiversity and the prevention of nature loss.

Under the FSC standard, the number of stands of retention trees was increased in Finsilva's forests, large old deciduous trees were left uncut, coarse woody debris was left in the forest and the number of biodiversity stumps and protective thickets for game, birds and insects was increased. The practice of deep tillage was abandoned, the necessity of ditch network maintenance works was carefully considered and controlled burning of stands of retention trees was increased wherever possible. The zoning of protective thickets along water bodies and shorelines was doubled.

The establishment of protected areas has long been a way for Finsilva to safeguard biodiversity. The company's oldest and still largest contiguous nature reserve, Mäntänvuori, was established as far back as 1945. Finsilva has also donated several areas for conservation. Typically these sites have been relatively large individual nature reserve areas in protection programmes adjacent to Finsilva's lands with suitable habitat types, such as Dalkarby.

With the contentious reception of the Natura 2000 protection programme at the turn of the millennium, traditional environmentalism suffered a severe setback. As a result, a new protection scheme was developed, in which landowners' opinions and wishes were better acknowledged. The Forest Biodiversity Programme for Southern Finland (METSO Programme) was launched in 2008, the aim of which is to halt the ongoing decline in the biodiversity of forest habitats and species and to establish favourable trends in forest ecosystems.

Between 2012 and 2023, Finsilva voluntarily protected about 800 hectares of valuable natural sites, mainly in central Finland and Savo. The largest protected areas are

Lempaatsuo in Central Finland is a swamp of 172 hectares, roughly one-third of which remains in its natural state. Finsilva designated it a protected area in 2023 as part of the Helmi habitats programme. Finsilva.

Lempaatsuo in Jämsä and Keuruu (172 hectares, established in 2023) and Kannusvuori in Juva (60 hectares, established in 2021). The compensation instruments of these protection programmes have been important for Finsilva. The selected sites are either low yield or excluded from active commercial use due to their significant environmental value.

A total of 600–700 hectares of former peat extraction areas owned by Finsilva are similarly unproductive assets. Their suitability for solar power generation has been assessed, and they have been marketed to energy companies.

Finsilva has also held negotiations with several companies on the construction of wind farms. The company has several sites that would be suitable for wind power production, being sufficiently large in area and located far from residential areas. According to a principle Finsilva has adopted, any construction of renewable energy infrastructure must be compensated in full as close as possible to the site in question to safeguard the original environmental value of the land used.

One of the interesting questions for the 2022–2027 strategy period is whether the European Union can find market-based solutions for removing carbon dioxide from the atmosphere. Finsilva is closely monitoring the development of carbon sequestration certification schemes and whether mechanisms will emerge that create markets for forest carbon sequestration. Under Finsilva's new strategy, renewable energy and other nature capital projects (other than traditional forestry) are expected to account for 30 per cent of the company's operating profit by 2027.

The discussion on natural capital and natural capital markets, as well as efforts to create these markets, point to a profound societal paradigm shift. The safeguarding of biodiversity that began with the FSC certification is developing into proactive measures to improve biodiversity, such as restoring peatlands, actively producing coarse woody debris, establishing bird wetlands and protective thickets and requiring forest compensations, which requires the establishment of functioning carbon sink markets. Finsilva and its owners are currently at the hinge point of this change, with the company aiming proactively to shape these emerging market structures. The race to accumulate forest holdings, both in Finland and elsewhere in the world, has now begun.

AFTERWORD

TRACES OF USE

Do forests need humans and do humans need forests? Examples from the past demonstrate humans' dependence on forests and the impact forests have had on not only people and their livelihoods but also societies and their development. As ecosystems, forests would typically regenerate over the course of a couple of hundred years without human interference. However, as humans began to exploit them more intensively, their capacity to regenerate came under increasing pressure.

Examples of this can be seen in the Mediterranean region, Iceland, Scotland and Ireland, where human actions resulted in sparsely wooded or even treeless areas in which forests did not regenerate as a result of erosion or other factors. One of the main causes of deforestation was the expansion of agriculture as populations grew.

In Finland such sparsely wooded areas also emerged, for example in Kainuu, where intensive tar burning in the 19th century prevented tree populations from reaching their full height. Only the decline in global demand for tar led to a reduction in tar burning. Before this, legislative measures were required to bring an end to this wasteful practice that damaged the forest environment. Forests did not need humans but rather regulations and restrictions on human activity to allow them to return to their natural rotation.

Humans have influenced forest ecosystems in various ways at different times. In prehistoric times, the limited use of forests by small communities was focused on obtaining timber for building and other domestic uses as well as logs and firewood from limited areas. The forest also provided food in the form of game, plants and berries. Forests experienced new pressures as agriculture spread in the 11th century. In central Finland, populations of settlers, though still relatively small, practised slash-and-burn farming; in the south, although the prevalence of slash-and-burn farming declined,

◆◆ Previous spread: These spruces covered with thick textured bark in the Paljakka Strict Nature Reserve in Hyrynsalmi, Kainuu are more than 250 years old. There are very few forests that would be classified as primeval left in areas south of Lapland. Erkki Oksanen, the Finnish Forest Research Institute Collection, Lusto.

◆ In the 1930s, forest industry products accounted for more than 80 per cent of the value of Finland's exports. Forestry, processing and transport provided jobs for a large number of Finnish people. *Felling a Tree* (1934) by Marcus Collin was part of a series of paintings commissioned by Gösta Serlachius that depict forest management activities. The Gösta Serlachius Fine Arts Foundation. © Kuvasto 2026.

forest land was cleared to make way for agricultural fields. The limited population meant the overall human impact on forests at this time was still insignificant; the area that is present-day Finland is estimated to have had a population of less than 100,000 at the end of the Middle Ages.

Arable farming and animal husbandry added to the use of forests in the 16th and 17th centuries. Strip fields had to be fenced to protect them from livestock, which grazed for tree leaves and thin grass in the forests near human dwellings, trampling seedling stands. The use of timber for household purposes, construction and the manufacture of tools, fencing and firewood, alongside the impact of livestock grazing in woodland pastures, depleted forests, which gradually became thinner around villages. The landscape in southern Finland opened up as human activities caused forests to retreat.

As the population grew, people spread into untouched wilderness, where their main livelihoods were slash-and-burn farming, hunting and fishing. The Swedish crown started to support the settlement of wilderness in the early 16th century to increase tax revenues, while some peasants moved ever deeper into the wilds to avoid the Crown's tax collectors. Slash-and-burn cultivation, practised by an expanding population, required more land and suitable spruce forests. As suitable spruce stands became scarce, people migrated further into central Finland and southern and northern Savo in search of good slash-and-burn land. It is estimated that in the latter half of the 16th century, Finland, then part of Sweden, had about 300,000 inhabitants.

While farms in Savo only used small slash-and-burn clearings, perhaps one or two hectares in size, they each required several such plots. Forest use was thus affected by the growing population. Even if swidden rye yielded a good crop, it is estimated that a single large Savonian household would have required approximately 30 hectares of land every year for the various stages of the slash-and-burn cycle as well as for firewood and other domestic use. If this figure is accurate, there would have been hardly any virgin forests left in Savo by the mid-16th century.

Over time, families settled down and cleared fields around their dwellings, but they did not give up slash-and-burn farming entirely. Even younger pine or deciduous forest stands were eventually deemed suitable for burning. The forest rotation period shortened as burning was repeated before trees had had time to grow into mature stands. When population data was first systematically collected in the mid-18th century, Finland's population was approximately 420,000.

As part of Sweden, Finland gradually became integrated into the global economy. Products processed from wood that were exported from Finland, first tar and later also boards and planks, became sought-after commodities in Europe. Tar was needed to protect wooden ships, while boards and planks were used in the construction of both buildings and ships.

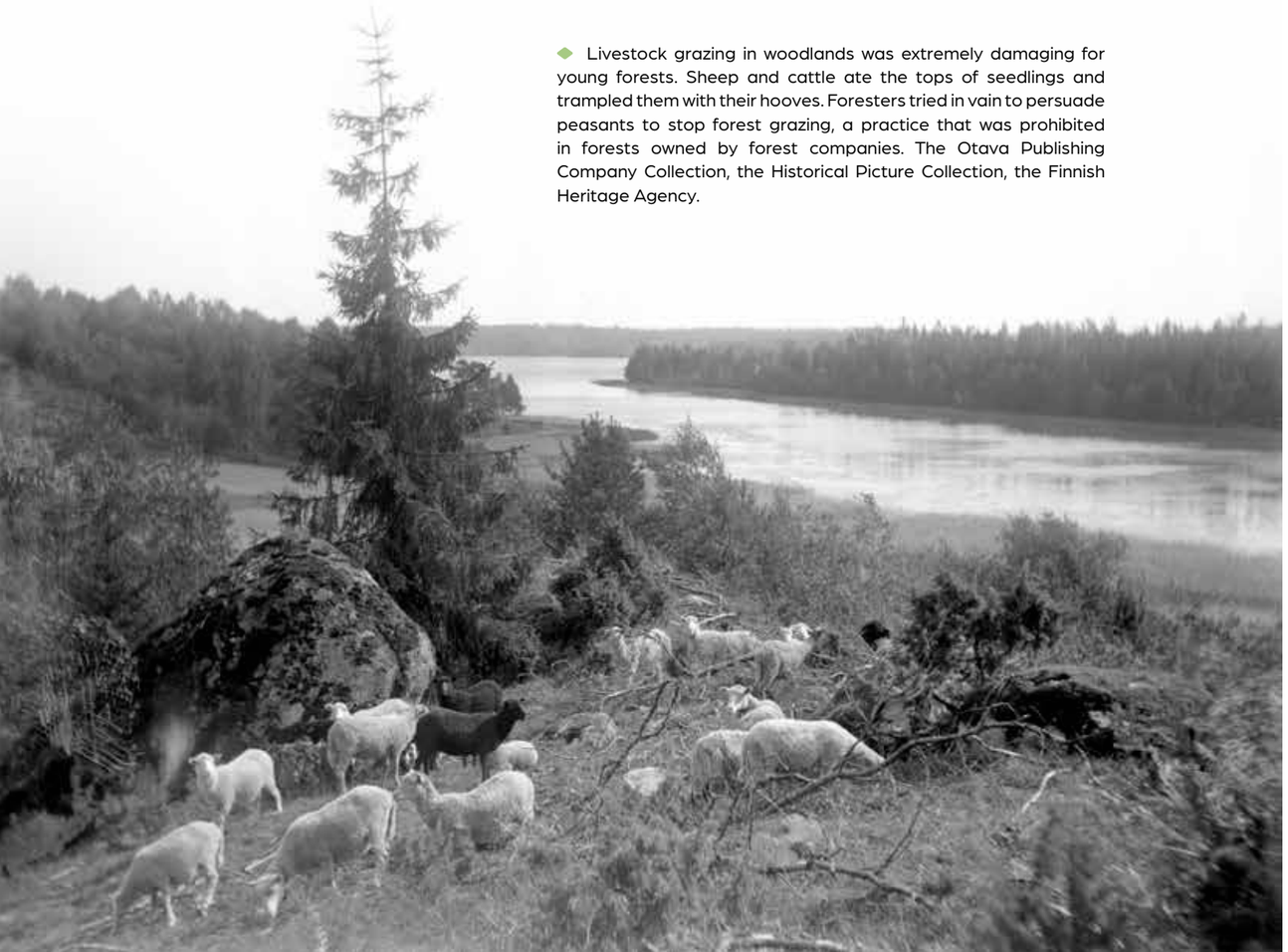
The first extensive tar burning region in Finland in the late 16th and the 17th century was established around the Lake Saimaa water system in South Karelia and Savo. By the 18th century, Ostrobothnia was established

Slash-and-burn cultivation has been practised since prehistoric times. It reached its peak in the late 18th century and early 19th century, but smoke from smouldering fields could still be seen in Kainuu, Northern Savo and Karelia in the late 19th century. *Slash and Burn* (1893) by Eero Järnefelt. The Reitz Foundation Collection.

as the main area for tar burning activities, as the region offered plenty of pine forests and good transport connections to coastal towns along rivers. Tar production required significant manpower, especially in the initial phase when partially debarked pines that had been left standing to dry were felled, chopped and stacked into tar pits. Raw material was collected near the burning site, which significantly depleted local forests.

The production of charcoal for the ironworks of southern Finland also required considerable amounts of wood. Dry charcoal was used to generate the high temperatures necessary for the forging of iron. Firewood and charcoal were also needed for the processing of lake ore. Some of the ore went to the ironworks, but village blacksmiths also used pig iron produced using firewood.

The increased demand for charcoal at the ironworks of western Uusimaa, combined with household use, caused a shortage of timber, evident in the forests of the early 19th century, which were bare and in poor condition. Regeneration was hindered by the continued grazing of livestock, while the forests surrounding ironworks, such as Dalkarby, now owned by Finsilva, were in poor condition.



Livestock grazing in woodlands was extremely damaging for young forests. Sheep and cattle ate the tops of seedlings and trampled them with their hooves. Foresters tried in vain to persuade peasants to stop forest grazing, a practice that was prohibited in forests owned by forest companies. The Otava Publishing Company Collection, the Historical Picture Collection, the Finnish Heritage Agency.

A stand of trees partly debarked in preparation for tar burning behind a roundpole fence in Kuortane in 1913. The prepared pines were left to dry and secrete resin for a few years before they were felled and chopped. U. T. Sirelius, the Ethnographic Picture Collection, the Finnish Heritage Agency.

The demand from international markets in the 18th century meant that operations expanded deeper into Finland's inland forests, where peasants burned tar and charcoal and felled large pines, floating the logs to local water-powered sawmills. Tar and charcoal burning, as well as felling and transporting saw logs, provided peasants with additional income. Slash-and-burn agriculture continued to flourish in forested regions, while in just 50 years, by the late 18th century, the population had doubled to approximately 840,000.

Water-powered sawmills were built along fast-flowing rivers and rapids in the latter half of the 18th century. Ostrobothnia became the core area for tar production during this period, and water-powered sawmills thrived in southeast Finland, now part of the Russian Empire. The Lake Saimaa region mainly produced pine planks and boards, which were transported to Vyborg. Travellers reported in the early 19th century that columns of horses, hauling sawn

timber, blocked the roads in winter and, when business was good, even in summer. Water-powered sawmills were also built in Ostrobothnia, where coastal towns were busy building ships. The decline in the number of large trees was evidence of the heavy use of forests.

The peasantry literally lived in and off the forest. In the 19th century, the practice of slash-and-burn became less common and from the south of the country to the north peasants started instead to cultivate fields. There were exceptions, however, such as Vermassalo, Virrat, now owned by Finsilva, in the watershed area in central Finland, where slash-and-burn was still actively practised in the 1860s and 1870s.

Diets became less diverse, and cereals, especially rye, became the main source of food. When crops failed, which occurred regularly, people made bark bread using the phloem and cambium layers of pine trees. Dried sheets of bark were ground into a powder and used as a partial substitute for rye flour. During the Great Famine of 1867–1868, many people resorted to bark bread, and its large-scale production caused localised damage to forests. The best bark came from pine trees that were thin and about 50 years old, with smooth bark that could be easily stripped. Courses were held for peasants in Nygård, Kuru, now owned by Finsilva, to teach them how to bake bark bread.

Tar burning moved further into the wilderness in the mid-19th century. The area around Lake Oulujärvi and Kainuu became the centre of tar burning, but the activity was also widespread in the watershed region of central Finland, such as in Vermassalo, Virrat. Tar burning was extremely intensive locally and regionally and left barren land behind as forests were not allowed to regenerate. The stands that slowly grew back on the clearings were prematurely felled again for tar.

People were well aware that tar burning was a waste of forest resources and, in the mid-19th-century, the bleak landscapes created by tar burning raised concerns of forest depletion. As tar was burned in common forests, authorities that understood the wastefulness of the practice hastened to extend the coverage of the Great Partition to these areas. The transfer of forests to private ownership curbed tar burning at least among the landless population. The change in ownership meant that forests had a greater chance of regeneration.

The issue of firewood supply also became acute as the population grew. The firewood used in large towns in the Baltic region was transported over greater distances, from Finland all the way to St. Petersburg, Tallinn and Stockholm, for example. The energy needs of rapidly growing towns such as Helsinki, Turku, Tampere and Vyborg were initially met by surrounding areas, but by the late 19th century, firewood had to be obtained from further afield. Tampere, for example, sourced firewood from Nygård in Kuru, more than 40 kilometres by water. Coal eventually replaced firewood in coastal towns, but during the World Wars, firewood was practically the only source of energy available.

After the Crimean War, from the mid-19th century onwards, the Grand Duchy of Finland, then part of Russia, started to dismantle old mercantile restrictions, while important export markets, such as Great Britain

Bark bread was still commonly baked in the early 20th century. Men felled young pines in spring and women and children stripped sheets of bark from the trees, which were then dried and ground to be used to bake bread. Samuli Paulaharju, the Ethnographic Picture Collection, the Finnish Heritage Agency.

and other European countries, also continued to remove import barriers. The construction of steam-powered sawmills was permitted, sawing quotas were abolished and measures were introduced to facilitate the establishment of groundwood mills. In the 1860s and 1870s, new sawmills and groundwood mills were built in coastal towns located at river mouths, with areas used to source raw materials already extending deep inland.

The great logging boom, which started in the early 1870s, led to a spike in demand for large saw logs. Large quantities of saw logs were felled, and the visible consequences on forests were criticised in newspapers. In some parishes, all large trees were removed, and even large clearings were quite common. As no seedlings were planted or seeds sown to replace felled trees, forests regrew unevenly. Seeds from the few remaining, perhaps poor-quality, conifers that remained were suffocated through a lack of light and nutrients by deciduous trees.

By the mid-1850s, the population of the Grand Duchy had grown to approximately 1.6 million, and it exceeded two million in 1879. Although tar burning was in decline, annual tar production remained at approximately 160,000–180,000 barrels until the 1880s. Smoke from slash-and-burn sites still rose from the wildernesses but became less widespread as grain was imported to Finland and transported even to the most remote areas via inland waterways and, eventually, by rail. Slash-and-burn farming had become very rare by the end of the century.

While slash-and-burn farming and tar burning were becoming obsolete uses of forest, some other traditional practices became more widespread. The growing population of the Grand Duchy still heated their homes with firewood, which was also exported to the insatiable market of the rapidly growing St. Petersburg. There is no precise data on the total volume of wood burned in stoves, but annual consumption must have been significant.

The shift to animal husbandry after the Great Famine in the 1870s resulted in an increase in the livestock population. However, rather than fields, livestock continued to graze in forests, where they were led every day by herdboys and herdgirls. In the forests, these animals ate all the green grass and tree leaves they found, eventually trampling small tree seedlings to death. In the 1870s, with slash-and-burn farming and tar burning in decline, and an increase in forest grazing and the demand for firewood, new industries set their sights on the forests. The first were modern steam-powered sawmills and groundwood mills, followed, from the 1880s, by the sulphite pulp and paper industry, which used spruce as its raw material.

Initially, paper, cardboard and carton were made from mechanical pulp produced in groundwood mills, but this was replaced by sulphite pulp, produced via a chemical process, as the raw material for paper manufacture in the 1880s. The process used spruce, which was chipped and boiled in an acidic sulphur dioxide solution to separate the cellulose fibres. Paper mills were built next to pulp mills, their main markets first being Russia and, after the 1917 revolutions, Great Britain, other European countries and the United States.

In terms of export value, however, the sawmill industry was the largest branch of the wood processing industry. Companies founded in the latter half of the 19th century sourced saw logs from even further inland. In the 1860s and 1870s, sawmills used very large logs, but by the 1880s onwards, the average diameter measured at the top of a top log was considerably smaller. Logs felled with axes and saws were hauled by horse to streams and rivers, from where they were floated to sawmills directly or towed as log rafts. If a sawmill was far from the coast, the finished boards and planks had to be transported to the port and either restacked or loaded directly into the holds of ocean steamers. The largest customers of Finnish sawmills were also in Great Britain.

Vast quantities of firewood were transported to towns. In this image, workers from the Tampere-based company J. W. Enqvist Oy load dry firewood onto barges in the 1920s. Matti Luhtala, the Vapriikki Photo Archive.

Due to selection felling, slash-and-burn farming and tar burning, forests grew poorly. Selectively logged forests were left populated with trees of increasingly poor quality. Their crowns, reaching for light, prevented the development of understory, and forest growth slowed. The nutrients in slash-and-burn clearings had been used for growing rye, oats and turnips, and when the clearings were abandoned, it took time for the forest to start regenerating properly. Deciduous trees first took over these areas and choked out conifers, which grew more slowly. Beautiful birch stands grew on slash-and-burn areas, which from the 1870s onwards were used

The forest industry has been extremely important for Finland's national economy. The Finland of the 1920s and 1930s has been called 'the Forest Republic' as more than 80 per cent of the value of its exports was generated by forest industry products. Pictured is the mechanical pulpwood mill at G. A. Serlachius Ltd's Tampere factory in 1908. The Vapriikki Photo Archive.

for making bobbins, and later plywood, as well as for firewood. For a long time birch trees had been considered weeds, and they were usually removed during thinning.

Forest industry companies acquired their own forests with the aim of stabilising the purchase price of raw timber, especially during economic booms. Companies wanted returns on the capital they had invested in forests, so forests had to be managed by planting seedlings, seeding, digging ditches, cleaning streams and carrying out clearing and thinning works. The aim was to promote tree growth. Companies commissioned ten-year management plans from private forest agencies, which defined annual maximum harvesting volumes and provided general plans for management tasks. Compared to privately owned forests, forests owned by companies were much better managed and followed the principle of economically sustainable forestry, meaning total annual growth could only be harvested in exceptional circumstances. Farmers' privately owned forests were barely tended and left to grow on their own without any actual forest management measures.

Finland gained independence in 1917, and the nation of 3.1 million people grew on the back of the forest industry. Approximately 85 per cent of the value of its exports consisted of products from the wood processing industry: boards, planks, plywood, bobbins, pulp, cardboard and paper. The production chain from forests to ports provided jobs and livelihoods for a vast number of Finnish people. Work at logging sites, felling and transporting trees, was done by hand and with horses. Raw timber was either floated or transported by rail to factories, as there were still very few lorries.

Finland's determined pursuit of self-sufficient agriculture in the 1920s and 1930s was also reflected in its forests. Although the use of artificial fertilisers increased and ensured higher yields, new fields had to be cleared. The most fertile and productive woodlands were selected, where the trees were cut and felling waste and stumps were burned. The clearings were drained, ploughed and finally put into cultivation. In Ostrobothnia and central Finland, mires were drained, cleared and burned with roots and stumps in place. Such fields had layers of nutrient-rich ash and were suitable for cultivation for three or four years, after which they were left to grow hay for livestock.

From the perspective of the national economy, it was important to know how much timber was in Finland's forests and their yearly growth rates. Estimating the total timber stock had previously been difficult, but as statistical methods developed, increasingly reliable assessment methods became available. This led to the launch of the first national forest inventory in 1921. It was completed in 1924, and showed that Finland had approximately 25 million hectares of forest, of which approximately 20 million were productive forest land. The average annual growth rate nationally was 2.13 cubic metres on productive forest land, although in the southern half of Finland this figure was approximately three cubic metres. The data could be used as a basis for the assessment of the country's forest resources and various forecasting models. Forest industry companies were particularly interested in how their investments in forest management compared to the results of the national forest inventory.

◆ The key markets for Finnish paper, pulp, plywood, bobbins and sawn timber were Great Britain and Central Europe, while paper was also exported to North and South America. Bales of pulp are seen being loaded into the hold of a steamer in Marcus Collin's 1934 painting. The Gösta Serlachius Fine Arts Foundation. © Kuvasto 2026.

WWII brought work in Finland's forests to a halt. During the Continuation War (1941–1944), Finland's ally and main trading partner was Germany. As little work was carried out in the forests, they were left to grow in peace, meaning forest growth exceeded the volumes of trees harvested. However, demand for firewood was high; it became the exclusive source of fuel on the railways and towns and other populated areas also relied on it heavily. Harvesting activities mainly took place in forests near railways and other good transport connections.

The situation changed after the war. Finland owed war reparations to the Soviet Union, which were initially focused on products of the wood processing industry. By 1948, the reconstruction markets of Western Europe had opened to the Finnish forest industry, which exported sawn timber and paper to its old trading partner, Great Britain. Large volumes of wood were harvested, and what had been saved during the war was quickly consumed. Everyone could see the effects of extensive harvesting on forests.

Finland experienced steady economic growth from the Korean War boom of the early 1950s until the 1973 oil crisis. The Finnish welfare state continued to be built on income from forest industry exports. Forest work became mechanised: axes and bowsaws were replaced by chainsaws, horses by forwarders, and loggers by processors and, later, harvesters. Mechanisation reduced demand for labour, but the biggest change came in the 1980s, when companies let go of their forest workers and hired contractors to operate machinery.

Since forests were vital to the national economy, there was a strong desire to improve forest growth. The selective felling of the largest trees was abandoned in favour of the cultivation of even-aged forests. This meant clear-cutting areas that had previously been selectively cut or were in poor condition and re-planting or seeding them, which was done after the soil had been scarified, harrowed or ploughed. These jobs were carried out using various machines, which were becoming heavier and more efficient. The alternative was controlled burning, which was a common practice until the 1960s.

The third national forest inventory (1951–1953) showed that forests had not grown as expected. The average growth per hectare was still 2.2 cubic metres per year, meaning that investments had not yielded the desired results. In G. A. Serlachius' forests in Pirkanmaa and central Finland, the annual growth was only 1.4 cubic metres per hectare according to the 1950 forest plan. Given the importance of forests to the national economy, more investments were required in forest management methods and growth improvement. In 1950, after the peak of the baby boom, Finland's population exceeded four million for the first time.

Concerns about the sufficiency of forest resources meant that growth potential had to be identified in new areas. One solution was to drain low-yielding and waterlogged swamps and spruce mires covered with thick moss using heavy ditching ploughs. The marks left in the forest environment were shocking: straight ditches were dug side by side through the swamps, which channelled water into nearby lakes. These measures did promote some forest growth, but the results were less positive than hoped. Drainage also brought unpleasant surprises, as water in nearby lakes became dark and eutrophic as nutrients accumulated. The practices of clear-cutting, cultivation of even-aged forests and mire drainage became known as intensive forest management.

Environmentalists became an opposing force to advocates of intensive forest management in the early 1970s as they opposed clear-cutting and demanded more varied, multiple and recreational uses for forests, as well as the expansion of protected areas. The polarisation led to confrontations – so-called 'forest wars' – between Metsähallitus, industry and private forest owners on one side and environmentalists on the other.

Finland's forests were growing well at this time, due to well-timed clearing and thinning operations in which forest companies had played a pioneering role since the early 20th century. The impacts on forests became less

The traces of forest use were shocking in some places. Breaking the soil surface allowed tree seeds to germinate more quickly. In this image a bulldozer is seen pulling a forest plough. Akke Virtanen, the Finnish Forest Industries Federation Collection, Lusto.

obvious as machines improved and detailed working instructions became available.

A turning point in forest growth was reached in the 1970s and 1980s. Between the sixth (1971–1976) and seventh (1977–1984) national forest inventories, the volume of growing stock increased, a trend that has continued upwards ever since. According to results published in 1984, average annual total growth had risen from 2.5 to 2.9 cubic metres per hectare. In the former Serlachius forests that now belong to Finsilva, the average annual total growth between 1978 and 1983 was approximately 2.8 cubic metres per hectare.

It was at this time the consensus that had surrounded forest use for decades began to erode. This became evident, for example, in the 'forest wars', initiated by the environmental movement, and contentious debates that weakened the authority of forest researchers. Although the majority of forest owners still prioritised the economic value of their forests, resistance to formulaic forest management methods grew. Forest companies were first defiant and perplexed by the debate, but gradually they had to revise their position in response to signals from the market. Buyers of paper and sawn timber around the world increasingly enquired as to the origin of the raw materials, reconsidering purchases or posing further questions of sellers if they were unsatisfied with the findings of their inquests.

A question posed by C. C. Böcker, C. W. Gyldén and A. G. Blomqvist in the 19th century – and by many later researchers – became topical once again: how should forests be managed sustainably and wasteful uses of forests prevented? Although the term was not yet a feature of forest debates in the 1980s and 1990s, the concepts these early critics of forest management practices introduced would now be referred to as 'biodiversity loss'. Many believed that monotonous, even-aged, single-species commercial forests weakened biodiversity. The draining of mires, which by that time had, in fact, largely been abandoned, was seen as irreversible destruction of mire ecosystems and the heavy-handed soil treatment of clear-cutting a disruption of the delicate balance of forest nature. The conversion of drained mires into peat extraction areas was, in those days, justified and economically viable. Debates on climate policy and decisions to curb carbon dioxide emissions ended the licensing of peat extraction areas and, with it, the production of fuel peat. Given the polarisation of forestry debates, achieving consensus has proved impossible.

Despite the criticisms of commercial forestry, forests have grown faster than ever before. The fifth national forest inventory, completed in 1970, put annual growth at 2.6 cubic metres per hectare. Fifty years later, in the 2020 inventory, this figure had almost doubled, to 4.7 cubic metres. In 1970, the annual growth rate for forests owned by G. A. Serlachius Ltd was 2.2 cubic metres; the current annal growth rate for those same forests, now owned by Finsilva Plc, is 5.7 cubic metres. Finsilva can sustainably harvest 4.6–5.3 cubic metres per hectare every year over the coming decades under its harvesting plan. This change reflects the results of post-war forest management efforts and improvements in growth that have been achieved. For example, the average tree height in Finsilva's forests is higher than it was in the late 1940s.

The closer we come to the present, the harder it is to identify turning points in forest use. The most obvious recent paradigm shift is associated with the understanding that humans can take actions to promote biodiversity, and that society is willing to pay forest owners to introduce measures aimed at enhancing biodiversity. For a forest and nature capital company like Finsilva, this development has been welcome. The protection of forest and natural sites that have significant environmental value but low economical yields has spawned a business model that satisfies both the values of contemporary society and the profitability basis of companies.

Another paradigm shift relates to renewable energy sources, mainly wind and solar power, for which Finsilva can offer sites that are sufficiently large and located in suitably sparsely populated forest areas. Former peatlands are being restored, and more of them are being leased out for solar power production. Although commercial forestry remains

In 2024, Finsilva began the restoration of the Majasuo swamp in South Ostrobothnia by blocking the ditches dug in the 1960s and building dams to raise the water level. Drainage had failed, and no trees had grown on the swamp. Restoration has enhanced the biodiversity on the dried swamp and improved the condition of nearby water bodies. Finsilva.

the dominant form of forest use for Finsilva, there are elements of its operations that are completely new. It remains to be seen how widespread these new forest uses will become and whether their significance will eventually wane after initial enthusiasm.

So, do forests need humans? It is becoming increasingly clear that safeguarding and enhancing forest biodiversity, preventing biodiversity loss and halting climate change will have to be achieved through human action, and our historical use of forests has already negatively impacted biodiversity and contributed to climate change. Forests would certainly survive without humans if humans did not exploit them as a resource. Finsilva believes that genuine and well-functioning natural capital markets could be one tool for tackling climate change and biodiversity loss.

The forest and nature capital company Finsilva aims to maintain and produce renewable and non-renewable natural resources in response to market demand. Identifying and accumulating nature capital provides sustainable benefits to forest ecosystems, the climate, forest owners, the public and the national economy. This image shows a forested landscape at Lake Siikajärvi, owned by Finsilva. Finsilva.

Next spread: Most of Finsilva's forests are well-managed commercial forests. The company aims to grow high-quality saw timber and pulpwood to meet the industry's needs. Finsilva's key partner in timber trading and forest management operations is Metsä Group. Samin Savotta.

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From Exhaustible Use to Natural Capital – The Story of Finsilva's Forests examines the history and development of the forests owned by the natural capital company Finsilva Plc from prehistoric times to the present day. What were these forests like at different points in time, and what forces – beyond those of nature – have shaped them? This book also explores the history of the ownership and use of these forests.

The first human impacts on the forests were the result of household use of forest resources and slash-and-burn agriculture, accompanied shortly thereafter by a tar industry driven by international demand. However, the emergence of the sawmill, pulp and paper industries brought about profound changes in forest use from the latter half of the 19th century onwards. Since forests were neither regenerated nor managed, the signs of these various uses remained visible long after their initial impact.

The majority of the forests owned by Finsilva Plc, founded in 2005, consist of former holdings of G. A. Serlachius Ltd, Ab J. W. Enqvist Oy and Metsäliitto Cooperative. Finsilva Plc is a natural capital company committed to enhancing biodiversity and contributing to the development of natural capital markets. Humans need forests but they also need deep historical and regional knowledge and understanding of their nature and development.

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