

Annual Report on Forest and Forestry in Japan

Fiscal Year 2021

(Summary)

Forestry Agency

Ministry of Agriculture, Forestry and Fisheries, Japan



The Annual Report on Forest and Forestry is a report which the Government of Japan (GOJ) submits to the Diet every year, in accordance with article 10 of the Forest and Forestry Basic Act. This document is a summary of the annual report for fiscal year (FY) 2021.

Table of Contents

Forests and Forestry Topics for FY2021	1
Special Topic 1: Responses to Wood Shortages and Price Increases in 2021	4
Special Topic 2: Expanding Demand for Wood and Strengthening the Competitiveness of the Wood Industry as a Key to Green Growth.....	6
Chapter I Forest Management and Conservation	16
Chapter II Forestry and Rural Communities in Hilly and Mountainous Areas	23
Chapter III Wood Product Demand and Use of Wood	29
Chapter IV National Forest Management.....	34
Chapter V Reconstruction after the Great East Japan Earthquake	37
Appendix	40

Note: The maps of Japan included in this summary report do not necessarily represent the territory of Japan comprehensively.

Forests and Forestry Topics for FY2021

Topic 1: Basic Plan for Forest and Forestry Aiming to Realize “Green growth” with a View to Achieving Net-zero by 2050

The GOJ revised the Basic Plan for Forest and Forestry in June 2021. The plan aims to realize “Green growth” that contributes to achieving net-zero greenhouse gas (GHG) emissions by 2050 through continuing efforts to transform forestry and wood industry into a growth industry by promoting appropriate management of forests including reforestation and sustainable use of forest resources such as wood use in buildings.

Five points of measures in the Basic Plan for Forest and Forestry

- Appropriate management and use of forest resources
- Development of initiatives for “New forestry”
- Strengthening the competitiveness of the wood industry
- Creation of the "Second forests" in urban areas that means increasing buildings with wood
- Creation of a new value for rural communities in hilly and mountainous areas



Topic 2: Enforcement of “Act for Promotion of Use of Wood in Buildings to Contribute to the Realization of a Decarbonized Society” -Toward “Wood Change*”-

To promote wood use in buildings further, the Act for Promotion of Use of Wood in Public Buildings was amended and renamed the Act for Promotion of Use of Wood in Buildings to Contribute to the Realization of a Decarbonized Society which came into force in October 2021.

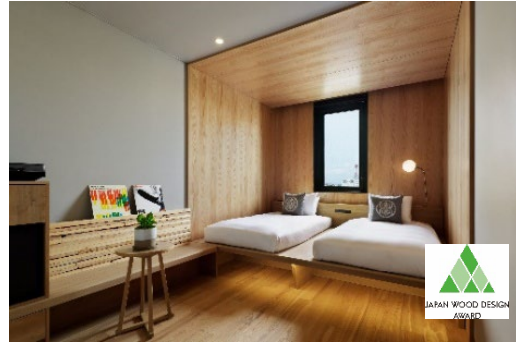
In the Act, the scope of basic national policies was expanded from public buildings to buildings in general. In addition, “Wood Use Promotion Day” (October 8th) and “Wood Use Promotion Month” (October) were established. Furthermore, the GOJ created a headquarters for wood use promotion and an agreement system for wood use promotion in buildings.

The “Wood Change Council”, including wide range of stakeholders such as organizations of suppliers, processors and consumers of wood, was also launched to create environment conducive to the use of wood.

The GOJ has developed a guideline that shows a standard calculation and indication method for the carbon storage of wood used in buildings.



docomo Shop Tamba Sasayama
(TambaSasayama City, Hyogo)
(©SWING Co., Ltd.)



The Royal Park Canvas - Sapporo Odori Park
(Sapporo City, Hokkaido)
(©Mitsubishi Estate Co., Ltd.)

* Wood Change is the change to sustainable society through the activities as followings; change commodities into wood products, utilize wood in daily life and construct buildings and houses with wood.

Topic 3: Inscription of "Amami-Oshima Island, Tokunoshima Island, Northern part of Okinawa Island, and Iriomote Island" on the World Heritage List

In July 2021, "Amami-Oshima Island, Tokunoshima Island, Northern part of Okinawa Island, and Iriomote Island" was newly inscribed as UNESCO World Natural Heritage sites. The islands are the fifth site in Japan, following Shirakami-Sanchi, Yakushima, Shiretoko and Ogasawara Islands.

Most of the heritage area is covered with evergreen broadleaf subtropical rainforests. In the area, numerous rare species grow and inhabit, including 95 endangered species on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, such as the Amami Rabbit.

The Forestry Agency has designated almost all the area of the national forest, which accounts for approximately 70 % of the heritage area, as a "Forest Ecosystem Reserve" to protect and manage the area strictly.

The GOJ, prefectural governments, local municipalities and related parties work together to respond to the requests such as tourism management, issued by the World Heritage Committee.



Mangrove forests (Iriomote Island)



Guided tours conducted by the Ecotour
Guide Liaison Council (Tokunoshima Island)
(©Tokunoshima Niji no Kai)

Topic 4: Countermeasures against Mountain Disasters from Heavy Rains in July and August in 2021

The heavy rains caused mountain disasters in various regions of Japan in July and August 2021. Especially in the Shimokita Peninsula of Aomori Prefecture, from August 9th to August 10th, localized heavy rains caused mountain disasters simultaneously and resulted in sediment and driftwood runoff.

The Forestry Agency supported the affected prefectures by conducting emergency observations using satellites based on an agreement with the Japan Aerospace Exploration Agency (JAXA). The Forestry Agency also implemented an investigation for the damage from the sky using helicopters in cooperation with the affected prefectures.

In addition, technical staffs from the Forestry Agency and experts from the Forest Research and Management Organization have provided technical support in assessing the disaster situation and for the recovery.

In response to the mudslide disaster in the Izusan district of Atami City, Shizuoka Prefecture, in July 2021, the GOJ carried out a comprehensive inspection to prevent embankment disasters and provided the necessary support in collaboration with related organizations. The GOJ also submitted the Proposed Act Partially Amending the Act on the Regulation of Housing Land Development that comprehensively regulates dangerous embankments to the Diet in March 2022.



Disruption of national roads due to mainly runoff sediment
(Kazamaura village, Aomori Prefecture)



Control of sediment and driftwood runoff by forest conservation facilities
(Kazamaura village, Aomori Prefecture)



Joint helicopter investigation with affected prefectures
(Kagoshima Prefecture)

Special Topic 1: Responses to Wood Shortages and Price Increases in 2021

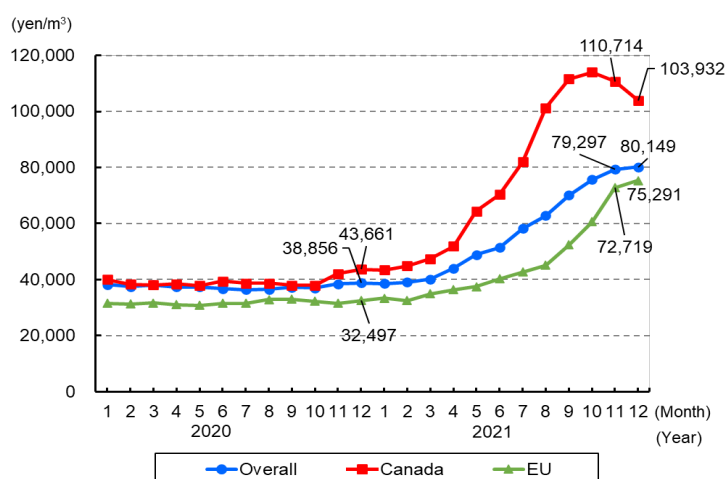
1. State of Wood Shortages and Price Increases in 2021

Trends in Wood Imports

In the United States, the number of housing starts surged since May 2020, mainly due to an increase in teleworking. In 2021, the lumber price in North America reached a record high. Furthermore, sea freight rates for containers rose sharply after the end of 2020.

Due to the increasing demand for wood in the United States and Europe and the disruption of maritime transportation, the monthly volume of Japan's sawn wood imports fell below the previous year's level in the first half of 2021, after which it gradually recovered.

The average unit price of imported sawn wood products in Japan has increased significantly with the rise in local prices and sea freight rates (Fig. 1).



Source: Ministry of Finance "Trade Statistics of Japan"

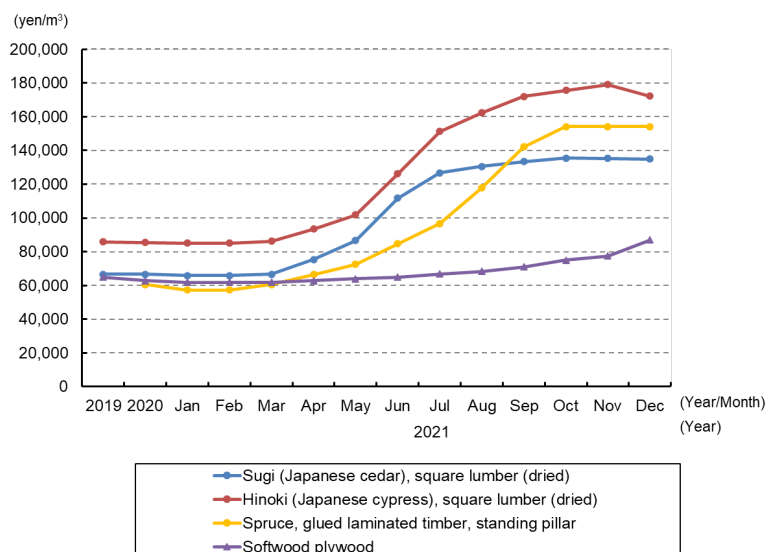
Fig. 1 Average unit price of imported sawn wood products in Japan

Trends in Shipments of Sawn Wood Products and Plywood and Wood Prices

As housing demand recovered in Japan, the demand for domestic wood increased as a substitute for imported wood. The shipments of sawn wood products recovered to the level before the COVID-19 pandemic in March 2021. However, the wood prices rose because forestry and the wood industry could not fully meet the strong demand.

Since March 2021, plywood shipments have recovered to the pre-pandemic level. Due to the continued strong demand, especially for housing, the product inventories have remained on a declining trend and the prices have risen (Fig. 2).

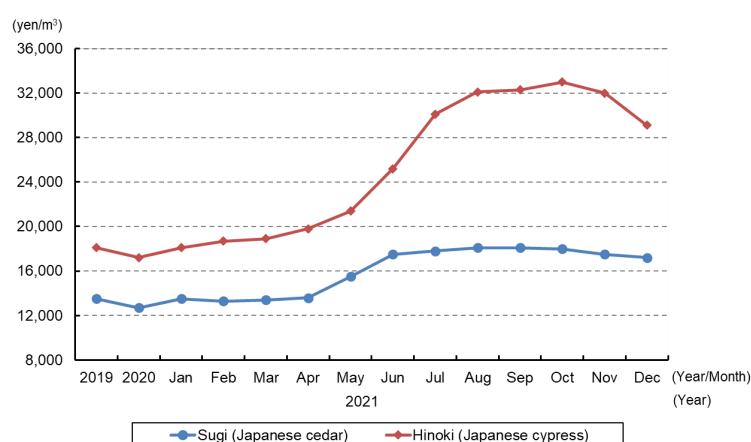
Log prices have also increased with the rise in product prices (Fig. 3).



Source: MAFF "Wood Supply and Demand Report"

- Notes: 1. Sugi (Japanese cedar), square lumber and Hinoki (Japanese cypress), square lumber are 10.5 cm square and 3.0 m long.
 2. Spruce, glued laminated timber, standing pillar is 10.5 cm square and 2.98-3.0 m long. The price (yen/m³) is calculated by converting one pillar to 0.033075 m³.
 3. Softwood plywood is 1.2 cm thick, 91 cm wide and 1.82 m long.

Fig. 2 Changes in prices of sawn wood products, glued laminated timber and plywood



Source: MAFF "Wood Supply and Demand Report"

Note: Logs of Sugi and Hinoki are medium-diameter logs with 14-22 cm in diameter and 3.65-4.0 m in length.

Fig. 3 Changes in log prices

2. Efforts to Convert from Imported Wood and Ensure a Stable Supply of Domestic Wood

As an urgent response to the situation, the Forestry Agency held three rounds of supply-demand information liaison councils at the center and by district in FY2021 to share supply-demand information among participants from upstream to downstream of the forestry and wood industry and to disseminate examples of conversion to domestic wood products.

The Forestry Agency also supported the installation of drying facilities to strengthen the supply capacity of wood products, as well as thinning and forestry road system development to ensure a stable supply of logs through a supplementary budget for FY2021.

Special Topic 2: Expanding Demand for Wood and Strengthening the Competitiveness of the Wood Industry as a Key to Green Growth

1. Realization of Green Growth by Expanding Demand for Wood and Strengthening the Competitiveness of the Wood Industry

Significance of Wood Use for the Public Benefits

The majority of Japan's planted forests have reached maturity and are in the utilization phase, with over half the area is aged 50 years and above. It is essential to promote a cycle of "harvesting, utilizing, re-planting and tending" the planted forests (Fig. 1), including by expanding the use of wood and developing young forests with vigorous growth, to ensure that forests continue to contribute to carbon dioxide removals.

The use of wood in buildings enables long-term storage of carbon removed by forests (Fig. 2).

Wood contributes to the reduction of carbon dioxide emissions since it consumes less energy than other materials during the manufacturing process and can replace fossil fuels if burnt as woody biomass.

Toward the Realization of Green Growth

The Basic Plan for Forest and Forestry revised in June 2021 aims to realize "Green growth".

One of key points to achieve "Green growth" is how to secure and expand stable demand for wood, especially for lumber, in addition to efforts to reduce the costs of afforestation and log production through initiatives such as "New forestry".

The wood industry, which purchases logs from forest owners and processes and sells them to customers, plays an important role in ensuring the sustainability of forests and forestry and promoting the appropriate use of wood. Strengthening the competitiveness of the wood industry is key to "Green growth".

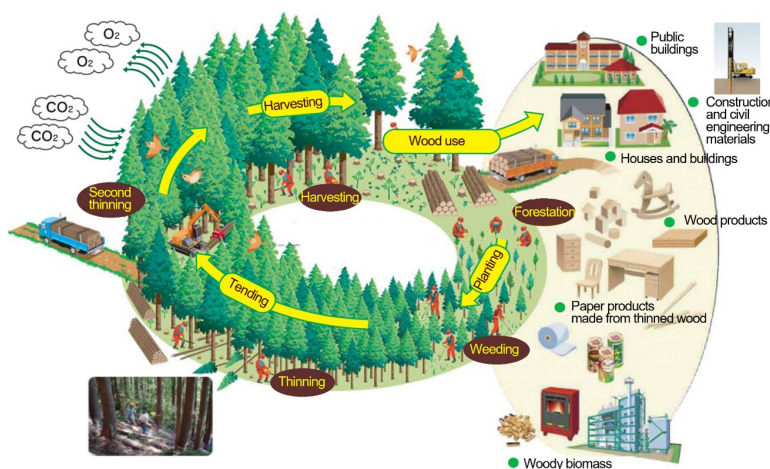
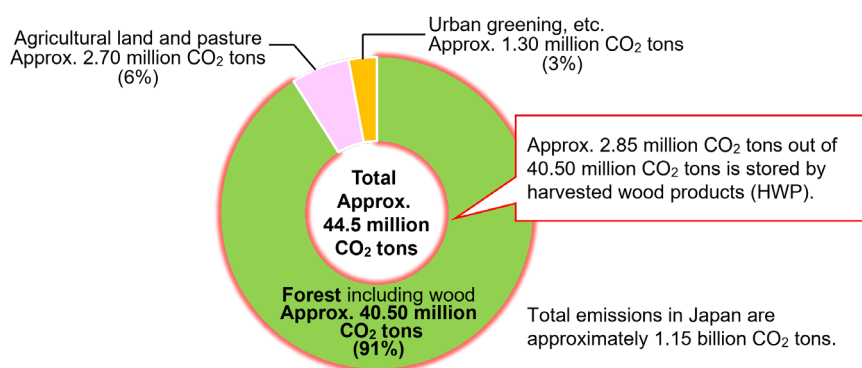


Fig.1 A schematic diagram of sustainable and cyclic use of forest resources



Source: Prepared by Forestry Agency based on National Institute for Environmental Studies "Japan's National Greenhouse Gas Emissions in Fiscal Year 2020 (Final Figures)"

Note: This pie chart shows the amount of CO₂ removed by forest and other carbon sink measures. Removals by forests are accounted for as the amount of CO₂ removed by forests where forest management activities such as thinning have been conducted since 1990.

Fig. 2 Carbon dioxide removals in Japan in FY2020

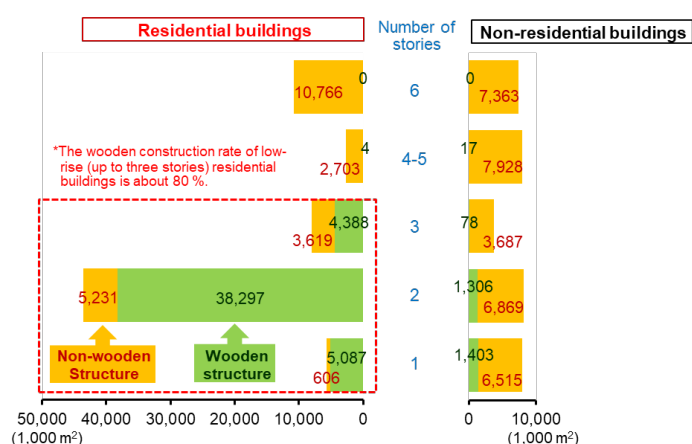
2. Trends in Wood Use in Housing and Construction

(1) Trends in Wood Use in Housing

The wooden construction rate of low-rise (up to three stories) residential buildings is 80 %. The housing sector is an important market for domestic wood (Fig. 3).

More reliable quality and performance are required for wood products used for housing in terms of dimensional stability and strength. As a result, the proportion of kiln-dried lumber has increased (Fig. 4).

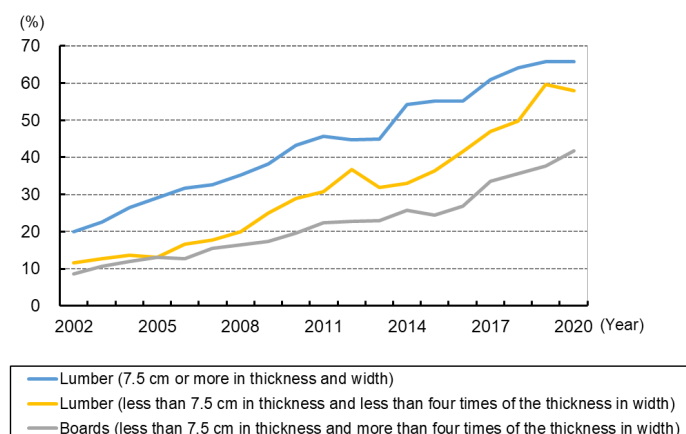
Furthermore, major housing manufacturers use more glued laminated timber (glulam) with high dimensional stability. The use of Sugi (Japanese cedar) glulam has increased in pillars. On the other hand, glulam of imported wood is highly competitive for horizontal members due to the need for strength.



Source: Prepared by the Forestry Agency based on Ministry of Land, Infrastructure, Transport and Tourism "Statistics Survey on Building Starts 2021"

Note: Residential buildings are the total of residential, semi-residential and residential-industrial buildings, while non-residential buildings are the total of all the other types of buildings.

Fig. 3 Floor area of buildings starts by use, number of stories and structure



Source: MAFF "Wood Supply and Demand Report"

Fig. 4 Proportion of kiln-dried lumber in construction lumber

(2) Trends in Wood Use in Non-residential and Mid-to-high-rise Buildings

The wooden construction rate of non-residential and mid-to-high-rise buildings started was only 6% in 2021.

Since the Act for Promotion of Use of Wood in Public Buildings came into force in 2010, the share of wooden construction in public buildings started in each fiscal year has been increasing (8.3% in FY2010 → 13.9% in FY2020) .

In private buildings, construction and design firms and private enterprises that serve as building owners are moving toward wooden structures, interiors and exteriors in non-residential and mid-to-high-rise buildings against the backdrop of the expected shrinkage of the housing market and the growing attention to wood as a sustainable resource.

Especially for low-rise non-residential buildings with small floor areas, the wooden construction rate is relatively high (about 40% for buildings less than 500 m²). Various buildings such as stores and offices are constructed with wood.

For mid-to-high-rise buildings, the technical and institutional environment for wood use has been developed to a certain extent. As a result, leading buildings such as an 11-story wooden training facility has made progress.

3. Strengthening the Competitiveness of the Wood Industry

(1) Trends in the Wood Product Manufacturing Industry

Among sawn wood, glued laminated timber and plywood, which are the major wood products for construction, sawn wood has the largest supply. It is important to provide a stable supply of products that meet market needs (Fig. 5).

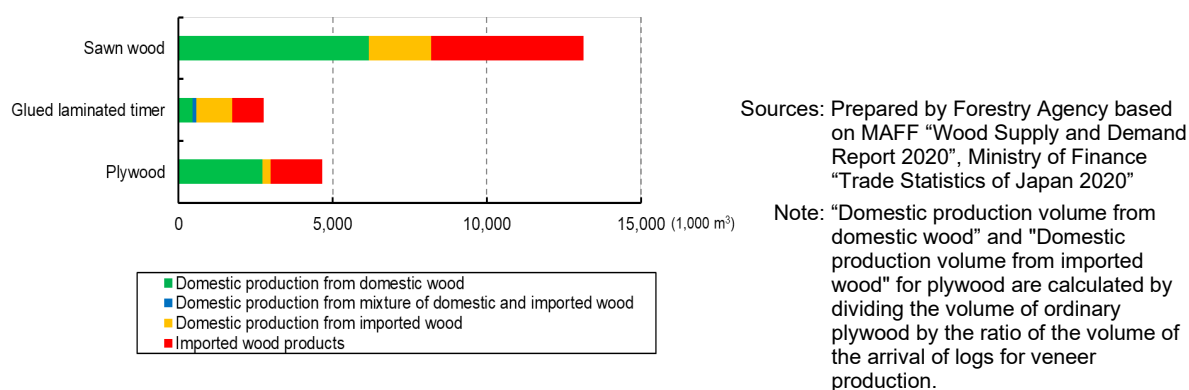


Fig. 5 Supply of sawn wood, glued laminated timber and plywood in 2020

Strengthening Global Competitiveness

The needs of major housing manufacturers are to procure wood products (general distribution products) stably, with reliable quality and performance in large lots.

Sawmills have become larger in scale: the number of mills consuming more than 10,000 m³ of logs per year and the volume of logs consumed have increased (Fig. 6). Large-scale mills ensure cost competitiveness not only by reducing costs through expansion of scale but also by conducting multiple operations, such as combined production of lumber and glued laminated timber, and woody biomass power generation.

Plywood mills have also become larger in scale: the number of mills consuming more than 100,000 m³ of logs per year and the volume of logs consumed have increased (Fig. 7).

The utilization rate of domestic wood has improved, mainly for structural plywood. Efforts to use domestic wood are also progressing in plywood for floor base and concrete forming, where imported wood products have a high market share.

In addition, some plywood mills produce particle board and Medium Density Fiberboard (MDF) for the advanced utilization of wood offcuts generated during veneer production.

Scale (Domestic log consumption)	Number of mills (Log consumption)	
	2004	2019
More than 100,000 m ³	0 (0)	12 (2.43 million m ³)
50,000-100,000 m ³	13 (0.85 million m ³)	31 (2.24 million m ³)
10,000-50,000 m ³	194 (3.70 million m ³)	209 (4.30 million m ³)
Less than 10,000 m ³	9,213 (6.92 million m ³)	4,130 (3.90 million m ³)

Sources: MAFF "Wood Supply and Demand Report", Survey by Forestry Agency

Fig. 6 Number and log consumption of sawmills by scale

Scale (Domestic log consumption)	Number of mills (Log consumption)	
	2004	2019
More than 200,000 m ³	0 (0)	9 (2.34 million m ³)
100,000-200,000 m ³	1 (0.14 million m ³)	12 (1.77 million m ³)
10,000-100,000 m ³	11 (0.28 million m ³)	4 (0.26 million m ³)

Source: Survey by Forestry Agency

Note: The total number of plywood mills was 287 in 2004 and 176 in 2019 (MAFF "Wood Supply and Demand Report").

Fig. 7 Number and log consumption of plywood mills by scale



Chugoku Lumber Co., Ltd. owns a sawmill that consumes about 700,000 m³ of logs annually in Hyuga City, Miyazaki Prefecture.

The company accepts logs of a wide range of diameters from small to large, and processes them into kiln-dried lumber and glued laminated timber while improving processing yields.

Furthermore, the company works to maximize the added value of wood by fully utilizing logs through selling and using logs and offcuts that cannot be processed into wood products as pulp materials and biomass fuels.



A large-scale sawmill

Strengthening Local Competitiveness

Local sawmills provide high-quality lumber such as knot-free lumber that meets the various individual needs of local builders and other related parties.

In FY2020, a total of 19,898 houses were supplied by 540 groups that consist of all parties involved, from forest owners to home builders who work together to build houses with wood, connecting producers and consumers.

Local sawmills are also responding to demand for wood other than for housing (Fig. 8). The shipments of domestic sawn wood products for furniture and fittings increased from 30,000 m³ in 2015 to 49,000 m³ in 2020.

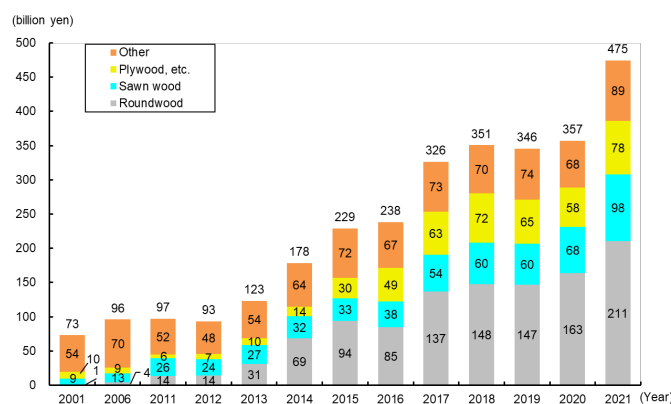


Fig.8 Furniture made of Japanese cypress produced through collaboration among designers, sawmills and other related parties

(©KOIYA Council)

Initiatives for Wood Exports

The value of wood exports has increased. In 2021, it rose to 47.5 billion yen, which was an increase of 33 % from the previous year (Fig. 9).



Source: Ministry of Finance "Trade Statistics of Japan"

Notes: 1. The bar chart of each year is the total of HS44.
2. For 2021, it is the definite reported value.

Fig. 9 Changes in the value of wood exports in Japan

The largest export destination was China at approximately 47%, 77% of which was exported in logs used for packaging materials, civil engineering materials and other materials. Exports of Sugi (Japanese cedar) lumber to the United States have increased for the usage of fence materials (Fig. 10).

In the Action Strategy for Expanding the Export of Agricultural, Forestry and Fishery Products and Foods, lumber and plywood are selected as priority items for exports. In addition, it sets out a policy on marketing and expansion of overseas sales channels for building materials and highly durable woods, targeting mainly China, the United States, South Korea and Taiwan.



Fig. 10 Exterior wall decoration of a shopping mall in Shanghai, China (Japanese cedar and Japanese cypress)
(©KOSHII & Co., Ltd.)

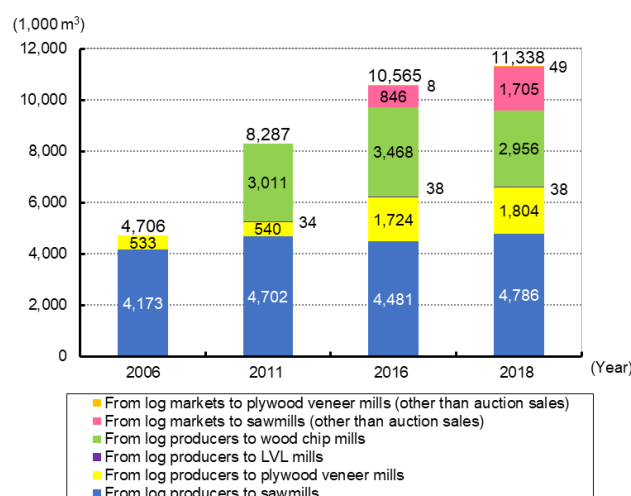
(2) Trends in the Wood Distribution Industry

Establishment of a Stable Supply System

In order to establish a stable supply system of logs, some sawmills have entered into agreements with forest owners' cooperatives and others to stabilize supply volumes and transaction prices.

The amount of logs sent directly from log producers to sawmills and plywood mills has also increased due to development of agreements with them (Fig. 11).

In the manufacturing sector, there is a trend toward the expansion of multiple operations combined with forestry management whereby log markets and sawmills enter the forestry sector to secure a stable supply of logs.



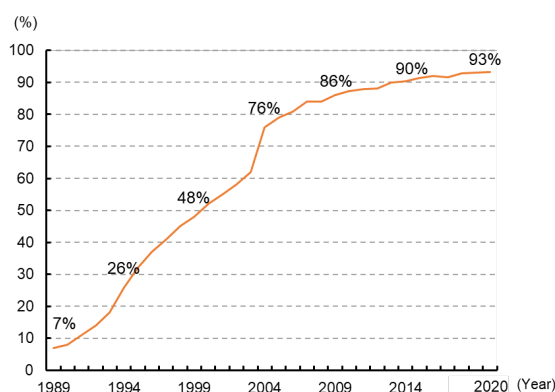
Source: MAFF "Report on wood distribution structure survey"

- Notes: 1. The volume of shipments from log markets to sawmills and plywood mills (other than auction sales) has been added since 2016.
2. The volume of shipments from log markets to LVL mills and wood chip mills (other than auction sales) has been added since 2011.

Fig. 11 Changes in direct shipments from log producers to sawmills

Expansion of the Role of Precut Factories

The precut rate of the post-and-beam construction method has been increasing year by year, and it reached to 93 % in 2020 (Fig. 12). The role of precut factories is expanding in the distribution of wood products, as precut factories are often responsible for part of the design process and wood procurement and quality control. The scale of precut factories is also expanding and their consolidation is progressing.



Source: Survey by National Wooden Housing Machinery Precut Association

Fig. 12 Changes in the precut rate of the post-and-beam construction method

4. Challenges and Countermeasures

(1) Full Utilization of Forest Resources

To promote sustainable use of forest resources, it is important to develop an environment where logs are fully utilized by cultivating demand to use them according to their quality and characteristics.

Since the price of logs decreases in the order of use for lumber, plywood and chips, how much logs can be used for lumber is also important in terms of obtaining funds for reforestation.

To increase the utilization rate of logs, some sawmills accept logs of a wide range of diameters from small to large and produce pieces of solid sawn wood called laminations used for glued laminated timber, along with sawn wood products, while using low-quality wood and offcuts as fuel for kiln-drying and biomass power generation. The challenge is to disseminate these practices widely.

(2) Utilization of Domestic Wood Products

Expanding Demand in the Housing Sector

The proportion of domestic wood used in the post-and-beam construction method is gradually increasing. As for the wood frame construction method, a stable supply system for domestic wood construction materials is being established mainly in the Kyushu and Tohoku regions, and some major housing manufacturers have started to use domestic wood products.

In 2021, the supply and demand of wood products significantly tightened, especially in those used as horizontal members which have a high proportion of imported wood. In response to this situation, there is a movement to substitute domestic wood for imported wood in some cases. It is important to disseminate these cases in order to cope with the shortage of imported wood.

Expanding Demand in Non-residential and Mid-to-high-rise Sectors

The Forestry Agency and the Ministry of Land, Infrastructure, Transport and Tourism have been supporting the training and development of such designers, since there is a shortage of designers with the knowledge required to design non-residential and mid-to-high-rise buildings using wooden structures, interiors and exteriors.

It is necessary to develop and disseminate standardized designs and construction methods that are widely applicable, in order to reduce design and construction costs (Fig. 13).



Source: Japan Housing and Wood Technology Center "Model designs for building medium-sized buildings with "wood""

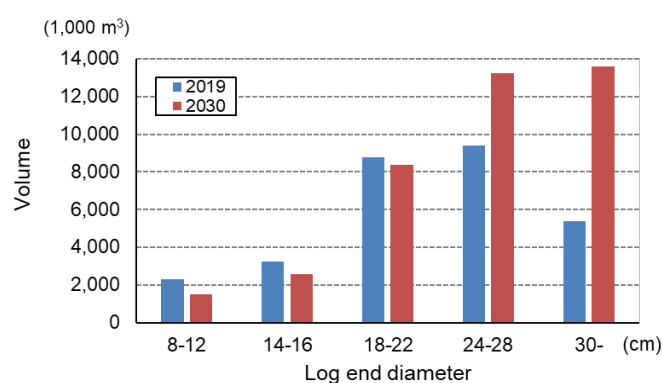
Fig. 13 4-story office model based on the post-and-beam construction method

In addition, it is essential to establish a supply system for Japanese Agricultural Standards (JAS) products of reliable quality and performance. The Forestry Agency is working to rationalize the classification and criteria of the JAS in line with actual usage conditions, as well as supporting demonstrative use of JAS structural wood products.

Initiatives for Utilization of Large-diameter Logs

While the supply of large-diameter logs (over 30 cm in diameter) is expected to increase, many sawmills do not have a system for efficient sawing of large-diameter logs. Therefore, efforts to expand their use are required (Fig. 14).

The Forestry Agency supports sawmills to introduce production lines for large-diameter logs, which can cut the logs automatically and efficiently.



Source: Forestry Policy Council materials on March 30, 2021

Fig. 14 Expected supply of logs by log end diameter

(3) Improvement of a Working Environment in the Wood Industry

It is vital to address labor shortages and improve the working environment including work safety, not only in forestry but also in the wood industry, in order to strengthen the supply capacity of domestic wood.

The Forestry Agency supports the introduction of labor-saving machinery such as automated sawmill machines and promotes occupational safety measures. The Forestry Agency has also been disseminating the “Code of Practice for Work Safety in Agriculture, Forestry, Fisheries and Food Industry” developed in February 2021 as well as related training materials.

(4) Technological Development for Further Utilization of Domestic Wood

The Forest Research and Management Organization has been conducting technological development to establish the drying technology necessary for the production of flat-square lumber from large-diameter logs to expand the use in areas where the proportion of domestic wood is low, such as horizontal members of buildings.

In addition, it is also important to develop and disseminate technologies, for example, cross-laminated timber (CLT) and fire-resistant wooden materials, to expand wood use in non-residential and mid-to-high-rise buildings. As of April 2021, the annual production capacity of CLT was 80,000 m³ with a total of 9 mills.

Products such as floorboards with increased surface hardness by compression have been developed to expand wood demand in interior decoration, furniture and refurbishment.

Chapter I Forest Management and Conservation

1. Promoting Appropriate Management and Conservation of Forests

(1) Current State of Forests and Multiple Functions

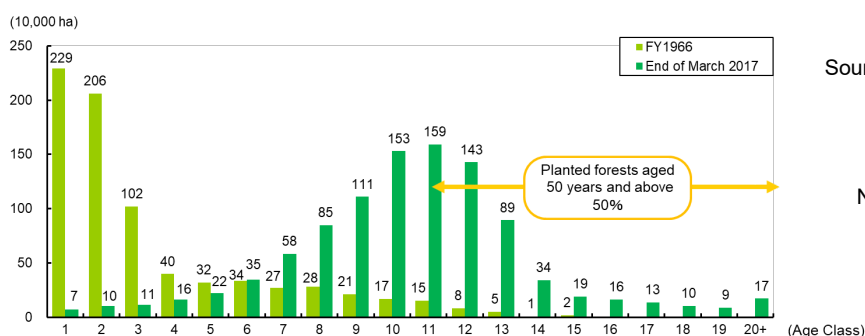
Forests contribute to the people's lives and economies through their multiple functions including land conservation, water resource conservation, and mitigating global warming.

The part of forests' multiple functions that can be monetarily evaluated is estimated at 70 trillion yen a year.

Forests cover about 25 million hectares, which accounts for 2/3 of the national land. About 40% of forests are planted forests. Half of the planted forests are aged 50 years and above 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).

The stock of forest is steadily expanding mainly on planted forests, reaching about 5.2 billion m³ by the end of March 2017.

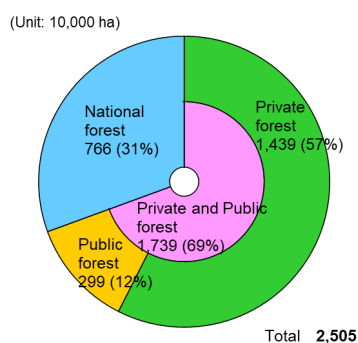
Forests contribute to the achievement of SDGs and net-zero by 2050 through their multiple functions and the economic and social benefits of forestry and wood industry.



Sources: Forestry Agency "State of Forest Resources" (March 31, 2017) 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 Changing forest age class configuration of planted forests



Source: Forestry Agency "State of Forest Resources" (March 31, 2017)

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 formulated the Basic Plan for Forest and Forestry (revised in June 2021) in accordance with the Forest and Forestry Basic Act as well as the National Forest Plan formulated under the Forest Act.

(3) Research and Development

In May 2021, the Ministry of Agriculture, Forestry, and Fisheries (MAFF) has developed a “Strategy for Sustainable Food Systems” to promote innovation in reducing environmental impact from a medium- to long-term perspective. In the forest and forestry sector, the strategy promotes the development and dissemination of the “elite trees” which are selected varieties with faster initial growth and good wood quality, 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.

The Forestry Agency develops Foresters who support municipal governments’ forest administration and management.

2. Forest Management

(1) Promotion of Forest Management

The Forest Agency promotes systematic and appropriate forest management based on the Forest Planning System under the Forest Act. In order to secure the multiple functions of forests for future and to use forest resources appropriately, the Forestry Agency promotes implementation of thinning and replanting after harvesting steadily on planted forests. The Forestry Agency also encourages to establish diverse and healthy forests through leading part of coniferous planted forests into multi-layered forests or mixed forests of conifers and broadleaf trees depending on its natural conditions.

Furthermore, it is vital to enhance carbon dioxide removals by forests through thinning and reforestation to achieve the forest removals target of approximately 3.8 million CO₂ ton 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. The Forestry Agency has been promoting thinning for the forest removals. In addition, it has been supporting production of the “specified mother tree” with superior growth, which are selected from trees including the “elite trees” and designated by the MAFF. 456 varieties have been designated in nine years since 2013.

To encourage planting after harvesting, it is increasingly important to reduce planting costs and to supply seedlings stably. About 66 million seedlings were produced for planting in FY2020, about 30% of which was raised using containers ([Fig. I-3, 4](#)).

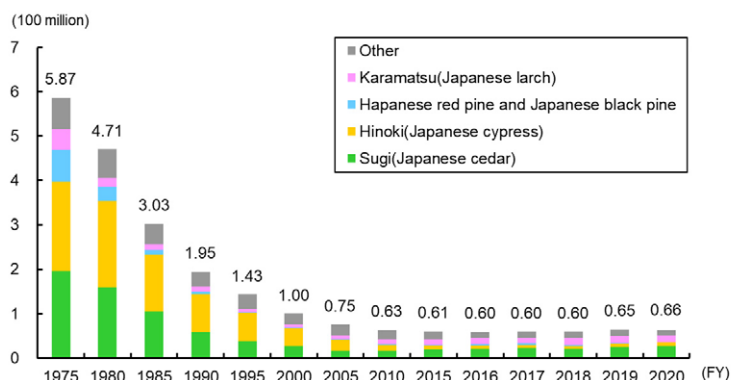
(Unit: 10,000 ha)

Type of work	Private and public forest	National forest	Total
Tree planting	2.3	1.1	3.4
Post establishment nurturing	35	14	49
Thinning	26	10	36

Source: Survey by Forestry Agency

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

Fig. I-3 Forest management area (FY2020)



Source: Forestry Agency "Forests and Forestry Statistics"

Note: Excluding those produced in state-owned nurseries

Fig. I-4 Annual production of seedlings for planting

(2) Private Forest Management Entrustment System and Forest Environment Tax

The Private Forest Management Entrustment System was enforced in April 2019 through the Private Forest Management Entrustment Act.

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. Otherwise, the municipalities will manage those entrusted forest by themselves.

In FY2020, 778 out of total 1,592 municipalities in Japan conducted the "questionnaires of forest owners' intention", the first step of the entrustment process, for approximately 400,000 ha of private forest. In total, approximately 80% of all the municipalities, including those conducted questionnaires, have conducted some activities related to the Private Forest Management Entrustment System.

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 FY 2019.

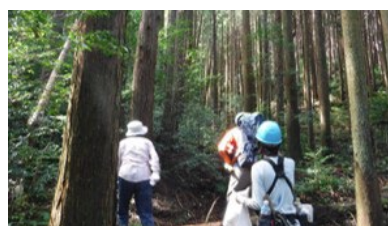
In FY2020, local municipalities in Japan conducted the “questionnaires of forest owners’ intention” for 216,000 ha of private forests and forest thinning in 10,300 ha, with the revenue from the Forest Environment Transfer Tax.

(3) People’s Participation in Forest Management

Forest management activities by organizations such as NPOs and companies are expanding. The number of planting groups in Japan topped 3,671 in FY2021, nearly six-fold from FY2000. In recent years, more companies are willing to get involved in forest management with increasing interest in SDGs and ESG investment.



Okazaki City in Aichi Prefecture has designated 15 districts of planted forest as the potential areas of the Private Forest Management Entrustment System through forest resource analysis with aerial photographs. The city conducts forest boundary confirmation and field survey of the entire district, before implementing questionnaires of forest owners’ intention, for smooth confirmation of intention and entrustment of forest management.



Forestry boundary confirmation

In FY2020, the city was entrusted with management of 57 ha of private forests by their owners, 23 ha of which were re-entrusted to private forestry operators. In FY2021, the city has conducted 24 ha of thinning in the entrusted forests by itself.

3. Forest Conservation

(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 FY2019, 12.2 million ha of forests were designated as protection forests. Additionally, even when a forest, except a protection forest, is diverted, the Forest Land Development Permission System secures public benefits.

(2) Disaster Control

The Forestry Agency promotes integrated forest conservation projects including accurately clarifying 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 variety of forest management such as conversion to mixed forests of conifers and broadleaf trees and long-term management, and the protection and management of primeval forest ecosystems.

Additionally, the Forestry Agency implements the strict protection and management of forests in World Heritage sites and Biosphere Reserve sites.

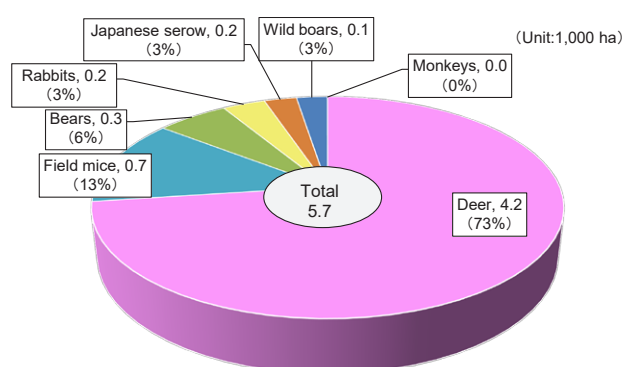
(4) Forest Damage by Wildlife, Pests and Forest Fire

Forest damage by wildlife is serious. In FY2020, about 5,700 ha of forests were damaged by wildlife, about 70% of which was caused by deer (Fig. I-5). To prevent the damage, the MAFF and Ministry of the Environment promote comprehensive measures including barrier fences installation and population control through capturing wildlife.

Damage by pinewood nematode (*Bursaphelenchus xylophilus*) is declining, although it remains the worst forest pest in Japan. In FY2020, pinewood nematode damaged about 298 thousand m³ of wood. 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 increasing. In FY2020, this pest damaged 192 thousand m³ of wood. 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 2020, 1,239 forest fires occurred, burning down 449 ha of forest. Forest fires intensively occur in winter and spring, with most of the cases caused by people carelessly using fire.



Source: Survey by Forestry Agency

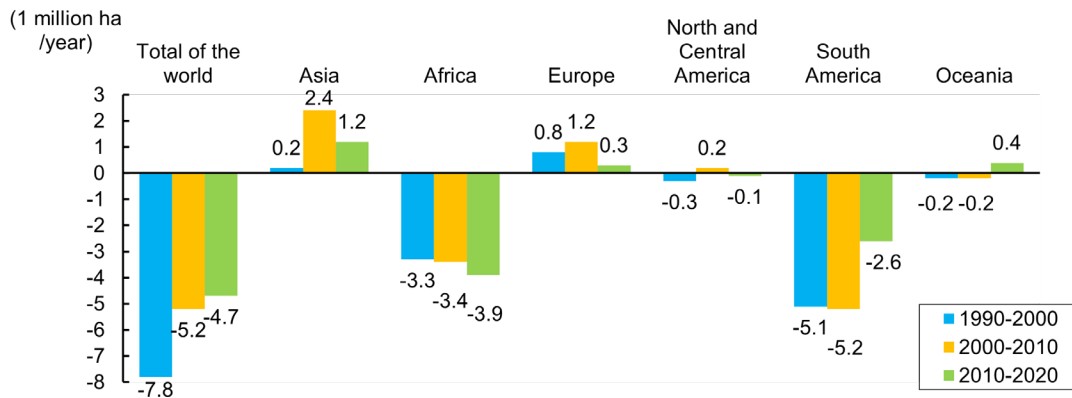
Fig. I-5 Area of forests damaged by major wildlife species

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 at 4.06 billion ha, which is 31 percent of the total land area. The world's forest area is still decreasing worldwide, especially in tropical forests in Africa and South America. The annual rate of forest loss in 2010-2020 is estimated at 4.7 million ha/year, but if the increase due to afforestation and forest expansion is not taken into account, the annual rate of forest loss is 10.2 million ha/year in 2015-2020 (Fig. I-6).



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

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 Montreal Process.

In Japan, two forest certification schemes have been widely 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 the 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 2.15 million ha).

(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, in which Japan's target for GHG reduction for FY2030 has been raised to 46% (compared to the total emissions in FY2013) and that for forest removals to approximately 2.7%.

Forest carbon sink measures are essential to achieve the targets. It is necessary to implement the forest management through thinning and reforestation using the "elite trees" and to promote wood use.

The GOJ has taken initiatives in “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+). The GOJ has also promoted adaptation measures based on the Climate Change Adaptation Plan (revised in October 2021, by the GOJ).

(3) International Discussions on Biodiversity

The first part of the 15th meeting of the Conference of the Parties (COP15) to the Convention on Biological Diversity was held in October 2021. A new target (Post-2020 Global Biodiversity Framework) to replace the "Aichi Biodiversity Targets" will be discussed and adopted in the second part of the COP15 scheduled in 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.

Approximately 1,360 million US dollar was provided into official development assistance (ODA) for the forestry sector worldwide in 2019, of which 33 million US dollar was from Japan. Japan was the fourth largest donor following Germany, France, and the United Kingdom.

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). At the end of December 2021, in the forestry sector, Japan was conducting 18 technical cooperation projects through 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 domestic wood consumption in Vietnam and establishes timber legality framework in producing countries, and FAO promotes conservation and utilization of forests for enhancing community resilience to climate change in mountain watersheds of developing countries.

Chapter II Forestry and Rural Communities in Hilly and Mountainous Areas

1. Forestry

(1) Forestry Production

Total forestry output in 2020 was 483 billion yen, a decrease of 3% from the previous year due to the COVID-19 pandemic. Wood production accounted for 51% of forestry output and reached 246 billion yen in 2020, which was a decrease of 9% from the previous year (Fig. II-1).

Supply of domestic wood totaled 31.0 million m³ in 2020. Of the supply, logs for sawn lumber, plywood and chips accounted for 19.9 million m³. By tree species, the volume of Sugi (Japanese cedar) production was 59%, Hinoki (Japanese cypress) 14%, Japanese larch 10%, and hardwood 9%, respectively (Fig. II-2).

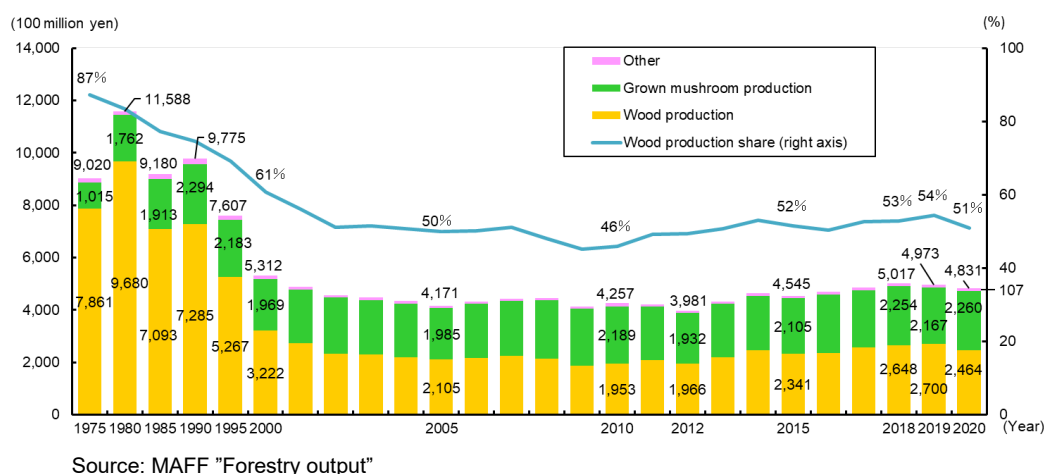


Fig. II-1 Gross forestry output

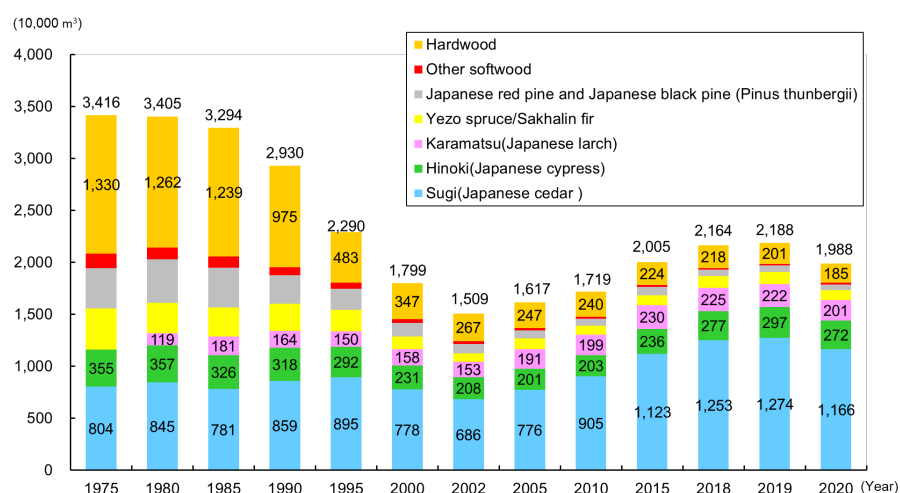
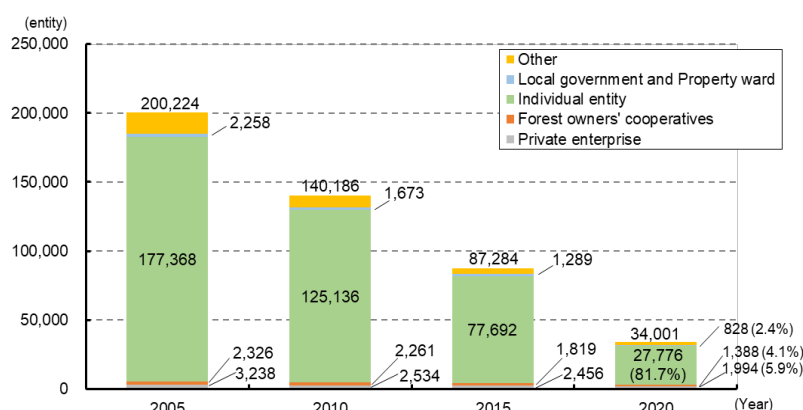


Fig. II-2 Domestic roundwood production

(2) Forestry Management

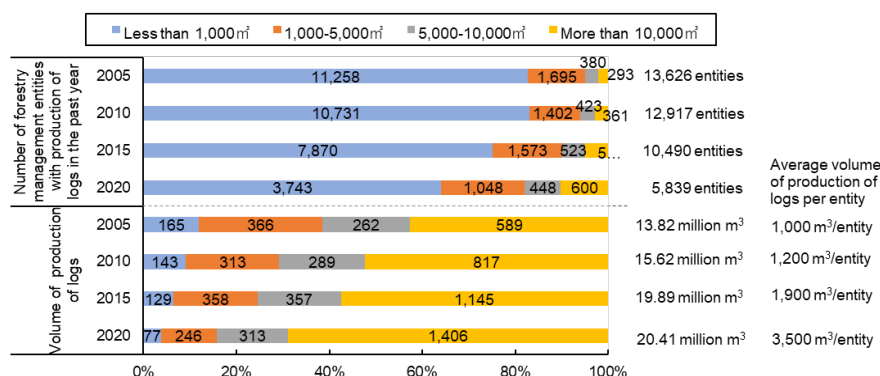
The 2020 Census of Agriculture and Forestry shows that the number of forestry households was 690 thousand, 88% of which owned less than 10 ha of forest area. Small-scale forest ownership remains dominant.

The number of forestry management entities is about 34,000, significantly decreasing from about 200,000 in 2005 (Fig. II-3). On the other hand, the average volume of log production per forestry management entity has increased. In addition, the portion of log volume by entities with the annual log production of more than 10,000 m³ has increased to 70%, indicating that the scale of entities is expanding (Fig. II-4).



Source: MAFF "Census of Agriculture and Forestry"

Fig. II-3 Number of forestry management entities by organization type



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

Fig. II-4 Number of forestry management entities by the scale of log production

It is necessary to strengthen the management base of forest owners' cooperatives, which are the main player in the forest management, in terms of increasing profit return to forest owners and forestry workers.

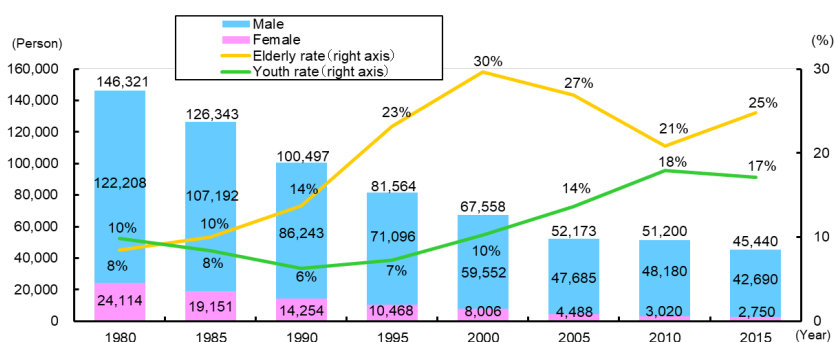
To improve the profitability of forestry management, the Forestry Agency has supported the development of Forest Practice Planners who conduct proposal-based coordination

and consolidation of forestry operations and Forest Management Planners who engage in selling woods strategically and sustainable forest management.

(3) Forestry Workforce

According to the 2015 national census, the number of forestry workers was 45,440, showing a long-term declining trend.

On the other hand, permanent employment rate of forestry workers is on a growing trend. In addition, the proportion of young forestry workers remains stable while the proportion of young workers in all industries is on a declining trend (Fig. II-5).



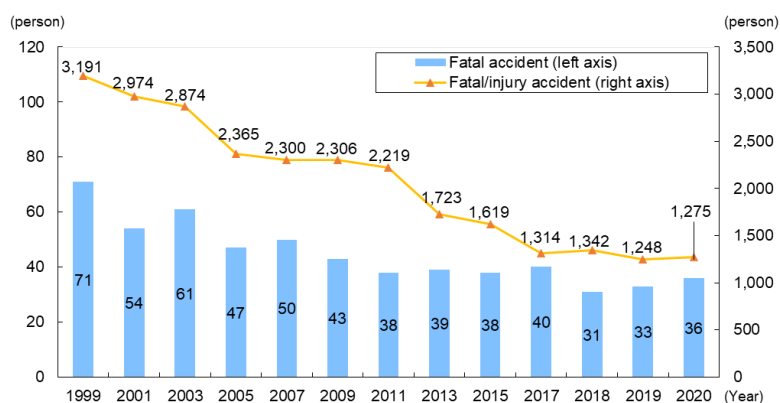
Source: Ministry of Internal Affairs and Communications "National Census"

Notes: 1. "Elderly rate" reflects the rate of people aged 65 and over.

2. "Youth rate" reflects the rate of people under 35.

Fig. II-5 Number of forestry workers

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-6).



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

Fig. II-6 Number of occupational accidents in forestry

Although the proportion of females engaged in forestry is lower than that of males (Fig. II-5), 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.

(4) Improvement of Forest Productivity

Consolidating Forestry Operation

In Japan, it is difficult to implement efficient work systems because most forest owners have small forest areas. Therefore, it is necessary to coordinate and consolidate forestry practices and develop forestry road systems and thinning comprehensively.

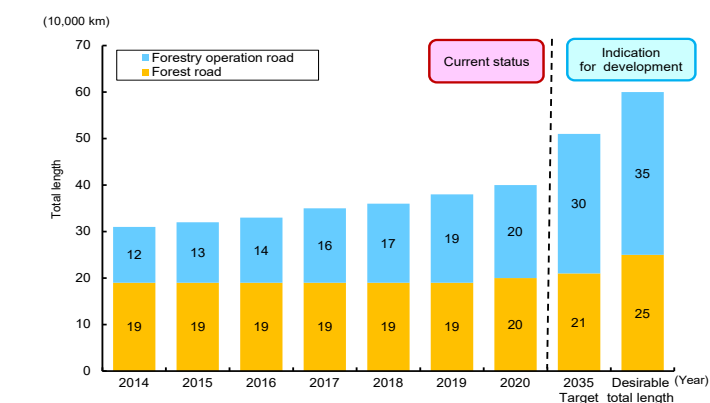
The Forestry Agency promotes it through the Collective Forest Management Plan System, the Private Forest Management Entrustment System and the development of Forest Management Planners.

Municipalities launched the Forest Area Register System in April 2019 to enable centralized management of information on forest owners and ownership boundaries and to provide part of such information for forestry entities.

Prefectures introduce Forest Cloud for sharing forest information efficiently.

Development of Forestry Road Systems

The Forestry Agency promotes to develop forestry road systems, which contribute to forestry and livelihood of mountain villages (Fig. II-7). Forestry road systems have been developed to reach the total length of 396 thousand km in FY2020, although Japan has steep terrain and diverse geology.



Source: Forestry Agency

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

Fig. II-7 Current status of forestry road systems and the indication for development

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 will enable a shift toward a positive balance of income and

expenditure from logging to reforestation and silviculture processes. In addition, the Forestry Agency also promotes “smart forestry” using ICT and the development of machinery utilizing cutting-edge technologies, based on the estimation that the surplus can be expanded by introducing the “elite trees” and remotely operated machinery.

2. Non-wood Forest Products

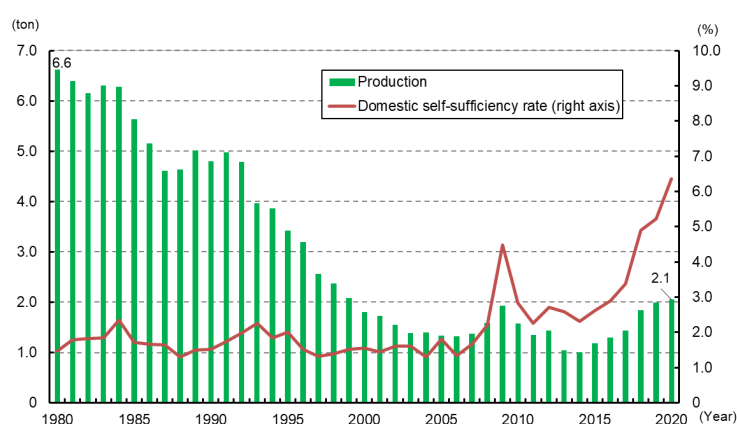
Non-wood forest products include variety of products such as mushrooms, edible nuts, wild vegetables, Japanese lacquer, bamboo, charcoal and firewood. Non-wood forest products account for about half of the forestry output and play key roles in stimulating rural economies and ensuring employment. The value of non-wood forest products in 2020 was 283.7 billion yen, an increase of 2% from the previous year.

(1) Mushrooms

Mushrooms earned more than 80% of the value of non-wood forest products in 2020. Production of mushrooms has been flat in recent years, reaching 462,000 tons in 2020.

(2) Other Non-wood Forest Products

Total production of charcoal has been decreasing over the long term, reaching 20,000 tons in 2020. Total fuelwood production was 52,000 m³ in 2020, and it has remained at approximately 50,000 m³ in recent years (roundwood equivalent volume). Bamboo material had been on growing trend since 2010, but fell to 31,000 tons in 2020, with a decrease of 4% from the previous year. Japanese lacquer production has been increasing in recent years as Japanese lacquer has been adopted in principle for preserving and repairing national treasure and important cultural property buildings (Fig. II-8).



Source: Forestry Agency “Non-wood Forest Products Data”

Fig. II-8 Japanese lacquer production

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 people engage in forestry, 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.

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

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.

The MAFF has supported to discover local resources such as non-wood 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 also worked to create and promote the “Forest-related Service Industry” in these fields.

Inokashira Development Association (Fujinomiya City, Shizuoka Prefecture), a non-profit organization, has promoted inbound tours utilizing local resources.

The association focused on companies working on health and productivity management (H&PM), and tried a new experience tour: meditation facing themselves in a forest space, an e-bike (electrically assisted mountain bike) tour traveling around spring water and an early morning relaxation program to soak up the sunrise. After these experiences, participants were measured in their physical and mental health.

The results showed that psychological restorative effects lasted for one month after the experience. The data on physical and mental health states were also shared with local companies interested in H&PM.



A monitor tour



Chapter III Wood Product Demand and Use of Wood

1. Supply and Demand for Wood

(1) Global Wood Supply and Demand

In 2020, the global consumption of industrial roundwood decreased by 2% from the previous year to 1,986 million m³.

The total volume of industrial roundwood imports in the world decreased by 3% from the previous year to 136 million m³. China was the world's largest industrial roundwood importer in 2020, accounting for 44% of global imports of industrial roundwood.

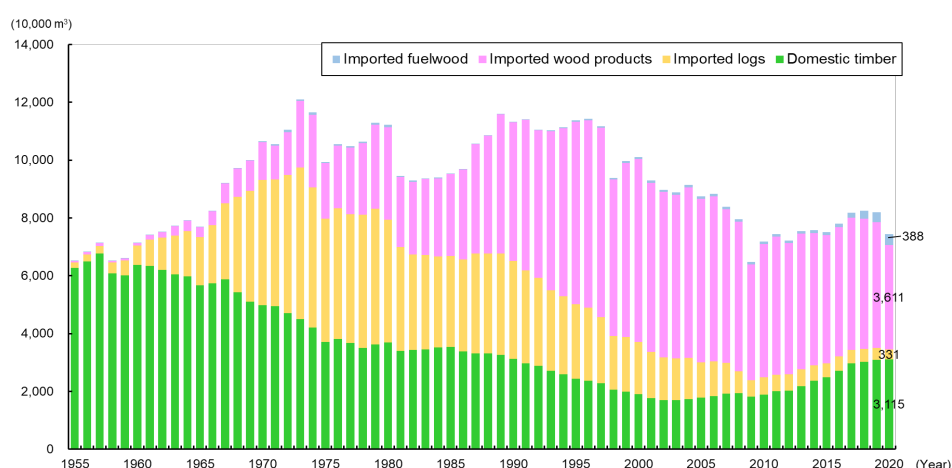
In 2020, the global production of sawn wood decreased by 3% from the previous year to 473 million m³. The total volume of sawn wood imports in the world decreased by 5% to 145 million m³. China was also the world's largest sawn wood importer in 2020, accounting for 23% of global imports of sawn wood.

(2) Wood Supply and Demand in Japan

Japan's wood demand bottomed out in 2009 and has since recovered. The total wood product demand in Japan in 2020 was 74.44 million m³ (roundwood equivalent), which was a 9.1% decrease from the previous year.

The domestic wood supply bottomed out in 2002 and has since recovered. It was 31.15 million m³ in 2020, which was a 0.5% increase from the previous year (Fig. III-1).

The volume of imported wood in 2020 was 43.29 million m³, which was a 15% decrease from the previous year, due to a decrease in the imports of wood products (Fig. III-1).



Source: Forestry Agency "Wood Supply and Demand Chart"

Fig. III-1 Wood supply in Japan

(3) Wood Prices

The prices of domestic roundwood and sawn wood products have increased. Domestic wood chip prices have slightly decreased.

(4) Addressing Illegal Logging

The Clean Wood Act, enforced in 2017, stipulates that all business entities must endeavor to use legally harvested wood and wood products, and that Wood-related Business Entities in particular shall confirm the legality of the wood and wood products they handle.

Wood-related Business Entities that properly and reliably take measures for ensuring the use of legally harvested wood and wood products may apply to a registering organization to obtain registration as a “Registered Wood-related Business Entities”. As of March 2022, 581 entities has been registered.

The GOJ supports the establishment of legal and sustainable supply chain in producing countries through the contribution to ITTO. Japan has joined the Experts Group on Illegal Logging and Associated Trade (EGILAT) of Asia-Pacific Economic Cooperation (APEC), which shares information and exchanges views regarding measures to combat illegal logging.

2. Wood Use

(1) Wood Use in Housing and Construction

In Japan, about 80% of low-rise (up to three stories) residential buildings are wooden. However, wooden buildings account for less than 10% of mid-to-high-rise (four stories and above) buildings and non-residential ones.

Across Japan, wooden structures, both interior and exterior, have been promoted in the construction of mid-to-high-rise and non-residential buildings. Various companies and organizations have been working collaboratively towards expansion of wood use.

(2) Wood Use for Public Buildings

The proportion of wooden structured buildings was 13.9% of all public buildings (based on floor area) whose construction started in FY2020. It was 29.7% among low-rise buildings.

(3) Use of Woody Biomass

The quantity of woody biomass for energy use has been increasing recently. Japan’s fuelwood consumption including wood chips, wood pellets, firewood and charcoal in 2020 increased by 23% from the previous year to 12.80 million m³.

While the increased use of woody biomass is mainly caused by a boom in woody

biomass power plants, the Forestry Agency is also encouraging heat-use, which has higher energy conversion efficiency.

High value-added products including lightweight, high-strength cellulose nanofibers (CNF) and heat-resistant, processible glycol lignin are being developed as ways to utilize woody biomass for materials. As for CNF, manufacturing facilities are under operation in various places, and some products using CNF have been put into practical use, including athletic shoes and paint.



A consortium led by LignoMateria Co., Ltd. has started trial production of the world's first demonstration plant that produces approximately 100 tons of glycol lignin per year. The demonstration plant promotes product development through the supply of glycol lignin samples to companies. The LignoMateria Co., Ltd. aims to construct a commercial plant with an annual production capacity of several thousand tons in the vicinity.



Demonstration Plant for Glycol Lignin
(©LignoMateria Co., Ltd.)

(4) Spread of the Use of Wood among Consumers

The Forestry Agency has been promoting the Kizukai Undo (attention to wood use) initiative to disseminate the importance of wood use among consumers, including through the Japan Wood Design Award which acknowledges outstanding wood products and related activities that contribute to the re-discovery of the excellence and value of wood from the consumers' viewpoints.

The Forestry Agency has also been promoting "Mokuiku" (wood use education) activities to disseminate the excellence and significance of wood use among both adults and children.

3. Wood Industry

(1) State of the Wood Industry

The added value amount of lumber and the wood industry bottomed out in 2009 and has since recovered. In 2019, the value rose to 874 billion yen, which was an increase of 3.7% from the previous year.

(2) Each Sector of the Wood Industry

Sawmilling Industry

Shipments of sawn wood products have remained flat since the beginning of 2010. In 2020, shipments rose to 8.20 million m³, which was a decrease of 9.2% from the previous year. The quantity of industrial wood received by sawmills was 14.85 million m³ in 2020.

Glued Laminated Timber Manufacturing Industry

Glued laminated timber production in 2020 totaled 1.74 million m³ of which structural use accounted for 1.67 million m³. Japan's import of glued laminated timber products in 2020 stood at 1.02 million m³.

Plywood Industry

Production of plywood in 2020 was 3.00 million m³, which was a decrease of 10.1% from the previous year. Most of this - 2.67 million m³ - was for structural use, while 30 thousand m³ was used as concrete formwork.

The share of domestic wood in domestic plywood production in 2020 rose to 91% (4.20 million m³). In 2020, the total wood supply for plywood, including imported products, was 8.92 million m³. Domestic wood accounted for 47% of total wood supply for plywood in Japan (Fig. III-2).

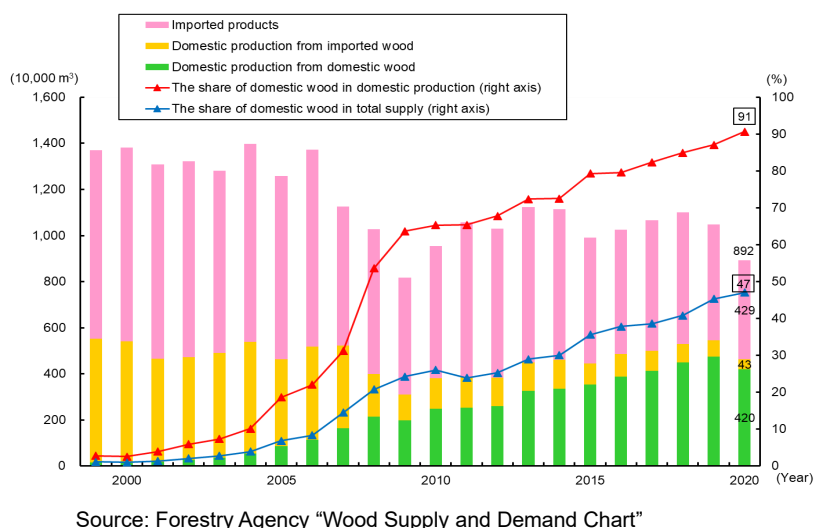


Fig. III-2 Supply of wood for plywood

Wood Chip Manufacturing Industry

Production of wood chips (excluding fuel use chips) in 2020 was 4.75 million tons, which was a decrease of 9.7% from the previous year.

Japan's import of wood chips in 2020 totaled 9.49 million tons, accounting for about 67% of wood chip supply in Japan.

Precut Processing Industry

"Precut lumber" refers to lumber that is pre-processed into the required shapes and sizes of building components, such as posts and beams, which enables quick and easy assembling of the components onsite.

The share of precut lumber in the lumber used for the post-and-beam construction method, which is one of the main construction methods for houses in Japan, reached 93% in 2020.

Wood Distribution Industry

In the distribution of domestic logs in 2018, 41% was distributed through the timber market, 19% was sold to wood suppliers, while 40% was transported directly from logging sites to mills. The share of direct delivery has been increasing.

Chapter IV National Forest Management

1. Roles of National Forests

(1) Distribution and Roles of National Forests

National forests occupy 7.58 million ha of land, which account for approximately 20% of the land area of Japan and approximately 30% of the total forest area. They are widely distributed in the remote mountainous areas and headwaters areas, and they play important roles in fulfillment of the multiple functions of forests, including land conservation and watershed conservation.

National Forests, which have diverse ecosystems such as planted forests and primeval natural forests, are a place for the growth and habitat of various wildlife including rare species. They also provide fields for health and recreation in forests.

(2) National Forests Management

National forests, an important asset of the country, are managed by the Forestry Agency in an integrated manner under the National Forest Management Program.

2. Specific Initiatives under the National Forest Management Program

(1) Further Promotion of Management with Emphasis on Public Benefits

The Forestry Agency manages each national forest in accordance with the five forest types categorized based on the expected functions of “mountain disaster prevention”, “nature conservation”, “recreational use”, “comfortable environment development”, and “watershed conservation”.

Ninety percent of national forests are conservation forests such as watershed conservation. The Forestry Agency improves devastated land and conservation forests through forest conservation projects in order to ensure safe and secure life.

The Forestry Agency designates and manages “Protected Forests” and “Green Corridors” in order to conserve biodiversity. As of March 2021, Protected Forests were designated at 661 locations covering 978,000 ha of land, which accounted for 13% of national forest area. “Green Corridors” were formed as of March 2021 at 24 locations, covering 584,000 ha of land, and accounting for 8% of national forest area. The Forestry Agency takes measures to protect rare species of wildlife, and prevents deer and other wildlife from damaging forests.

(2) Contribution to Revitalizing Forest and Forestry

Through the organizations, technical capabilities and resources of the National Forest Management Program, the Forestry Agency is (I) developing and disseminating technologies for low-cost and effective forestry practices, such as utilization of containerized seedlings, drones and Information and Communication

Technology (ICT) and an integrated harvesting and planting system; (II) establishing cooperative forest management areas to collaborate with private forests to promote development of forestry road systems and forest operations; and (III) promoting stable wood supply to lumber and plywood mills through “System Sales”.

In April 2020, the Timber Harvesting Rights System was enforced. Under this system, forestry management entities can acquire the right to steadily harvest trees in certain designated areas of national forests for a certain period of time, while ensuring multiple functions of the forest.

The Kyushu Regional Forest Office set up a “low-cost model demonstration site” in the Kumamoto Nanbu District Forest Office in 2017. The Office implemented demonstration tests in cooperation with research institutions for a five-year test period ending in FY2021.



The test indicates the possibilities: omitting weeding by using seedlings of 70 to 100 cm in length, reducing deer damage and mis-cutting of planted trees by raising the cutting height of weeding.

Trees in the fourth year after planting in the demonstration site
(The initial size of seedlings was 70 to 100 cm in length.)



(3) National Forests as “Forests for People”

The Forestry Agency provides various organizations (e.g. schools, voluntary groups, corporations, traditional woodworkers) with places for field activities such as forest environmental education and forest management practices, by designating forests for such activities within national forests. The Forestry Agency also undertakes “model projects” to manage forests in cooperation with local parties and nature conservation groups.

The Forestry Agency leases national forests to local governments and residents. “Recreation Forests” are managed and administered in partnership with municipalities and other stakeholders in local communities such as the tourist industry. In FY2020, a total of about 110 million people visited “Recreation Forests”.

And 93 of “Recreation Forests” that have potential attractiveness as tourism resources were selected as “Japan’s Forests with Breathtaking Views” (Fig. IV-1). To encourage more people to visit these forests, the Forestry Agency has improved facilities by posting multilingual signs and providing information on web sites in English.



**Recreation
Forests of
JAPAN**



QR Code for “Japan’s Forests
with Breathtaking Views” website



**Shikaribetsu
Recreation Forest**



**Nozori
Recreation Forest**



**Yakehashiri
Recreation Forest**



**Omi Konan Alps
Recreation Forest**



**Senbonyama
Recreation Forest**

Source: Forestry Agency

Fig. IV-1 Cases of “Japan’s Forests with Breathtaking Views”

Chapter V Reconstruction after the Great East Japan Earthquake

1. Recovery of Forests, Forestry and the Wood Industry

(1) The Great East Japan Earthquake

On March 11, 2011, the Great East Japan Earthquake, the largest earthquake ever recorded in Japan, hit the eastern part of Japan. It caused a strong earth tremor over a broad area and brought a great tsunami which devastated entire coastal communities along the eastern coast of the Tohoku region.

In July 2011, the GOJ developed the fundamental reconstruction policy, titled the Basic Guidelines for Reconstruction in Response to the Great East Japan Earthquake, setting the timeframe for reconstruction at 10 years.

In March 2021, the GOJ established “Basic Guidelines for Reconstruction from the Great East Japan Earthquake After the “Reconstruction and Revitalization Period””.

(2) Recovery of Forests

The Great East Japan Earthquake caused damages to forests and forest conservation facilities and forest roads in 15 prefectures. By FY2021, the recovery works had been completed.

Approximately 164 km of coastal disaster-prevention forests damaged by the tsunami required restoration work. Restoration works were completed on about 153 km of them at the end of FY2021. It is necessary to continue the project for growing the seedlings.



Bus tours
(©Miyagi Prefecture)

Miyagi Prefecture established the “Miyagi Coastal Disaster-Prevention Forest and Forest Management Council” in 2021 in order to make the importance of coastal disaster-prevention forests known to many generations.

In addition, the prefecture is promoting efforts for the silviculture management and utilization of the coastal disaster-prevention forests through community development workshops and bus tours in the “Miyagi Green Coast Project”.



(3) Recovery of Forestry and the Wood Industry

The Great East Japan Earthquake damaged 115 wood processing/distribution facilities and 476 non-wood forest products facilities. Distribution of plywood materials and wood chips was disrupted as large-scale plywood and paper mills along the Pacific Coast were damaged.

The restoration of 98 facilities was completed by the end of March 2014, and their

operations have restarted. The production of logs and wooden products have generally recovered to the respective levels before the earthquake.

(4) Promotion of Wood Use for Reconstruction and Contribution by Forests and Forestry

More than 25% (about 15,000) of “emergency temporary houses” were constructed of wood. Disaster agreements concluded between local governments and housing-related organizations have increased to ensure promptly supply of wooden emergency temporary houses in case of large-scale disasters.

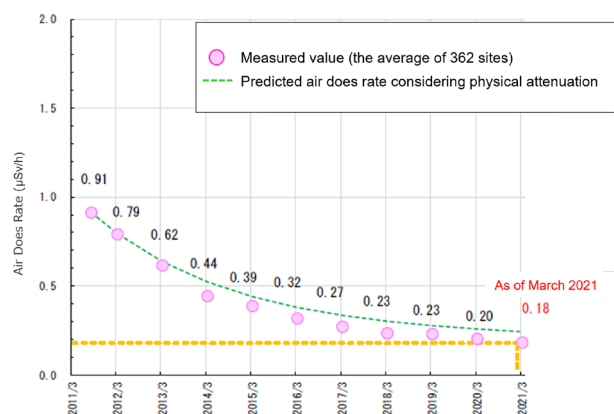
In the end of December 2020, approximately 25% of public houses for disaster victims (reconstruction houses) were constructed with wooden structures.

The initiatives to utilize wood in reconstruction of public buildings and civil engineering have been promoted. Furthermore, woody biomass facilities such as power plants have been introduced in each prefecture, which contribute to reconstruction.

2. Reconstruction after the Nuclear Accident

(1) Measures against Radioactive Substances in Forests

Air dose rate in forests in Fukushima Prefecture has been declining year by year (Fig. V-1).



Source: Forest planning division of Fukushima prefectural government, *the current state and prediction of radioactive materials in forests (FY 2020)*

Fig. V-1 Changes of Air Dose Rate in forests in Fukushima

The GOJ conducts monitoring and research about trends of distribution of radioactive substances within forests.

In order to maintain and promote the multiple functions of forests and to regenerate forestry industry, the Forestry Agency has promoted forest management such as thinning and pilot initiatives against radioactive substances since FY2013.

For decontamination of the forests, the measures in the vicinity of residence had been given top priority. Based on “Comprehensive Efforts towards the Regeneration of Forests and Forestry in Fukushima” (March 2016), the Forestry Agency is undertaking efforts to restore “satoyama forests” around residential areas, to regenerate forestry and to disseminate information.

For ensuring safety and security against radiation for forest workers, the Forestry Agency summarized the points during work and researched the exposure reduction method. In 2016, a guidebook for forest workers was published.

To supply safe wood products to consumers, the Forestry Agency supports research and analysis on radioactive materials of wood products and the relevant work environment, and initiatives to develop arrangements for certifying the safety of wood products.

The Forestry Agency has launched the “Restoration of satoyama and hardwood forest project” in cooperation with people in Fukushima Prefecture and promotes the restoration of satoyama hardwood forest for shiitake logs.

(2) Supply Safe Forest Products

The GOJ set standard limits for radioactive substances in foods at 100 Bq/kg for general foods. As of March 30, 2022, 22 items of non-wood forest products have shipping restrictions.

The Forestry Agency has developed Guidelines Concerning Management of Bed-log Cultivation of Mushrooms to Decrease Radioactive Cesium. Shipping restrictions on mushrooms are to be lifted when cultivation is managed based on this guideline and it has been determined that no mushrooms are produced whose radioactivity exceeds the standard limits. Although the production of shiitake mushrooms on logs has not recovered even now, the production of shiitake mushrooms on sawdust medium has recovered to almost the level before the Great East Japan Earthquake.

Some shipment restrictions for wild mushrooms have been gradually lifted through the appropriate efforts of inspection and shipment management, while other restrictions remain.

Since 2021, if a system for properly managing and inspecting mushrooms and edible wild plants is developed under the shipping and inspection policy set by prefectures, it can be possible to ship the products which are confirmed not to exceed the limit for general foods by non-destructive inspection. As a result, the shipments of Matsutake mushrooms have resumed in some restriction areas.

Appendix

1. Forestry-related Fundamental Figures

Item	Unit	2000	2005	2010	2015	2016	2017	2018	2019	2020
i Nominal gross domestic product (GDP)	billion yen	535,418	532,516	505,531	538,032	544,365	553,073	556,294	558,491	538,155
Forestry	billion yen	176	137	196	234	239	243	249	247	233
Forestry / GDP	%	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
ii Total number of workers	million	64.46	63.56	62.57	64.01	64.65	65.30	66.64	67.24	66.76
Forestry	million	0.07	0.06	0.08	0.07	0.06	0.06	0.07	0.08	0.06
Forestry / Total # of workers	%	0.11	0.09	0.13	0.11	0.09	0.09	0.11	0.12	0.09
iii Land area of Japan	million ha	37.79	37.79	37.80	37.80	37.80	37.80	37.80	37.80	37.80
iv Forest	million ha	25.15	25.12	25.10	25.08	25.08	25.05	25.05	25.05	25.05
Forest / Land area	%	67.5	67.4	67.3	67.3	67.3	67.2	67.2	67.2	67.2
v Protection forest	million ha	8.93	11.65	12.02	12.17	12.18	12.20	12.21	12.23	12.25
Protection forest / Forest	%	35.5	46.4	47.9	48.5	48.6	48.7	48.7	48.8	48.9
vi Growing stock of forest	billion m ³	3.5	4.0	4.4	4.9	4.9	5.2	5.2	5.2	5.2
vii Total wood supply/demand	million m ³	101.01	87.42	71.88	75.16	78.08	81.85	82.48	81.91	74.44
Domestic production	million m ³	19.06	17.90	18.92	24.92	27.14	29.66	30.20	30.99	31.15
Import	million m ³	81.95	69.52	52.96	50.24	50.94	52.19	52.28	50.92	43.29
Self-sufficiency rate	%	18.9	20.5	26.3	33.2	34.8	36.2	36.6	37.8	41.8
viii New housing starts	million units	1.23	1.24	0.81	0.91	0.97	0.96	0.94	0.91	0.82
Ratio of wooden structure	%	45.2	43.9	56.6	55.5	56.5	56.5	57.2	57.8	57.6

Sources i: Cabinet Office "SNA (System of National Accounts)"

ii: Ministry of Internal Affairs and Communications "Annual Report on the Labour Force Survey"

iii: Geospatial Information Authority of Japan "The Report of Statistical reports on the land area by prefectures and municipalities in Japan"

iv, v, vi: Forestry Agency

vii: Forestry Agency "Wood Supply and Demand Chart"

viii: Ministry of Land, Infrastructure, Transport and Tourism "Housing Starts"

Note "Total wood supply/demand", "Domestic production" and "Import" in "vii" refer to the volume in roundwood equivalent.

2. Forestry Output

(Unit: billion yen)

Item	2000	2005	2010	2015	2016	2017	2018	2019	2020
Forestry output	531.15	417.05	425.70	454.47	470.26	486.02	501.73	497.28	483.06
Wood production	322.18	210.50	195.29	234.08	237.00	256.09	264.83	270.00	246.43
Softwood	265.33	177.41	170.16	198.19	195.39	206.06	209.99	213.01	179.02
Sugi (Japanese cedar)	123.78	87.53	93.50	118.09	116.74	122.68	126.44	127.43	107.39
Hardwood	54.72	31.71	23.76	19.51	19.06	18.40	18.42	16.95	15.82
Fuelwood and charcoal production	6.16	6.09	5.08	5.31	5.49	5.44	5.54	5.81	5.96
Grown mushroom production	196.89	198.50	218.91	210.52	221.39	219.76	225.37	216.67	225.96
Minor forestry products production	5.92	1.96	6.42	4.55	6.38	4.74	5.99	4.80	4.71
Forestry income produced	351.91	245.78	229.22	251.02	260.11	269.40	266.45	264.35	253.57

Source Ministry of Agriculture, Forestry and Fisheries (MAFF) "Forestry Output"

Notes 1. "Wood production" includes the output of wood chips for fuel since 2011.

2. "Fuelwood and charcoal production" includes the output of bamboo charcoal and charcoal dust since 2001.

3. "Grown mushroom production" includes the output of eryngii mushrooms and other varieties of grown mushrooms since 2001.

4. "Minor forestry products production" includes the output of Japanese wax and Japanese lacquer since 2002,

the output of wild grass (wild vegetables and wild herbs) since 2010 and the output of gibier since 2016.

5. Due to rounding, some totals may not correspond with the sum of the separate figures.

3. Current State of Forest Resources

(Unit: 1,000 ha, million m³)

Classification			Total		Standing timber area (canopy cover more than 30%)				Treeless land (canopy cover less than 30%)		Bamboo groves
					Planted forest		Natural forest		Area	Growing stock	
Total			Area	Growing stock	Area	Growing stock	Area	Growing stock			Area
National forest	Subtotal		25,048	5,241.50	10,204	3,308.42	13,481	1,932.45	1,197	0.64	167
	Under the Forestry Agency's jurisdiction	Subtotal	7,659	1,225.93	2,288	513.04	4,733	712.45	637	0.44	0
		State-owned	7,593	1,220.72	2,282	512.03	4,682	708.24	629	0.44	0
		Government reforestation	7,508	1,201.28	2,208	492.83	4,680	708.01	620	0.44	0
		Other	85	19.44	73	19.21	2	0.23	10	0	-
	Under other Agency's jurisdiction	0	0	-	-	-	-	0	0	-	
Private and public forest	Subtotal		65	5.21	7	1.00	51	4.20	8	-	0
	Public forest	Subtotal	17,389	4,015.57	7,916	2,795.38	8,747	1,220.00	560	0.19	167
		Prefecture	2,995	615.56	1,334	397.05	1,531	218.36	124	0.15	6
		Municipality/Property ward	1,292	252.69	529	145.59	709	107.01	53	0.09	1
	Private forest	1,702	362.87	804	251.47	822	111.35	71	0.06	5	
	Others	14,347	3,394.33	6,569	2,395.55	7,188	998.74	431	0.04	158	
		48	5.68	13	2.78	28	2.90	5	0	3	

Source Forestry Agency

Notes 1. Data cover the forests defined in Article 2 of the Forest Act.

2. "Others" refers to forests that are not subject to the "Regional Forest Plans" for non-national forest under Article 5 of the Forest Act, and for national forest under Article 7-2 of the Forest Act.

3. Figures are as of March 31, 2017.

4. Symbol of "-" means "not applicable".

5. Due to rounding, some totals may not correspond with the sum of the separate figures.

4. Planted Area by Tree Species

(Unit: ha)

	Total	Softwood					Hardwood
		Sugi (Japanese cedar)	Hinoki (Japanese cypress)	Matsu (Pine)	Karamatsu (Japanese larch)	Other	
2000	(31,316) 28,480	(8,223) 7,967	(11,574) 10,745	(233) 223	(2,524) 2,493	(4,954) 4,014	(3,808) 3,038
2005	(25,584) 22,498	(5,216) 5,011	(7,096) 6,307	(226) 183	(3,534) 3,423	(5,728) 4,611	(3,784) 2,963
2010	(18,756) 16,388	(4,132) 3,844	(2,820) 2,262	(247) 237	(4,604) 4,418	(4,265) 3,381	(2,688) 2,246
2015	(19,429) 16,607	(5,537) 5,390	(2,039) 1,930	(185) 168	(4,467) 4,027	(5,250) 3,450	(1,950) 1,642
2016	(21,106) 18,390	(6,766) 6,570	(1,972) 1,852	(291) 253	(5,017) 4,552	(4,983) 3,383	(2,077) 1,781
2017	(22,069) 19,866	(7,102) 6,845	(1,979) 1,874	(406) 388	(5,388) 5,179	(5,423) 4,110	(1,771) 1,471
2018	(21,568) 19,340	(6,899) 6,597	(1,845) 1,760	(277) 272	(5,486) 5,165	(5,106) 3,799	(1,956) 1,747
2019	(22,788) 20,562	(7,189) 7,005	(1,821) 1,745	(311) 308	(6,466) 6,139	(5,046) 3,692	(1,954) 1,673
2020	(22,777) 20,686	(7,571) 7,359	(1,894) 1,738	(309) 294	(6,681) 6,198	(4,412) 3,445	(1,910) 1,653

Source Forestry Agency

Notes 1. Figures do not include national forest.

2. Figures in parentheses refer to the total area which includes area planted as lower layer of multi-layered forest.

5. Planted Forest Area by Age Classes

(Unit: 1,000 ha)

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
1985	604	895	1,263	1,691	1,762	1,569	947	337	240	205	178	137	111	83	148					
1989	436	700	943	1,351	1,691	1,746	1,413	777	270	224	183	151	118	93	79	52	62			
1994	278	421	699	937	1,336	1,686	1,719	1,388	735	262	213	172	139	112	86	67	105			
2001	131	226	350	589	874	1,149	1,599	1,677	1,522	946	353	204	171	144	112	89	62	52	70	
2006	88	168	227	352	593	873	1,143	1,582	1,649	1,500	918	345	200	168	141	106	90	62	120	
2011	73	114	159	231	347	584	852	1,111	1,565	1,631	1,473	921	345	194	164	138	105	87	174	
2016	68	102	114	164	224	348	582	846	1,108	1,529	1,592	1,428	893	340	190	162	135	104	86	172

Source Forestry Agency

Notes 1. Figures are as the end of each fiscal year.

2. For the year 1985, the class XV contains forests older than that class. For the years 1989 and 1994, the class XVII contains forests older than that class. For the years 2001, 2006 and 2011, the class XIX contains forests older than that class. For the year 2016, the class XX contains forests older than that class.

3. Data cover the forests defined in Article 5 or Article 7-2 of the Forest Act.

6. Thinned Area and Use of Thinnings

(FY)	Thinned area (1,000 ha)			Volume of thinnings used (million m ³)					
	Total	Private and public forest	National forest	Total	Private and public forest				National forest
					Subtotal	Sawnwood	Roundwood	Others	
2010	556	445	110	6.65	4.43	2.70	0.42	1.31	2.22
2011	552	437	115	7.11	4.86	2.88	0.40	1.58	2.25
2012	488	368	121	7.59	5.21	3.00	0.36	1.86	2.38
2013	521	400	121	8.11	5.65	3.23	0.44	1.97	2.46
2014	465	339	126	7.69	5.21	2.91	0.33	1.97	2.47
2015	452	341	112	8.13	5.65	2.97	0.35	2.32	2.48
2016	440	319	121	8.23	5.76	2.95	0.30	2.51	2.47
2017	410	304	106	8.12	5.56	2.75	0.28	2.53	2.56
2018	370	269	101	7.46	4.94	2.37	0.25	2.32	2.52
2019	365	268	98	7.68	5.21	2.53	0.30	2.37	2.47
2020	357	261	96	7.29	4.79	2.26	0.28	2.25	2.50

Source Forestry Agency

Notes 1. Volumes are in roundwood equivalent.

2. "Sawnwood" means the wood such as wood building materials and wood packaging materials.

3. "Roundwood" means the wood such as scaffolding timber and stakes.

4. "Others" includes the wood such as wood chip and wood powder (sawdust).

5. Due to rounding, some totals may not correspond with the sum of the separate figures.

7. Forest Area by Owners

	2015		2020	
	Forest area (ha)	Ratio to total area(%)	Forest area (ha)	Ratio to total area(%)
Total	17,626,761	100.0	17,616,863	100.0
Private	13,563,827	77.0	13,560,696	77.0
Public	3,370,380	19.1	3,407,898	19.3
Prefecture	1,271,571	7.2	1,310,110	7.4
Public corporation	391,189	2.2	351,519	2.0
Municipality	1,406,063	8.0	1,434,838	8.1
Property ward	301,557	1.7	311,431	1.8
Incorporated Administrative Agencies	692,554	3.9	648,269	3.7

Source MAFF "Census of Agriculture and Forestry"

Notes 1. Due to rounding, some totals may not correspond with the sum of the separate figures.

2. "Incorporated Administrative Agencies" include Independent Administrative Agencies, National University Corporations and Special Corporations.

8. Number of Forestry Management Entities and their Forest Area

(Unit: #, ha)

	Total		Less than 3ha		3-5ha		5-20ha		20-50ha		50-100ha		More than 100ha	
	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area
Total	34,001	3,322,691	1,520	628	6,236	22,979	15,220	148,280	6,045	176,477	2,151	142,598	2,829	2,831,728
Corporation	4,093	1,245,256	983	210	201	757	765	8,398	611	19,542	423	29,441	1,110	1,186,908
Private company	1,994	663,822	656	114	90	322	372	3,868	270	8,221	143	9,562	463	641,736
Cooperative	1,608	314,120	271	87	65	256	268	3,229	267	8,842	229	16,117	508	285,588
Agricultural cooperative	47	15,354	-	-	1	3	4	40	8	298	4	283	30	14,730
Forestry cooperative	1,388	212,763	238	87	51	198	229	2,751	234	7,702	209	14,682	427	187,343
Other cooperatives	173	86,003	33	-	13	55	35	438	25	842	16	1,152	51	83,516
Other corporations	491	267,314	56	8	46	179	125	1,301	74	2,480	51	3,763	139	259,583
Non-corporation	29,080	723,038	536	417	6,031	22,207	14,399	139,244	5,374	154,949	1,648	107,263	1,092	298,959
Individual	27,776	616,223	494	398	5,883	21,634	13,940	134,299	5,093	146,131	1,484	95,694	882	218,067
Public	828	1,354,397	1	1	4	15	56	638	60	1,986	80	5,894	627	1,345,862

Source MAFF "2020 Census of Agriculture and Forestry"

Notes 1. The symbol "-" means "not applicable".

2. "Forestry management entities" corresponds to one of the followings. The entities (I) own more than 3 hectares of forest, and also have conducted forestry or have established a "Forest Management Plan" for the past five years, (II) have been entrusted with forestation or (III) have harvested more than 200 m³ of logs for the past one year through the entrustment and the purchase of standing trees.

9. Roundwood Production

(Unit: 1,000 m³, %)

		2000	2005	2010	2015	2016	2017	2018	2019	2020	Relative change from the previous year (%)
Total		17,034	16,166	17,193	20,049	20,660	21,408	21,640	21,883	19,882	▲ 9.1
By tree species	Subtotal	13,707 (80)	13,695 (85)	14,789 (86)	17,815 (89)	18,470 (89)	19,258 (90)	19,462 (90)	19,876 (91)	18,037 (91)	▲ 9.3
	Sugi (Japanese cedar)	7,671	7,756	9,049	11,226	11,848	12,276	12,532	12,736	11,663	▲ 8.4
	for sawnwood	7,258 <57>	6,737 <58>	6,695 <63>	7,869 <66>	8,095 <66>	8,200 <65>	8,237 <66>	8,582 <67>	7,841 <68>	▲ 8.6
	Hinoki (Japanese cypress)	2,273	2,014	2,029	2,364	2,460	2,762	2,771	2,966	2,722	▲ 8.2
	Akamatsu (Japanese red pine), Kuromatsu (Japanese black pine)	1,034	783	694	779	678	641	628	601	570	▲ 5.2
	Karamatsu (Japanese larch), Ezomatsu (Yezo spruce), Todomatsu (Sakhalin fir)	2,410	2,910	2,816	3,268	3,325	3,380	3,366	3,405	2,940	▲ 13.7
	Other	319	232	201	170	153	198	165	168	142	▲ 15.5
	Hardwood	3,327 (20)	2,471 (15)	2,404 (14)	2,236 (11)	2,188 (11)	2,153 (10)	2,178 (10)	2,007 (9)	1,845 (9)	▲ 8.1
	Sawnwood	12,798 (75)	11,571 (72)	10,582 (62)	12,004 (60)	12,182 (59)	12,632 (59)	12,563 (58)	12,875 (59)	11,615 (58)	▲ 9.8
	Plywood	138 (1)	863 (5)	2,490 (14)	3,356 (17)	3,682 (18)	4,122 (19)	4,492 (21)	4,745 (22)	4,195 (21)	▲ 11.6
By use	Chips	4,098 (24)	3,732 (23)	4,121 (24)	4,689 (23)	4,796 (23)	4,654 (22)	4,585 (21)	4,263 (19)	4,072 (20)	▲ 4.5

Source MAFF "Wood Supply and Demand Report"

Notes 1. Figures in parentheses refer to the percentage of each to total volume.

2. Figures in angle brackets refer to the percentage of Sugi for sawnwood to the volume for sawnwood of all species.

3. Roundwood Production excludes forest residue.

4. Total figures is the sum of "Sawnwood", "Plywood" and "Chips".

5. Due to rounding, some totals may not correspond with the sum of the separate figures.

6. Production of roundwood for LVL is added to "Plywood" since 2017.

10. Wood Supply and Demand Chart (roundwood equivalent)

(Unit: 1,000 m³)

Supply	Demand	Demand						Domestic consumption						Export					
		Industrial use			Wood for mushroom production			Industrial use			Wood for mushroom production			Industrial use			Fuel wood		
		Subtotal	Sawnwood	Pulp and chips	Plywood	Other	Fuel wood	Subtotal	Sawnwood	Pulp and chips	Plywood	Other	Subtotal	Roundwood	Sawnwood	Pulp and chips	Plywood	Other	Subtotal
Total	(18,609)	(5,634)	24,597	26,064	8,919	1,812	(12,975)	(18,609)	(5,634)	(5,634)	8,741	426	(12,975)	3,005	1,384	275	1,164	179	3
Roundwood	74,439	61,392	24,597	26,064	8,919	1,812	12,805	71,430	58,387	24,321	24,900	8,741	11,954	3,005	1,384	275	1,164	179	3
Forest residue	(5,634)	(5,634)	(5,634)	(5,634)	(5,634)	(5,634)		(5,634)	(5,634)	(5,634)	(5,634)	(5,634)		3,005	1,384	275	1,164	179	3
Import	25,180	25,180	14,476	4,315	4,626	1,764		22,176	22,176	14,201	3,151	4,447							
Wood for mushroom production	106	106		106				106	106										
Fuel wood	36,106	36,106	10,121	21,643	4,293	49		36,106	36,106	10,121	21,643	4,293							
Wood for mushroom production	242						242	242					242						
Fuel wood	(12,975)						(12,975)	(12,975)					(12,975)						
Total	31,149	21,980	11,615	4,420	4,195	1,750	8,927	28,145	18,981	11,340	3,256	4,022	364	3,003	2,999	1,384	275	1,164	173
Roundwood	21,874	21,874	11,615	4,314	4,195	1,750		18,875	18,875	11,340	3,150	4,022	364	2,999	2,999	1,384	275	1,164	173
Forest residue	106	106		106				106	106										
Wood for mushroom production	242						242	242					242						
Fuel wood	8,927						8,927	8,927						5					
Total	43,290	39,412	12,982	21,644	4,724	62	3,878	43,284	39,406	12,981	21,644	4,719	62	6	6	1	5		
Roundwood	3,306	3,306	2,861	1	431	13		3,300	3,300	2,860	1	426	13	6	6	1	5		
Subtotal	36,106	36,106	10,121	21,643	4,293	49		36,106	36,106	10,121	21,643	4,293	49						
Sawnwood	10,121	10,121	10,121					10,121	10,121	10,121									
Pulp	4,997	4,997		4,997				4,997	4,997		4,997								
Chips	16,646	16,646		16,646				16,646	16,646		16,646								
Plywood	4,293	4,293			4,293			4,293	4,293			4,293							
Other	49	49				49		49	49				49						
Fuel wood	3,878						3,878	3,878											

Source Forestry Agency "Wood Supply and Demand Chart", 2020

Notes 1. Figures in parentheses of the volume of pulp and chips and fuel wood, for example wood chips from mill residue or construction waste, are not included in the "total" and "subtotal".
2. "Forest residue" refers to branches or roots carried into mills for use.
3. Due to rounding, some totals may not correspond with the sum of the separate figures.

11. Wood Supply/Demand (roundwood equivalent)

(Unit: 1,000 m³)

	Wood supply/demand				Wood demand for industrial use by sector				Wood supply for industrial use by source	
	Total	Wood for industrial use	Fuel wood	Wood for mushroom production	Sawnwood	Pulp and chips	Plywood	Others	Domestic production	Import (roundwood and wood products)
1955	65,206	45,278	19,928	...	30,295	8,285	2,297	4,401	42,794	2,484
1960	71,467	56,547	14,920	...	37,789	10,189	3,178	5,391	49,006	7,541
1965	76,798	70,530	6,268	...	47,084	14,335	5,187	3,924	50,375	20,155
1970	106,601	102,679	2,348	1,574	62,009	24,887	13,059	2,724	46,241	56,438
1975	99,303	96,369	1,132	1,802	55,341	27,298	11,173	2,557	34,577	61,792
1980	112,211	108,964	1,200	2,047	56,713	35,868	12,840	3,543	34,557	74,407
1985	95,447	92,901	572	1,974	44,539	32,915	11,217	4,230	33,074	59,827
1990	113,242	111,162	517	1,563	53,887	41,344	14,546	1,385	29,369	81,793
1995	113,698	111,922	721	1,055	50,384	44,922	14,314	2,302	22,916	89,006
2000	101,006	99,263	940	803	40,946	42,186	13,825	2,306	18,022	81,241
2005	87,423	85,857	1,001	565	32,901	37,608	12,586	2,763	17,176	68,681
2010	71,884	70,253	1,099	532	25,379	32,350	9,556	2,968	18,236	52,018
2015	75,160	70,883	3,962	315	25,358	31,783	9,914	3,829	21,797	49,086
2016	78,077	71,942	5,807	328	26,150	31,619	10,248	3,925	22,355	49,586
2017	81,854	73,742	7,800	311	26,370	32,302	10,667	4,403	23,312	50,430
2018	82,478	73,184	9,020	274	25,708	32,009	11,003	4,465	23,680	49,505
2019	81,905	71,269	10,386	251	25,270	31,061	10,474	4,464	23,805	47,464
2020	74,439	61,392	12,805	242	24,597	26,064	8,919	1,812	21,980	39,412

Source Forestry Agency "Wood Supply and Demand Chart"

Notes 1. "Others" includes items such as roundwood for export.

2. The symbol "..." means "unknown or lack of investigation".

3. Due to rounding, some totals may not correspond with the sum of the separate figures.

4. "Fuel wood" includes wood chip for fuel utilized by woody biomass power plants since 2014.

12. Trend of Domestic and Imported Wood Supply/Demand (roundwood equivalent)

(Unit: 1,000 m³)

		2000	2005	2010	2015	2016	2017	2018	2019	2020	Relative change from the previous year (%)
Total wood supply/demand		101,006	87,423	71,884	75,160	78,077	81,854	82,478	81,905	74,439	▲ 9.1
Wood for industrial use		99,263	85,857	70,253	70,883	71,942	73,742	73,184	71,269	61,392	▲ 13.9
Fuel wood		940	1,001	1,099	3,962	5,807	7,800	9,020	10,386	12,805	23.3
Wood for mushroom production		803	565	532	315	328	311	274	251	242	▲ 3.6
Domestic production		19,058	17,899	18,923	24,918	27,141	29,660	30,201	30,988	31,149	0.5
Import		81,948	69,523	52,961	50,242	50,936	52,194	52,277	50,917	43,290	▲ 15.0
Self-sufficiency rate (%)		18.9	20.5	26.3	33.2	34.8	36.2	36.6	37.8	41.8	4.0
Wood demand for industrial use by sector	Total	99,263	85,857	70,253	70,883	71,942	73,742	73,184	71,269	61,392	▲ 13.9
	Domestic production	18,022	17,176	18,236	21,797	22,355	23,312	23,680	23,805	21,980	▲ 7.7
	Import	81,241	68,681	52,018	49,086	49,586	50,430	49,505	47,464	39,412	▲ 17.0
	Self-sufficiency rate (%)	18.2	20.0	26.0	30.8	31.1	31.6	32.4	33.4	35.8	2.4
	Sawnwood	40,946	32,901	25,379	25,358	26,150	26,370	25,708	27,619	24,597	▲ 10.9
	Domestic production	12,798	11,571	10,582	12,004	12,182	12,632	12,563	12,875	11,615	▲ 9.8
	Import	28,148	21,330	14,797	13,354	13,968	13,738	13,145	14,744	12,982	▲ 12.0
	Self-sufficiency rate (%)	31.3	35.2	41.7	47.3	46.6	47.9	48.9	46.6	47.2	0.6
	Pulp and chips	(6,537)	(7,974)	(6,192)	(6,667)	(6,853)	(7,107)	(6,792)	(6,258)	(5,634)	▲ 17.5
	Domestic production	42,186	37,608	32,350	31,783	31,619	32,302	32,009	31,579	26,064	▲ 5.0
	Import	4,749	4,426	4,785	5,202	5,266	5,193	5,089	4,651	4,420	▲ 19.6
	Self-sufficiency rate (%)	11.3	11.8	14.8	16.4	16.7	16.1	15.9	14.7	17.0	2.3
	Plywood	13,825	12,586	9,556	9,914	10,248	10,667	11,003	10,474	8,919	▲ 14.8
	Domestic production	138	863	2,490	3,530	3,876	4,122	4,492	4,745	4,195	▲ 11.6
	Import	13,687	11,723	7,066	6,384	6,372	6,545	6,511	5,729	4,724	▲ 17.5
	Self-sufficiency rate (%)	1.0	6.9	26.1	35.6	37.8	38.6	40.8	45.3	47.0	1.7
	Others	2,306	2,763	2,968	3,829	3,925	4,403	4,465	1,597	1,812	13.5
	Domestic production	337	316	379	1,061	1,031	1,365	1,536	1,534	1,750	14.1
	Import	1,969	2,447	2,589	2,767	2,894	3,038	2,930	63	62	▲ 1.6
	Self-sufficiency rate (%)	14.6	11.4	12.8	27.7	26.3	31.0	34.4	96.0	96.6	0.6

Source Forestry Agency "Wood Supply and Demand Chart"

Notes 1. Self-sufficiency rate is calculated by domestic production divided by total or subtotal in each category.

2. "Others" includes items such as roundwood for export.

3. Figures in parentheses refer to the volume of wood chip from mill residue or construction waste. They are not included in the "total" and "subtotal".

4. Due to rounding, some totals may not correspond with the sum of the separate figures.

5. "Fuel wood" includes wood chip for fuel utilized by woody biomass power plants since 2014.

6. Among "relative change from the previous year", "self-sufficiency rate" field is the difference from the previous year.

13. Wood Supply by Country (roundwood equivalent)

(Unit: 1,000 m³, %)

			2000	2005	2010	2015	2016	2017	2018	2019	2020
Imported wood	North America	Subtotal	(28.9)	(18.8)	(19.2)	(17.5)	(17.2)	(16.8)	(16.3)	(15.3)	(14.8)
		U.S.A	28,700	16,129	13,506	12,415	12,377	12,352	11,898	10,893	9,068
		Canada	14,460	6,844	5,838	6,057	6,083	6,233	6,273	5,754	5,488
	Southeast Asia	Subtotal	(13.7)	(12.2)	(8.9)	(8.3)	(7.7)	(7.8)	(7.4)	(6.9)	(6.9)
		Malaysia	13,569	10,511	6,287	5,848	5,525	5,751	5,421	4,949	4,215
		Indonesia	6,690	5,888	3,773	2,917	2,709	2,778	2,514	2,213	1,771
		Others	5,858	4,137	2,304	2,804	2,698	2,887	2,759	2,548	2,333
	Russia Federation		1,021	486	209	127	117	85	148	187	111
			(7.5)	(8.6)	(3.3)	(2.9)	(3.3)	(3.3)	(3.3)	(3.5)	(3.3)
	Europe		7,429	7,411	2,343	2,081	2,366	2,398	2,411	2,459	2,050
			(4.7)	(6.9)	(7.1)	(7.6)	(8.5)	(8.7)	(8.0)	(8.4)	(9.3)
	Others		4,675	5,937	4,967	5,374	6,135	6,450	5,880	5,974	5,695
		New Zealand	(4.4)	(3.4)	(3.9)	(2.3)	(2.4)	(2.1)	(2.0)	(2.0)	(1.8)
			4,374	2,878	2,720	1,638	1,749	1,545	1,484	1,393	1,086
		Chile	(3.8)	(4.6)	(6.7)	(5.6)	(5.9)	(5.7)	(5.5)	(4.9)	(4.9)
			3,795	3,952	4,726	3,987	4,234	4,236	4,055	3,479	2,994
		Australia	(8.7)	(10.2)	(11.0)	(6.6)	(5.7)	(6.4)	(6.3)	(6.0)	(4.3)
			8,604	8,729	7,722	4,662	4,067	4,684	4,604	4,271	2,628
		China	(2.5)	(3.0)	(3.0)	(2.8)	(2.7)	(2.7)	(2.6)	(2.5)	(2.6)
2,445			2,544	2,084	1,967	1,912	1,982	1,901	1,777	1,591	
Viet Nam				(7.6)	(6.9)	(6.7)	(8.1)	(9.0)	(9.5)		
				5,418	4,946	4,917	5,939	6,446	5,840		
Others		(7.7)	(12.3)	(10.9)	(8.0)	(8.7)	(8.3)	(8.1)	(8.2)	(6.9)	
		7,651	10,591	7,663	5,696	6,275	6,116	5,911	5,823	4,245	
Subtotal		(81.8)	(80.0)	(74.0)	(69.2)	(68.9)	(68.4)	(67.6)	(66.6)	(64.2)	
		81,241	68,681	52,018	49,086	49,586	50,430	49,505	47,464	39,412	
Domestic wood		(18.2)	(20.0)	(26.0)	(30.8)	(31.1)	(31.6)	(32.4)	(33.4)	(35.8)	
		18,022	17,176	18,236	21,797	22,355	23,312	23,680	23,805	21,980	
Total		(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	
		99,263	85,857	70,253	70,883	71,942	73,742	73,184	71,269	61,392	

Sources Ministry of Finance "Trade Statistics of Japan", Forestry Agency "Wood Supply and Demand Chart"

Notes 1. Figures refer to the sum of domestic/imported roundwood volume and imported products volume (sawnwood, plywood, and pulp and chips) converted into roundwood equivalent.

2. "Others" of "Southeast Asia" includes Philippines, Singapore, Brunei, Papua New Guinea, and Solomon.

3. "Others" of "Others" includes African countries.

4. "Others" of "Others" includes Viet Nam until 2014.

5. Figures in parentheses refer to the percentage of each volume to the "total" volume of each year.

6. Due to rounding, some totals may not correspond with the sum of the separate figures.

14. Number of Mills/Factories and Production Volume

		Unit	2000	2005	2010	2015	2016	2017	2018	2019	2020
Sawnwood	Number of mills	mills	11,692	9,011	6,569	5,206	4,934	4,814	4,582	4,382	4,115
	Arrival of logs	1,000 m³	26,526	20,540	15,762	16,182	16,590	16,802	16,672	16,637	14,851
	Shipment	1,000 m³	17,231	12,825	9,415	9,231	9,293	9,457	9,202	9,032	8,203
Plywood	Number of mills	mills	354	271	192	185	183	181	180	176	173
	Arrival of logs	1,000 m³	5,401	4,636	3,811	4,218	4,638	5,004	5,287	5,448	4,626
	Surface-untreated plywood production	1,000 m³	3,218	3,212	2,645	2,756	3,063	3,287	3,298	3,337	2,999
	Surface-treated plywood production	1,000 m³	1,534	1,037	647	524	642	623	580	562	488
Glued laminated timber	Number of factories	factories	281	259	182	157	150	165	165	162	148
	Production	1,000 m³	892	1,512	1,455	1,485	1,549	1,971	1,923	1,920	1,740
Cross Laminated timber	Number of factories	factories	...	...	...	...	...	7	9	9	11
	Production	1,000 m³	...	...	...	...	...	14	14	13	13
Wood chips	Number of mills	mills	2,657	2,040	1,577	1,424	1,393	1,364	1,303	1,250	1,196
	Production	1,000 tons	...	6,005	5,407	5,745	5,826	5,954	5,706	5,266	4,753
		(1,000 m³)	10,851	...	...	...	...	...	...	...	...

Sources MAFF "Wood Supply and Demand Report", Japan Laminated Wood Products Association

Notes 1. "Sawnwood" excludes sawmills with output power less than 7.5kW.

2. Figures of LVL are added to figures of "Plywood" since 2017.

3. Figures of glued laminated timber are based on the data from Japan Laminated Wood Products Association until 2016.

4. "Wood chips" excludes chips for fuel.

5. The symbol "..." means "unknown or lack of investigation".

Full text (in Japanese) of the “Annual Report on Forest and Forestry for FY2021” is available on the website of the Forestry Agency:

<https://www.rinya.maff.go.jp/j/kikaku/hakusyo/r3hakusyo/index.html>

Please refer to those texts for further information on the issues contained in this brochure, or ask the Annual Report Group of the Forestry Agency:

Annual Report Group

Policy Planning Division, Forest Policy Planning Department,
Forestry Agency

Ministry of Agriculture, Forestry, and Fisheries (MAFF)

1-2-1 Kasumigaseki, Chiyoda-ku, TOKYO 100-8952

JAPAN

Contact of the Ministry of Agriculture, Forestry and Fisheries

https://www.contactus.maff.go.jp/rinya/form/rinsei/inquiry_rinya_160801.html

