

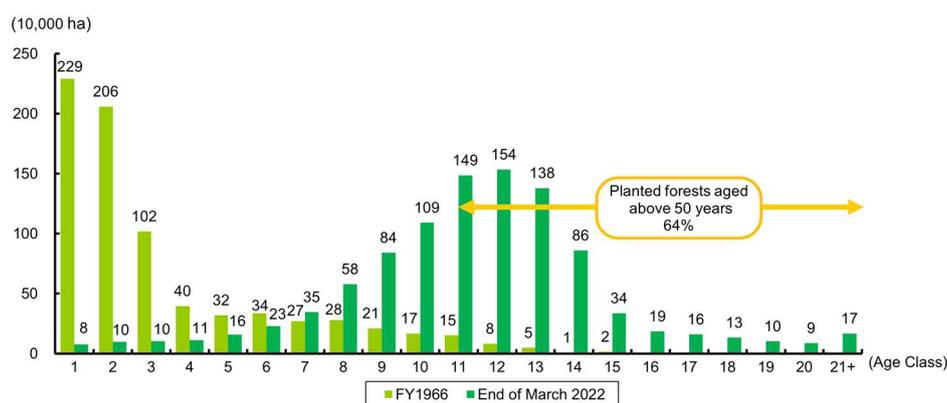
## Chapter I

# Forest Management and Conservation

## 1. Promoting Appropriate Management and Conservation of Forests

### (1) Current State of Forests and Multiple Functions

Japan's forests cover about 25 million hectares, which accounts for two-thirds of the national land area. About 40% of them are planted forests. 64% of the planted forests are aged above 50 years and entering their period of use (Fig. I-1). The forest area consists of private forest, public forest, and national forest, which account for 57%, 12%, and 31%, respectively (Fig. I-2).



Sources: Forestry Agency "State of Forest Resources" (March 31, 2022) and "Forest Resources of Japan" (April 1968)

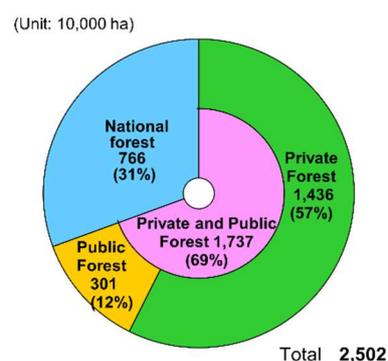
Note: Age-classes are divided by 5 year-period steps. "Age-class 1" includes the 1st to 5th year after planting with the year of planting counted as the 1st year.

**Fig. I-1 Area of planted forest age class**

The stock of forest is steadily expanding mainly on planted forests, reaching about 5.6 billion m<sup>3</sup> by the end of March 2022.

Forests contribute to the stability of people's lives and development of sustainable economy through their multiple functions including land conservation, water resource conservation, mitigating global warming, wood production and biodiversity conservation.

Through these multiple functions, forests also contribute to the achievement of SDGs and net-zero by 2050 and to the economic and social benefits of forestry and wood industry.



Source: Forestry Agency "State of Forest Resources" (March 31, 2022)

**Fig. I-2 Forest area by owners**

### (2) The Fundamental Framework of Forest Plans for Appropriate Management and Conservation

To make sure forests perform their multiple functions sustainably, the GOJ formulates the Basic Plan for Forest and Forestry (latest revision in June 2021) in accordance with the Forest and Forestry Basic Act. The Basic Plan sets targets for the state of forests and the supply of forest products, and specifies measures to be taken by the GOJ.

The Minister of Agriculture, Forestry and Fisheries formulates the National Forest Plan under the Forest Act. The National Forest Plan sets targets for forest management and conservation, the amount of logging, and reforestation areas to align with the Basic Plan for Forest and Forestry. Prefectural governors formulate Regional Forest Plans based on the National Forest Plan. Mayors of municipalities formulate Municipality Forest Plans, in accordance with the Regional Forest Plans, that indicate zoning and forestry road system plans according to the functions of forests to be emphasized.

### (3) Research and Development

In the “Strategy for Research and Technology Development in Forest, Forestry, and Wood Industry” revised in March 2022, the Forestry Agency has stated a policy to promote the following development; (1) prediction of the impact of climate change on domestic and foreign forests and forestry; (2) sophistication of monitoring technology to calculate forest removals with high accuracy; (3) cost reduction of afforestation and silviculture technology; (4) development of cross-laminated timber (CLT) utilization technology; and (5) development of superior seedlings, and so on. Furthermore, the Forestry Agency updated the “Forestry Innovation Field Implementation Promotion Program” in July 2022 to accelerate innovation in the forestry sector.

The GOJ has stated policies of working on zero emissions by smart forestry and the establishment of technology for long-term and large-scale carbon storage by forests and wood in the "Green Growth Strategy Through Achieving Carbon Neutrality in 2050," published in December 2022. The Forestry Agency is promoting related development using the Green Innovation Fund created based on this strategy. In addition, the Ministry of Agriculture, Forestry, and Fisheries (MAFF) has developed a “Strategy for Sustainable Food Systems” to promote innovation for reducing environmental impact in a medium- to long-term perspective. In the forest and forestry sector, the strategy promotes the development and dissemination of superior seedlings, the development of automated forestry machinery, the utilization of ICT, the construction of wooden high-rise buildings and the development of wood-based chemical materials such as glycol lignin.

Forestry promotion instructors assigned in each prefecture disseminate and instruct forestry technology to forest owners, forestry workers, municipal officials, and other related people. Furthermore, the Forestry Agency develops Foresters who support municipal governments’ forest administration and management.

## 2. Forest Management

### (1) Promotion of Forest Management

In order to secure the multiple functions of forests for future, appropriate forest management is required. It is achieved by appropriate and adequate forestry practice on planted forests, such as thinning and replanting after harvesting, and establishment of diverse forests depending on its natural conditions, such as diversification of logging age and inducement of coniferous planted forests into multi-layered forests or mixed forests.

Furthermore, it is vital to enhance carbon dioxide removals by forests through thinning

(Unit: 10,000 ha)

Type of work	Private and public forest	National forest	Total
Tree planting	2.4	0.9	3.3
Post establishment nurturing	33	14	47
Thinning	24	9	33

Source: Survey by Forestry Agency

Note: Area of Thinning represents a result of the forest sink measures.

**Table I-1 Forest management area (FY2022)**

and reforestation to achieve the forest removals target of approximately 38 million ton-CO<sub>2</sub> in FY2030 (equivalent to approximately 2.7% of Japan's total emissions in FY2013) as set out under the Paris Agreement and also to contribute to net-zero by 2050.

To respond to these issues, the Forestry Agency supports forest management activities by private and public forest owners through forest management projects, while steadily promoting forest management in national forests (Table I-1).

## (2) A Stable Supply of Superior Seeds and Seedlings

It is essential to improve the supply capacity of seedlings for reforestation due to the expected increase in harvesting of planted forests. In particular, the production proportion of containerized seedlings, which allow a longer planting period, should be increased to help reduce reforestation costs. About 67 million seedlings were produced for planting in FY2022, about 50% of which was raised using containers (Fig. I-3).



Source: Survey by Forestry Agency

Fig. I-3 Production of seedlings for afforestation

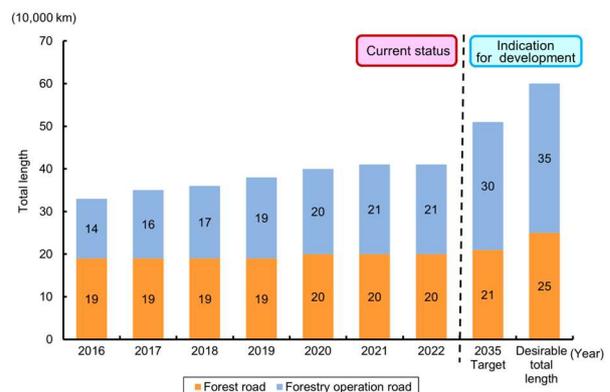
Furthermore, it is crucial to develop and supply varieties with superior growth aiming at the increase in carbon dioxide removals and forestry yield and the efficiency of afforestation and nurturing. The Forest Research and Management Organization has been developing the "elite trees" which are selected varieties with faster initial growth and good wood quality through crossbreeding and selection. The MAFF designates trees that meet criteria such as superior growth as the "specified mother trees" and promotes especially the designation of the "elite trees" in recent years. As of March 2024, 538 varieties have been designated as "specified mother trees" with superior growth, of which 368 are the "elite trees." The Forestry Agency is promoting the development of seed and hedge orchards to increase the seedlings derived from "specified mother trees".

## (3) Development of Forestry Road Systems

The Forestry Agency promotes to develop forestry road systems, which are essential infrastructure for forestry and livelihood of rural communities in hilly and mountainous areas. Forestry road systems have been developed to reach the total length of 410 thousand km in FY2022 (Fig. I-4).

## (4) Private Forest Management Entrustment System and Forest Environment Tax

Since small-scale forest ownership accounts for most private forests in Japan, consolidation is vital for promoting forest management. The Forestry Agency had



Source: Forestry Agency

Note: Forestry roads include "operation roads used mainly by timber transport trucks".

Fig. I-4 Current status of forestry road systems and the indication for development

promoted consolidation effort of forestry management entities, such as forest owners' cooperatives. The Private Forest Management Entrustment System was enforced in April 2019 through the Private Forest Management Entrustment Act, as forestry management entities faced difficulties in consolidating efforts. This was due to difficulties in tracking forest owners caused by generation changes and the declining interest in forest management.

Under the Private Forest Management Entrustment System, local municipalities can be entrusted with the management of forests whose owners are unable to manage appropriately. The municipalities can re-entrust the management of those forests that are suitable for forestry activities to private forestry operators who authorized by prefectural governments. For the forests which are not suitable for forestry activities and are required to fulfill multiple functions, the municipalities manage those entrusted forest by themselves.

By FY2022, 1,070 municipalities conducted the “questionnaires of forest owners' intention”, the first step of the entrustment process, for approximately 810,000 ha of private forest.

Also in 2019, the Forest Environment Tax and Forest Environment Transfer Tax were introduced for the funding of forest management activities by local municipalities. While the Forest Environment Tax will be imposed on each individual as a national tax at a rate of 1,000 yen per capita per year from FY2024, the Forest Environment Transfer Tax has been transferred to all the municipalities in Japan for the expenses of their forest management activities since FY2019.

The utilization of the Forest Environment Transfer Tax is increasing yearly. The total amount of the utilization plan for FY2023 is 53.7 billion yen. The efforts are steadily progressing. For example, the area of forest management using this tax, such as thinning, is about seven times in FY2022 as large as the first year of FY2019.

#### **(5) Social Support and Participation in Forest Management**

An increasing number of organizations, such as private companies and NPOs, are engaging in forest management activities in recent years with 3,671 organizations conducted in 2021. Active involvement of the private sector in forest management activities is driven by their growing interest in SDGs and ESG investment.

The J-Credit scheme operated by the MAFF, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment certifies the amount of greenhouse gas emissions reductions and removals and embraces forest-based carbon removals methodologies since its inception in 2013. The total issuance of credits certified through the forest methodologies up to FY2023 amounts to about 626,000 ton-CO<sub>2</sub>. The rapid increase of validated forest projects signals further expansion of removals credits in the years to come.

### **3. Forest Conservation**

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#### **(1) Management and Conservation of Protection Forests**

“Protection forests” are designated in accordance with the Forest Act when it is considered particularly necessary that they provide important public benefits. Felling and forest development are regulated in them. At the end of FY2022, 12.27 million ha of forests were designated as protection forests. Even when a forest except a protection forest will be diverted, the Forest Land Development Control System secures public benefits. In addition, Dangerous embankments are comprehensively regulated under nationwide uniform standards regardless of land use, including residential land, forestland, and cropland, according to the Act on Regulation of Residential Land Development and Specific Embankments enforced in May 2023.

## (2) Disaster Control

The Forestry Agency promotes integrated forest conservation projects including accurate clarification of mountain disaster hazard zones, restoration of devastated forests, and development of coastal forests. When natural disasters occur in mountainous areas, the Forestry Agency conducts immediate surveys and elaborates recovery works.

## (3) Conservation of Forest Biodiversity

The Forestry Agency promotes establishment of diverse forests depending on its natural conditions, and protection and management of primeval forest ecosystems. The Forestry Agency implements the appropriate protection and management of forests in areas such as World Heritage sites and Biosphere Reserves.

In 2024, the Forestry Agency compiled the "Guidelines for forestry management to enhance forest biodiversity", targeting forestry contractors and forest holders to promote nature-positive activities in the forestry sector.

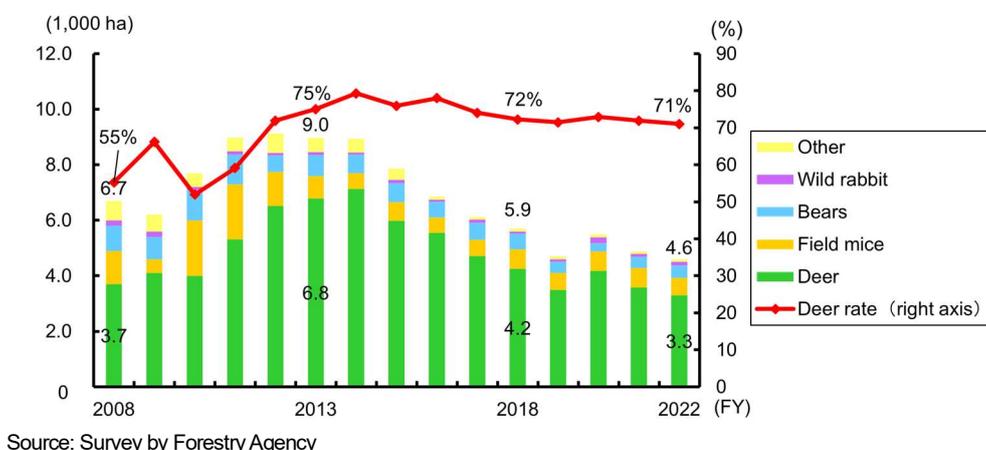
## (4) Forest Damage by Wildlife, Pests and Forest Fire

Forest damage by wildlife is still serious though it is decreasing. In FY2022, about 4,600 ha of forests were damaged by wildlife, about 70% of which was caused by deer (Fig. I-5). The MAFF and Ministry of the Environment promote comprehensive measures including barrier fences installation and population control through capturing wildlife to prevent the damage.

Damage by pinewood nematode (*Bursaphelenchus xylophilus*) is the worst forest pest in Japan, although it is declining. In FY2022, pinewood nematode damaged about 250 thousand m<sup>3</sup> of trees. To prevent the spread of this pest, the Forestry Agency propagates pest-resistant seedlings, implements prevention measures with chemicals, and eradicates the nematode and mediating insects by logging and fumigation of affected trees.

In addition, damage by Japanese Oak Wilt, which is transmitted by *Platypus quercivorus*, is spreading. In FY2022, this pest damaged 148 thousand m<sup>3</sup> of trees in 41 prefectures. To prevent the spread of this pest, the Forestry Agency promotes the extermination of insects by fumigation of damaged trees and the prevention of insect invasion by applying adhesives to and covering with vinyl sheets on healthy trees.

In 2022, 1,239 forest fires occurred, burning down 605 ha of forest. Forest fires intensively occur in winter and spring, with most of the cases caused by people carelessly using fire.



**Fig. I-5 Area of forests damaged by major wildlife species**

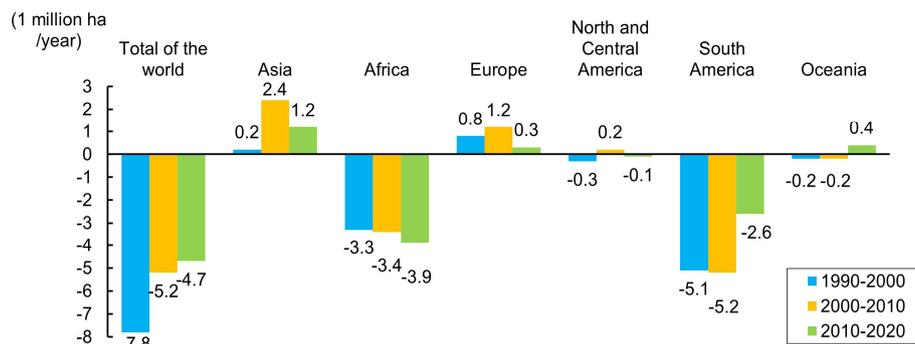
## 4. Addressing Global Policy Agenda

### (1) Promotion of Sustainable Forest Management

According to the Food and Agriculture Organization of the United Nations (FAO), the global forest area in 2020 is estimated to be 4.06 billion ha, which is 31 % of the total land area. The global forest area is still decreasing worldwide, especially in tropical forests in Africa and South America. The annual rate of net forest loss in 2010-2020 is estimated at 4.7 million ha/year, however if the increases due to afforestation and forest expansion are not taken into account, the annual rate of forest loss would be 10.2 million ha/year in 2015-2020 (Fig. I-6).

The GOJ promotes efforts toward sustainable forest management through participating in international dialogues on forests such as the United Nations Forum on Forests (UNFF), the FAO Committee on Forestry (COFO) and the Montréal Process.

In Japan, two forest certification schemes have been in place, one of which is run by the Forest Stewardship Council (FSC), an international organization, and the other is run by the Sustainable Green Ecosystem Council endorsed by Programme for the Endorsement of Forest Certification schemes (SGEC/PEFC-J), which had been established as a domestic certification scheme in Japan, and was endorsed by the Programme for the Endorsement of Forest Certification (PEFC) in 2016. About 10% of forests in Japan are certified by FSC (about 0.42 million ha) and/or SGEC (about 2.21 million ha).



Source: Prepared by the Forestry Agency based on Global Forest Resources Assessment 2020 (FAO)

**Fig. I-6 Annual forest area net change by decade and region, 1990–2020**

### (2) Global Warming and Forests

Global warming is one of the most serious environmental problems. Adverse impacts caused by the rising global average temperature are causing concern.

To realize net-zero by 2050, the GOJ revised the Plan for Global Warming Countermeasures in October 2021, with Japan's aim to reduce its GHG emissions by 46% in FY2030 compared to FY2013 levels, of which approximately 2.7% is to be met by forest carbon removals.

Measures for the enhancement of forest carbon sinks are essential to achieve the targets, which include the implementation of forest management practices such as thinning and reforestation using the "elite trees" as well as promoting wood use.

The GOJ has promoted "Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of

carbon stocks in developing countries” (REDD+), and adaptation measures based on the Climate Change Adaptation Plan (revised in May 2023, by the GOJ).

### (3) International Discussions on Biodiversity

The Kunming-Montreal Global Biodiversity Framework, new global goals for 2050 and global targets for 2030, was adopted at the second part of COP15 to the Convention on Biological Diversity (CBD) held in December 2022.

### (4) International Cooperation

The GOJ contributes to the promotion of sustainable forest management in developing countries by providing technical cooperation and financial assistance by bilateral cooperation and multilateral cooperation through international bodies.

Japan’s technical cooperation is conducted as projects which optimally combine the “dispatch of experts”, “acceptance of training participants” and “provision of equipment”, and policy/technical training courses through the Japan International Cooperation Agency (JICA). Also, the GOJ provides financial support such as loans and grants through JICA: loans for promoting afforestation and reforestation projects and developing human resources, and grants for procurement of machinery and materials for forest management.

The GOJ also provides financial support to projects conducted by the International Tropical Timber Organization (ITTO) and FAO. In the projects, ITTO promotes sustainable wood use in Viet Nam, Indonesia, Thailand and Malaysia, and establishes timber legality framework in wood producing countries, and FAO promotes conservation and utilization of forests for enhancing community resilience to climate change in mountain watersheds of developing countries and balancing conservation of forest and agriculture for halting deforestation.



In the Republic of Kenya in East Africa, 80% of the land is arid or semi-arid and afforestation has not progressed. Japan International Forestry Promotion and Cooperation Center (JIFPRO) is developing and promoting long-rooted seedling technology, working with the Kenya Forest Research Institute, under a subsidized project by the Forestry Agency. Since FY 2022, Komatsu Ltd., a Japanese company, has provided machinery for efficiently digging deep planting holes, and technical demonstrations of afforestation with long-rooted seedlings have been conducted on the land of over 70 farmers.



Planting long-rooted seedlings by President of Kenya

(©Kenya Forest Research Institute)



Excavation of planting holes using construction machinery

(©JIFPRO)

## Chapter II

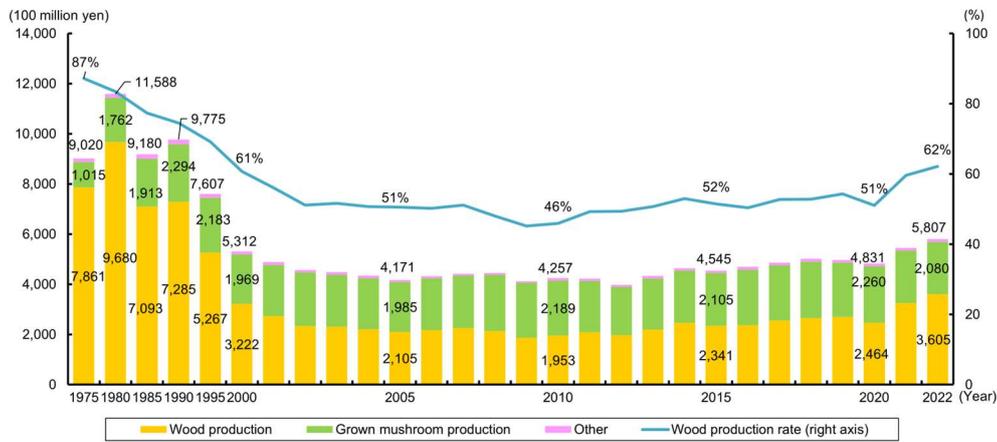
# Forestry and Rural Communities in Hilly and Mountainous Areas

## 1. Forestry

### (1) Forestry Production

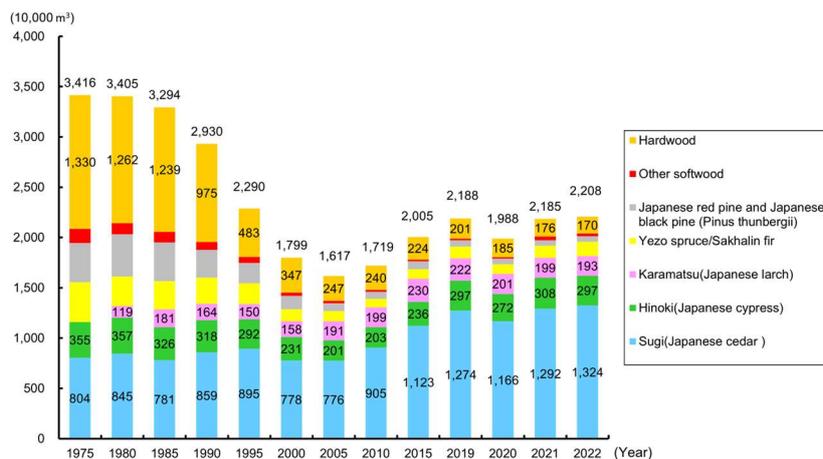
Total forestry output in 2022 was 580.7 billion yen, an increase of 6.4% from the previous year. Wood production accounted for about 60% of forestry output and reached 360.5 billion yen in 2022, which was an increase of 10.8% from the previous year (Fig. II-1).

Supply of domestic wood totaled 34.62 million m<sup>3</sup> in 2022. Of the supply, logs for sawn lumber, plywood and chips accounted for 22.08 million m<sup>3</sup>. By tree species, the volume of Sugi (Japanese cedar) production was 59.9%, Hinoki (Japanese cypress) 13.5%, Japanese larch 8.7%, and hardwood 7.7%, respectively (Fig. II-2).



Source: MAFF "Forestry output"

Fig. II-1 Gross forestry output



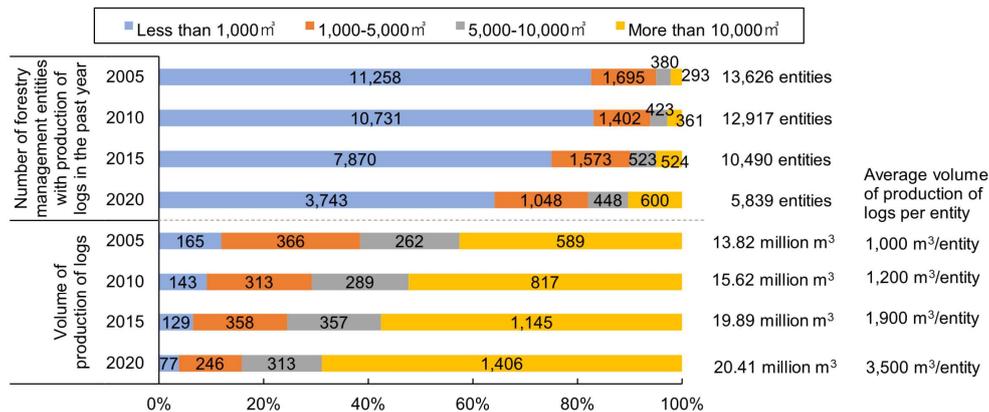
Source: MAFF "Report on supply and demand of lumber"

Fig. II-2 Domestic roundwood production

## (2) Forestry Management

The number of forestry households in 2020 was 690 thousand, 88% of which owned less than 10 ha of forest area. Small-scale forest ownership remains dominant.

The number of forestry management entities is about 34,000, significantly decreasing from about 200,000 in 2005. On the other hand, the average volume of log production per forestry management entity has increased. In addition, the proportion of log volume by entities with the annual log production of more than 10,000 m<sup>3</sup> has increased to 70%, indicating that the scale of entities is expanding (Fig. II-3).



Source: MAFF "Census of Agriculture and Forestry" (aggregate calculation after reclassification)

Fig. II-3 Number of forestry management entities by the scale of log production

Forest owners' cooperatives are the main players in forest management. Thus, it is necessary to strengthen their management base in terms of increasing profit return to forest owners and forestry workers.

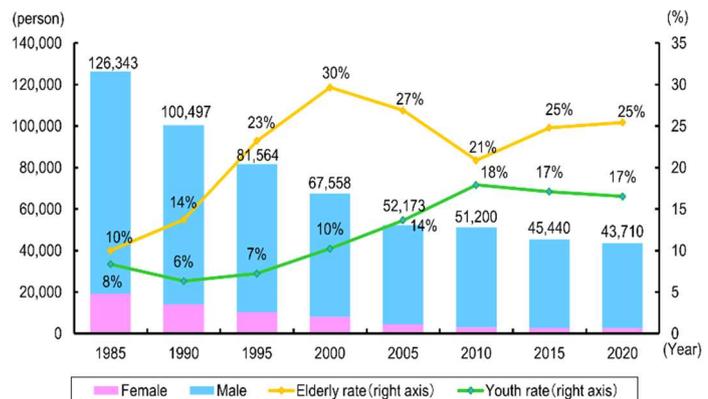
To strengthen the management skills of forestry management entities, the Forestry Agency has supported the development of "Forest Management Planners" who engage in selling woods strategically and sustainable forest management.

## (3) Forestry Workforce

The number of forestry workers in 2020 was 43,710, which leveled off after a long-term declining trend.

The proportion of young workers in forestry remains stable while that in all industries is on a declining trend (Fig. II-4).

Since the rate of occupational accidents in forestry is higher than in other industries, the Forestry Agency promotes safety patrol guidance to forestry management entities, and offers various training programs for forestry workers (Fig. II-5).

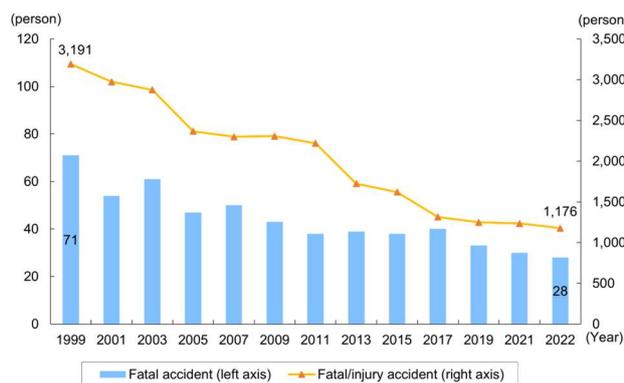


Source: Ministry of Internal Affairs and Communications "National Census"

- Notes: 1. "Elderly rate" reflects the rate of people aged 65 or over.
- 2. "Youth rate" reflects the rate of people aged under 35.

Fig. II-4 Number of forestry workers

Permanent year-round employment rate of forestry workers is on a growing trend. On the other hand, the average annual salary for forestry workers is lower than in other industries. Therefore, the Forestry Agency is making efforts to improve their salary levels. Although the proportion of females engaged in forestry is lower than that of males (Fig. II-4), the opportunities that women play an active role such as the log production and forest surveys have increased due to the progress of the mechanization of forestry in recent years. In addition, some entities have developed the environments where women can work comfortably.



Source: Ministry of Health, Labour and Welfare "Report on Fatal Accidents" and "Report on occupational casualties"

**Fig. II-5 Number of occupational accidents in forestry**

#### **(4) Improvement of the Efficiency of Forestry Management**

##### **Consolidating Forestry Operations**

Consolidation of forestry operations is necessary to improve productivity since most of the private forests in Japan consist of small-scale forest owners.

The Forestry Agency encourages such operations through the Collective Forest Management Plan System, the Private Forest Management Entrustment System and the development of Forest Practice Planners.

It is also promoted to provide forestry entities with forest information necessary for consolidating operations through forest land ledgers, in which each municipality consolidates ownership and boundary information, and “Forest Cloud Systems” introduced by prefectures for efficient information sharing among stakeholders.

##### **Development of the New Forestry**

Based on the revised Basic Plan for Forest and Forestry, the Forestry Agency is promoting initiatives for the “New forestry” that utilizes new technologies to improve productivity and safety, which makes it possible to significantly improve profitability of forestry, from logging to reforestation and silviculture processes. Introducing of the “elite trees” and “Smart forestry”, which utilize ICT and new technologies such as remotely operated machinery, is considered to be the key to realizing the “New forestry”.

## **2. Non-timber Forest Products**

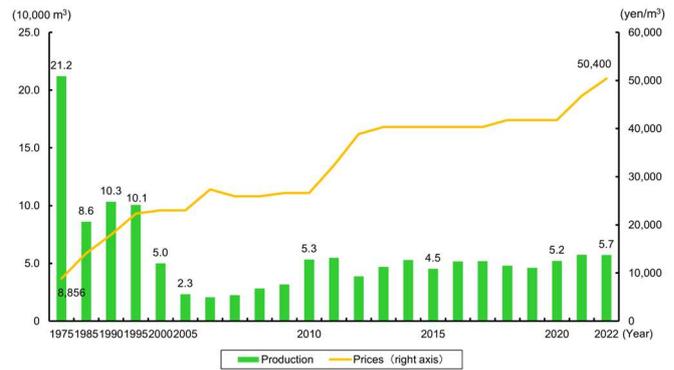
Non-timber forest products include variety of products such as mushrooms, edible nuts, wild vegetables, Japanese lacquer, bamboo, charcoal, and firewood. Non-timber forest products account for about 40% of the forestry output and play key roles in stimulating rural economies and increasing in income. The value of non-timber forest products in 2022 was 265.8 billion yen, an increase of 1.9% from the previous year.

### **(1) Mushrooms**

Mushrooms earned more than 80% of the value of non-timber forest products in 2022. Production of mushrooms has been flat in recent years, reaching 461,000 tons in 2022.

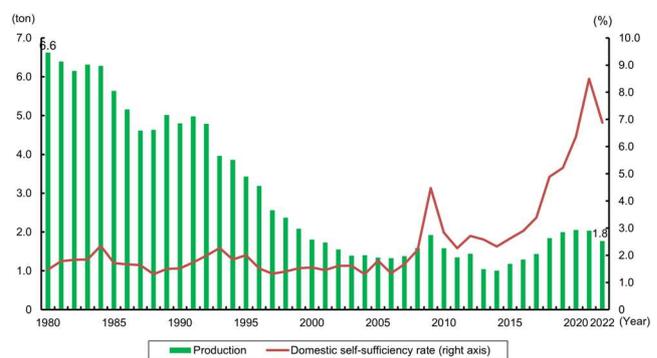
## (2) Other Non-timber Forest Products

Total production of charcoal has been decreasing over the long term and amounted to 17,000 tons in 2022. On the other hand, reflecting continued popularity of camping, total production of firewood for sale was almost the same as the previous year and amounted to 57,000 m<sup>3</sup> (Fig. II-6). Production of bamboo material was 25,000 tons in 2022, a decrease of 9.6% from the previous year. Production of domestically produced lacquer has been increasing in recent years since the Agency for Cultural Affairs announced a policy to use domestically produced lacquer in principle for the preservation and restoration of national treasure and important cultural property buildings in 2015. Domestic production in 2022 was 1.8 tons (Fig. II-7).



Source: MAFF “Non-timber Forest Products Data”

Fig. II-6 Production and prices of firewood for sale



Source: MAFF “Non-timber Forest Products Data”

Fig. II-7 Production of Japanese lacquer

## 3. Rural Communities in Hilly and Mountainous Areas

### (1) Current State of Rural Communities in Hilly and Mountainous Areas

Rural communities in hilly and mountainous areas, where many people engage in forestry and other activities based on forest, play a significant role in securing the multiple functions of forests. “Mountain Village Areas Due for Development”, designated pursuant to the Mountain Villages Development Act, cover about half of Japan’s total land area, accounting for approximately 60% of the total forest area. These communities face several problems such as a decrease in job opportunities and an increase in abandoned farmland due to continuing depopulation and the aging population.

On the other hand, there has been increasing interest by urban residents and foreign tourists in abundant forests, clear water, landscape and culture in rural communities in hilly and mountainous areas.

### (2) Revitalization of Rural Communities in Hilly and Mountainous Areas

The MAFF has supported to discover local resources such as non-timber forest products, hardwood and *gibiers* (game meat) and to improve the added value of the resource, in addition to develop the forestry and wood industry by utilizing forest resources.

In recent years, there are new movements to use forest spaces in diverse fields such as health promotion, tourism, and education as people change their lifestyles and diversify their values. The Forestry Agency has worked to create and promote the “Forest-related Service Industry” in these fields.

Ueno Village in Gunma Prefecture is a region rich in forest resources, with 95% of the area covered by forests, and woodworking products are a specialty of the area. Aiming to further utilize the forest resources and revitalize the woodworking industry, the village's forest owners' cooperatives and woodworking artists have established a project team "Uenomuramokko", working to develop new products and secure workers.

As a result of these efforts, which have been joined by I-turners, the village has become better known as a woodworking village. This has also led to further I-turns to the region, 12 people have settled and are working in the area as of 2023.



Development of woodworking products utilizing forest resources



Woodworking artists at work

