

Formation and development of the tropical forestry in modern Japan

メタデータ	言語: English 出版者: 公開日: 2025-04-07 キーワード: 熱帯林業 台湾 東京帝国大学 三浦伊八郎 帝国林業 作成者: Koji NAKASHIMA, 中島 弘二 メールアドレス: 所属:
URL	https://doi.org/10.24517/0002002384

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Formation and development of the tropical forestry in modern Japan

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Abstract

This paper traces the history of the formation and development of the tropical forestry in modern Japan from the late 19th century through the middle of the 20th century, and attempts to elucidate the relationships between scientific knowledge and politics in tropical forests. After an overview of the development of the tropical forestry at forestry experimental facilities in Taiwan under Japanese rule, this paper traces the historical transition of the Department of Forestry and the research organizations of the tropical sciences at Tokyo Imperial University. With a focus on Professor Ihachiro Miura, a leading researcher in the forest products sciences and the tropical forestry at the Tokyo Imperial University, this paper elucidates Miura's ambition and aspiration for the development of the tropical forestry connected to the political task of establishing Japanese empire forestry, in which the tropical forestry could contribute to the construction of Greater East Asia through the development of tropical forest resources.

Keyword the tropical forestry, Taiwan, Tokyo Imperial University, Ihachiro Miura, empire forestry

1. Introduction

Recent studies on environmental history and history of science have focused on diverse ways of articulating relationships between scientific knowledge of the environment, colonialism, and imperialism. It has been noted that, rather than relying on a diffusionist or instrumentalist view of colonial sciences, new knowledge and perceptions about the environment were constructed through the interaction between Western and colonial local knowledge, and the networks among colonial scientists and colonial bureaucrats (Bennett and Hodge 2011; Mizuno 2020). However, most of the discussions on the diverse relationships between scientific knowledge, imperialism, and colonialism are limited to Western colonial sciences and the sciences of empire, and are not necessarily sufficient

with respect to non-Western imperialism and colonialism.

We examined the history of the conservation and development of forest resources in modern East Asia (including Southeast Asia) in relation to Japanese imperialism (Nakashima 2023). The relationship between Japanese empire forestry and the forest environment of East Asia was by no means uniform and varied according to various factors, including the environmental conditions of each area, the degree of industrialization, the local forest policy, and the relationship with the local people. The importance of scientific forestry also varied according to the diverse modalities of the Japanese empire forestry in East Asia.

For example, the development of scientific forestry based on the concept of sustainable forest management promoted afforestation of degraded lands in colonial Korea combined with the ideology of “greening” that excluded conventional forest use of the local people and justified the introduction of modern colonial forestry. However, in Southeast Asia, the development of tropical timber as a new forest resource for the Japanese empire has become the focus of scientific forestry, and the afforestation of tropical forests has not received much attention. Thus, in considering the development of scientific forestry in the Japanese empire, it is necessary to understand the significance of scientific knowledge in different regions.

This paper traces the history of the formation and development of the tropical forestry in modern Japan from the late 19th century through the middle of the 20th century, and attempts to elucidate the relationships between scientific knowledge and politics in tropical forests. With regard to the development of the tropical forestry in Japan, there have been several studies and articles: the necessity of establishing the tropical forestry in Japanese forestry (Miura 1944; Takeshita 1942, 1943), Japan’s contribution to the development of the tropical forestry in Southeast Asian countries (Asakawa 1991; Hashimoto 1983; Morita 1983), retrospective reports of Japan’s the tropical forestry (Kitano 1984; Mori 2017), the economic history of the tropical timber trade and the tropical forestry development (Hagino 1961, 2003), and specialized sub-topics of the tropical forestry. However, there has been little research on the history of the institutionalization of scientific knowledge of the tropical forestry and its relationships with the political and economic context of the time.

After an overview of the development of the tropical forestry in Taiwan under Japanese rule, where the experimental research of the tropical forestry was first launched and institutionalized in the Japanese Empire, this paper traces the history of the Department of Forestry, Faculty of Agriculture and the research organizations of the tropical forestry and sciences in Tokyo Imperial University, with focusing on Professor Ihachiro Miura (三浦 伊八郎), a leading researcher of the forest products sciences and a proponent of the tropical forestry in Japan. By examining the

relationship between forest product sciences and the tropical forestry in Miura's systematic understanding of forestry research, this paper attempts to disclose Miura's ambition and aspiration for the development of the tropical forestry and its impact on the institutionalization of tropical sciences at Tokyo Imperial University. Finally, it is concluded that Miura's ambitions and aspirations were connected to his concern about the development of Japanese empire forestry.

2. Development of the tropical forestry in Taiwan under Japanese rule

Since the possession of Taiwan in 1895, the Japanese Empire has consistently expanded its sphere of influence, including the cession of South Sakhalin in 1905, the annexation of Korea in 1910, the League of Nations mandate of the South Sea Islands in 1919, the establishment of Manchukuo by a Japanese puppet government in 1932, the occupation of China during the Sino-Japanese War in 1937, and the occupation of Southeast Asia during the Pacific War in 1941. Taiwan was the only one of the Japanese imperial colonies located in a tropical and subtropical environment. The geographical position of Taiwan allowed it to play a unique role in the Japanese Empire, namely, the base for the southward expansion, from which the Japanese Empire expanded its sphere of influence through South China, the South Seas Islands, and Southeast Asia. Within such a geopolitical scheme, Taiwan was situated as an experimental base for the tropical forestry, as well as a timber supply area utilizing its virgin forests and as a camphor production area using native Taiwanese camphor trees (Nakashima 2021). This chapter focuses on the history of the experimental base for the tropical forestry in Taiwan under the Japanese rule.

Table 1 shows a brief history of the forestry experimental facilities in Taiwan under Japanese rule. In relation to the development of the tropical forestry, it is noteworthy that the Regenerative and Products Bureau of the Government-General of Taiwan established two the tropical forestry related facilities in the 1900s: the Hengchun Tropical Plant Cultivation Farm (恒春熱帶植物殖育場) which was established for the experimental cultivation of tropical useful plants in 1902, and the Chiayi Rubber Tree Nursery (嘉義護謨苗園) which was established for the production of rubber and raising seedlings of rubber tree in 1908. After that, the Regenerative and Products Bureau of the Government-General of Taiwan established the Experimental Station of Forestry (林業試驗場) in 1911 as a comprehensive research facility of the forestry in Taiwan and integrated those two the tropical forestry related facilities of the Hengchun Tropical Plant Cultivation Farm and the Chiayi Rubber Tree Nursery into the Experimental Station of Forestry as its branch stations.

Table1 History of the forestry experimental facilities in Taiwan under Japanese rule

Year	Event
1895	Japan's possession of Taiwan
1896	The Nursery was established in Taipei City
1900	The Taipei Nursery was newly established
1902	The Hengchun Tropical Plant Cultivation Farm *1 was established
1908	The Chiayi Rubber Tree Nursery *2 was established
1911	The Experimental Station of Forestry was established *1 and *2 were reorganized into branch stations of the Experimental Station of Forestry The Taipei Nursery was renamed to the Forestry Experimental Site
1921	The Experimental Station of Forestry was reorganized to the Forestry Division of the Central Research Institute The Forestry Experimental Site was renamed to the Taipei Botanical Garden
1939	The Forestry Division of the Central Research Institute was reorganized to the Forest Experiment Station (Three divisions: plant cultivation, forest operation, utilization)
1942	The Forest Experiment Station (Five divisions: plant cultivation, forest operation, wood materials, forest products, pulp)
1943	The five divisions were reorganized into five departments and " Southern Research
1945	The Forest Experiment Station was seized by the Taiwan Administrative Offices and renamed to the Taiwan Forestry Research Institute

Source: Translated from Nakashima (2021, p.10).

According to *the General Survey of the Experimental Station of Forestry* (Regenerative and Products Bureau of the Government-General of Taiwan 1914), the purpose of establishing the Experimental Station of Forestry is 1) to promote afforestation and silviculture of devastated forests because of overcutting and cultivation, and to develop undeveloped forests deep in the mountains, and 2) to conduct research on forest management methods in Taiwan, which has a (sub)tropical climate different from that of mainland Japan. Although the first purpose can be seen in other colonies, such as Korea, the second is unique to Taiwan. "As Taiwan extends over tropical and semi-tropical areas, its ways of forest practices are completely different from those of Japanese mainland and there is no standard model to be based on. Therefore, it is the most necessary task to establish an independent institution in this island and to make research on the forest practices, and thereby to provide standard guidelines of the forest practices" (Regenerative and Products Bureau of the Government-General of Taiwan 1914: 1-2). In this respect, we find an imperialistic recognition that situates colonial Taiwan as a base for experimental research on the tropical forestry.

After the establishment of the Experimental Station of Forestry, various experimental stations for agriculture, sugar production, tea cultivation, horticulture, and stockbreeding were established one after another. However, since each of these was an independent organization, there was insufficient communication between the organizations, and this was an obstacle to conducting

unified research activities (Central Research Institute of the Government-General of Taiwan 1930: 1-2). To solve this problem, these different research institutes were integrated into the Central Research Institute of the Government-General of Taiwan in 1921, and the Experimental Station of Forestry was reorganized into the Forestry Division of the Central Research Institute.

In regard to the forestry research of the Forestry Division of the Central Research Institute, 吳 (2009) points out that one of the characteristics of the experimental research of the Forestry Division of the Central Research Institute is that more practical experimental research was conducted based on the basic research of the predecessor Experiment Station of Forestry. I have already described an outline of the experimental research of the Forestry Division of the Central Research Institute by examining research papers published in bulletins and reports of the Forestry Division of the Central Research Institute (Nakashima 2021), suggesting that most experimental studies in the Forestry Division of the Central Research Institute were conducted for the plantation and cultivation of useful trees imported from tropical regions, and many of the experimental studies on forest products were related to the use of tropical useful plants, such as rubber, tannin, and pulp production, using tropical timber. These characteristics of the Forestry Division of the Central Research Institute as a base for the tropical forestry have continued since the early days of the Hengchun Tropical Plant Cultivation Farm and the Chiayi Rubber Tree Nursery, and have intensified during wartime.

In 1939, the Forestry Division of the Central Research Institute was reorganized into a Forest Experiment Station under the direct control of the Governor General of Taiwan, which consisted of three divisions: plant cultivation, forest operation, and forest utilization. In 1942, the three divisions were developmentally reorganized into five divisions: plant cultivation, forest operation, wood materials, forest products, and pulp. The new establishment of the two divisions of forest products and pulp reflected an increasing demand for the use of forest products, such as rubber, tannin, camphor, quinine, and pulp, to increase the production of military supplies during the war. In 1943, the five divisions were upgraded into the “Department” and the “Southern Research Office” was additionally established to conduct research on the tropical forestry, and to collect and organize materials and documents related to the tropical forestry.

As suggested in the history of forestry experimental facilities in colonial Taiwan, as the only region with tropical and subtropical environments among the Japanese colonies, Taiwan had been positioned as a site for various experimental research on tropical forest resources. In particular, the establishment of the tropical forestry-related divisions and departments in the 1940s, when Japan entered the Pacific War and launched a military invasion of the South, suggests the specific role of the forestry experimental facilities of colonial Taiwan in responding to the increasing military demand

for tropical forest resources. Thus, the development of the tropical forestry in forestry experimental facilities of colonial Taiwan reflects the geopolitical context surrounding Japan at the time.

3 History of the Department of Forestry and the research organizations of the tropical forestry and tropical sciences in Tokyo Imperial University

While the tropical forestry in modern Japan was first launched in colonial Taiwan, the development of the tropical forestry in mainland Japan, in conjunction with the institutionalization of forestry in universities, took place mainly in the 1940s. First, this chapter traces a brief history of the development of the Department of Forestry at Tokyo Imperial University, and then describes the development of the research organizations of the tropical forestry and tropical sciences at Tokyo Imperial University during the 1940s and attempts to situate the rise of interest in the tropical forestry and tropical sciences in the geopolitical context of the time. Finally, with a focus on Miura's academic career and works on forest product sciences, this chapter situates the tropical forestry in his scheme of forest product sciences.

3.1 Development of the Department of Forestry in Tokyo Imperial University

Table 2 shows a brief history of the Department of Forestry and research organizations related to the tropical forestry at the Tokyo Imperial University. Four years after the establishment of the Imperial University in 1886, the Tokyo College of Agriculture and Forestry was integrated into the Imperial University as a College of Agriculture in 1890 (the college system was abolished in 1919 and replaced by the departmental system). The amendment to the Imperial University Ordinance established chairs at the College of Imperial University, and the Department of Forestry at the College of Agriculture of Imperial University established three chairs: Forestry I (Forest Management), Forestry II (Silviculture), and Forestry III (Forest Policy). With the establishment of Kyoto Imperial University, Imperial University was renamed the Tokyo Imperial University in 1897. Then, two chairs of Forestry IV (Forest Hydrology and Erosion Control Engineering) and Forest Utilization were added to the Department of Forestry in 1900 and 1902, bringing the total number of chairs in the Department of Forestry to five.

After a period of 20 years in five chairs in the Department of Forestry, a new chair of Forest Chemistry was established in 1922 with Dr. Miura as its chief Associate Professor. As explained in the next section, forest chemistry is the field of research on the chemical utilization of forests and

Table 2 Development of the department of forestry and research organizations related to the tropical forestry in Tokyo Imperial University (the University of Tokyo)

Year	Events
1893	The amendment of the Imperial University Ordinance established chairs at each College of Imperial University, and the Department of Forestry in the College of Agriculture of Imperial University established three chairs: Forestry I (Forest Management), Forestry II (Silviculture), and Forestry III (Forest Policy) .
1897	Imperial University was renamed to Tokyo Imperial University.
1900	The Department of Forestry in the College of Agriculture of Tokyo Imperial University established the chair of Forestry ? (Forest Hydrology and Erosion Control Engineering) .
1902	The Department of Forestry in the College of Agriculture of Tokyo Imperial University established the chair of Forest Utilization . (Total five courses: Forestry I, II, III, ? , and Forest Utilization)
1919	The college systems of the Imperial Universities (Tokyo, Kyoto, Tohoku, Kyushu, and Hokkaido) were reorganized into the faculty systems. As a result, the College of Agriculture of Tokyo Imperial University was renamed to the Faculty of Agriculture of Tokyo Imperial University.
1922	The Department of Forestry, the Faculty of Agriculture of Tokyo Imperial University established the chair of Forest Chemistry . (Total six chairs: Forestry I, II, III, ? , Forest Utilization, and Forest
1923	The Faculty of Agriculture of Tokyo Imperial University purchased the privately-owned land of ² 87,000 m in Taiwan for the Tropical Arboretum of the experimental forest .
1940	The Faculty of Agriculture of Tokyo Imperial University established the Institute of Tropical Forestry at Hainan Island, Republic of China.
1941	The Department of Forestry, the Faculty of Agriculture of Tokyo Imperial University established three chairs of Forest Botany, Forest Zoology, and Pulp Science and Wood Chemistry (Total nine chairs: Forestry I, II, III, ? , Forest Utilization, Forest Chemistry, Pulp Science and Wood Chemistry, Forest Botany, and Forest Zoology). The Department of Forestry, the Faculty of Agriculture of Tokyo Imperial University was reorganized into two programs of Forestry Sciences (Forestry I, II, III, ? , Forest Utilization, Forest Botany, Forest Zoology) and Forest Products Sciences (Forest Chemistry, Pulp Science and Wood The Southern Resources Study Group was established in Tokyo Imperial University, which consisted of three divisions: Agriculture and Forestry, Fisheries, and Underground Resources.
1942	The Southern Resources Study Group and the Southern Medicine Study Group merge to form the Southern Science Study Group , which consisted of seven divisions: Agriculture, Forestry, Fisheries, Underground Resources, Petrol, Medicine, and Economy.
1943	Tokyo Imperial University Forests established the Arboricultural Research Institute in Minami-Izu, Shizuoka Prefecture as a research center for tropical and subtropical trees of special use.
1944	The Southern Science Study Group was developmentally reorganized into the Institute of Southern Natural Sciences , which consisted of seven divisions: Agriculture, Forestry, Fisheries, Underground The Department of Forestry, the Faculty of Agriculture of Tokyo Imperial University established two chairs of Wood Material Science ? and ? in the program of Forest Products Sciences.
1945	Japan's defeat in the Asia-Pacific War
1946	The Institute of Southern Natural Sciences was reorganized to the Physiographical Science Research Institute . (The Physiographical Science Research Institute was discontinued in 1952.)
1947	With the amendment of the Imperial University Ordinance, Tokyo Imperial University was renamed to the University of Tokyo. The Department of Forestry, the University of Tokyo consisted of two programs and eleven chairs: Forestry Sciences (Forestry I, II, III, ? , Forest Utilization, Forest Botany, Forest Zoology) and Forest Products Sciences (Forest Chemistry, Pulp Science and Wood Chemistry, Wood Material Science I, and II).
1956	The Department of Forestry, Faculty of Agriculture, the University of Tokyo was reorganized into two departments, the Department of Forestry Sciences and the Department of Forest Products

Source: Miura (1955), and Faculty of Agriculture, The University of Tokyo "History of faculty of agriculture, The University of Tokyo" <https://www.a.u-tokyo.ac.jp/history/index.html>

forest products, which was a newly developed field of forestry at that time. Another 18 years later, three new chairs were established in the Department of Forestry in 1941: Forest Botany, Forest Zoology, and Pulp Science and Wood Chemistry. Furthermore, the Department of Forestry was reorganized into two programs: Forestry Sciences (Forestry I, II, III, IV, Forest Utilization, Forest Botany, Forest Zoology) and Forest Products Sciences (Forest Chemistry, Pulp Science, and Wood Chemistry).

Pulp Science and Wood Chemistry were originally planned to be established as an endowed chair by the Oji Paper Company. In 1938, Miura who longed early on for the forestry department to expand into pulp research visited the president of Oji Paper to request a donation for establishing the pulp science related new chair in the Department of Forestry together with Ichiro Sonobe (菌部 一郎), then Dean of the department. They successfully managed to secure a donation commitment of 200,000 yen from Oji Paper. Miura strongly urged the Ministry of Education to establish a semi-endowed chair in which the interest from the donation would be used to pay ordinary expenses, and the personnel expenses of the faculty would be paid by the government (Miura 1955; Migita 1972). As a result, the Ministry of Education approved the establishment of a chair of Pulp Science and Wood Chemistry, fully funded by the government.

Furthermore, with the outbreak of the Pacific War, the importance of the physical and chemical use of wood increased, and Miura then Dean of the Faculty of Agriculture felt the need for research in the specialized course and applied to establish the chairs of Wood Material Science I (wood material physics) and II (wood material chemistry) in the Program of Forest Products Sciences in 1943. Miura's petition to the Budget Bureau of the Ministry of Finance allowed these two chairs to be established in 1944 (Miura 1955). Thus, Miura's enthusiasm and active encouragement led to the establishment of four new chairs in the field of forest product sciences at the Department of Forestry from the 1920s to the 1940s.

3.2 Development of the research organizations of tropical sciences in Tokyo Imperial University

As shown in Table 2, the tropical forestry became an academic ground at Tokyo Imperial University in the 1940s: Tropical forestry Research Institute (1940), Southern Resource Study Group (1941), Southern Science Study Group (1942), Tropical Arboricultural Research Institute (1943), and Institute of Southern Natural Sciences (1944) were rapidly established one after another in the early 1940s. The establishment of these the tropical forestry and tropical science-related research facilities and

groups was in line with the geopolitical strategy of the Japanese Empire to promote its expansion southward. In this section, I will trace the brief history of almost five years from 1940 to 1945 and attempt to elucidate the development of scientific networks in the tropical forestry and tropical sciences.

The first research facility related to the tropical forestry at the Tokyo Imperial University was the Institute of the tropical forestry, established by the Faculty of Agriculture in 1940. This Institute was established in Hainan Island, Republic of China, for the purpose of research and survey of tropical forests and to provide guidance on the improvement of forestry for tropical forests. Specifically, the institute conducted basic experimental research on the cultivation of useful plants in tropical and subtropical regions.

The next research facility was the Arboricultural Research Institute, The University of Tokyo Forests, which was established in 1943 on a newly purchased 241.3-hectare land at Aono, Minamiizu-Town, Shizuoka Prefecture, which is considered to have a relatively warm and rainy subtropical climate within mainland Japan, to study tropical and sub-tropical trees for non-wood special forest products, and to contribute to the production of tropical plants in Japan (Nagumo 1994: 129-130).

In 1941, the Southern Resources Study Group was established at the Tokyo Imperial University, which consisted of three divisions: Agriculture and Forestry, Fisheries, and Underground Resources. Its purpose was to conduct a study on animals, plants, minerals, petroleum, and medical resources in Southeast Asia. Although it was considered a private research organization by the faculty members of the Tokyo Imperial University, it was a public research organization (Itoh and Suzuki 1978). The president of the Tokyo Imperial University served as its chairman, the dean of the Faculty of Agriculture as its vice-chairman, and the deans of the other faculties as councilors. At the inception of the study group in March 1941, Miura was commissioned as its researcher, but when he was elected the Dean of the Faculty of Agriculture in November of the same year, he simultaneously became the vice president of the study group.

According to the Preface of *the Research Document on Southern Resources No.1* published in 1943 by the Southern Sciences Study Group, this study group had a tremendous interest in the resources of South and Southeast Asia. “Needless to say, the area bordering the Pacific and Indian Oceans, or so-called the South, is unparalleled in the world in its abundance of various resources...This is what is indispensable for the survival of the people belonging to our East Asia Co-prosperity Sphere, and what will foster the basis for their future development and prosperity...Before the Asia-Pacific War, the Tokyo Imperial University was already keenly aware of the need for

comprehensive research on the resources of the South, and in March 1941, it established the Southern Resources Study Group” (Southern Science Study Group 1943: Preface, not paged).

At the same time as the Southern Resources Study Group was established in March 1941, a student organization, the “Southern Study Group,” was formed, with Miura serving as its president. Professors from each faculty member participated in this study group as councilors, and the office was located in the Department of Forestry. The purpose of this study group was to promote research and study in a wide range of areas from Taiwan to the South China Sea, Southeast Asia, and the South Seas Archipelago, in addition to inviting various lecturers to hold study groups and lecture meetings (Itoh and Suzuki 1978).

In July 1942, the Southern Resources Study Group and the Southern Medicine Study Group (comprising Professors of the Faculty of Medicine) merged to form the Southern Science Study Group. With seven divisions (Agriculture, Forestry, Fisheries, Minerals, Petroleum, Medicine, and Economics), the Southern Resources Study Group was reorganized into the Resources Division (Agriculture, Forestry, Fisheries, Minerals, and Petroleum). Ihachiro Miura, as Dean of the Faculty of Agriculture, became Director of the Resources Division of the Southern Science Study Group.

Finally, in January 1944, the Southern Science Study Group was developmentally reorganized into the Institute of Southern Natural Sciences, an official research institute of Tokyo Imperial University, with seven divisions: Agriculture, Forestry, Fisheries, Minerals, Petroleum, Medicine, and Pharmacy.

It is clear that Miura played a central role as a promoter in the establishment of a series of the research groups and the institute related to the South (Itoh and Suzuki 1978: 105-106). It is no coincidence that most of the South-related research groups and institutes were established during Miura’s three-year term (November 1941-November 1944) as the Dean of the Faculty of Agriculture. It can be said that Miura’s strong ambition and aspiration for the tropical forestry and tropical sciences made it possible to develop these research organizations for tropical science at Tokyo Imperial University.

4. Forest Products Science and the Tropical forestry: Ihachiro Miura’s Ambition

Ihachiro Miura (1885-1971), a specialist of forest products science and a proponent of the tropical forestry, graduated from Tokyo Imperial University in 1912, followed by his appointment as a lecturer there in 1915. He received his Ph.D. from Tokyo Imperial University for his research on charcoal production methods and properties in 1920. In 1922, the year before the Great Kanto Earthquake,

Miura was assigned as the chief Associate Professor of the Chair of Forest Chemistry. Forest chemistry is a field of research on the chemical utilization of forests and forest products.

One of the characteristics of Miura's forestry research is the focus on forest chemistry and the chemical technology of forest products, which is concerned with the chemical industry or manufacturing chemistry using forest products as raw materials. Miura (1925:3-4) insisted the significance of the forest chemistry, "The reason why this science (forest chemistry) has not yet become an important part of forestry is that forestry is not as technologically intensive as agriculture, and therefore, forestry has not progressed as far as agriculture. Therefore, ...if forestry is to become technologically intensive, rather than being left mainly to nature, as it has been in the past, it will be necessary to further develop this area." Miura, who learned both agricultural chemistry and forest chemistry at the graduate school of Tokyo Imperial University, criticized conventional forestry methods, which depended heavily on the conditions of the natural environment, and aimed to establish forestry as a more technology-intensive, applied, and practical science.

Miura emphasized the need for further research in wood chemistry in his joint work with Kitsuji Nishida (西田 屹二) Professor of Kyushu Imperial University *Mokuzai kagaku (Wood chemistry)* published in 1933. "Wood quality includes resinous elements, tannin, essential oil, carbohydrates, and lignin as well as fibrous elements. These substances will have many uses in the future as industrial materials, fuels, food, feed, and synthetic chemical raw materials...We believe that this book is the first publication of wood chemistry in Japan. The authors dare to publish this book, despite our inexperience, because we are convinced that wood chemistry will surely grow into a major branch of the science in the future, and we are sowing a seed of it here" (Miura and Nishida 1933: Preface, not paged).

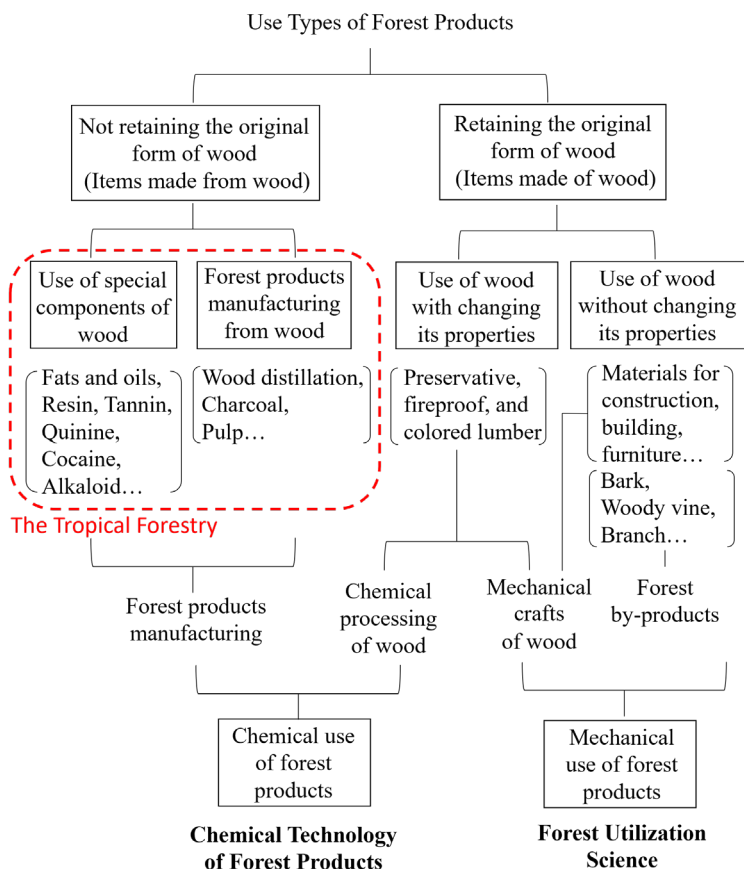
Thus, Miura attached a great deal of importance to the link between research and industry. Miura's practical attitude intensified during the war. In his preface to the 1938 second edition of "*Mokuzai Kagaku (Wood Chemistry)*," Miura wrote "Five years have passed since the first edition of this book, during which there have been significant developments in wood chemistry. In particular, the recent development of the textile industry has had a significant impact on the supply and demand of global pulp resources, and the exploration and securing of pulp resources has become an important international economic issue. As a result of the Second Sino-Japanese War, pulp self-sufficiency in Japan has become a major national issue" (Miura and Nishida 1938: Preface to the second edition, not paged). Miura grasped the significance of wood chemistry in relation to securing the self-sufficiency of pulp resources in Japan during wartime.

Another characteristic of Miura's forestry research is his attention to the tropical forestry,

focusing on geographic differences in forest types around the world. In his book *Rinsan (The Forestry)* (Miura 1949), published as one of “Shakaika Bunko (the Social Studies Collection),” educational books for general readers, after the war in 1949. Miura classified the forestry into two types of “stand forestry (林分林業)” that treats trees as groups that form the unit of forest handling and “arboricultural forestry (樹芸林業)” that treats each tree individually just like a horticulture. Miura criticized Japanese forestry science conventionally based on German stand forestry, which was dominated by the production of ordinary timber in the temperate and boreal forests of central and northern Europe; instead argued for the necessity of arboricultural forestry that produces special wood materials of paulownia and bamboo, and special products of paulownia oil, camellia oil, camphor, lacquer, wood wax, and shiitake mushrooms in warm temperate forests such as Japanese forests. Furthermore, he emphasized the diversity of special forest products in tropical forest such as rubber, shellac, palm oil, coconut oil, tannin materials, quince, coca, cork oak and rattan, and they have more importance than ordinary timber production (Miura 1949: 52-53). He took some examples of various types of arboricultural forestry and explained the tropical arboricultural forestry as follows: “Since tropical forests lack coniferous trees, afforestation for ordinary timber production is not advantageous. Therefore, ordinary timber is usually harvested only from natural forests and artificial plantations are carried out only for special timber such as heavy hardwood or light softwood. Arboricultural forestry is carried out for special forest products such as resins, oils, essential oils, tannins, and alkaloids in tropical forests” (Miura 1949:75). In Chapter 8, Miura explained forest geography worldwide (Japan, Asian countries, Europe, Africa, North and South America, and Oceania). He spent more than half of the 43 pages of this chapter for Asian countries, including Japan, and 13 pages for tropical Asia, and said “Particularly, tropical Asia is the most advanced area of arboricultural forestry in the world” (Miura 1949:210).

As shown in Figure 1, Miura systematically classified various forest products according to their use types and suggested their relations to forest product sciences such as Chemical Technology of Forest Products and Forest Utilization. In this figure, the tropical forestry is positioned mainly in forest product manufacturing and is considered by Miura to be an important field in which to practice Chemical Technology of Forest Products. In other words, Forest Utilization Science focusing on the mechanical use of forest products, such as materials for construction, buildings, and furniture, is mainly situated in the context of temperate and boreal forestry. Thus, the tropical forestry is situated at the intersection of the systematic understanding of forest product sciences and geographic differences in forest types in the world.

In the first chapter of *Nettai Ringyo (The Tropical Forestry)*, published in 1944, Miura



Source: Modified from Miura (1925: 11) and Miura (1949: 123) by the author

Figure 1 Scheme of the forest product sciences and the tropical forestry

emphasized the significance of the tropical forestry. “Historically, as existing forestry sciences were established in Central Europe and have developed in Central and North Europe, they have been developed for temperate and boreal forests. In other words, existing forestry sciences have never been general forestry, but only temperate and boreal forestry sciences. In this sense, unlike their Central and Northern European counterparts, universities in Japan and the U.S. are teaching the tropical forestry to fill in the gaps in past forestry sciences” (Miura 1944:1). Miura emphasized the necessity of developing the tropical forestry by Japan as well as by the United States. This led to the need to construct a Japanese empire forestry. “The construction of the tropical forestry by the forestry faculty of the Great Empire of Japan, taking the lead in the world, can play a role in the construction of Greater

East Asia through the development of South Seas. It is the responsibility of the forestry researchers of the Great Empire of Japan to establish a complete system of forestry that can be applied anywhere in the world” (Miura 1944: 1-2). Thus, the issue of building the tropical forestry is not merely a matter of institutionalizing forestry sciences at the university or pioneering Miura’s personal research field, but is connected to the political task of establishing empire forestry in the Greater East Asia Co-prosperity Sphere.

4. Conclusion

This paper traced the history of the formation and development of the tropical forestry in modern Japan by examining the institutionalization of the tropical forestry in forestry experimental facilities in Taiwan under Japanese rule, the organizational transition of the Forestry Department of Tokyo Imperial University, and the establishment of tropical science-related research organizations.

As a result, it can be concluded that the tropical forestry was first developed at forestry experiment stations in Taiwan under Japanese colonial rule from the early 20th century, while interest in tropical and southern forestry in the Japanese mainland grew rapidly, mainly from the 1940s onward. In the 1920s, the chair of forest chemistry was established at Tokyo Imperial University under the leadership of Miura, and in the 1940s, new chairs and departments related to forest product sciences were established one after another in the Faculty of Agriculture to study tropical forest resources, and various research groups and institutes for tropical science were established at Tokyo Imperial University.

As a background to the institutionalization of the tropical forestry and tropical sciences at Tokyo Imperial University, we can point to the ambitions and aspirations of Miura, who held a key position in the Faculty of Agriculture at the time, toward the tropical forestry. Professor Miura, a leading researcher in the forest products sciences and a proponent of the tropical forestry in Japan, situated the tropical forestry at the intersection of systematic understanding of forest product sciences and geographic differences in forest types of the world. It can be said that Miura’s strong ambition and aspiration for the tropical forestry and tropical sciences were connected to the political task of establishing Japanese empire forestry, in which the tropical forestry could contribute to the construction of Greater East Asia through the development of tropical forest resources.

Acknowledgement

This paper was presented at the Seventh Biennial Conference of East Asian Environmental History, held in June 2023 in Daejeon, South Korea. I would like to thank all participants of the session who provided constructive comments and questions. This work was supported by JSPS Kakenhi Grants Number 21H00502 and 24K00038.

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近代日本における熱帯林業の形成と発展

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要旨

本研究は 19 世紀後半から 20 世紀半ばにかけての近代日本における熱帯林業の形成と発展の歴史をたどり、熱帯林をめぐる科学的知見と政治の関係を明らかにしようとするものである。最初に日本統治下の台湾総督府林業試験場における熱帯林業をめぐる研究施設・組織の変遷を概観し、日本帝国において亜熱帯環境に位置する唯一の植民地としての台湾と熱帯林業の関係を検討する。次いで、東京帝国大学林学科の歴史の変遷をたどり、熱帯林業に関連する講座および専修が設置された経緯を明らかにするとともに、特に 1940 年代に入ってから熱帯林学を含む熱帯科学の研究組織・施設が矢継ぎ早に設置されたことを明らかにする。最後に、東京帝国大学における林産学・熱帯林学研究の第一人者である三浦伊八郎教授のキャリアと研究内容の検討を通じて、三浦が林産物の化学的利用に関する林産製造学の確立と制度化に貢献し、その独自の研究対象として熱帯林業を位置付けたことを明らかにするとともに、このような三浦の学問的な野心と野望が、熱帯林資源の開発を通じて帝国林業の確立に貢献するという政治的課題と結びついていたことを指摘した。

キーワード： 熱帯林業，台湾，東京帝国大学，三浦伊八郎，帝国林業