Annual Report on Forest and Forestry in Japan

Fiscal Year 2020

(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) 2020.
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*Note: The maps of Japan included in this summary report do not necessarily represent the territory of Japan comprehensively.*
Forests and Forestry Topics for FY2020

Topic 1: 10th Anniversary of Act for Promotion of Use of Wood in Public Buildings

Ten years have passed since the Act for Promotion of Use of Wood in Public Buildings was enacted and enforced in 2010.

Over the last decade, the percentage of wooden construction of public buildings has increased, especially for low-rise public buildings.

With the technological progress of fire-resistant wooden materials and the rationalization of the building standard, the momentum to use wood in private buildings has also increased, and mid-to-high-rise wooden buildings have started to be constructed.

Various companies and organizations have established networks to expand wood use in the private sector.

Shirataka Town Complex Facility
(Yamagata Prefecture)
(Prime Minister’s Award in “Reiwa 2nd Year the Excellent Wood-Using Facility Contest”)

The Hanno Chamber of Commerce and Industry
(Saitama Prefecture)
(Japan Wood Design Award 2020)

Topic 2: Revision of Forest Owners' Cooperative Associations Act aiming to Strengthen the Management Base of Forest Owner's Cooperatives

Forest owner's cooperatives, the main players in forestry are expected to promote sustainable forest management in each region through the forest management system and timber sales. On the other hand, some cooperatives need to strengthen their management base.

In May 2020, in order to strengthen the management base of the cooperatives and improve the management efficiency, the Forest Owners' Cooperative Associations Act was revised (enforced on April 1st, 2021) with the following three main matters.

1. Introducing various cooperation methods among cooperatives
2. Expanding the scope of the qualification for regular membership
3. Strengthening the business execution system
It is expected that cooperatives will revitalize forest and forestry by promoting these matters and the efficiency of operations.

A new federation for sales in large areas is established through integrating sales sectors of several prefectural federations of forest owners’ cooperatives.

Example of cooperation methods among cooperatives

**Topic 3: Initiatives based on Forest Environment Transfer Tax**

In September 2019, the distribution of the Forest Environment Transfer Tax to local governments started. Municipalities have utilized it for various initiatives.

In FY 2019, half of the municipalities carried out forest management such as intention surveys of forest owners (conducted in 125,000 ha) and thinning (conducted in 3,600 ha).

In addition, some municipalities have launched other initiatives such as training of forestry engineers and forest volunteers, depending on their conditions. About 6,500 people nationwide participated in various trainings and courses.

In urban areas, municipalities conducted forest environmental education and other activities in collaboration with other municipalities which own forests.

Forest conducted thinning

Afforestation activities in collaboration with urban areas and mountainous areas
Cutting-edge technologies are adopted to smart forestry, which is expected to reduce labor load, improve productivity, and ensure worker safety.

Riding forestry machineries that can be used for ground preparation and weeding even on slopes of 30° have been developed and commercialized. Drones are widely utilized in forestry such as transportation of seedlings. Remote cable-yarding systems will be commercialized soon, and automatic systems by AI are under development. In addition, some municipalities are striving to build communication networks in forests with LPWA (Low Power Wide Area) for safety of forestry workers.

Torrential rains in July 2020 hurt 43 prefectures mainly in the Kyushu region, resulting in forest damage totaling about 97 billion yen.

The Forestry Agency dispatches technical staff (MAFF-SAT) to grasp the damage and provide technical support for the disaster recovery. Furthermore, the Forestry Agency investigated these damaged areas through helicopter surveys and aerial laser measurements, and provided the information to the affected prefectures.
In the Ashikita district of Kumamoto Prefecture, which was particularly severely damaged, the restoration project for forest land and disaster control facilities was carried out by the Kyushu Regional Forest Office on behalf of the prefecture.

The forest disaster in Ashikita district

Topic 6: Restoration of Coastal Forests Damaged by the Great East Japan Earthquake

Ten years have passed since the Great East Japan Earthquake occurred. In most of the coastal disaster-prevention forests damaged by the tsunami, planting of seedlings had been completed by the end of FY 2020 with the cooperation of local residents, NPOs and companies.

The coastal disaster-prevention forests along Sendai Bay were particularly severely damaged. The Tohoku Regional Forest Office had restored both national and private forests in this area. Since the restoration project was completed at the end of FY 2020, Miyagi Prefecture has started to manage the growth of the private forests. Projects for growing the seedlings will be continued in order to fully enhance a disaster prevention function of the coastal disaster-prevention forests.

Just after the tsunami (March 2011)  
(©Tohoku Community Development Association)

After planting of seedlings was completed (October 2020)

Costal disaster-prevention forests along Sendai Bay
Special Topic 1: Sustainable Forestry Management that Leverages the Potential of Forests

1. Current State of Forestry Management in Japan

(1) Importance of Forestry Management Entities

Forests have various multiple functions. It is important to properly manage forests such as thinning and reforestation and to expand wood use, which contribute to carbon neutrality by 2050.

In Japan, the area of planted forests aged more than 50 years, the general harvesting period, has increased 2.4 times in this decade. It is vital to utilize the planted forest resources effectively, which revitalizes hilly and mountainous rural communities.

Some logging sites, which are suitable for forestry, have been left without planting after harvesting. Forestry management entities have a role to manage forests appropriately not only for increasing their own profits but also for returning profits to forest owners.

(2) Current State of Forestry Management Entities

“Forestry management entities” refers to forest owners who perform forest management by themselves or by entrusting, and entities which perform forest management and wood production by entrustment and purchase of trees.

There are around 34 thousand forestry management entities in Japan. About half of the forest areas managed by the owners themselves are managed by unincorporated family-owned management entities. On the other hand, most of the forest areas managed under entrustment are managed by private enterprises and forest owners’ cooperatives. Mainly, harvesting is carried out by private enterprises and afforestation is by forest owners’ cooperatives.

![Managed forest area categorized by the type of forestry organizations](source: MAFF: 2015 Census of Agriculture and Forestry)
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Source: MAFF: 2015 Census of Agriculture and Forestry

Business Conditions of Forestry Management Entities

The amount of wood production per forestry management entity is increasing. The proportion of forestry management entities which produce more than 10 thousand m³ woods annually is also increasing.

However, forestry income of family-owned management entities is decreasing. Even those which have 100-500 ha of forests cannot make enough profits by forestry itself, on average.

The national average business profits for forestry companies was 2.7 million yen in 2018. As the sales profits increase, the recurring profit margins increase, and the management becomes stable.

![Business conditions of forestry companies](source)

<table>
<thead>
<tr>
<th>Sales-Size</th>
<th>Wood Production (m³)</th>
<th>The areas of planting and nurturing trees (ha)</th>
<th>The number of Employees</th>
<th>The number of advanced forestry machineries</th>
<th>Recurring profits (1,000 yen)</th>
<th>Recurring profit margins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50 million yen</td>
<td>2,529</td>
<td>28.6</td>
<td>5.3</td>
<td>2.3</td>
<td>-1,958</td>
<td>-4.1%</td>
</tr>
<tr>
<td>50-100 million yen</td>
<td>5,073</td>
<td>57.4</td>
<td>9.3</td>
<td>2.8</td>
<td>3,739</td>
<td>3.6%</td>
</tr>
<tr>
<td>100-300 million yen</td>
<td>19,403</td>
<td>39.1</td>
<td>13.4</td>
<td>5.9</td>
<td>12,617</td>
<td>3.6%</td>
</tr>
<tr>
<td>Over 300 million yen</td>
<td>36,541</td>
<td>131.9</td>
<td>29.2</td>
<td>12.5</td>
<td>29,870</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

Source: MAFF: 2018 “Forestry management statistical research”

Although the number of forestry workers tends to decline, the proportion of young forestry workers is on a growing trend. It is important to attract and retain workers in the long term. The average annual income of forestry workers grew from 3.05 million yen in 2013 to 3.43 million yen in 2017, but it is lower than the average income for all industries. Therefore, it is necessary to improve the profitability and support the career development. In addition, since the forestry work accident rate is higher than other industries, safer working environments should be ensured.

![Changes in the number of forestry workers](source)

Source: Ministry of Internal Affairs and Communications: Population 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. 3 Changes in the number of forestry workers
(3) For the Purpose of Sustainable Forest Management

According to a trial calculation of harvesting of a 50-year-old Sugi (Japanese Cedar) plantation, the current stumpage price is not enough to motivate forest owners to reforest. For this reason, it is vital to improve wood sales and to reduce the cost for logging, wood transportation and reforestation.

It is necessary to secure profits and return them to forest owners and forestry workers, which will lead to forest and business sustainability.


Notes 1: The provisional calculation is about 50 years old Sugi planted forest per ha.
2: The cost for wildlife control can make silviculture cost higher.

2. Improving the Profitability of Forestry Management Entities

(1) Sales Enhancement

Sales Growth through Stable Supply of Wood

Forestry management entities can stabilize transaction prices through a stable wood supply under the cooperation and the sales agreement. These efforts can also improve their price negotiating power.

They can also sell woods in higher price through logging and sorting wood according to customer needs.

The revision of Forest Owners' Cooperative Associations Act has introduced various cooperation methods between cooperatives, which is expected to strengthen their marketing functions.

Miyazaki Prefecture federation forest owners' cooperative association established a council on stable supply of wood with forest owners' cooperatives and log production enterprises in the prefecture. The council regularly holds discussion with large sawmills and reflects the result in the wood collection. As a result, the stumpage price of Sugi (Japanese Cedar) in Miyazaki Prefecture has grown to top class in Japan.

The change in stumpage price of Sugi in Miyazaki Prefecture

Fig. 4 Image of balance of payments in wood production
### Sales of Various Woods

Even when forestry management entities produce high-quality wood or perform long-term management in order to sell wood to small and medium-sized construction shops or carpenters, it is important for entities to catch customer needs directly. Some entities select high-quality hardwoods and sell them for furniture at a higher price than that for chips.

### Diversification of Income for Stable Management

One option for small-scale entities is to stabilize their income through supplement income with other business such as agriculture and outdoor guides, taking advantage of their locations and environments. Some entities stabilize the income through utilizing forests in various ways like recreational use.

### (2) Saving Costs for Wood Production and Reforestation

It is important for the forestry management entities to take the initiative in saving costs of re-planting and weeding by themselves, since the sales price of wood may be influenced by the demand.

### Saving Costs for Wood Production and Distribution

The costs of logging, shipping and distribution in Japan are higher than those in Austria, which has similar terrain to Japan.

It is necessary to improve the operating rate of advanced forestry machineries for saving production costs. Therefore, it is vital to systematically secure and consolidate the operation areas, select work systems, manage the processes, and improve the forestry road system.

For small-scale entities, it is difficult to increase the operating rate even if they introduce advanced forestry machineries. It is rational to select a system with a small capital investment that matches the amount of wood production.

The costs for distribution can be reduced through simplifying sales channels and increasing the size of trucks and trailers.
Saving Costs for Reforestation

Initiatives for saving cost and labor have been developed in each process of ground preparation, planting, and weeding. Since costs depend on the afforestation method, it is important to save costs through looking ahead to future wood use and customers.

Although the Forestry Agency promotes to introduce an integrated harvesting and planting system to use forestry machine for simultaneously or sequentially implementing harvesting, land preparation and planting, the system has been introduced in less than 10% of all afforestation. The cooperation between harvesting entities and planting entities is important.

The “elite tree” species with excellent growth is expected to spread in Japan in the future.

Innovation for Forestry Efficiency

The GOJ promotes initiatives that use information and communications technologies for collecting forest resources data and improving efficiency in wood production and distribution stages.

The GOJ supports machine development for automation and remote control of logging, conveying, weeding for safety and saving labor.
3. Improvement of Human Resources and Working Conditions in Forestry

(1) Maintenance and Development of Human Resources in Forestry

Forestry workers are important for improving productivity. It is necessary to recruit forestry workers, train their technical skills and develop them. Forestry management entities are expected to motivate forestry workers through introducing systems such as a capacity evaluation system.

The GOJ supports events such as employment counseling and trial employment and conducts training through the Green Employment Program so that entities can recruit and develop new workers. Some local governments have College of forestry.

(2) Improvement of Working Conditions in Forestry

Safe workplaces are essential to protect forestry workers and to retain workers continuously. Forestry management entities and workers are required to comply with health and safety regulations and guidelines for logging. It is vital to take safety patrol guidance and training, and to introduce and use safety equipment and devices.

A stable employment is also important. In forest owners’ cooperatives, the proportion of full-time employment workers who work all year round, workers with social insurance and monthly salary workers are increasing.

The number of female forestry workers who engage in harvesting, processing and logging is increasing. Creating an environment where women can work comfortably contributes to "work style reform" for all forestry workers.

Fig. 9 Annual working days of employees in forestry owners’ cooperatives

Source: Forestry Agency: Statistics on Forest Owners’ Cooperatives
Note: Due to rounding, some percentages may not total 100.
4. Development of Human Resources and Systems for Sustainable Forestry

(1) Development of Human Resources for Sustainable Forestry

It is vital to retain forestry sites and retain customers so that forestry workers can focus on the job and fully demonstrate their abilities. The GOJ has developed Forest Practice Planners who will conduct proposal-based coordination with forest owners and consolidation of forestry operations. In addition, the GOJ has developed Forest Management Planners who will engage in selling woods strategically since 2020.

(2) System Development for Forest and Business Sustainability

Forestry management entities can make a long-term plan, anticipate future harvesting, and develop permanent road networks by owning the forest and acquiring the right to operate it in the long term. The Collecting Forest Management Plan System and the Forest Management System support coordination and consolidation of forestry operations and long-term entrustments.

Forestry management entities are expected to plant after harvesting by themselves or under cooperation. It is vital to coordinate reforestation with forest owners when planning harvesting.

Some sawmills and wood markets start to manage forest and subsidize afforestation and seedling production, for sustainable wood production.

5. The Future of Forestry Business

The bar chart below illustrates a trial calculation about how productivity would be improved and how much afforestation costs would be reduced by the initiatives.

Assuming general wood price, the income and expenditure per ha would be 710,000 yen in the black after improving the worker wages by 10% or more through improving productivity and reducing costs such as planting with 2,000 seedlings per ha in the near future. Furthermore, planting the “elite tree” species in the density of 1,500 per ha and introducing automation machineries could increase the surplus.

Since this estimate doesn’t take account of the sales price increase, there is a possibility of further improvement in profits through market development and cooperation among forestry sectors.

These surpluses are expected to increase the motivation for reforestation because entities distribute them to not only executive remuneration and capital investment but also return to forest owners who decide reforestation.

It is noted that this estimate is based on the premise that the forestry area is large enough to operate advanced forestry machineries efficiently. It is rational that small-scale entities select a simple work system that matches a small amount of wood production, reduce logging cost and secure profits.
In the future, it is expected that each forestry management entity will grow with its creativity and ingenuity, enhancing forest and business sustainability.

**Fig. 10 A trial calculation about balance of payments of forestry in the future (per ha)**
Special Topic 2: Impact of and Responses to the Covid-19 Pandemic in the Forestry and Wood Industry

1. Impact of the Covid-19 Pandemic

(1) Impact on Economy and Society in Japan

The global pandemic of the Covid-19 has had serious effects on the Japanese economy and society.

(2) Impact on Supply and Demand in Wood Industry

Log exports from Japan to China plummeted from January to March in 2020, but recovered after April and remained solid.

The number of new housing starts in 2020 decreased by 10% from the previous year to 820,000, of which 470,000 were wooden houses. As of April 2020, 40% of sawmills and 60% of plywood mills had reduced production, due to delays and decreases in housing construction. The amount of log input and that of product output at sawmills and plywood mills bottomed out in July and August, and have since been gradually recovering. However, the rate of recovery varies among regions: it has been slow in Hokkaido due to sluggish demand for packaging materials.

(3) State of Forestry

From January to March 2020, log exports to China stagnated and logs piled up in ports and stockyards, especially in the main log exporting region of Kyushu, which...
negatively affected log production. Forest management entities reduced log production after April 2020 and some shifted to other forest management practices in order to maintain employment, as sawmills and plywood mills reduced production and restricted the input of logs.

The prices of medium-diameter logs of Sugi (Japanese Cedar) fell by 10% year-on-year in June 2020 due to decreasing wood demand. The prices later recovered in some areas as the result of the shortage of log supply caused by the torrential rains of July and preceding adjustment in log production, as well as the reduced supply of North American and European wood for Japan since autumn.

As for non-wood forest products, the demand for mushrooms provided in school lunch and restaurants declined.

2. Responses in the Forestry and Wood Industry

(1) Japanese Government Responses
The GOJ has implemented various measures for the forestry and wood industry to continue operation and mitigate the impact of the pandemic. The GOJ held national and regional forums, involving all stakeholders, to share information and the understanding of the current situation and to inform them of its various support measures.

(2) Business Management under the Covid-19 Pandemic
Business entities are seeking new business opportunities to adapt to the Covid-19 pandemic. For example, some entities have commercialized wooden-framed partitions used to reduce the risk of infection. The use of remote meetings for sales promotion and online bidding systems may become more widely adopted in the forestry and wood industry in the coming future. Some facilities for remote working have been constructed in areas with abundant forests.

Forestry can provide employment opportunities for those who move out of cities to live in rural areas. In 2020, a total of 2,744 people, which was more than in the previous year, participated in the “Forest Work Guidance Events” held in the main metropolitan areas and online.

(3) For the Future Response
According to a survey by the National Federation of Forest Owners’ Co-operative Associations, 70% of forestry management entities answered that their sales had decreased since January 2020, while 98% maintained employment by utilizing support measures or other means.

The Forestry Agency will continue to monitor the situation and respond appropriately in cooperation with Prefectures.
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 more than 50 years old and entering their period of use (Fig. I-1, 2).

The growing stock 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 carbon neutrality by 2050 through their multiple functions and the economic and social benefits of forestry and wood industry.

(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 May 2016) 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

The GOJ, prefectural governments, the Forestry and Forest Products Research Institute (FFPRI), universities and private sectors jointly conduct research and technology development in order to secure the fulfillment of the multiple functions of forests and to develop forestry, to ensure the supply and use of forest products, and to lower the cost of planting after harvesting. The achievements of research and technology development are spread by forestry extension agents.

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

2. Forest Management

(1) Promotion of Forest Management

In order to sustainably secure the fulfillment of the multiple functions of forests, it is necessary to appropriately use forest resources and work steadily on thinning and planting after harvesting. It is also necessary to lead the way to diverse and sound forests by promoting the creation of multi-layered forests, long-term management, creating mixed forests of conifers and broadleaf trees, and forming broad-leafed forests, depending on natural conditions. For those reasons, the GOJ promotes systematic and appropriate forest management based on the Forest Planning System under the Forest Act.

Furthermore, it is vital to enhance carbon absorption of forests through thinning and reforestation for the Paris Agreement and the carbon neutrality by 2050. The GOJ has promoted thinning and production of the “specified mother tree” with excellent growth, based on the Thinning Promotion Special Law. In March 2021, this law was revised to prompt reforestation using saplings grown from the “specified mother tree” with excellent growth.

To encourage planting after harvesting, it is increasingly important to reduce planting costs and to stably supply seedlings. About 65 million seedlings for planting were produced in FY2019, and about 30% was for seedlings raised in the container (Fig. I-3, 4).

Source: Survey by Forestry Agency
Note: Thinned area for promotion of forest sink activities

Fig. I-3 Forest management area (FY2019)

Source: Forestry Agency “Forests and Forestry Statistical Manual”
Note: Excluding state-owned

Fig. I-4 Annual production of seedlings for planting
(2) Forest Management System and Forest Environment Tax

The Forest Management System, based on the Forest Management Act was enforced in April 2019.

The Forest Management System is a new scheme that differs from any past systems in Japan. In this scheme, municipalities are entrusted with the management of forests which their owners are not able to manage appropriately. Then the municipalities re-entrust the forests suitable for forestry to forestry practitioners who manage forests sustainably through certain proceedings.

In FY2019, a quarter of municipalities conducted intention surveys on about 150,000 ha of forest. Approximately 70% of municipalities worked on or prepared for the forest management system.

And in 2019, the Forest Environment Tax and Forest Environment Transfer Tax were created with the idea that all citizens equally support Japan’s forests. As Forest Environment Tax will be imposed as a national tax at a rate of 1,000 yen per capita per year, utilizing the tax collection system of the individual inhabitant tax from FY2024.

The Forest Environment Transfer Tax is earmarked for municipalities’ expenses related to forest management. In 2019, half of the municipalities used the tax for forest management.

(3) People’s Participation in Forest Management

Forest management activities by NPOs and companies, etc. are expanding. The number of planting groups in Japan topped 3,303 in FY2018, 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.

3. Forest Conservation

(1) Management and Conservation of Protection Forests

“Protection forest” 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 GOJ promotes integrated forest conservation projects including accurately clarifying mountain disaster hazard regions, 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

Based on the National Biodiversity Strategy of Japan 2012-2020 (adopted in September 2012), the Forestry Agency promotes appropriate thinning and diverse forest creation and the protection and management of primeval forest ecosystems.

The Forestry Agency promotes the strict protection and management of forests in World Heritage sites and Biosphere Reserve sites (Fig. I-5). The GOJ is promoting efforts to inscribe “Amami-Oshima Island, Tokunoshima Island, Northern part of Okinawa Island and Iriomote Island” on the World Heritage List as Natural Property in 2021.

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

Forest damaged by wildlife is serious. In FY2019, about 4,900 ha of forests were damaged by wildlife, about 70% of which was caused by deer (Fig. I-6). To prevent the damage, the GOJ promotes comprehensive measures including subsidies for barrier fences and population control through capturing wildlife.

Damage by pinewood nematode (Bursaphelenchus xylophilus) is also declining; it remains the worst forest pest in Japan. In FY2019, pinewood nematode damaged about 0.30 million 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 FY2019, this pest damaged 61 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 2019, 1,391 forest fires occurred, burning down 837 ha of forest. The number of forest fires are declining in the long term. Forest fires intensively occur in winter and spring, with most of the cases caused by people carelessly using fire.

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 declined by about 178 million ha in the 30 years from 1990 to 2020. The rate of forest loss has decreased since 1990, a result of reduced deforestation in some countries and forest gains in others (Fig. I-7).
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), the Montreal Process, etc.

Since illegal logging is one of the factors obstructing global environment conservation and sustainable forest management, the international community is making efforts to combat illegal logging through various international frameworks. The GOJ supports the establishment of legal and sustainable supply chain in producing countries through the contribution to the International Tropical Timber Organization (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.

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 0.41 million ha) and/or SGEC (about 2.16 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.

In the Paris Agreement, it is stipulated to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases (GHGs) in the second half of this century.

In order to achieve greenhouse gas (GHG) reduction targets stipulated in the Plan for Global Warming Countermeasures (May 2016), Japan enhances the steady implementation of forest sink measures, including forest management through thinning and use of wood.

In response to the declaration of carbon neutrality by 2050, i.e. achieving net-zero GHG emissions by 2050, the plan will be reviewed.

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+), and has promoted adaptation measures based on the Climate Change Adaptation Plan (formulated in November 2018, by GOJ).

(3) International Discussions on Biodiversity

As of December 2020, the Convention on Biological Diversity (CBD) has been signed by 194 countries, the European Union (EU) and the State of Palestine. A total
of 129 countries and regions including Japan have ratified the Nagoya Protocol on access to genetic resources and sharing of benefits arising from their utilization.

(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 $1,340 million was provided into official development assistance (ODA) for the forestry sector worldwide in 2019, of which $33 million was from Japan. Japan was the fourth largest donor following Germany, France, and the United Kingdom.

Japan's technical cooperation is conducted as technical cooperation projects, which optimally combine the “dispatch of experts”, “acceptance of training participants” and “provision of equipment”, training, etc. through the Japan International Cooperation Agency (JICA). At the end of December 2020, in the forestry sector, Japan was conducting 16 technical cooperation projects through JICA. The Forestry Agency dispatched 7 experts to 6 countries 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 ITTO and FAO. In the projects, ITTO establishes traceability system and timber legality framework in producing countries, and FAO promotes afforestation and reforestation efforts to maximize forest carbon stock and enforces knowledge and understanding of national legal frameworks governing forestry and timber supply chains.
Chapter II  Forestry and Hilly and Mountainous Rural Communities

1. Forestry

(1) Forestry Production

Total forestry output in 2019 was 498 billion yen, which was an decrease of 1% over the previous year. Wood production accounted for 50% of forestry output and reached 270 billion yen in 2019, which was an increase of 2% over the previous year (Fig. II-1).

Supply of domestic wood totaled 31.0 million m³ in 2019. Of the supply, logs for sawn lumber, plywood and chips accounted for 21.9 million m³, maintaining an uptrend from 2002. By tree species, the volume of Sugi (Japanese cedar) production was 58%, Hinoki (Japanese cypress) 14%, Japanese larch 10%, and hardwood 9% (Fig. II-2).

![Fig. II-1 Gross forestry output](source)

![Fig. II-2 Volume of domestic roundwood](source)
(2) Forestry Management

The 2015 Census of Agriculture and Forestry shows that the number of forestry households was 830 thousand, 88% of which owned less than 10 ha of forest area. Small-scaled forest ownership remains dominant (Fig. II-3).

It is necessary to strengthen the management base of forestry owners’ cooperatives in terms of increasing profit return to forest owners and forestry workers.

In May 2020, the Forest Owners’ Cooperative Associations Act was revised in order to introduce various cooperation methods between cooperatives, expand regular membership qualifications and strengthen their business execution systems.

(3) Forestry Workforce

According to the 2015 national census, the number of forestry workers was 45,440, tending to decline in the long-term.

On the other hand, permanent employment rate of forestry workers is on growing trend. In addition, the proportion of young forestry workers remains stable while the proportion of young workers in all industries is tending to decline.

Female forestry workers and female prefectural staffs of forestry have established various voluntary groups in Japan. In 2020, the online network "Forest Women’s Meeting" was launched with the aim of gathering, learning, and exchanging ideas among women involved in forestry, beyond the boundaries of voluntary groups.
(4) Improvement of Forest Productivity

Consolidating Forestry Operation

The Forestry Agency and prefectures are consolidating forestry operations by developing Forest Management Planners who will conduct proposal-based coordination with forest owners and consolidation of forestry operations.

Municipalities launched the forest area register system in April 2019 to unitarily compile information on forest owners and ownership boundaries and to provide part of such information for forestry management entities.

The Forestry Agency supports to introduce Forest Cloud to prefectures for sharing forest GIS and the forest area register system efficiently.

Development of Forestry Road System

Although Japan has steep terrain and diverse geology, forestry road system has been developed and the total length reached at 383 thousand km in FY2019. The Forestry Agency promotes to develop forestry road system, which contribute to forestry and mountain village life (Fig. II-4).

![Fig. II-4 Classification and roles of forestry road system](image)
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 2018 was 278.4 billion yen, a decrease of 2% over the previous year.

(1) Mushrooms

Mushrooms earned more than 80% of the value of non-wood forest products in 2019. Production of mushrooms has been flat in recent years, reaching 456,000 tons in 2019.

(2) Other Non-wood Forest Products

Total production of charcoal has been decreasing over the long term, reaching 21,000 tons in 2019. Total fuelwood production was 46,000 m$^3$ in 2019, and it has remained at approximately 50,000 m$^3$ in recent years (converted to logs). Bamboo material had been on growing trend since 2010, but fell to 32,000 tons in 2019, with a decrease of 6% over 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-5).

Fig. II-5 Japanese lacquer production
Non-wood forest products include a 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 a key role in stimulating rural economies and ensuring employment. The value of non-wood forest products in 2018 was 278.4 billion yen, a decrease of 2% over the previous year.

(1) Mushrooms

Mushrooms earned over 80% of the value of non-wood forest products in 2019. Production of mushrooms has been flat in recent years, reaching 456,000 tons in 2019.

(2) Other Non-wood Forest Products

Total production of charcoal has been decreasing over the long term, reaching 21,000 tons in 2019. Total fuelwood production was 46,000 m³ in 2019, and it has remained at approximately 50,000 m³ in recent years (converted to logs). Bamboo material had been on a growing trend since 2010, but fell to 32,000 tons in 2019, with a decrease of 6% over 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-5).

3. Hilly and Mountainous Rural Communities

(1) Current State of Hilly and Mountainous Rural Communities

Hilly and mountainous rural communities, 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 the total land area, accounting for approximately 60% of the total forest area. There are problems such as a decrease in job opportunities and an increase in abandoned farmland due to continuing depopulation and the aging population in such communities.

(2) Revitalization of Hilly and Mountainous Rural Communities

In recent years, there are new movements to use forest spaces in diverse fields such as health promotion, tourism, and education as the people change their lifestyles and diversify their values (Fig. II-6).

The Forestry Agency implements model projects in 16 regions to promote “Forest-related Service Industry” and sharing these results on online forums. In addition, the Forestry Agency is attempting to use forest including “Recreation Forests” in national forest as tourism resources and field of environmental education and other experiences in order to promote connection between hilly and mountainous rural communities and cities and to increase people who related to these communities.

Fig. II-6 Forest therapy walks
Chapter III  Wood Product Demand and Use of Wood

1. Supply and Demand for Wood

(1) Global Wood Supply and Demand

In 2019, the global consumption of industrial roundwood decreased by 2% from the previous year to 2,031 million m³.

The total volume of industrial roundwood imports in the world increased by 0.3% from the previous year to 144 million m³. China was the world’s largest industrial roundwood importer in 2019, accounting for 44% of global imports of industrial roundwood.

In 2019, the global consumption of sawn wood was 482 million m³, the same level as the previous year. The total volume of sawn wood imports in the world decreased by 1% to 149 million m³. China was also the world’s largest sawn wood importer in 2019, accounting for 26% 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 2019 was 81.91 million m³ (roundwood equivalent), which was a 0.7% decrease from the previous year (Fig. III-1).

The domestic wood supply bottomed out in 2002 and has since recovered. It was 30.99 million m³ in 2019, which was a 2.6% increase from the previous year (Fig. III-1).

The volume of imported wood in 2019 was 50.92 million m³, which was a 2.6% 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 Changes in wood supply
(3) Wood Prices
The prices of domestic roundwood and sawn wood products have remained almost flat in recent years. Domestic wood chip prices have slightly increased.

(4) Illegal Logging Countermeasures
The Clean Wood Act came into force in May 2017. The Act stipulates that all businesses 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 appropriately and reliably take steps to confirm the legality of wood and wood products may apply to a registration body (there are six such bodies in operation) to obtain registration as a “registered Wood-related Business Entities”. As of March 2021, 536 companies had completed this registration process.

(5) Wood Exports
The value of wood exports has been on a rising trend since 2013. In 2020, it rose by 3% from the previous year and reached 35.7 billion yen.

In December 2020, the GOJ established the Action Strategy for Expanding the Export of Agricultural, Forestry and Fishery Products and Foods. In this strategy, lumber and plywood are selected as priority items for exports. In addition, it announces a policy for working on marketing and expansion of overseas sales channels for building materials and highly durable woods, targeting China, the United States, South Korea, Taiwan, etc. The export production areas have been listed, including four lumber producing areas and eight plywood producing areas.

2. Wood Use

(1) Importance of Wood Use
Wood use can contribute to sustainable fulfillment of multiple functions of forests, as well as vitalization of local economies. Wood provides comfortable and healthy living conditions, through showing excellent properties of humidity conditioning and heat insulation, as well as the relaxing and stress-reducing effect of its scent.

In addition, wood use will contribute to achieving carbon neutrality by 2050, because wood stores carbon, processing of wood emits low levels of carbon dioxide, and wood can be used as a substitute for fossil fuels.

(2) 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.

Developments are ongoing for fire-resistant wooden materials, cross-laminated timber (CLT) and other technologies and products to use wood for mid-to-high-rise 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.

The seven-story "Takaso Wooden Building" was constructed in front of Sendai Station, using structural members made of bundled lumber. This construction method is expected to expand the possibilities of using wood for mid-to-high-rise buildings.

A pillar bundled with Cedar lumber

(3) Wood Use for Public Buildings

The proportion of wooden structured buildings was 13.8% of all public buildings (based on floor area) whose construction started in FY2019. It was 28.5% among low-rise buildings.

(4) 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 2019 increased by 15% from the previous year to 10.38 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 building materials. A speaker using glycol lignin for the diaphragm has also been commercialized.

(5) 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 2018, the value rose to 840 billion yen, which was an increase of 2.5% over the previous year.

(2) Response to Consumer Needs and the Creation of New Demand

Precut lumber using kiln-dried lumber is becoming popular in response to consumer needs for the quality and capability of wooden buildings. As large-scale wooden buildings are expected to create new demand for wood, it is necessary to establish a stable supply system for the JAS products.

Various efforts are being made in order to ensure a stable supply of wooden products that meet the needs of home builders, for example: (I) expanding further the capacity of large-scale mills; (II) improving production efficiency by collaboration among multiple mills; and (III) providing distinctive housing through collaboration among local timber producers, sawmills and home builders. The Forestry Agency supports collaborative supply chain management efforts of all stakeholders, including in efficient distribution of timber and sharing of supply and demand information.

(3) Each Sector of the Wood Industry

Sawmilling Industry

Shipments of sawn wood products have remained flat since the beginning of 2010. In 2019, shipments rose to 9.03 million m³, which was a decrease of 1.8% from the previous year. The quantity of industrial wood received by sawmills was 16.64 million m³ in 2019.

Glued Laminated Timber Manufacturing Industry

Glued laminated timber production in 2019 totaled 1.92 million m³ of which structural use accounted for 1.83 million m³. Japan’s import of glued laminated timber products in 2019 stood at 0.97 million m³.
Plywood Industry

Production of plywood in 2019 was 3.34 million m$^3$, which was an increase of 1.2% over the previous year. Most of this - 2.95 million m$^3$ - was for structural use, while 50 thousand m$^3$ was used as concrete formwork.

The share of domestic wood in domestic plywood production in 2019 rose to 87% (4.75 million m$^3$). In 2019, the total wood demand for plywood, including imported products, was 10.47 million m$^3$. Domestic wood accounted for 45% of total wood demand for plywood in Japan (Fig. III-2).

Wood Chip Manufacturing Industry

Production of wood chips (excluding fuel use chips) in 2019 was 5.27 million tons, which was a decrease of 8% from the previous year.

Japan’s import of wood chips in 2019 totaled 12.17 million tons, accounting for about 70% of wood chip consumption 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 2019.

Wood Distribution Industry

In the distribution of domestic timber in 2018, 40% was distributed through the timber market, while 41% 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, almost 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, watershed conservation, etc.

National forests which have diverse ecosystems, are important for the conservation of biodiversity, and 95% of the land designated as World Natural Heritage sites in Japan (Shiretoko, Shirakami-Sanchi, Yakushima and Ogasawara Islands) is located in national 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.

Since FY2013, this program has been executed under the General Account Budget with a view to further promoting the sound management of national forests aiming to enhance public benefits and to contribute to revitalization of Japan’s forests and forestry.

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 “landslide prevention”, “natural 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 the people safe and worry-free lives.

The Forestry Agency designates and manages “Protected Forests” and “Green Corridors” in order to conserve biodiversity. As of April 2020, 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 April 2020 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.

In Shiretoko, a World Natural Heritage Site, feeding damage on vegetation by Yezo sika deer has a significant impact on the ecosystem and biodiversity of the heritage area. Since 2006, the GOJ and the local government have been collaborating to implement conservation and management measures for Yezo sika deer with advice of academic experts. The Hokkaido Regional Forest Office used traps to capture Yezo sika deer, and investigated the effects of feeding damage on vegetation and the status of vegetation recovery. Using captured Yezo sika deer for gibiers (game meat) contributes to effective utilization of local resources.

As of 2012

Vegetation recovery in Shiretoko

As of 2020

(2) Contribution to Transforming Forestry into a Growth Industry

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 practitioners 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.

(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 FY2019, a total of 130 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 Forest Agency has improved facilities and promotes these by posting multilingual signs, provides information on web sites in two languages.

![QR Code for “Japan’s Forests with Breathtaking Views” website](image)

**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 disaster control facilities and forest roads in 15 prefectures. By January 2021, 99% of 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 145 km of them at the end of March 2021 (Fig. V-1). It is necessary to continue the project for growing the seedlings.

Since coastal disaster-prevention forests mitigated the tsunami damage in the Earthquake, the GOJ promotes to develop coastal disaster-prevention forests in other coasts.

(*) the length of coastal line where planting was completed

Fig. V-1 Recovery of coastal disaster-prevention forests
(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 Forestry Agency supported disposal, restoration, and improvement of wood processing and distribution facilities.

The distribution recovered within FY2011. As of April 2020, operations had restarted at 98 facilities and 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. The temporary wooden houses are highly evaluated for their convenience and comfort.

Disaster agreements are increasingly being concluded by local governments to ensure promptly supply of wooden emergency temporary houses in case of large-scale disasters. Some wooden emergency temporary houses built in Fukushima Prefecture were rebuilt and reused in another disaster-affected area in 2018.

Approximately 30% (approximately 7,800) of public houses for disaster victims (reconstruction houses) are planned to be constructed with wooden structures, and 99% have been completed by the end of December 2020.

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

2. Reconstruction after the Nuclear Accident

(1) Nuclear Disaster and Response to Radioactive Materials

On March 11, 2011, the Fukushima Daiichi Nuclear Power Stations of the Tokyo Electric Power Company (TEPCO) automatically shut down following the Great East Japan Earthquake. As a result of explosions presumably caused by hydrogen, a substantial amount of radioactive material was discharged into the atmosphere.

The GOJ designated the areas of evacuation and has rearranged them one by one. By March 2020, the evacuation orders were lifted in all the areas except areas where returning is difficult.

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 GOJ is undertaking efforts to restore “satoyama forests” around residential areas, to regenerate forestry and to disseminate information.

Air dose rate in forests in Fukushima Prefecture has been declining year by year (Fig. V-2).

![Fig. V-2 Changes of Air Dose Rate in forests in Fukushima](source)

(2) Measures against Radioactive Substances in Forests

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 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.

(3) Supply Safe Forest Products

The GOJ set standard limits for radioactive substances in foods at 100 Bq/kg for general foods. As of March 26, 2021, 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.

The Forestry Agency promptly publishes the results of inspections on radioactivity levels in the products in order to dispel harmful rumors. In addition, the agency promotes the restoration of satoyama hardwood forest for shiitake logs.

Iwaki Shiitake Blocks Growers Cooperation, which produces shiitake mushrooms in Fukushima Prefecture, was forced to suspend shipments for a while after the Great East Japan Earthquake, but it has succeeded in expanding production and sales channels through safety management and branding.

By disclosing all the facilities, the production processes, and the inspection results, the association has earned the trust from their business partners. It has been also working on creating their hit products such as Shochu (Japanese distilled spirits) using shiitake mushrooms as one of their sixth industrialization activities.

Shiitake mushrooms and Shochu produced under safety management
Appendix

1. Forestry-related Fundamental Figures

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<td>i</td>
<td>Nominal gross domestic product (GDP)</td>
<td>billion yen</td>
<td>535,418</td>
<td>532,516</td>
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<td>Forestry / GDP</td>
<td>%</td>
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<td>Total number of workers</td>
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<td>Forestry / Total # of workers</td>
<td>%</td>
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<td>0.09</td>
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<td>Land area of Japan</td>
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<td>Forest / Land area</td>
<td>%</td>
<td>67.5</td>
<td>67.4</td>
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<td>Protection forest</td>
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<td>Growing stock of forest</td>
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<td>Total wood supply/demand</td>
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<td>82.48</td>
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<tr>
<td></td>
<td>Domestic production</td>
<td>million m3</td>
<td>19.06</td>
<td>17.90</td>
<td>18.92</td>
<td>24.92</td>
<td>27.14</td>
<td>29.66</td>
<td>30.20</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td>million m3</td>
<td>81.95</td>
<td>69.52</td>
<td>52.96</td>
<td>50.24</td>
<td>50.94</td>
<td>52.19</td>
<td>52.28</td>
</tr>
<tr>
<td></td>
<td>Self-sufficiency rate</td>
<td>%</td>
<td>18.9</td>
<td>20.5</td>
<td>26.3</td>
<td>33.2</td>
<td>34.8</td>
<td>36.2</td>
<td>36.6</td>
</tr>
<tr>
<td>viii</td>
<td>New housing starts</td>
<td>million units</td>
<td>1.23</td>
<td>1.24</td>
<td>0.81</td>
<td>0.91</td>
<td>0.97</td>
<td>0.96</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>Ratio of wooden structure</td>
<td>%</td>
<td>45.2</td>
<td>43.9</td>
<td>56.6</td>
<td>55.5</td>
<td>56.5</td>
<td>57.2</td>
<td>57.2</td>
</tr>
</tbody>
</table>

Notes: *Total wood supply/demand*, "Domestic production" and "Import" in "vii" refer to the volume in roundwood equivalent.
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 "Wood Supply and Demand Chart"
vii: Ministry of Land, Infrastructure, Transport and Tourism "Housing Starts"

2. Forestry Output

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry output</td>
<td>531,158</td>
<td>471,085</td>
<td>425,700</td>
<td>454,471</td>
<td>470,240</td>
<td>488,346</td>
<td>502,063</td>
<td>497,831</td>
</tr>
<tr>
<td>Wood production</td>
<td>322,180</td>
<td>210,500</td>
<td>195,290</td>
<td>234,080</td>
<td>237,000</td>
<td>256,096</td>
<td>264,837</td>
<td>270,000</td>
</tr>
<tr>
<td>Softwood</td>
<td>265,330</td>
<td>177,410</td>
<td>170,160</td>
<td>198,190</td>
<td>195,390</td>
<td>206,060</td>
<td>209,999</td>
<td>213,010</td>
</tr>
<tr>
<td>Sugi (Japanese Cedar)</td>
<td>123,780</td>
<td>87,530</td>
<td>93,500</td>
<td>118,090</td>
<td>116,740</td>
<td>122,680</td>
<td>126,440</td>
<td>127,430</td>
</tr>
<tr>
<td>Hardwood</td>
<td>54,720</td>
<td>31,710</td>
<td>23,760</td>
<td>19,510</td>
<td>19,060</td>
<td>18,400</td>
<td>18,420</td>
<td>16,950</td>
</tr>
<tr>
<td>Fuelwood and charcoal production</td>
<td>6,160</td>
<td>6,090</td>
<td>5,080</td>
<td>5,310</td>
<td>5,490</td>
<td>5,440</td>
<td>5,540</td>
<td>5,810</td>
</tr>
<tr>
<td>Grown mushroom production</td>
<td>196,890</td>
<td>198,500</td>
<td>218,910</td>
<td>210,520</td>
<td>221,390</td>
<td>220,080</td>
<td>225,680</td>
<td>217,020</td>
</tr>
<tr>
<td>Minor forestry products production</td>
<td>5,920</td>
<td>1,960</td>
<td>6,420</td>
<td>4,550</td>
<td>6,600</td>
<td>4,740</td>
<td>5,990</td>
<td>4,800</td>
</tr>
<tr>
<td>Forestry income produced</td>
<td>351,910</td>
<td>245,780</td>
<td>229,220</td>
<td>251,020</td>
<td>260,110</td>
<td>269,540</td>
<td>266,500</td>
<td>254,520</td>
</tr>
</tbody>
</table>

Notes: 1. Due to rounding, some totals may not correspond with the sum of the separate figures.
2. "Wood production" includes the output of wood chips for fuel since 2011.
3. "Fuelwood and charcoal production" includes the output of bamboo charcoal and charcoal dust since 2001.
4. "Grown mushroom production" includes the output of eryngii mushrooms and other varieties of grown mushrooms since 2001.
5. "Minor forestry products production" includes the output of j apan wax and j apane lacquer since 2002, the output of wild grass (wild vegetables and wild herbs) since 2010 and the output of giber since 2016.
Source: Ministry of Agriculture, Forestry and Fisheries (MAFF) "Forestry Output"
### 3. Current State of Forest Resources

<table>
<thead>
<tr>
<th>Classification</th>
<th>Total</th>
<th>Growing stock (Unit: 1,000ha, million m³)</th>
<th>Treeless land (canopy cover less than 30%)</th>
<th>Bamboo groves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Growing stock</td>
<td>Area</td>
<td>Growing stock</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------</td>
<td>---------------</td>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>Total</td>
<td>25,048</td>
<td>5,241.50</td>
<td>10,204</td>
<td>3,308.42</td>
</tr>
<tr>
<td>National forest</td>
<td>Subtotal</td>
<td>7,659</td>
<td>1,225.93</td>
<td>2,288</td>
</tr>
<tr>
<td></td>
<td>Under the Forestry Agency's jurisdiction</td>
<td>7,593</td>
<td>1,220.72</td>
<td>2,282</td>
</tr>
<tr>
<td></td>
<td>State-owned</td>
<td>7,508</td>
<td>1,201.28</td>
<td>2,208</td>
</tr>
<tr>
<td></td>
<td>Government reforestation</td>
<td>85</td>
<td>19.44</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Under other Agency's jurisdiction</td>
<td>65</td>
<td>5.21</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Subtotal</td>
<td>17,389</td>
<td>4,015.57</td>
<td>7,916</td>
</tr>
<tr>
<td></td>
<td>Public forest</td>
<td>2,995</td>
<td>615.56</td>
<td>1,334</td>
</tr>
<tr>
<td></td>
<td>Prefecture</td>
<td>1,292</td>
<td>252.69</td>
<td>529</td>
</tr>
<tr>
<td></td>
<td>Municipality/Property ward</td>
<td>1,702</td>
<td>362.87</td>
<td>804</td>
</tr>
<tr>
<td></td>
<td>Private forest</td>
<td>14,347</td>
<td>3,394.33</td>
<td>6,569</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>48</td>
<td>5.68</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes:
1. Data cover the forests defined in Article 2 of the Forest Act.
2. Figures in parentheses refer to the total area which includes area planted as lower layer of multi-layered forest.
3. Figures are as of March 31, 2017.
4. Due to rounding, some totals may not correspond with the sum of the separate figures.

Source: Forestry Agency

### 4. Planted Area by Tree Species

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>(Unit: ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sugi (Japanese cedar)</td>
<td>Hinoki (Japanese cypress)</td>
</tr>
<tr>
<td>2000</td>
<td>31,318</td>
<td>4,223</td>
</tr>
<tr>
<td>2005</td>
<td>25,584</td>
<td>5,216</td>
</tr>
<tr>
<td>2010</td>
<td>18,756</td>
<td>4,132</td>
</tr>
<tr>
<td>2015</td>
<td>16,607</td>
<td>5,537</td>
</tr>
<tr>
<td>2016</td>
<td>21,106</td>
<td>6,766</td>
</tr>
<tr>
<td>2017</td>
<td>18,390</td>
<td>6,570</td>
</tr>
<tr>
<td>2018</td>
<td>22,069</td>
<td>7,102</td>
</tr>
<tr>
<td>2019</td>
<td>19,866</td>
<td>6,845</td>
</tr>
</tbody>
</table>

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.

Source: Forestry Agency
5. Planted Forest Area by Age Classes

<table>
<thead>
<tr>
<th>Year</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
<th>XI</th>
<th>XII</th>
<th>XIII</th>
<th>XIV</th>
<th>XV</th>
<th>XVI</th>
<th>XVII</th>
<th>XVIII</th>
<th>XIX</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>604</td>
<td>895</td>
<td>1,263</td>
<td>1,691</td>
<td>1,762</td>
<td>1,569</td>
<td>947</td>
<td>337</td>
<td>240</td>
<td>205</td>
<td>178</td>
<td>137</td>
<td>111</td>
<td>83</td>
<td>148</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>436</td>
<td>700</td>
<td>943</td>
<td>1,351</td>
<td>1,691</td>
<td>1,746</td>
<td>1,413</td>
<td>777</td>
<td>270</td>
<td>224</td>
<td>183</td>
<td>151</td>
<td>118</td>
<td>93</td>
<td>79</td>
<td>52</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>278</td>
<td>421</td>
<td>699</td>
<td>937</td>
<td>1,338</td>
<td>1,686</td>
<td>1,719</td>
<td>1,388</td>
<td>735</td>
<td>262</td>
<td>213</td>
<td>172</td>
<td>139</td>
<td>112</td>
<td>86</td>
<td>67</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>131</td>
<td>226</td>
<td>350</td>
<td>589</td>
<td>874</td>
<td>1,149</td>
<td>1,599</td>
<td>1,677</td>
<td>1,522</td>
<td>946</td>
<td>946</td>
<td>353</td>
<td>204</td>
<td>171</td>
<td>144</td>
<td>112</td>
<td>89</td>
<td>52</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>88</td>
<td>168</td>
<td>227</td>
<td>352</td>
<td>593</td>
<td>873</td>
<td>1,143</td>
<td>1,582</td>
<td>1,649</td>
<td>1,500</td>
<td>918</td>
<td>345</td>
<td>200</td>
<td>168</td>
<td>141</td>
<td>106</td>
<td>85</td>
<td>62</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>73</td>
<td>114</td>
<td>159</td>
<td>231</td>
<td>347</td>
<td>584</td>
<td>852</td>
<td>1,111</td>
<td>1,565</td>
<td>1,631</td>
<td>1,473</td>
<td>921</td>
<td>345</td>
<td>194</td>
<td>146</td>
<td>138</td>
<td>105</td>
<td>87</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>68</td>
<td>102</td>
<td>114</td>
<td>164</td>
<td>224</td>
<td>348</td>
<td>582</td>
<td>846</td>
<td>1,108</td>
<td>1,592</td>
<td>1,473</td>
<td>921</td>
<td>345</td>
<td>194</td>
<td>164</td>
<td>138</td>
<td>105</td>
<td>87</td>
<td>174</td>
<td></td>
</tr>
</tbody>
</table>

Notes 1: Figures are as the end of each fiscal year.
2: For the years 1989 and 1994, the class XV contains forests older than that class.
3: Data cover the forests defined in Article 5 or Article 7-2 of the Forest Act.

Source: Forestry Agency

6. Thinned Area and Use of Thinnings

<table>
<thead>
<tr>
<th>(FY)</th>
<th>Thinned area (1,000ha)</th>
<th>Volume of thinnings used (million m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Private and public forest</td>
</tr>
<tr>
<td>2010</td>
<td>556</td>
<td>445</td>
</tr>
<tr>
<td>2011</td>
<td>552</td>
<td>437</td>
</tr>
<tr>
<td>2012</td>
<td>488</td>
<td>368</td>
</tr>
<tr>
<td>2013</td>
<td>521</td>
<td>400</td>
</tr>
<tr>
<td>2014</td>
<td>465</td>
<td>339</td>
</tr>
<tr>
<td>2015</td>
<td>452</td>
<td>341</td>
</tr>
<tr>
<td>2016</td>
<td>440</td>
<td>319</td>
</tr>
<tr>
<td>2017</td>
<td>410</td>
<td>304</td>
</tr>
<tr>
<td>2018</td>
<td>370</td>
<td>269</td>
</tr>
<tr>
<td>2019</td>
<td>365</td>
<td>268</td>
</tr>
</tbody>
</table>

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" means 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.

Source: Forestry Agency

7. Forest Area by Owners

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Forest area (ha)</td>
<td>Ratio to total area</td>
</tr>
<tr>
<td>Total</td>
<td>17,626,761</td>
<td>100.0%</td>
</tr>
<tr>
<td>Private</td>
<td>13,563,827</td>
<td>77.0%</td>
</tr>
<tr>
<td>Public</td>
<td>3,370,380</td>
<td>19.1%</td>
</tr>
<tr>
<td>Prefecture</td>
<td>1,271,571</td>
<td>7.2%</td>
</tr>
<tr>
<td>Public corporation</td>
<td>381,189</td>
<td>2.2%</td>
</tr>
<tr>
<td>Municipality</td>
<td>1,406,063</td>
<td>8.0%</td>
</tr>
<tr>
<td>Property ward</td>
<td>301,557</td>
<td>1.7%</td>
</tr>
<tr>
<td>Incorporated Administrative Agencies</td>
<td>692,554</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

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.

Source: MAFF "Census of Agriculture and Forestry"
8. Number of Forestry Management Entities and their Forest Area

<table>
<thead>
<tr>
<th>Number Area</th>
<th>Area 3-5ha</th>
<th>Area 5-20ha</th>
<th>Area 20-50ha</th>
<th>Area 50-100ha</th>
<th>Area 100ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>87,284</td>
<td>4,373,374</td>
<td>2,247</td>
<td>1,170</td>
<td>389,986</td>
</tr>
<tr>
<td>Corporation</td>
<td>5,599</td>
<td>1,470,626</td>
<td>1,045</td>
<td>237</td>
<td>397</td>
</tr>
<tr>
<td>Private company</td>
<td>2,456</td>
<td>774,282</td>
<td>707</td>
<td>144</td>
<td>193</td>
</tr>
<tr>
<td>Cooperative</td>
<td>2,337</td>
<td>497,968</td>
<td>304</td>
<td>85</td>
<td>109</td>
</tr>
<tr>
<td>Agricultural cooperative</td>
<td>87</td>
<td>19,669</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Forestry cooperative</td>
<td>1,819</td>
<td>304,008</td>
<td>263</td>
<td>83</td>
<td>74</td>
</tr>
<tr>
<td>Other cooperatives</td>
<td>431</td>
<td>174,291</td>
<td>41</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>Non-corporation</td>
<td>806</td>
<td>198,376</td>
<td>54</td>
<td>8</td>
<td>95</td>
</tr>
<tr>
<td>Individual</td>
<td>77,692</td>
<td>1,215,213</td>
<td>1,181</td>
<td>933</td>
<td>23,329</td>
</tr>
<tr>
<td>Public</td>
<td>1,289</td>
<td>1,553,229</td>
<td>1</td>
<td>41</td>
<td>159</td>
</tr>
</tbody>
</table>

Notes 1: Symbol of "-" 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.

Source: MAFF "2015 Census of Agriculture and Forestry"

9. Roundwood Production

<table>
<thead>
<tr>
<th>By tree species</th>
<th>By use</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>Relative change from the previous year (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugi (Japanese cedar) for sawnwood</td>
<td>Subtotal</td>
<td>13,707</td>
<td>13,695</td>
<td>14,789</td>
<td>17,815</td>
<td>18,470</td>
<td>18,256</td>
<td>18,402</td>
<td>19,876</td>
<td>2.1</td>
</tr>
<tr>
<td>Hinoki (Japanese cypress)</td>
<td>7,258</td>
<td>6,737</td>
<td>6,695</td>
<td>7,869</td>
<td>8,095</td>
<td>8,200</td>
<td>8,237</td>
<td>8,582</td>
<td>-</td>
<td>4.2</td>
</tr>
<tr>
<td>Akamatsu (Japanese red pine), Kuromatsu (Japanese black pine)</td>
<td>1,034</td>
<td>783</td>
<td>694</td>
<td>779</td>
<td>678</td>
<td>641</td>
<td>628</td>
<td>601</td>
<td>-</td>
<td>4.3</td>
</tr>
<tr>
<td>Karamatsu (Japanese larch), Ezomatsu (Yezo spruce), Todomatsu (Sakhalin fir)</td>
<td>2,410</td>
<td>2,910</td>
<td>2,816</td>
<td>3,268</td>
<td>3,325</td>
<td>3,380</td>
<td>3,366</td>
<td>3,405</td>
<td>-</td>
<td>1.2</td>
</tr>
<tr>
<td>Others</td>
<td>319</td>
<td>232</td>
<td>201</td>
<td>170</td>
<td>153</td>
<td>198</td>
<td>165</td>
<td>168</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>Hardwood</td>
<td>3,327</td>
<td>2,471</td>
<td>2,404</td>
<td>2,236</td>
<td>2,188</td>
<td>2,153</td>
<td>2,178</td>
<td>2,007</td>
<td>-</td>
<td>7.9</td>
</tr>
<tr>
<td>Sawdust</td>
<td>12,798</td>
<td>11,571</td>
<td>10,582</td>
<td>12,004</td>
<td>12,182</td>
<td>12,312</td>
<td>12,563</td>
<td>12,675</td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td>Plywood</td>
<td>138</td>
<td>863</td>
<td>2,490</td>
<td>3,356</td>
<td>3,682</td>
<td>4,122</td>
<td>4,492</td>
<td>4,745</td>
<td>-</td>
<td>5.6</td>
</tr>
<tr>
<td>Chips</td>
<td>4,058</td>
<td>3,752</td>
<td>4,121</td>
<td>4,689</td>
<td>4,796</td>
<td>4,654</td>
<td>4,585</td>
<td>4,263</td>
<td>-</td>
<td>7.0</td>
</tr>
</tbody>
</table>

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: Sawnwood 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.

Source: MAFF "Wood Supply and Demand Report"
## 10. Wood Supply and Demand Chart (roundwood equivalent)

### Supply

<table>
<thead>
<tr>
<th>Item</th>
<th>Domestic Production</th>
<th>Import</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundwood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sawnwood</td>
<td>8,996</td>
<td>6,932</td>
<td>15,928</td>
</tr>
<tr>
<td>Pulp and chips</td>
<td>5,580</td>
<td>6,928</td>
<td>12,508</td>
</tr>
<tr>
<td>Plywood</td>
<td>4,651</td>
<td>6,928</td>
<td>11,579</td>
</tr>
<tr>
<td>Others</td>
<td>3,399</td>
<td>703</td>
<td>4,092</td>
</tr>
<tr>
<td>Charcoal</td>
<td>34</td>
<td>698</td>
<td>1,042</td>
</tr>
<tr>
<td>Firewood</td>
<td>40</td>
<td>698</td>
<td>1,098</td>
</tr>
<tr>
<td>Wood chips for fuel</td>
<td>30</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Subtotal</td>
<td>23,805</td>
<td>2,711</td>
<td>26,516</td>
</tr>
<tr>
<td>Subtotal</td>
<td>27,043</td>
<td>2,711</td>
<td>29,754</td>
</tr>
<tr>
<td>Subtotal</td>
<td>30,988</td>
<td>2,711</td>
<td>33,700</td>
</tr>
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</table>

### Demand

<table>
<thead>
<tr>
<th>Item</th>
<th>Domestic Consumption</th>
<th>Industrial Use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundwood</td>
<td>23,805</td>
<td>2,711</td>
<td>26,516</td>
</tr>
<tr>
<td>Sawnwood</td>
<td>8,996</td>
<td>1,199</td>
<td>10,195</td>
</tr>
<tr>
<td>Pulp and chips</td>
<td>5,580</td>
<td>1,199</td>
<td>6,779</td>
</tr>
<tr>
<td>Plywood</td>
<td>4,651</td>
<td>1,199</td>
<td>5,850</td>
</tr>
<tr>
<td>Others</td>
<td>3,399</td>
<td>0</td>
<td>3,399</td>
</tr>
<tr>
<td>Charcoal</td>
<td>34</td>
<td>698</td>
<td>1,032</td>
</tr>
<tr>
<td>Firewood</td>
<td>40</td>
<td>698</td>
<td>1,138</td>
</tr>
<tr>
<td>Wood chips for fuel</td>
<td>30</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Subtotal</td>
<td>27,043</td>
<td>3,398</td>
<td>30,441</td>
</tr>
<tr>
<td>Subtotal</td>
<td>30,988</td>
<td>3,398</td>
<td>34,386</td>
</tr>
</tbody>
</table>

### Notes

1. Figures in parentheses refer to the volume of pulp and chips from mill residue or construction waste, which are already included in the volume of sawnwood, plywood, or others. Therefore, these figures are excluded from "total" and "subtotal".
2. "Forest residue" refers to branches or roots carried into mills for use.
3. Wood pellets produced domestically are included in "fuel wood" of domestic production.
4. Due to rounding, some totals may not correspond with the sum of the separate figures.

Source: Forestry Agency "Wood Supply and Demand Chart", 2019
11. Wood Supply/Demand (roundwood equivalent)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Wood for industrial use</th>
<th>Fuel wood</th>
<th>Wood for mushroom production</th>
<th>Sawmilling</th>
<th>Pulp and chips</th>
<th>Plywood</th>
<th>Others</th>
<th>Domestic production</th>
<th>Import</th>
<th>Self-sufficiency rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td>65,208</td>
<td>45,278</td>
<td>19,928</td>
<td>30,295</td>
<td>8,285</td>
<td>2,297</td>
<td>4,401</td>
<td>42,794</td>
<td>2,448</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>71,467</td>
<td>56,547</td>
<td>14,920</td>
<td>37,789</td>
<td>10,189</td>
<td>3,178</td>
<td>5,391</td>
<td>49,309</td>
<td>7,541</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>76,798</td>
<td>70,530</td>
<td>6,268</td>
<td>47,084</td>
<td>14,335</td>
<td>5,187</td>
<td>3,924</td>
<td>50,375</td>
<td>20,155</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>106,603</td>
<td>102,679</td>
<td>3,924</td>
<td>62,009</td>
<td>24,887</td>
<td>13,059</td>
<td>2,724</td>
<td>46,241</td>
<td>56,438</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>99,305</td>
<td>96,369</td>
<td>1,132</td>
<td>55,341</td>
<td>27,298</td>
<td>11,173</td>
<td>2,557</td>
<td>34,577</td>
<td>61,792</td>
<td></td>
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<tr>
<td>1985</td>
<td>95,447</td>
<td>92,901</td>
<td>1,797</td>
<td>44,539</td>
<td>32,915</td>
<td>11,217</td>
<td>2,430</td>
<td>33,074</td>
<td>59,827</td>
<td></td>
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<tr>
<td>1990</td>
<td>113,242</td>
<td>111,162</td>
<td>1,563</td>
<td>53,887</td>
<td>41,344</td>
<td>14,546</td>
<td>1,385</td>
<td>29,369</td>
<td>81,793</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>113,698</td>
<td>111,922</td>
<td>2,034</td>
<td>50,285</td>
<td>41,344</td>
<td>14,546</td>
<td>1,385</td>
<td>29,369</td>
<td>81,793</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>101,605</td>
<td>99,263</td>
<td>1,526</td>
<td>47,966</td>
<td>42,186</td>
<td>12,825</td>
<td>2,356</td>
<td>18,022</td>
<td>81,241</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>87,423</td>
<td>85,857</td>
<td>1,563</td>
<td>32,581</td>
<td>32,097</td>
<td>10,680</td>
<td>2,672</td>
<td>17,178</td>
<td>68,681</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>71,884</td>
<td>70,253</td>
<td>1,631</td>
<td>25,379</td>
<td>32,350</td>
<td>9,506</td>
<td>2,968</td>
<td>18,236</td>
<td>52,018</td>
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</tr>
<tr>
<td>2015</td>
<td>75,160</td>
<td>70,883</td>
<td>3,962</td>
<td>25,358</td>
<td>31,783</td>
<td>9,314</td>
<td>3,829</td>
<td>21,787</td>
<td>49,085</td>
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</tr>
<tr>
<td>2016</td>
<td>78,077</td>
<td>71,942</td>
<td>5,807</td>
<td>20,156</td>
<td>31,619</td>
<td>10,248</td>
<td>3,924</td>
<td>22,305</td>
<td>49,585</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>81,859</td>
<td>73,742</td>
<td>7,800</td>
<td>26,370</td>
<td>32,370</td>
<td>10,671</td>
<td>4,404</td>
<td>23,312</td>
<td>50,430</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>82,478</td>
<td>73,184</td>
<td>9,020</td>
<td>25,708</td>
<td>32,009</td>
<td>11,003</td>
<td>4,460</td>
<td>23,680</td>
<td>49,505</td>
<td></td>
</tr>
</tbody>
</table>

Notes 1: "Others" includes items such as roundwood for export.
2: Due to rounding, some totals may not correspond with the sum of the separate figures.
3: "Fuel wood" includes wood chip for fuel utilized by woody biomass power plants since 2014.
Source: Forestry Agency "Wood Supply and Demand Chart"

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Total wood supply/demand</th>
<th>Domestic production</th>
<th>Import</th>
<th>Self-sufficiency rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>101,008</td>
<td>99,263</td>
<td>1,745</td>
<td>18,022</td>
</tr>
<tr>
<td>2005</td>
<td>87,423</td>
<td>85,857</td>
<td>1,563</td>
<td>17,178</td>
</tr>
<tr>
<td>2010</td>
<td>71,884</td>
<td>70,253</td>
<td>1,631</td>
<td>25,379</td>
</tr>
<tr>
<td>2015</td>
<td>75,160</td>
<td>70,883</td>
<td>3,962</td>
<td>25,358</td>
</tr>
<tr>
<td>2016</td>
<td>78,077</td>
<td>71,942</td>
<td>5,807</td>
<td>20,156</td>
</tr>
<tr>
<td>2017</td>
<td>81,859</td>
<td>73,742</td>
<td>7,800</td>
<td>26,370</td>
</tr>
<tr>
<td>2018</td>
<td>82,478</td>
<td>73,184</td>
<td>9,020</td>
<td>25,708</td>
</tr>
<tr>
<td>2019</td>
<td>81,905</td>
<td>71,269</td>
<td>10,365</td>
<td>25,270</td>
</tr>
</tbody>
</table>

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, which are already included in the volume of sawnwood, plywood, or others. Therefore, these figures are excluded from "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 calculated as the difference from the previous year.
Source: Forestry Agency "Wood Supply and Demand Chart"
### 13. Wood Supply by Country (roundwood equivalent)

(\text{Unit: 1,000m}^3, \%) 

<table>
<thead>
<tr>
<th>Region</th>
<th>Subtotal</th>
<th>North America</th>
<th>Southeast Asia</th>
<th>Subtotal</th>
<th>Malaysia</th>
<th>Indonesia</th>
<th>Others</th>
<th>Russia Federation</th>
<th>Europe</th>
<th>Import Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28.9</td>
<td>18.8</td>
<td>19.2</td>
<td>17.5</td>
<td>17.2</td>
<td>16.8</td>
<td>16.3</td>
<td>15.3</td>
<td>45.4</td>
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<td></td>
<td>14,460</td>
<td>6,844</td>
<td>5,838</td>
<td>6,057</td>
<td>6,083</td>
<td>6,233</td>
<td>5,754</td>
<td>5,139</td>
<td>13,569</td>
<td>10,511</td>
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<tr>
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<td>14,240</td>
<td>9,295</td>
<td>7,806</td>
<td>6,359</td>
<td>6,294</td>
<td>6,119</td>
<td>5,625</td>
<td>5,139</td>
<td>5,690</td>
<td>5,888</td>
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<td>5,858</td>
<td>4,137</td>
<td>2,304</td>
<td>2,804</td>
<td>2,698</td>
<td>2,887</td>
<td>2,759</td>
<td>2,548</td>
<td>6,021</td>
<td>4,866</td>
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<td>486</td>
<td>209</td>
<td>127</td>
<td>117</td>
<td>69</td>
<td>148</td>
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<td>7,429</td>
<td>7,411</td>
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<td>(7.5)</td>
<td>(8.6)</td>
<td>(3.5)</td>
<td>(2.9)</td>
<td>(3.3)</td>
<td>(3.3)</td>
<td>(3.3)</td>
<td>(3.5)</td>
<td>(4.7)</td>
<td>(6.9)</td>
</tr>
<tr>
<td></td>
<td>28,700</td>
<td>16,129</td>
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<td>12,415</td>
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<td>12,352</td>
<td>12,352</td>
<td>12,352</td>
<td>24,675</td>
<td>9,937</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>2016</td>
<td>2017</td>
<td>2018</td>
<td>2019</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>2018</td>
<td>2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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" include Philippines, Singapore, Brunei, Papua New Guinea, and Solomon.
3: "Others" of "Others" include African countries.
4: "Others" of "Others" include 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.

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

### 14. Number of Mills/Factories and Production Volume

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawnwood Number of mills</td>
<td>11,692</td>
<td>9,011</td>
<td>6,569</td>
<td>5,206</td>
<td>4,934</td>
<td>4,814</td>
<td>4,582</td>
<td>4,382</td>
</tr>
<tr>
<td>Arrival of logs (1,000m^3)</td>
<td>26,256</td>
<td>20,540</td>
<td>15,762</td>
<td>16,182</td>
<td>16,590</td>
<td>16,802</td>
<td>16,872</td>
<td>16,762</td>
</tr>
<tr>
<td>Shipment (1,000m^3)</td>
<td>17,231</td>
<td>12,652</td>
<td>9,415</td>
<td>9,231</td>
<td>9,293</td>
<td>9,457</td>
<td>9,202</td>
<td>9,032</td>
</tr>
<tr>
<td>Plywood Number of mills</td>
<td>354</td>
<td>271</td>
<td>182</td>
<td>157</td>
<td>150</td>
<td>165</td>
<td>165</td>
<td>162</td>
</tr>
<tr>
<td>Arrival of logs (1,000m^3)</td>
<td>5,401</td>
<td>4,636</td>
<td>3,811</td>
<td>4,218</td>
<td>4,638</td>
<td>5,004</td>
<td>5,287</td>
<td>5,448</td>
</tr>
<tr>
<td>Surface-untreated plywood production (1,000m^3)</td>
<td>3,218</td>
<td>3,212</td>
<td>2,645</td>
<td>2,756</td>
<td>3,063</td>
<td>3,287</td>
<td>3,298</td>
<td>3,337</td>
</tr>
<tr>
<td>Surface-treated plywood production (1,000m^3)</td>
<td>1,534</td>
<td>1,037</td>
<td>647</td>
<td>524</td>
<td>616</td>
<td>591</td>
<td>582</td>
<td>583</td>
</tr>
<tr>
<td>Glued laminated timber Number of factories</td>
<td>281</td>
<td>259</td>
<td>182</td>
<td>157</td>
<td>150</td>
<td>165</td>
<td>165</td>
<td>162</td>
</tr>
<tr>
<td>Production (1,000m^3)</td>
<td>892</td>
<td>1,512</td>
<td>1,455</td>
<td>1,485</td>
<td>1,549</td>
<td>1,971</td>
<td>1,923</td>
<td>1,920</td>
</tr>
<tr>
<td>Cross laminated timber Number of factories</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Production (1,000m^3)</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wood chips Number of mills</td>
<td>6,059</td>
<td>5,407</td>
<td>5,745</td>
<td>5,826</td>
<td>5,954</td>
<td>5,706</td>
<td>5,266</td>
<td></td>
</tr>
<tr>
<td>Production (1,000tons)</td>
<td>-</td>
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Notes 1: "Sawnwood" excludes sawmills with output power less than 7.5kW.
2: Figures of LVL is 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: "-" means "figures not available".

Sources: MAFF "Wood Supply and Demand Report", Japan Laminated Wood Products Association
Full text (in Japanese) of the “Annual Report on Forest and Forestry for FY2020” is available on the website of the Forestry Agency:
https://www.rinya.maff.go.jp/j/kikaku/hakusyo/R2hakusyo/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:

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