

From Economic Miracle to Pollen Allergy Crisis: The Legacies of Postwar Forestry ‘Rationalization’ (合理化 *gōrika*) in Japan (1957-2023)

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Introduction

The Japanese cedar (*Cryptomeria japonica*, 杉 *sugi*) is the most common cause of hay fever (花粉症 *kafunshō*, literally “flower pollen disease”), in Japan, with 44 percent of the population now believed to be susceptible to Japanese cedar pollinosis.¹ With a large part of the workforce suffering from its effects for months, Japanese cedar pollinosis has been labelled a social problem in Japan. *Sugi* is a conifer species endemic to Japan and one of its most common tree species. Its high prevalence is blamed on a postwar reforestation policy that sought to ‘rationalize’ (合理化 *gōrika*) forestry, starting with the “National Forest Productivity Enhancement Plan” (国有林生産力増強計画 *kokuyūrin seisanryoku zōkyō keikaku*) of 1957. In an attempt to increase forest productivity through scientifically informed and economically oriented forest management, *sugi* monocultures became widespread, as the species was regarded as ideal for this purpose.

As a result, planted forests now account for approximately half of Japan’s forest area, of which 44 percent consist of Japanese cedars and 25 percent of Japanese cypresses (*Chamaecyparis obtusa*, 檜 *hinoki*), another highly allergenic species.² The majority of the reforestation took place in the 1950s and 1960s, to regrow heavily logged forests during the war and to meet the demands of Japan’s postwar economic growth. *Sugi* had already been popular as a tree in reforestation traditionally, as it matures quickly to a harvestable size and has soft wood valued in

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¹ The small pollen grains of *sugi* and *hinoki* are particularly likely to trigger allergies, whose effects may interact with other allergenic particulate matter, such as tire wear particles in cities or loess particles carried over from China. Takechiyo Yamada, Hirohisa Saito, and Shigeharu Fujieda, “Present state of Japanese cedar pollinosis: The national affliction,” *Journal of Allergy and Clinical Immunology* 133:3 (2014).

² Data from the Ministry of Agriculture, Forestry and Fisheries, “Sugi, hinokirin ni kansuru dēta” [Data concerning cedar and cypress forests], Rin’yachō, https://www.rinya.maff.go.jp/j/sin_riyout/kafun/data.html (accessed on May 31, 2026).

construction and the production of everyday goods.³ To a lesser extent, because of its slower growth, *hinoki* were also planted. *Hinoki* is generally regarded as more high quality and is popular in construction and carpentry because of its sturdiness.⁴ However, by the time the planted *sugi* were ready for harvest, the demand for wood resources was met by imports. The domestic forestry industry was in severe crisis and abandoned by many practitioners, leaving unattended plantations behind. The biological consequences on the human body are not the only negative effects on the ecosystem that were attributed to the planted conifer forests: The reforestation process is said to have benefitted the explosion of the deer population.⁵ Deer browsing now amounts to over 60 percent of the total wildlife damage.⁶ In addition, conifer plantations are inhospitable to many animal species, pushing wild boars and bears towards human settlements.⁷ Moreover, unattended monocultures are more vulnerable to the Japanese island's violent nature that is prone to earthquakes, typhoons, heavy rains – and contribute to landslides instead of preventing them.⁸

This paper explores how Japan's forestry governance and science embraced the concept of rational forestry in the mid-twentieth century, and why it did not result in economic success for the lushly forested country that consists of 70 percent mountain forests and theoretically grows as much timber in a year as it consumes.⁹ It examines the Japanese case in the context of the wider global spread of "rational" forestry in the 20th century. "Rational" forestry, also referred to as "scientific forestry" or "reductionist forestry," describes a form of forest management based on scientific expertise that associated economic efficiency with the concept of "rationality." It promoted one-size-fits-all solutions in top-down policies, standardized and simplified management techniques, as well as monocultures.¹⁰ As

³ There is a duality to the use of *sugi*, since they can also grow very old (the oldest tree on the island of Yakushima is estimated to be 8,000 years old) and provide high-quality construction material. With its striking pointy shape and considerable sizes, *sugi* are often part of temples and shrines or are venerated as holy trees. Toshiyuki Arioka, *Sugi* [The Japanese cedar], 2 vols. (Tōkyō: Hōsei Daigaku Shuppanyoku, 2010), 1, 4–18, 71–75.

⁴ Toshiyuki Arioka, *Hinoki* [The Japanese cypress] (Tōkyō: Hōsei Daigaku Shuppanyoku, 2011).

⁵ The deer could feed on the myriads of planted seedlings during reforestation. Another reason named is that uncut undergrowth of abandoned plantations provides food for the animals. Hiroyuki Ishi, "Yasei dōbutsu no hanran (jō)" [The rebellion of the wild animals (1)], <https://www.nippon.com/ja/features/c03914/> (accessed on May 31, 2026).

⁶ "Yasei chōjū ni yoru shinrin higai" [Forest damage caused by wild birds and animals], Rin'yachō, <https://www.rinya.maff.go.jp/j/hogo/higai/tyouju.html> (accessed on May 31, 2026).

⁷ Hiroyuki Ishi, "Yasei dōbutsu no hanran (ge)" [The rebellion of the wild animals (1)], <https://www.nippon.com/ja/features/c03915/> (accessed on May 31, 2026).

⁸ Yūko Shirai, *Shinrin no hōkai: Kokudo o meguru fu no rensa* [The Devastation of the Forests: The Negative Chain Concerning the National Land], (Tōkyō: Shinchōsha, 2009), 16.

⁹ Shirai, *Shinrin no hōkai*, 14.

¹⁰ Jönsson, Jimmy. "Historical Perspectives on Forestry Science and Monocultures: Ideas of Rationality in Sweden During the Early Twentieth Century." *Ambio* 53:6 (2024), 933–940; James

a consequence, forestry divided forests into intensively managed plantations and protected forests to reconcile the conflicting demands of timber production and nature conservation.¹¹

In Japan, the introduction of this form of forestry was described as “rationalization” (*gōrika*) and encompassed a variety of measures such as the expansion of planted forests (拡大造林 *kakudai zōrin*), mechanization, and infrastructure development. The author argues that “rationalization” was deeply transformative for Japan’s forestry and fundamentally reshaped the character of Japanese forests. It created path dependence both through the material legacy of *sugi* monocultures and through administrative structures such as guidelines and subsidies. Path dependence is a widely used concept in the social sciences and science and technology studies (STS) to explain how historical decisions continue to shape the present. For example, institutions tend to reinforce past decisions by reproducing them.¹² In the case of forestry, both administrative institutions and the material existence of the plantation forests continue to shape present courses of action. The paper therefore repeatedly connects its account of forestry policy to the *sugi* forests themselves. Because of the long lifecycle of *sugi*, the paper also adopts a long-term perspective and traces a larger shift in forestry policy and science in Japan, from regarding the forest as a resource base to be improved by “rationalization” to viewing it as an economic and ecological “liability” posing problems to be solved.

The paper not only takes the global context of Japanese forestry into account but also adopts a long-term perspective reaching back to the early modern period. On the one hand, this long-term perspective helps to highlight the particularities of the Japanese case, as postwar Japanese forestry drew on early modern traditions, such as the monocultures established in Yoshino, to implement “rationalization” policies. On the other hand, many of the perceived struggles encountered during “rationalization” were rooted in continuities from the early modern period. These layers of global and historical context set this account apart from earlier scholarship. Historical analyses of postwar Japanese forestry are relatively scarce, especially in English, which is dominated by short overviews written by forestry scientists.¹³ Recent historical scholarship has mostly been concerned with Japanese colonial and

C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 11–22.

¹¹ Brett M. Bennett, *Plantations and Protected Areas: A Global History of Forest Management* (Cambridge, MA: The MIT Press, 2015).

¹² See for example Jürgen Beyer, “The Same or Not the Same: On the Variety of Mechanisms of Path Dependence,” *International Journal of Humanities and Social Sciences* 4 (2010), 186–196.

¹³ Junichi Iwamoto, “The Development of Japanese Forestry,” in Yoshiya Iwai ed., *Forestry and the Forest Industry in Japan* (Vancouver: UBC Press, 2002): 3–9; Kōji Matsushita, “Japanese Forestation Policies During the 20 Years Following World War II,” in Miodrag Zlatić ed., *Precious Forests – Precious Earth* (InTech, 2015). An exception is Noriko Sato, “The Research on the Forestry under the Military Occupation in Post-War Japan,” *Ecological Environment and History* 생태환경과 역사 4 (2018).

neocolonial forestry.¹⁴ The Japanese literature on postwar forestry, though substantial, has been dominated by self-diagnoses by forestry scientists grappling with the legacies of the “rationalization” period, with a few exceptions such as the work by Yamamoto Nobuyuki.¹⁵

Therefore, this paper contributes to the scholarship on postwar Japanese forestry by drawing on newer literature in the history of science that explores the social and political role of science from a global perspective. Concerning the environment in Asia, research has been especially active on engineering and rivers, but not so much on forestry.¹⁶ In addition, it explores the relationship between science and policy-making in postwar Japan, contributing to the growing literature on scientifically informed bureaucracy and technocratic policymaking in Japan that so far has been mostly limited to prewar and wartime Japan, but is known for its continuities into the postwar period.¹⁷ This paper therefore examines forestry policy as entangled

¹⁴ David Fedman, *Seeds of Control: Japan's Empire of Forestry in Colonial Korea* (Seattle: University of Washington Press, 2020); Kōji Nakajima, ed., *Teikoku Nihon to shinrin: Kindai Higashi Ajia ni okeru kankyō hogo to shigen kaihatsu* [Imperial Japan and forests: Environmental protection and resource extraction in Modern East Asia] (Tōkyō: Keisō Shobō, 2023); Peter Dauvergne, *Shadows in the Forest: Japan and the Politics of Timber in Southeast Asia* (Cambridge, MA: MIT, 1997).

¹⁵ To only name a few examples, Tanimoto, Takeo. “Meiji kara Heisei made no zōrin gijutsu no henshen to sono jidai haikai: Tokuni sengo no kakudai zōrin gijutsu no tenkai to sono kōzai.” [Changes in the silvicultural technologies and its social background until Heisei from Meiji era The merits and demerits on the expansive afforestation, especially in post-World War II] *Shinrin ritchi* [Japanese Journal of Forest Environment] 48:1 (2006), 57–62; Akito Arinaga, “Shinrin shigen seisaku no tenkai to kokuyūrin keiei no ‘kindaika’: Chūō shūkenteki shigen seisaku no shūen to keiei ‘kindaika’ rosen no hasan” [Development of forest resource policies and image of ‘modernized’ national forest management: The end of resource policies under centralized administrative framework and failure in ‘modernization’ of forestry], *Ringyō keizai* [Forest Economy] 61:4 (2008), 19–23; Kōichi Murao, *Machigaidarake no Nihon ringyō: Mirai e no kyōkun* [Japanese forestry, full of mistakes: Lessons for the future] (Tokyo: Nihon Ringyō Chōsakai, 2013). Yamamoto Nobuyuki has recently edited a volume anchoring modern and contemporary Japanese forestry in its local context. Nobuyuki Yamamoto, ed., *Shinrin to jikan: Mori o meguru chiiki no shakaishi* [Forests and time: A regional social history of forests] (Tokyo: Shinsensha, 2024).

¹⁶ Hiromi Mizuno, Aaron S. Moore and John DiMoia, eds., *Engineering Asia: Technology, Colonial Development, and the Cold War Order* (London: Bloomsbury Academic, 2020); Aaron S. Moore, *Constructing East Asia: Technology, Ideology, and Empire in Japan's Wartime Era, 1931-1945* (Stanford, CA: Stanford University Press, 2013), 150–176; Julia Mariko Jacoby, “‘Governing the Mountains, Governing the Water’ (Chisan Chisui): Developing Rivers in Modern Japan,” in Ismay Milford, Iris Borowy and Corinna R. Unger eds., *Yearbook for the History of Global Development 5: Environment, Technology and Development*: (Berlin: De Gruyter Oldenbourg, 2026).

¹⁷ Hiromi Mizuno, *Science for the Empire: Scientific Nationalism in Modern Japan* (Stanford, CA: Stanford University Press, 2009); Janis Mimura, *Planning for Empire: Reform Bureaucrats and the Japanese Wartime State* (Ithaca, NY: Cornell University Press, 2011); Tsuyoshi Wakatsuki, *Senzen Nihon no seitō naikaku to kanryōsei* [The changing structure of bureaucracy under the party cabinet system in prewar Japan] (Tokyo: Tōkyō Daigaku Shuppankai, 2014); Eric Dinmore,

with forestry science, policy planning, and societal change in the postwar period. The analysis is based on policy papers and government reports by forestry bureaucrats, scientific and popular writings by forestry scientists, economists, and social scientists, as well as some publications by members of the forestry industry.

The first part explains how in an encounter with US experts during the occupation period, reforestation was reconceptualized as a means to optimize the domestic production of resources through “rationalization.” The idea gained relevancy during Japan’s “economic miracle,” leading to the 1957 launch of the “National Forest Productivity Enhancement Plan.” The second part explores structural obstacles and problems to “rationalization” which emerged during the reforestation campaigns and how policy makers and science tried to address them. The third part analyzes how forestry scientists assessed the reasons for the economic failure of postwar plantations in the 1970s and 1980s and came to regard these forests as a liability. The fourth part focuses on Japanese cedar pollinosis as an example of the unintended ecological consequences of the *sugi* monocultures created through “rationalization” and examines how forest governance and research have addressed the issue.

“Rationalizing” postwar forestry

Reforestation in postwar Japan first began with the experience of losing forests and fearing resource scarcity. During the Second World War, Japan lost access to its colonies, which had provided a significant share of the empire’s timber resources.¹⁸ Having fallen back on the home islands and facing an increasingly desperate war effort, the government orchestrated a substantial increase in logging.¹⁹ When the war ended, logging continued to cope with resource scarcity, as timber and firewood was needed in the bombed Japanese cities. The consequences of this excessive logging were quickly felt: In the aftermath of the war, typhoons and floods devastated Japan almost annually between 1945 and 1953, claiming thousands of lives. The

“Concrete Results? The TVA and the Appeal of Large Dams in Occupation-era Japan,” *The Journal of Japanese Studies* 39:1 (2013); on forestry specifically, Nobuyuki Yamamoto, “Tekunokurāto to shinrin kanri: Kingendai Nihon rinsei no ikkisō,” [Technocrats and forest management: A foundational layer of modern and contemporary Japanese forest policy] *Ringyō keizai kenkyū* [Journal of Forest Economics] 62:1 (2016), 17–27.

¹⁸ The loss of the colonies meant a loss of roughly 46 percent of the prewar forest area, most of which was government forest. Sōrifu Shigen Chōsakai Jimukyoku, *Ashita no Nihon to shigen* [Tomorrow’s Japan and resources] (Tokyo: Daiyamondosha, 1953), cover.

¹⁹ William M. Tsutsui, “Landscapes in the Dark Valley: Toward an Environmental History of Wartime Japan,” in Richard P. Tucker and Edmund Russell eds, *Natural Enemy, Natural Ally: Toward an Environmental History of Warfare* (Corvallis: Oregon State University Press, 2004); Keito Mineo and Kōji Matsushita, “Kokuyūrin ni okeru daizai seisan seisaku no tsūshiteki kaimei,” [History of Policies Related to the Supply of Large Timber in Japanese National Forests] *Nihon shinrin gakkaiishi* [Journal of the Japanese Forest Society] 103:5 (2021), 328–329.

“devastation of national land” (国土荒廃 *kokudo kōhai*) by wartime logging was quickly singled out as the culprit. As a consequence, reforestation was demanded as a countermeasure.²⁰ This followed a well-practiced pattern in Japan, as forest planting had started in the early modern period as a reaction to overlogging and flood disasters.²¹ Meiji forest planting campaigns and subsidies had been introduced in the early 20th century after the introduction of the “three water control laws” (River Law 1896, Forest and Erosion Control Laws in 1897) and after forestry scientist Honda Seiroku (1866-1952) had warned that the ubiquity of the red pine pointed to the depletion and potential collapse of Japan’s forests.²² Modern forestry science in Japan was strongly shaped by Germany and adopted many of its concepts, including sustainability.²³ Reforestation and afforestation served both the restoration of the forest and resource security.

However, in the postwar period, the encounter with US experts that came with the Allied occupation (1945-1952) reconceptualized the meaning of forests for Japan. The General Headquarters (GHQ) of the Supreme Commander of the Allied Forces (SCAP) quickly set up the Natural Resources Section, where Japanese scientists worked alongside US scientists to survey the conditions of natural resources and their exploitation on the Japanese islands. In 1948, SCAP introduced the Resource Council in 1948 to discuss how to combat postwar resource scarcity and how to develop ways how Japan could sustain itself. According to its experts, Japan had to shift to an efficient use of resources on the main islands, following the loss of the colonies on which the Japanese Empire had relied.²⁴ Forestry was explored both as a source of employment and as a means of boosting domestic production.²⁵ Under

²⁰ Julia Mariko Jacoby, “Governing the Mountains, Governing the Water.”

²¹ Conrad D. Totman, *The Green Archipelago: Forestry in Preindustrial Japan* (Berkeley: University of California Press, 1989).

²² Jacoby, “Governing the Mountains, Governing the Water,” 40; Tarō Takemoto, “A History of Tree Planting in Modern Japan: Resource Utilization and Environment Conservation,” in Tatsushi Fujihara ed., *Handbook of Environmental History in Japan* (Amsterdam: Amsterdam University Press, 2023). Honda’s theory contradicts today’s understanding of red pine as a pioneer species that grows on depleted soils and helps facilitate forest regeneration. Seiroku Honda, “Waga kuni jiriki no suijaku to akamatsu” [The weakening of our country’s soil productivity and the red pine], *Tōyō gakugei zasshi* [*Oriental studies magazine*] 230 (1900); Tetsutarō Fukasaku, “Akamatsu bōkokuron no shūhen” [The surroundings of the red pine national ruin theory], *Ringyō gijutsu* [Forestry technology] 450 (1949).

²³ Murao, *Machigaidarake no Nihon ringyō*, 217–218. The German forestry academy that most influenced Japanese forestry scientists, Tharandt in Saxony, is associated with conifer monocultures and has been identified as one of the birthplaces of rational forestry. Scott, *Seeing Like a State*, 14–19.

²⁴ Jin Satō, “*Motazaru kuni*” *no shigenron: Jizoku kanō na kokudo o meguru mō hitotsu no chi* [The resource theory of a “have-not country:” The other knowledge surrounding a sustainable country] (Tōkyō: Tōkyō Daigaku Shuppankai, 2011); Kōichi Aki, *Nihon no shigen mondai* [Japan’s resource problem] (Tōkyō: Kokon Shoin, 1952).

²⁵ Sato, “The Research on the Forestry under the Military Occupation in Post-War Japan.”

the leadership of US forester Frederick J. Shulley, the GHQ introduced forestry extension in Japan to educate rural forestry practitioners in forestry science to improve the quality of production. Japanese sources later reported the introduction process as based on cooperation between Japanese and US foresters.²⁶

For the United States, Japan became the first experiment to promote the development of a country, with the goal to introduce a democratized Japan into the capitalist world order as a close ally facing the communist bloc on the continent. To foster development on the Japanese islands, which were perceived as poor in mineral resources, but rich in water and forest, US experts of the occupation authorities, many of whom were New Dealers, promoted the model of the Tennessee Valley Authority (TVA). The TVA implemented a comprehensive regional development program during the Great Depression in 1933, using dams and afforestation to control a river valley and efficiently use its resources, for example by producing hydroelectricity. Japanese bureaucrats embraced the development model, as they had already begun learning from the TVA in the 1930s and were drawn to the idea of efficiently using “national land.” Benefiting from the connections during the US occupation, a process of knowledge transfer from the US to Japan followed, especially by sending delegations of Japanese experts to the US.²⁷ In 1949, a delegation of the Forestry Agency toured forestry research institutes, experimental stations, and the TVA. A later published report lauded the “rationalization” of forest management in the US. The US forestry administration contributed to the efficiency of forestry management by connecting practitioners with scientific research conducted in forestry experiment stations, as well as promoting technology such as chainsaws. All forests were to be used efficiently. At the TVA, methods were demonstrated in educational forests to generate economic returns even from protection forests.²⁸

Japan quickly introduced coordinated plans to promote the efficient use of its “national land.” In this context, the Forestry Agency (林野庁 *Rinyachō*) designed five-year plans beginning in 1948 to foster reforestation and afforestation, for both regenerating timber resources and establishing protection forests that retained water and stabilized mountains.²⁹ The Forestry Agency and forestry legislation was also reorganized in that period to not only control management in the government forests,

²⁶ Ryoko Ishizaki and Manuela G. Hartwig, “Factors That Shaped the Forestry Extension System in Japan: Adoption and Adaptation of the United States Model After World War II,” *Small-Scale Forestry* 23:2 (2024).

²⁷ Eric Dinmore, “Concrete Results? The TVA and the Appeal of Large Dams in Occupation-era Japan,” *The Journal of Japanese Studies* 39:1 (2013).

²⁸ Gen Shimizu, *Saikin no Amerika ringyō* [Recent American forestry] (Tōkyō: Nihon Ringyō Gijutsu Kyōkai, 1950), 9–13.

²⁹ Mineo and Matsushita, “Kokuyūrin ni okeru daizai seisan seisaku no tsūshiteki kaimei,” 329; “Waga kuni no shinrin seibi o meguru rekishi” [The history of the forest management of our country], *Rin'yachō*, <https://www.rinya.maff.go.jp/j/kikaku/hakusyo/25hakusyo/pdf/6hon1-2.pdf> (accessed on May 31, 2026), 26.

but also to stipulate policies for privately owned forests, which was codified in the revision of the Forestry Law of 1951. The groundwork of for the state's influence on privately owned forests had been laid during the Second World War, when the government tightened its control on forestry management and forcibly organized foresters in forestry cooperatives (森林組合 *shinrin kumiai*), which coordinated local practitioners and enforced government policies. In the democratized Forestry Law of 1951, forest owners were given the option to opt out forestry cooperatives, and government control was weakened to “guidance,” but the centrally mandated forestry policies since the 1950s would not only affect public forests, but private forests as well.³⁰

Meanwhile, ideas introduced from the US about economically efficient forestry supported by scientific progress inspired an entire generation of forestry bureaucrats at the Forestry Agency. Yamamoto has pointed out that most postwar forestry bureaucrats who became crucial for the “rationalization” policy had undergone scientific training at the General Research Institute for Agriculture (農業総合研究所 *Nōgyō Sōgō Kenkyūjo*), founded in 1946 to aid land reform and the reconstruction of Japanese agriculture.³¹ According to Nomura Isamu (*1924), a forestry economist of a similar age who participated in the training program in 1951, he encountered Keynesian economics for the first time at the institute. This illustrates how US ideas permeated postwar Japanese research institutions and likely influenced thinking about how state policies could shape the forestry economy.³²

By the mid-1950s, Ozawa Kesayoshi (1918-1999) a forestry bureaucrat who became central to drafting the policies to “rationalize” forestry in Japan, launched an attack on “classical” forest economics in Japan which originally had evolved from German cameralist ideas. According to Ozawa, forest economics had to abandon its roots and be renewed to produce economically viable forests. He claimed that traditional ideas on sustainability hampered wood production and rotation ages of trees had to be abandoned or lowered. Although Ozawa remained vague about his sources of inspiration, he was visibly influenced by ideas introduced from the US concerning economic efficiency and postulated “economics” and “business administration” as guiding principles for the renewal of forestry.³³ His ideas that forestry policy should be centralized and comprehensively coordinated (総合的

³⁰ Nobuyuki Yamamoto, “Nihon ni okeru shinrin keikaku seido no kigen” [The Origin of the Forest Planning System in Japan], *Nihon shinrin gakkaiishi* [Journal of the Japanese Forest Society] 192:1 (2020), 25–27.

³¹ Yamamoto, “Tekunokurāto to shinrin kanri,” 23.

³² Isamu Nomura, “Ringyō keizai kenkyū funki no setsubō: Isasaka fungeki o komete” [Earnest hope for a resurgence in forestry economics research: With a touch of indignation], *Ringyō keizai* [Forest Economy] 43:8 (1990), 12–16.

³³ Kesayoshi Ozawa, “Kokuyūrin keiei keikaku no kōsō: Kōten shinrin keieigaku e no chōsen” [Outline for the national forest management plan: Challenging the classical forest economy], *Ringyō keizai* [Forest Economy] 9:6 (1956), 6–12.

sōgōteki), and that larger administrative units should be introduced, suggest a significant influence of TVA regional planning on Ozawa's thinking.³⁴ The main goal of Ozawa's proposed forestry system was to increase wood production and regulate output through forest assessments using new technologies such as aerial photography.³⁵ He dismissed critics' concerns that his proposed forest management would reduce yields in the long run, pointing to expected advances in science, such as the development of forest fertilizers.³⁶ The academic debate Ozawa stimulated was ultimately not settled, but his ideas subsequently shaped the government's policies to "rationalize" forest management.

In 1957, the five-year "National Forest Productivity Enhancement Plan" was launched, which not only included reforestation to replace harvested forests but also to replace existing forests in order to increase the economic productivity of Japan's forests.³⁷ Since its independence from American occupation, Japan had seen an unprecedented economic boom, and the Japanese government was committed to foster economic growth even further with long-term economic development policy plans, as evidenced by the "Income Doubling Plan" initiated by premier Ikeda Hayato (1899-1965) that followed shortly thereafter in 1960.³⁸ The plan sought to "improve" (改良 *kairiyō*) Japan's forest by replacing old-growth forests by plantation forests (人工林 *jinkōrin*), which in most cases meant monocultures of fast-growing conifers.³⁹ It was estimated that the fast-growing plantation forests would eventually

³⁴ Ozawa, "Kokuyūrin keiei keikaku no kōsō," 7–8.

³⁵ Ozawa, "Kokuyūrin keiei keikaku no kōsō," 10–12. Aerial photography was already used for forest assessment in colonial Manchuria in the 1930s. Nobuyuki Yamamoto, "Shinrin gijutsusha no hikiage, fukuin to sengo ringyō, rinsei" [The influence of repatriation and demobilization of forest engineers on forestry and forest policy after WWII in Japan], *Ringyō keizai kenkyū* [Journal of Forest Economics] 64:3 (2018), 8–15. Paralleling developments in river management, ideas about government planning from the interwar period may have facilitated and influenced the adoption of centrally coordinated "rationalization" policies in the postwar period. On river management, see Jacoby, "Governing the Mountains, Governing the Rivers."

³⁶ Makoto Fujiwara, "Shinrin keirigaku ronsō no saikentō 3: Ozawa Kesayoshishi no hanron" [A re-examination of the controversy over forest accounting theory 3: Mr. Kesayoshi Ozawa's counterarguments], *Ringyō keizai* [Forest Economy] 27:5 (1974), 1–10, 35.

³⁷ Kesayoshi Ozawa, *Kokuyūrin keiei keikaku jitsumu teiyō: Keikaku to jikkō oyobi shōsa* [A summary of the government forest management plan and practice: The plan and execution, as well as inspection] (Tōkyō: Nihon Ringyō Chōsakai, 1960), 104–107.

³⁸ The Japanese developmental state is still best explained in Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford, CA: Stanford University Press, 1982). For the "Income Doubling Plan", see Nick Kapur, *Japan at the Crossroads: Conflict and Compromise after Anpo* (Cambridge, MA: Harvard University Press, 2018).

³⁹ Ozawa, *Kokuyūrin keiei keikaku jitsumu teiyō*, 106. Scientific forestry experimented also with fast growing tree species from abroad and with broad leaf trees that only led to moderate success with acacias imported from Australia and the domestic camphora tree respectively. Kentarō Nakamura, *Atarashī zōrin* [The new afforestation] (Tōkyō: Ishizaki Shoten, 1961), 19–24.

yield twice the amount of a naturally grown forest. To expand the area of monocultures, forest roads were to be built and transportation by truck promoted.⁴⁰ Reforestation was to be accompanied by the modernization of the forestry industry which had been significantly falling behind other industries of fast-developing Japan. Chainsaws and planting machines were introduced to an industry which still relied on craftsmanship of a cheap abundant workforce.⁴¹

One major reason for “rationalizing” forestry was that Japan’s economic growth had increased demand for resources. This was particularly true for the paper industry that required wood pulp for production. But construction material was also in high demand. Thus, “rationalization” prioritized increasing the short-term yield of timber and wood products for industrial production. This already started in 1955, when the “National Forest Long-term Production Plan” (国有林長期生産計画 *Kokuyūrin chōki seisan keikaku*) lowered the cutting age for old trees, especially broadleaf species.⁴² The policy was reinforced by the “National Forest Timber Production Increase Plan” (国有林木材増産計画 *Kokuyūrin mokuzaï zōsan keikaku*) of 1961, which amended the 1957 plan by setting higher logging targets and reducing conservation objectives.⁴³ That meant that anticipating higher productivity through plantations in the future, the government promoted a short-term boost of wood resources by cutting down mixed hardwood forest. This was made possible because the pulp industry had adapted its technology to using hardwood in the 1950s as a reaction to wood shortage and the high prices of conifers.⁴⁴ Replacement planting increasingly targeted previously untouched old-growth forests in higher altitudes.⁴⁵ This process increased the ratio of plantation forests from 18 percent around 1950 to 52 percent in 1972.⁴⁶ This government-orchestrated destruction of old-growth forests surprisingly encountered only limited resistance from local residents and environmentalists.⁴⁷

⁴⁰ Ozawa, *Kokuyūrin keiei keikaku jitsumu teiyō*, 104–109.

⁴¹ Nōrin Gyogyō Kihon Mondai Chōsakai, *Ringyō no kihon mondai to kihon taisaku: Kaisetsuban* [The fundamental problem of the forest industry and fundamental countermeasures: Commentary] (Tōkyō: Nōrin Tōkei Kyōkai, 1961), 104; Tadashi Okuchi, “Sengo Nihon shihon shugi to ringyō: Sanson mondai no tenkai kōzō” [The capitalism of postwar Japan and forestry: The development structure of the mountain village problem], *Ritsumeikan keizaigaku* [The Ritsumeikan economic review] 22:5–6 (1974), 146.

⁴² Mineo and Matsushita, “Kokuyūrin ni okeru daizai seisan seisaku no tsūshiteki kaimei,” 329–330.

⁴³ Arinaga, “Shinrin shigen seisaku,” 21–22.

⁴⁴ Nakamura, *Atarashī zōrin*, 59–60.

⁴⁵ Arinaga, “Shinrin shigen seisaku,” 22.

⁴⁶ Arinaga, “Shinrin shigen seisaku,” 19–20.

⁴⁷ There is unfortunately no historical overview of the environmental movement concerning forests. This is probably due to the fact that the environmental movement developed mainly by mobilizing against industrial pollution in the 1960s and 70s and rural areas were of less interest. See for example Simon Avenell, “The Borderless Archipelago: Toward a Transnational History of

“Rationalization” was a slogan used by the Japanese government to describe a bundle of ideas on how to increase forest productivity, ranging from replacement planting to technological and infrastructural improvements. The Allied occupation initiated the circulation of knowledge from the US, particularly ideas on efficient resource extraction based on state intervention and planning. Forestry bureaucrats influenced by these ideas were instrumental in drafting the “rationalization” policies in the late 1950s and early 1960s.

Obstacles to “rationalization” and government responses (1950s–1960s)

The government’s “rationalization” plans, while they encountered no significant resistance or protest among the population, faced structural obstacles and problems that were debated and addressed within both the forestry administration and the scientific community. Most of the problems were caused by the fact that a sweeping reforestation program was rushed in an industry that still carried many premodern legacies. *Sugi* plantation forestry largely continued to rely on labor-intensive cultivation techniques that had been developed during the Edo period in regions such as Yoshino. They required constant manual care. After planting, the land has to be cleared of competing growth to help the seedlings. Trees are planted at high density to ensure they grow straight. Once the trees mature, the forest has to be thinned in order to be more productive and allow the remaining trees to achieve greater growth. They also should be subjected to limbing: cutting branches to avoid knots in the wood.⁴⁸ Labor for tree planting and forest management was traditionally provided by village communities in Japan. Forests of the Edo period are usually distinguished between mixed forests, which were cultivated as village commons for fuel and fertilizers, and valuable timber forests which were controlled by the shogunate, domains, and other authorities. Local villagers typically managed both.⁴⁹

In the postwar period, the small-scale ownership structures and common extraction rights were still ubiquitous, which had been carried over from the early modern period and made forestry management a complicated process. In contrast to agricultural land, which was subjected to two land reforms both in the 1870s and late

Japanese Environmentalism,” *Environment and History* 19:4 (2013). In the case of old-growth forests, are only a few prominent cases of local resistance, most famously Yakushima south of Kyūshū and Shirakami Sanchi in Northeastern Japan which have both become UNESCO World Heritage Natural Sites, as well as Shiretoko in Hokkaidō which became a national park. Environmental activism concerning forests often seems to involve *buna* (beech), a tree species considered without value for the forestry industry. Hiroyuki Ishi, “Shinrin hogo no keifu (ge)” [The lineage of forest protection (2)], <https://www.nippon.com/ja/features/c03913/> (accessed on May 31, 2026).

⁴⁸ Totman, *The Green Archipelago*, 124–129.

⁴⁹ Totman, *The Green Archipelago*, 84–86, 134–137.

1940s, forests largely escaped comprehensive land reform. In the 1870s, the Meiji state had tried to modernize the ownership of the forests by making large portions public and assign forest ownership to individual landowners. In reality, common management practices often continued on nominally private land or was tolerated in public forests.⁵⁰ Fierce resistance against the dismantling of common rights (入会権 *iriaiken*) led to their codification in the Common Law in 1896.⁵¹ When the government began subsidizing afforestation projects in public forests in 1907, it became an opportunity for villagers to profit from it commercially in more ways than extracting resources for their own use.⁵²

In the postwar period, forest land was yet again not subjected to land reform, leaving the ownership and management structures carried over from prewar Japan intact. As a result, the roughly 60 percent of Japan's forests that were privately owned remained divided between large-scale landowners and rural smallholders. According to a census in 1960, about two thirds of private forests were owned by a few big landowners and companies, and one third consisted of land smaller than five hectares and owned by smallholders, who made up 90 percent of the landowners.⁵³ The public forests, of which 32 percent were national forests and 10 percent local according to a census in 1970, were remained embedded in a complex web of forest management structures which were carried over from older forms of common management.⁵⁴ When the postwar “rationalization” of forestry was introduced, forest ownership was not fundamentally addressed. Instead, more legal workarounds were introduced to enable plantation forestry, which were based on traditional profit-sharing models.⁵⁵ In 1958, the Special Measures Act on Revenue-Sharing Forests (分収林特別措置法 *Bunshūrin tokubetsu sochihō*) was enacted which enabled forest owners to lease their land to contractors who assumed responsibility for planting, maintenance, and harvesting. The lease contracts lasted around 80 years and ended

⁵⁰ Yūsaku Matsuzawa, ed., *Shinrin to kenryoku no hikakushi* [A comparative history of forest and power] (Tōkyō: Bensei shuppan, 2019).

⁵¹ Toshikuni Noguchi, “Iriai rinya kindaika seisaku no sōkatsu to tenbō” [A summary and the prospect of the modernization of common forests], *Iriai rinya kenkyū* [Journal of Forest Commons] 34 (2014), 6.

⁵² Toshio Furushiima, *Nihon rinya seido no kenkyū: Kyōdōteki rinya shoyū o chūshin ni* [Research on the Japanese woodland system: With emphasis on commonly owned woodland] (Tōkyō: Tōkyō Daigaku Shuppankai, 1955), 230.

⁵³ Nōrin Gyogyō Kihon Mondai Chōsakai, *Ringyō no kihon mondai to kihon taisaku*, 10.

⁵⁴ Okuchi, “Sengo Nihon shihon shugi to ringyō,” 139; Furushiima, *Nihon rinya seido no kenkyū*.

⁵⁵ The practice of “renting” forests and sharing profits seems to have originated in the special case of Edo period Yoshino, where villagers cooperated with timber merchant to run plantations. The modern legal situation was complicated and knew multiple forms of schemes where profits could be shared between owner and afforester, depending on the ownership structure. For a detailed analysis of the types of leasing contract for commercial forest plantations, see Toshitaka Ushiom, *Nihon ringyō to sanson shakai* [Japanese forestry and the village communities] (Tōkyō: Tōkyō Daigaku Shuppankai, 1962), 251–308.

with clearcutting. Once logged, the profits were shared, the landowners retaining one third and giving the rest to the contractor.⁵⁶ In a booklet explaining this new system, it was celebrated as a uniquely Japanese way of dealing with historically evolved ownership structures that was unheard of elsewhere in the world, as confirmed by a prominent FAO official.⁵⁷

When afforestation and reforestation progressed, the forestry administration identified fragmented property ownership as a major obstacle to productivity.⁵⁸ The wood industry blamed the separation between forest ownership and forest industry for hindering the alignment of wood production with industrial demand. They also saw the perceived lack of entrepreneurial initiative among forest owners.⁵⁹ They also claimed that forestry policies favored family-sized enterprises and did not take the interest of large-scale owners into account.⁶⁰ There were some voices that called for a forest reform analogous to the postwar land reform. However, the forestry administration pointed out that the land reform was based on the idea of agriculture based on family units, which was not enough to run profitable businesses. According to them, it was preferable to promote the enlargement of production units. The family-based agrobusinesses and village cooperatives also had to become more modernized and more productive.⁶¹ Selling of forest land could have accelerated this issue, which became more attractive for smallholders because of the economic conditions in the 1960s – the rural population increasingly moved towards the city and the reforestation campaigns offered investment opportunities. The convoluted common rights, however, often made this process difficult. To address these issues, the government attempted to sort out common-property arrangements by enacting the Common Forest Modernization Law (入会林野近代化法 *Iriai rinya kindaikahō*) in 1966, which demanded the dismantling of customary law and simplification of the “feudal” remnants by assigning use rights to individuals and cooperatives. Although the law was more concerned with codifying the status quo in a modern way, the law was not well received by the villagers.⁶² In the 1960s and 70s, the revision process saw some progress but slowed down thereafter and has mostly come to a halt because of the overall loss of interest in agriculture in the subsequent years.

⁵⁶ Ushiomi, *Nihon ringyō to sanson shakai*, 342–343.

⁵⁷ Tsutomu Shioya, *Bunshūrin no shinshutsu* [Advancement of revenue-sharing forestry] (Tōkyō: Nihon Ringyō Gijutsu Kyōkai, 1957), 39–40.

⁵⁸ Nōrin Gyogyō Kihon Mondai Chōsakai, *Ringyō no kihon mondai to kihon taisaku*, 2–19.

⁵⁹ Ryōichi Takano et al., “Zadankai tenki ni tatsu ringyō seisaku: Kakukai no iken o kiku” [Symposium on the forest economy standing on a turning point: Listening to opinions from every sector], *Ringyō keizai* [Forest Economy] 16:1 (1963), 31–32.

⁶⁰ Takano et al., “Zadankai tenki ni tatsu ringyō seisaku,” 21–24.

⁶¹ Nōrin Gyogyō Kihon Mondai Chōsakai, *Ringyō no kihon mondai to kihon taisaku*, 103–111.

⁶² Saburō Kuroki, “Iriaiken to iriai rinyi kindaikahō” [The Common the the Modernization of the Common Forest Act], *Hōshakaigaku* [The Sociology of Law] 1969:21 (1969).

In many cases, it was not possible to trace right holders anymore.⁶³ The decrease of forest owners also meant that the forestry cooperatives, which carried out the actual work in the plantations, were in decline since the 1960s. Public forest corporations, which were founded in increasing numbers since the late 1950s to aid the reforestation campaign, became crucial in undertaking reforestation since the mid-1960s, relying heavily on public funds and government subsidies.⁶⁴ They racked up substantial deficits in the following decades.⁶⁵

On the ground, the sudden increase of cutting and planting following the 1957 campaign put a lot of pressure on forestry workers. Again, the lingering village structures were singled out by lumberman unions and Marxist social scientists as one of the main reasons for the bad working conditions that were considerably worse than in other industries in Japan at the time. A study of the “National Forestry Labor Union” (全林野労働組合 *Zenrinya Rōdō Kumiai*) published shortly after the inauguration of the “National Forest Productivity Enhancement Plan” pointed out that the plan was carried out mostly pushing the new demands and higher workload on the lumbermen, “sucking workers to the marrow” without ameliorating their working conditions.⁶⁶ Seasonal employment, long working hours, and low wages were widespread, especially in cases where old village structures and power dynamics recruited the local population into the workforce without proper compensation.⁶⁷ Mechanization, especially chainsaws, was associated with deskilling and lower pay, safety risks, and fears of job loss.⁶⁸ Marxist forest economists also chimed in on the fear that the program to force the productivity of the forest would produce a proletariat of lumbermen.⁶⁹ Forestry was a hard and dangerous profession that became increasingly abandoned in favor of better opportunities provided by Japan’s economic growth.

To provide access to remote areas for commercial forestry and support the mechanization and modernization of forestry, the Japanese government invested in forest roads. For example in 1956, the “Forest Development Corporation” (森林開発

⁶³ Noguchi, “Iriai rinya kindaika seisaku no sōkatsu to tenbō”.

⁶⁴ Masao Koike, “Kōsha zōrin no tenkai kōzō to kinō” [The development structure and function of public corporation reforestation], *Ringyō keizai* [Forest Economy] 32:7 (1979).

⁶⁵ Matsushita, “Japanese Forestation Policies During the 20 Years Following World War II,” 105–107.

⁶⁶ Zen Rin’ya Rōdō Kumiai Chūō Honbu, ed., *Yama ni hataraku hitobito* [People working in the mountains], 2 vols. (Tōkyō: Zen Rin’ya Rōdō Kumiai Chūō Honbu, 1958–1959), Vol. 1, foreword.

⁶⁷ Zen Rin’ya Rōdō Kumiai Chūō Honbu, *Yama ni hataraku hitobito*, Vol. 1, 58–59, 256–257; Vol. 2, 58–59.

⁶⁸ Zen Rin’ya Rōdō Kumiai Chūō Honbu, *Yama ni hataraku hitobito*, Vol. 2, 98–99, 114–115.

⁶⁹ For example, Ushiom, *Nihon ringyō to sanson shakai*. The social sciences in postwar Japan were dominated by left-leaning scholars identified as Marxist, see for example Andrew E. Barshay, *Social Sciences in Modern Japan: The Marxian and Modernist Traditions* (Berkeley: University of California Press, 2007).

公団 *Shinrin Kaihatsu Kōdan*) was launched with US support. Clearly inspired by the TVA's regional development model, the Corporation promoted regional development and the replanting of forests with conifers in the Kumano River basin, adjacent to the famous forestry region of Yoshino, and in the Nakagawa River basin in Tokushima Prefecture. Its main contribution was the construction of forest roads and facilitating reforestation.⁷⁰ In 1965, the government decided on the construction of arterial forest roads or “super forest roads” (スーパー林道 *sūpā rindō*) which in contrast to their grandiose name, were equivalent to standard two-lane roads (4.6 to 5 meters). They were designed to be multipurpose, to serve both forestry operations and regional tourism development. However, in reality, Japan's mountainous terrain is characterized by steep slopes and narrow valleys, making it difficult to use machinery to work in the forests. The super forest roads were also targeted by environmentalists as facilitating the destruction of remote old-growth forests. Until 1990, 23 roads with a total length of 1,791 kilometers were constructed.⁷¹ In 1973, the program was followed up by another plan to build large-scale forest roads of 7 meters width. Most subsidized forest roads are, however, very simple narrow dirt roads that are ill equipped to use with motorized equipment.⁷² Compared to the large area covered in forests in Japan, forest-road density remains comparatively low, amounting to 19 meters of forest road per hectare in 2013 as compared to 119 meter in Western Germany in the 1980s and 89 meter in Austria in the 1990s.⁷³ Accordingly, mechanization of forestry in Japan did not take off either. Equipment is mostly imported as domestic research and production of technology more adapted to the steep Japanese forests never took off.⁷⁴ Still, the promotion of mechanization in forestry is part of reforestation policies in Japan to this day.⁷⁵

Following the “rationalization” concept, the reforestation project was also supported by scientific research in Japan's forestry research institutes and local forestry experiment stations, that got expanded in the 1950s.⁷⁶ Forestry extension to

⁷⁰ Noritada Wakae, “Shinrin Kaihatsu Kōdan no hōsoku.” [The inauguration of the Forest Development Corporation] *Ringyō keizai* [Forest Economy] 9:6 (1956), 1–2.

⁷¹ “Kankyō yōgoshū: Sūpā rindō,” [Collection of environmental terms: Arterial Forest Road], <https://www.eic.or.jp/ecoterm/?act=view&serial=1400> (accessed on May 31, 2026).

⁷² Shirai, *Shinrin no hōkai*, 21–26.

⁷³ See the numbers given by the Ministry of Agriculture, Forestry, and Fisheries: “Romō to sagyō shisutemu” [The forestry road network and the operation system], Rin'yachō, https://www.rinya.maff.go.jp/j/ken_sidou/forester/pdf/05_28_5bu.pdf, 106 (accessed on May 31, 2026).

⁷⁴ Shirai, *Shinrin no hōkai*, 21–26.

⁷⁵ “Reiwa 5 nendo shinrin ringyō hakusho” [White paper on forest and forestry, FY2023], Rin'yachō, <https://www.rinya.maff.go.jp/j/kikaku/hakusyo/r5hakusyo/index.html> (accessed on August 26, 2026), 22.

⁷⁶ See for example Shinrin Sōgō Kenkyūjo, ed., *Shinrin Sōgō Kenkyūjo hyakunen no ayumi* [A century of history at the Forestry and Forest Products Research Institute] (Tsukuba: Shinrin Sōgō Kenkyūjo, 2005), 11–15.

smallholders through lectures and films was continued in the 1950s, now with the goal of increasing productivity and promoting “rationalization,” as a report from Japan to the FAO suggests.⁷⁷ Researchers addressed the ecological challenges associated with large-scale monoculture forestry: For example, they tried to address the problem that seedlings used for reforestation were believed to originate from genetically inferior parent trees by breeding and grafting fast growing *sugi* seedlings. However, as this type of research trailed behind similar agricultural research, researchers acknowledged around 1960 that these efforts came too late for most of the plantations of the period.⁷⁸ Researchers also placed considerable hopes in the development of forest fertilizers that which were expected to double or even triple early growth rates, fueling the belief the general output would be greatly increased, but the efforts seem to have fizzled out.⁷⁹ Large-scale monocultures also increased vulnerability to pests and diseases, prompting forestry scientists to develop pesticides and biological controls.⁸⁰ The Japanese government distributed subsidies for supplying pesticides to the common forms of planted forests.⁸¹ Apart from occasional diseases, the conifer plantations in Japan turned out to be generally stable.

The “rationalization” policy encountered structural obstacles that had already been identified by contemporary bureaucrats and social scientists. These obstacles were managed through government programs and subsidies without fundamentally addressing their underlying causes. By around 1970, however, out-migration had left rural Japan with a significantly smaller population, making the structural problems of forestry increasingly detrimental to the sector. Forestry science supported the “rationalization” policy through research but ultimately did not deliver the kind of progress that would have significantly increased yields, as forestry bureaucrats such as Ozawa had hoped.

The planted forest as a liability (1970s-1980s)

In the early 1970s, forestry scientists began to notice that the Japanese government’s “rationalization” policy had not resulted in increased productivity in Japanese

⁷⁷ Nōrinshō Daijin Kanbō Sōmuka. *Nihon nōgyō no genkyō: FAO kenshō dai jūichijō ni motozuku 1955 nendo no hōkoku* [The state of agriculture in Japan: Report for the year 1955 under Article XI of the FAO Constitution]. Tokyo: Nōrinshō Daijin Kanbō Sanjikanshitsu, 1955.

⁷⁸ At the time, naturally grown seedlings were also still used for plantation. These were believed to be more likely to be derived from unproductive trees because productive trees were more likely to be cut in gradual cutting that had become more used in the 20th century. Nakamura, *Atarashī zōrin*, 36–39.

⁷⁹ Hideo Takehara, “Korekara no shinrin to ringyō gijutsu” [The future forest and forestry technology], *Gijutsu to keizai* [Technology and economy] 2:7 (1968), 7–8.

⁸⁰ Rin’yachō, *Shinrinbyō gaichū tō higai hōkoku: Shōwa 27 nendo* [Report of damage by forest diseases and pests: Fiscal year of 1964] (Tōkyō: Rin’yachō, 1964), 13-14, 20-21. Takehara, “Korekara no shinrin to ringyō gijutsu,” 9–10.

⁸¹ Nakamura, *Atarashī zōrin*, 29.

forestry but instead contributed to structural problems that were becoming increasingly visible. Since then, self-diagnoses and analyses of these structural problems have become a veritable genre in forestry science, generating a substantial body of literature.⁸² The main cause identified for the crisis in Japanese forestry, however, was not the failed “rationalization” of domestic forestry, but the second policy the Japanese government had introduced in the early 1960s to meet growing industrial demand for wood: facilitating imports.⁸³ Starting in 1961, the Japanese government had liberalized the import of timber and wood resources by lifting tariffs.⁸⁴ As a result, cheap wood imports surpassed domestic production by 1969, making Japan increasingly reliant on imported wood resources. The self-sufficiency rate kept decreasing and reached an all-time low of 18.8 percent in 2002.⁸⁵ For the pulp industry, the Japanese government encouraged using resources from abroad by making it a condition for government investment into new pulp production facilities to use imported resources in 1965. As a result, the pulp industry began researching the use of tropical woods in pulp production and engaged in plantation projects in particularly in Southeast Asia, including Indonesia, Malaysia and Papua New Guinea in the 1960s and 1970s, exporting Japanese forestry knowledge and plantations there.⁸⁶ Japan of the economic growth era drew on neocolonial structures in Southeast Asia for resource extraction.⁸⁷ However, the reliance on cheap wood from abroad proved to be detrimental for domestic forestry in Japan and led to a mass abandonment of the postwar plantations.

The problems forestry scientists have identified for the domestic plantations over the years were manifold. First, by the end of the 1960s, it became clear that the plantations did not deliver the dramatic increases in productivity anticipated by planners. On the contrary, the output started decreasing in the 1970s since the stock

⁸² To list only think-piece books that paint the *sugi* plantations of the postwar period as a “devastation” of Japan’s forests: Tsunahide Shidei, *Nihon no shinrin: Kokuyūrin o kōhai saseru mono* [The forest of Japan: What causes the devastation of the government forest] (Tōkyō: Chūō Kōronsha, 1974); Satoshi Sugawara, *Ningen ni totte shinrin towa nanika: Kōhai o fusegi saisei no michi o saguru* [What is the forest for the humans: Searching for a way to avoid devastation and to rebuild] (Tōkyō: Kōdansha, 1989); Shirai, *Shinrin no hōkai*.

⁸³ For an early example, see Nomura, Isamu. *Nihon ringyō no reizokuteki tenkai* [The subordinate development of Japanese forestry]. Tokyo: Chikyūsha, 1974.

⁸⁴ “Waga kuni no shinrin seibi o meguru rekishi,” [The history of the forest management of our country], Rin’yachō <https://www.rinya.maff.go.jp/j/kikaku/hakusyo/25hakusyo/pdf/6hon1-2.pdf> (accessed on May 31, 2026), 28.

⁸⁵ “Mokuzai juyō no dōkō” [Trends of wood supply and demand], Rin’yachō, <https://www.rinya.maff.go.jp/j/kikaku/hakusyo/28hakusyo/attach/pdf/zenbun-16.pdf> (accessed May 31, 2026), 136.

⁸⁶ For example, see Nanpō zōrin kyōkai, ed., *Nettaisan parupu tekizai jushu no tokusei to zōrin gijutsu* [Properties of tropical wood species suited for pulp production and afforestation techniques] (Tōkyō: Nanpō Zōrin Kyōkai, 1977); Hachirō Takeda, “Development of Overseas Planting Investment by Japanese Pulp and Paper Industry,” *Ringyō keizai kenkyū* [Journal of Forest Economics] 129 (1996).

⁸⁷ For neocolonial practices of the Japanese timber industry, see Dauvergne, *Shadows in the Forest*.

of good timber was already cut and the hasty conversion of old-growth forests into plantations had degraded the overall quality and value of the Japanese forests. The productivity of the planted forests had been overestimated in the projections, as silviculture had its limitations in less suitable locations.⁸⁸ As many forests were quickly planted in a short time on a low budget, they ended up low-quality and not well cared for afterwards.⁸⁹ Second, as mentioned above, due to the globalization of timber trade, the domestic forestry sector proved unable to compete with imported timber and entered a prolonged decline.⁹⁰ By promoting the mass plantation of *sugi*, Japan ended up producing a surplus of low-quality wood that brought Japan into a constant dilemma: The wood was not valuable enough to justify harvesting, while harvesting costs remained prohibitively high. In addition, the replacement of other forests by *sugi* monocultures contributed to a structural shortage of high-quality timber that could be profitable, and is also required for maintaining national heritage buildings.⁹¹ Third, urbanization during the economic growth years led to rural depopulation, leaving forestry with a constant shortage of workers. This problem was exacerbated by the fact that the forestry industry remains one of the most dangerous workplaces in Japan, especially compared to the majority of jobs found in the well-developed third sector.⁹² The labor shortage has proven detrimental for maintaining the plantations. Fourth, rural decline led to the widespread abandonment of plantation forests, many of them growing 60 or 70 years without ever being thinned. The ownership of many plantations cannot be determined, which also complicates common rights regimes. However, the strong property rights prevent that forestry measures can be conducted without the consent of the owner.⁹³ The profit sharing schemes most plantations were based on meant that the final payments were only settled after logging, so it ended up making it easier to postpone the problem by continuing the leases. But because of the collapse of the forestry industry, many contractors went bankrupt and left many forests without effective management.⁹⁴ Fifth, as Japan became more affluent, construction materials shifted from timber towards steel and concrete, diminishing the demand for traditional

⁸⁸ Arinaga, “Shinrin shigen seisaku,” 22; Mineo and Matsushita, “Kokuyūrin ni okeru daizai seisan seisaku no tsūshiteki kaimei,” 330.

⁸⁹ The “Labor union for all woodland” already pointed out in 1958 that the low costs and the lack of funding for the aftercare of plantations, such as thinning and limbing, produced a lot of low-quality plantations (up to 61 percent). Zen Rin’ya Rōdō Kumiai Chūō Honbu, *Yama ni hataraku hitobito*, Vol. 1, 346–347.

⁹⁰ By now, there often is no functioning supply chain for local timber in existence anymore, whereas the mass ordering of imported woods is well-practiced. Shirai, *Shinrin no hōkai*, 59–65.

⁹¹ Mineo and Matsushita, “Kokuyūrin ni okeru daizai seisan seisaku no tsūshiteki kaimei,” 325.

⁹² Yūki Imatomi, “1970–2020 nen ni okeru waga kuni no ringyō rōdō saigai no bunseki” [Occupational accidents in Japanese forestry, 1970–2020], *Tōkyō nōgyō daigaku nōgaku shūhō* 67:1 (2022).

⁹³ Shirai, *Shinrin no hōkai*, 27–29.

⁹⁴ Akira Suzuki, “Bunshūrin no mondai” [The problem of the shared profit forest], <https://www.chilchinbito-hiroba.jp/column/forest2/267/> (accessed on May 31, 2026).

construction material such as *sugi*.⁹⁵ Japan consequently faces a persistent oversupply of *sugi* timber for which demand remains limited. For example, *sugi* is not valued in pulp production at all.⁹⁶

Apart from economic problems, forestry scientists have criticized the planted monocultures for their negative effects on biodiversity and even for adding to disaster risk: They are vulnerable to snow damage and are prone to collapse entirely during landslides as they often develop shallow root systems when insufficiently thinned.⁹⁷ Finally, the Japanese cedar pollinosis issue emerged towards the end of the 1980s, receiving by far the most attention and turning the *sugi* plantations into a health hazard in the eyes of many Japanese.

The *sugi* monocultures were increasingly seen as liabilities within the forestry community, and their economic and ecological problems became issues to be addressed by forestry policy. The forest administration kept adding more and more subsidies to keep up the maintenance of the forests, including measures such as limbing and clearing, which were added in 1973 and 1974 respectively.⁹⁸ The complicated system of forestry subsidies has itself become a dense forest, making forestry a bureaucratic maze that is difficult to navigate.⁹⁹ Subsidies for planting *sugi* have not been removed either.¹⁰⁰ Changes to forestry policy remained limited, since they would have required substantial financial investment and labor inputs.

Since the 1970s, forestry science identified and analyzed structural problems that had led to the crisis of forestry and the failure of the *sugi* plantations. By the beginning of the 1990s, the *sugi* had reached maturity. But instead of being harvested for their economic value, their removal increasingly became a matter of public health. Forestry scientists, however, did not only diagnose these problems but also proposed a myriad of solutions. Examples range from abandoning working sections in forestry and instead managing individual trees to meet diverse demands of the wood industry and to ensure biodiversity, to easing building codes to increase demand for domestic timber.¹⁰¹ Many of the proposals were tested and some of them were incorporated into legislation. To illustrate the process how forestry science and forestry policy worked together, the next section analyzes the example of the fight against Japanese cedar pollinosis.

⁹⁵ Takano et al., “Zadankai tenki ni tatsu ringyō seisaku,” 36. By now, architectural codes make the construction of traditional wooden Japanese houses impossible. Shirai, *Shinrin no hōkai*, 122–148.

⁹⁶ Shirai, *Shinrin no hōkai*, 55–57; Nakamura, *Atarashī zōrin*, 14.

⁹⁷ Shirai, *Shinrin no hōkai*, 16–17.

⁹⁸ “Waga kuni no shinrin seibi o meguru rekishi,” [The history of the forest management of our country], Rin’yachō, <https://www.rinya.maff.go.jp/j/kikaku/hakusyo/25hakusyo/pdf/6hon1-2.pdf> (accessed on May 31, 2026), 30.

⁹⁹ Shirai, *Shinrin no hōkai*, 66–88.

¹⁰⁰ Ken’ichi Ōmae, “Kafunshō no konpon gen’in=sugi no ki o naze kirenainoka?,” [Why is it impossible to cut the *sugi* trees, the root problem of the] *Purejidentō* [President] 6 (2023), https://www.ohmae.ac.jp/mbaswitch/sugi_hay_fever (accessed on May 31, 2026).

¹⁰¹ Murao, *Machigaidarake no Nihon ringyō*; Shirai, *Shinrin no hōkai*.

The fight against Japanese cedar pollinosis (1990s to today)

Around 1990, mitigating the ill effects of the postwar reforestation program became a pressing issue for the Japanese government and forestry scientists. Japanese cedar pollinosis was discovered and described in a conference paper in 1964 in the region of Nikkō in Tochigi Prefecture, a rural region in the vicinity of Tokyo that has a long history of *sugi* plantations since the Edo period.¹⁰² The relatively late discovery may partly be explained by the fact that allergy research in Japan only expanded after the war, but it is remarkable that it took place shortly after reforestation began.¹⁰³ However, it only emerged as a major public issue in the 1980s when the number of sufferers started increasing dramatically.¹⁰⁴ This may have been linked to rising pollen levels, since thirty years had passed since the reforestation campaign began and the planted *sugi* reached their maturity and peak pollen emission period.¹⁰⁵ Beginning in the mid-1980s, newspaper op-eds blamed Japanese cedar pollinosis on the excessive plantation of *sugi* in the 1950s and 60s.¹⁰⁶ A movement arguing that the *sugi* plantation constituted a form of environmental pollution gained traction, culminating in a lawsuit by eleven individuals in Shizuoka Prefecture in the vicinity of Tokyo against the Japanese government in 1993. The lawsuit claimed that the Japanese government had pursued an erroneous forestry policy that had caused the allergy as a significant illness and demanded compensation for health damages. The government countered by arguing that a causal link between the plantations and the allergy could not be conclusively determined. Consequently, the plaintiffs withdrew the charges.¹⁰⁷ Nonetheless, it has been tried time and time again to declare *sugi* monocultures as a form of environmental pollution and to demand cutting or diminishing *sugi* forests for the sake of preventing Japanese cedar pollinosis.¹⁰⁸

¹⁰² Shinsaku Horiguchi et al., “Tochigiken Nikkō chihō ni okeru sugi kafunshō Japanese Cedar Pollinosis no hakken” [The discovery of the Japanese Cedar Pollinosis in the region of Nikkō, Tochigi Prefecture], *Arerugi* [Allergy] 13:5 (1964); Arioka, *Sugi*, Vol. 2, 239.

¹⁰³ Toshiyuki Takai and Hajime Karasuyama, “The Study of Allergy by Japanese Researchers: A Historical Perspective,” *International immunology* 21:12 (2009).

¹⁰⁴ Kaihei Koshio, *Kafunshō to jinrui* [Hay fever and humanity] (Tōkyō: Iwanami Shoten, 2021), 119; Arioka, *Sugi*, 233.

¹⁰⁵ Hideaki Taira, *Nihonjin wa sugi kafunshō o kokufuku dekiruka* [Can the Japanese overcome the sugi hay fever] (Niigata: Niigata Nippō Jigyōsha, 2005).

¹⁰⁶ Arioka, *Sugi*, Vol. 2, 234–346.

¹⁰⁷ Arioka, *Sugi*, 236–237, 242–244; “Sugi kafunshō, tairyō shokurin shita kuni ni sekinin ga aru: 30 nen mae no ishoku saiban, sono kekka wa?” [‘The country that planted masses of forests is responsible for the Japanese cedar pollinosis’: The unique lawsuit of 30 years ago, what was the result?] Bengoshi.com, https://www.bengo4.com/c_18/n_15723/ (accessed on May 31, 2026).

¹⁰⁸ Arioka, *Sugi*, Vol. 2, 249–250; Shūji Okuno, *Kafunshō wa kankyō mondai dearu* [The hay fever is an environmental problem] (Tōkyō: Bungei Shunjū, 2008). As recently as 2021, Katata Genki, a researcher of the Canon Institute for Global Studies has published a petition to cut *sugi* forests. Genki Katata, “Koizumi kankyō daijin, kafunshō wa kūzen no kōgai desu: Ima sugu sugi o bassai shite kudasai” [Minister of the Environment Koizumi, hay fever is an unprecedented

The government tried to address the allergy issue by launching a joint committee involving the government agencies responsible for public health, forestry, and meteorology in 1990 (花粉症に関する関係省庁担当者連絡会議 *Kafunshō ni kansuru kankei shōchō tantōsha renraku kaigi*). The policy objectives ranged from uncovering the causes of allergies, to pollen forecasting, to developing low-pollen *sugi* varieties.¹⁰⁹ Since then, several disciplines and industries have attempted to mitigate the effects of Japanese cedar pollinosis, especially in the medical field. The pharmaceutical industry has supplied a growing market for allergy medication. The electronics industry has developed air purifiers to mitigate the effects of pollen exposure in workplaces and homes. Monitoring systems and pollen forecasts provide detailed information on pollen propagation during the hay fever season.¹¹⁰ Forestry engaged in interdisciplinary research with meteorologists and allergologists to issue pollen forecasts, but focused on the development of low-pollen *sugi* varieties.

The research on pollen-free *sugi* varieties is a good example of how interdisciplinary research encouraged by the government was conducted in the local context, how it first produced local mitigation strategies, which were later introduced in national policies. The first pollen-free *sugi* specimen was found accidentally at a local shrine in Toyama City by the forester Taira Hideaki, who was a researcher at the Toyama Prefectural Agricultural, Forestry & Fisheries Research Center (富山県農林水産総合技術センター森林研究所 *Toyamaken Nōrin Suisan Sōgō Gijutsu Sentā Shinrin Kenkyūjo*). The tree did not emit pollen because the membranes of the male cones failed to develop properly. They collapsed before the pollen could be released, rendering the *sugi* sterile.¹¹¹ Taira's find was made as part of a local interdisciplinary research initiative led by Toyama University's allergologist Teranishi Hidetoyo to correlate local pollen emission by *sugi* with the reaction of local allergy patients.¹¹² Their joint research has also resulted in local pollen forecast system involving health practitioners, in operation since 1995.¹¹³ In 1997, they were joined by Taira's successor as researcher at the Toyama Prefectural Agricultural, Forestry & Fisheries Research Center, Saitō Maki. Taira and Saitō first developed a pollen-free variety out of a cutting of the original tree, which was named "Spring, please come" (はる

environmental pollution: Please cut the *sugi* immediately], *Agora* (2021), <https://agora-web.jp/archives/2050436.html> (accessed on May 31, 2026).

¹⁰⁹ "Reiwa 5 nendo shinrin oyobi ringyō no dōkō" [Trends in the forest and forestry in the fiscal year of 2023], Rin'yachō, <https://dl.ndl.go.jp/pid/13853713> (accessed on May 31, 2026), 10–11.

¹¹⁰ Yamada, Saito and Fujieda, "Present state of Japanese cedar pollinosis".

¹¹¹ Hideaki Taira, Hidetoyo Teranishi, and Yukiko Kenda, "Sugi no yūseifunen kotai ni tsuite" [A case study of male sterility in sugi (*Cryptomeria japonica*)], *Nihon ringakkaishi=Journal of the Japanese Forestry Society* 75:4 (1993).

¹¹² Interview with Saitō Maki, March 6, 2025.

¹¹³ "Kafun taisaku iinkai towa," [What the Hay Fever Countermeasures Committee is], Toyamaken ishikai [Toyama Prefector Medical Association], <http://www.toyama.med.or.jp/kenmin/kahun/works2.html> (accessed May 31, 2026).

よこい *haru yo koi*) (“spring, please come”) in 2007, in reference to a popular children’s song. This variety was mostly used for replanting *sugi* in areas close to city dwellers like parks or schools, as it is not suitable for mass production.¹¹⁴

Saitō was since dedicated to developing a variety suitable for commercial forestry. With the help of other local forestry research stations, he set out to find specimens with the same genetic mutation that rendered *sugi* sterile. This arduous process took another ten years and uncovered several other specimens.¹¹⁵ In the end, he succeeded in crossing two specimens of highly productive commercial *sugi* varieties from Toyama and neighboring Ishikawa Prefecture to create the variety “Tateyama, shine of the forest” (立山 森の輝き *Tateyama mori no kagayaki*).¹¹⁶ Registered and named in 2014, Toyama prefecture has since sold and promoted this variety for reforestation.¹¹⁷ Saitō has also conducted research to assist the reforestation process. To address the problem that planting seedlings is still done by hand in a region that suffers ageing and labor shortage, he developed a method using onion planting machines.¹¹⁸ After local campaigns such as Toyama’s were running successfully for several years, the national policy followed. In 2023, the Forestry Agency launched the ten-year “Plan to Promote the Reduction of the Hay Fever Source, *Sugi* Plantations” (花粉発生源スギ人工林減少推進計画 *Kafun hasseigen sugi jinkōrin genshō suishin keikaku*) to diminish the *sugi* pollen by 20 percent, with the goal to reduce them to 50 percent in 30 years. Under the plan, cedar stands are to be harvested at younger ages and replaced by seedlings that release less pollen.¹¹⁹

The research on pollen-free *sugi* variants has resulted in reinforcing the existing forestry regimen and another conifer reforestation campaign, this time justified primarily in terms of public health rather than economic growth. Economic considerations nevertheless remain central to the initiative. The pollen-free variants produced by the forestry research stations such as *Tateyama mori no kagayaki* are

¹¹⁴ Naomi Kanaji, *Kafunshō no nai mirai no tameni: Mukafun sugi no kenkyūsha Saitō Maki* [For a future without hay fever: Saitō Maki, researcher of pollen-free cedars] (Tōkyō: Kōsei Shuppansha, 2014), 53–63.

¹¹⁵ Kanaji, *Kafunshō no nai mirai no tameni*, 73–104. The Toyama Prefectural Agricultural, Forestry & Fisheries Research Center published database on these sterile *sugi* specimens. “Mukafun (yūsei funen) sugi no dētābēsu,” [Database of pollen-free (male sterile) Japanese cedars], <https://www.ffpri.affrc.go.jp/database.html#mukahunsugi> (accessed on May 31, 2026).

¹¹⁶ Kanaji, *Kafunshō no nai mirai no tameni*, 103–105.

¹¹⁷ Maki Saitō and Kōtarō Zushi, “Toyamaken ni okeru aratana mori zukuri puran: Yūryō mukafun sugi ‘Tateyama mori no kagayaki’ fukyū suishin jigyo ni tsuite” [New forest development plan in Toyama Prefecture: Promotional programs of high-quality male-sterile Japanese Cedar (*Cryptomeria japonica*) ‘Tateyama mori no kagayaki’], *Shinrin riyō gakkaiishi* [Journal of The Japan Forest Engineering Society] 33:1 (2018).

¹¹⁸ Maki Saitō, “Nōgyōyō kikai o katsuyō shita mukafun sugi no shōryokutekina ikubyō taikai” [A labor-saving, nursing seedling system for male-sterile Japanese cedar using agricultural machinery], *Shinrin riyō gakkaiishi* [Journal of The Japan Forest Engineering Society] 35:1 (2020).

¹¹⁹ “‘Hasseigen taisaku’ ni tsuite,” [On the ‘countermeasures against the source’], Rin’yachō, https://www.rinya.maff.go.jp/j/sin_riyou/kafun/hasseigen.html (accessed on May 31, 2026).

highly productive commercial variants. The campaign is also based on the premise that the existing *sugi* are used commercially. The initiative builds on broader government efforts to revitalize rural regions by relying less on imports and use domestic timber, for example by using domestic timber in public buildings and easing building codes since 2010.¹²⁰

The reforestation campaign thus reproduces the practices of the postwar campaigns and does not offer an alternative vision for commercial forestry in Japan. Of course, policies addressing Japanese cedar pollinosis constitute only one part of Japan's overall forestry policy framework, which also pursues goals such as carbon neutrality and sustainable development, alongside separate policies governing protection forests.¹²¹ Alternative forms of management have been proposed by forestry scientists, with a greater emphasis on biodiversity restoration. For example, selective thinning has been suggested to break up monocultures and to create diversity.¹²² The former broadleaf forest commons (里山 *satoyama*) have been reappraised in recent years for their biodiversity and see their share of revitalization campaigns.¹²³ But the legacy of rational forestry and the policymaking it inspired continues to dominate forest management. Whether alternative visions of forestry will take root in national policy remains to be seen.

Conclusion

The postwar reforestation policy which started with the “National Forest Productivity Enhancement Plan” in 1957 has fundamentally transformed the Japanese forest. Although outwardly a ‘green archipelago,’ as Conrad Totman has phrased it, the planted forest of mainly *sugi* and *hinoki* has created a difficult path dependence both ecologically and economically, which is going to shape Japanese forestry for many decades to come. The concept of the forestry “rationalization” marked a significant departure from earlier forms of reforestation, which had

¹²⁰ Kazuo Ōshima, “Kokusanzai no riyō no kakudai to ringyō keiei no hatten no tame ni” [For the development of the Japanese forestry], *Kyōtofuritsudaigaku gakujutsu hōkoku: Kōkyō seisaku* [Kyoto Prefectural University Academic Report: Public Policy] 12 (2020), 143.

¹²¹ Rin'yachō. “Reiwa 5 nendo shinrin ringyō hakusho.”

¹²² Kenji Seiwa, “Sugi jinkōrin ni okeru shutayōsei kaifuku no kaitei: Kyōkai kōka to kanbatsu kōka no kumiawase kara kōkateki na segyō hōhō o kangaeru” [Steps in recovering biodiversity of conifer plantations: An effective combination of edge- and thinning effects], *Japanese Journal of Ecology* 63:2 (2013). However, forestry officials regard such mixed forests as difficult to establish because fast-growing conifers tend to outcompete broadleaf species. “Jinkōrin ni shin'nyū suru kōyōju to no shinkōkonkōrin shigyō no kentō” [Study on mixed coniferous and broadleaf forest management with broadleaf trees encroaching on planted forests], Rin'yachō, <https://www.rinya.maff.go.jp/j/gyoumu/gijutu/portal/b2018-7.html> (accessed on May 31, 2026).

¹²³ Catherine Knight, “The Discourse of ‘Encultured Nature’ in Japan: The Concept of Satoyama and its Role in 21st-Century Nature Conservation,” *Asian Studies Review* 34:4 (2010).

primarily aimed at restoring deforested areas and ensuring a sustainable supply of forest resources. After encountering US experts and the development scheme of the TVA during the occupation period, forests came to be regarded as crucial sources of domestic resources whose productivity could be systematically increased. This knowledge circulation from the US led to a pivot in forest economics in Japan. When the demand for wood resources increased significantly during the 1950s, the forestry bureaucrats turned to “rationalized” forestry, with the goal to increase the extraction of wood resources. This meant that not only deforested areas were to be subjected to replanting, but that native forests were to be reforested by fast-growing conifers. This policy led to a widespread destruction of old-growth and broadleaf forests, which was arguably more beneficial for the pulp industry (which had researched the use of hardwood) in the short term than the newly planted forest.

Despite the claims of “rationalizing” and modernizing forestry, the policy was plagued by mismatches and legacies of older forms of forestry that could not easily be overcome. The reforestation campaign mainly relied on *sugi* and *hinoki*, conifers that had long been favored in plantation forestry because their rapid growth appeared to promise quick returns. They were reliable and tested, although they did not always match the demands of industries such as paper production, which preferred hardwood. Traditionally, planting *sugi* had relied on cheap, self-organized rural labor and was very labor intensive, requiring thinning and limbing. Ultimately, this became one of the principal obstacles to maintaining the new plantations. While urban Japan industrialized and labor changed, forestry struggled to rationalize. One of the main structural mismatches identified at the time was the small-scale ownership carried over from the early modern period, which had evaded two land reforms. The persistence of traditional ownership and management structures hindered the transformation of Japanese forestry into a system of large-scale capitalist enterprises. Reforestation and management of the plantations were continuously incentivized by subsidies, ultimately creating a complicated bureaucracy difficult to navigate by both forest owners and enterprises. Efforts to rationalize plantation management likewise fell short of expectations. Forestry science continuously conducted research to support monoculture plantations but did not deliver a kind of progress that would have revolutionized yields as in the case of agriculture. Mechanization – apart from the introduction of the chainsaw, which had enabled the quick reforestation campaign in the first place – was difficult to achieve in Japan’s vast forested area located in steep mountainous terrain. The same problem plagued the construction of forest roads that did not reach the same rate of coverage as in European countries.

By the 1970s, Japan’s economic growth, demographic shifts, and changes in the global economy had rendered Japan’s planted forests increasingly unprofitable, turning them into a liability that forestry scientists debated in a myriad of publications. When timber trade got liberalized in the 1960s, the supply was increasingly met by imports from abroad (including by the paper industry, whose research departments appear to have focused on researching ways to use the cheapest

wood available). Domestic production could not compete because of the high costs for labor in Japan and the low prices for conifers. Combined with the decline of the rural population, many plantations were abandoned or just left to grow. Around 1990, Japanese cedar pollinosis became a social problem. This increasingly reframed plantation forests from economic liabilities into sources of environmental and public-health concerns. Meanwhile, forest administration remained locked in the path dependence of its own policies and subsidies, and continued to fund reforestation with *sugi* and *hinoki*. Rather than pursuing structural reforms, policymakers increasingly relied on forestry research to mitigate the problems created by the plantation forests. The most prominent example was the development of pollen-free *sugi* varieties. However, this resulted in maintaining the status quo instead of reevaluating forestry policies in Japan. A new reforestation campaign since 2023 seeks to replace existing *sugi* stands with low-pollen or pollen-free varieties, ultimately reproducing the plantation forests with subsidies. The history of postwar forestry in Japan thus illustrates how large-scale environmental interventions can generate path dependence that continues to shape both ecosystems and policies long after their original objectives have disappeared.

Abstract

Forestry policy in Japan shifted in the 1950s after encountering US forestry practices and concepts of resource use during the US occupation (1945–1952). Originally initiated to cope with wartime devastation and timber shortages in the postwar period, reforestation and afforestation became regarded as tools for increasing forest productivity and supporting the Japanese economic miracle by the late 1950s. In an attempt to “rationalize” forestry, the “National Forest Productivity Enhancement Plan” (国有林生産力増強計画, *kokuyūrin seisanryoku zōkyō keikaku*) was launched in 1957 to replace existing forests with plantations of fast-growing conifers. However, efforts to “rationalize” forestry in the areas of labor, forest ownership, and infrastructure fell short of expectations, as did the productivity of the planted forests. As resource demands were increasingly met by imports and the rural population started abandoning forestry around 1970, these plantations became a liability for Japan, especially after conifer plantations were identified as the main cause of Japanese cedar pollinosis, which has affected Japanese society since the 1980s. Forest governance and research have since struggled to address these problems, for example by developing pollen-free Japanese cedar varieties, but path dependencies created by the “rationalization” policy have remained strong.

Keywords: Japanese cedar, Japanese postwar forestry, rational forestry, forest management, Japanese cedar pollinosis