

Annual Report on Forest and Forestry in Japan

Fiscal Year 2022

(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) 2022.

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Forest Conservation Measures in Response to Climate Change

In Japan, which has steep topography and a lot of rainfall, forest conservation measures have contributed to protecting people's lives and properties from mountain disasters. On the other hand, social requirements to make the national lands more resilient against disasters is getting higher since changes in precipitation patterns are causing intensification of mountain disasters due to climate change in recent years.

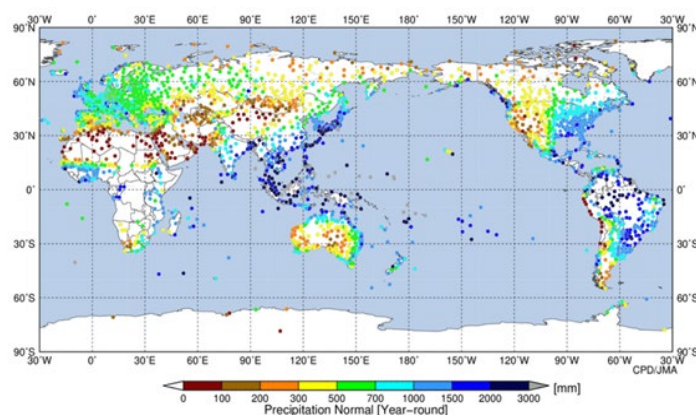
Therefore, this Special Topic describes the measures and effects of forest conservation so far and introduces the direction of future measures for forest conservation in response to climate change.

1. Forest Functions and Roles of Forest Conservation Projects

(1) Land Conservation Function of Forests

Forests play an important role in national land conservation, with multiple functions including mountain disaster prevention and water resource cultivation.

Japan is particularly vulnerable to erosion caused by rain, making it prone to mountain disasters and floods. The reason is that Japan has steep topography and fragile geology due to active mountain-building activity. Additionally, Japan experiences high amount of rainfall among the world with frequency occurrences of strong precipitation events such as typhoons and the rainy season (Fig. 1).



Source: Japan Meteorological Agency website "World Climate chart"

Note: This map shows normal year figures from 1991 to 2020.

Fig. 1 Distribution of global average annual precipitation

At the same time, most of Japan's mountainous areas are covered with forests as the moist environment helps forests grow.

Forests have land conservation functions. A main element of the land conservation functions of forests is mountain disaster prevention and soil conservation function, which works for preventing soil erosion and shallow landslides. Another main element is water conservation function, which equalizes the amount of water runoff into rivers. These functions are fulfilled through healthy forest soils which maintain high penetrability and water retention capacity and through healthy tree stands which firmly bind the forest soils to slopes.

Forests also have other disaster prevention functions, such as preventing wind damage, blown sand damage, and avalanches and mitigating damage caused by tsunamis.

(2) Forest Conservation (CHISAN) Projects to Maintain and Improve Forest Functions

The Government of Japan (GOJ) and prefectural governments are implementing forest conservation projects, such as stabilizing mountainside slopes and restoring/managing devastated streams in order to protect the lives and property of the people from mountain disasters.

Forest conservation projects are crucial measures for land conservation. The projects intend to maintain forests which have vital land conservation functions (designated as protection forests) or to restore collapsed forests. Prefectural governments implement the projects in private and public forests, and the GOJ (Regional Forest Offices) does the projects in national forests. In some private/public areas which require advanced technologies for restoration or are essential for land conservation, the GOJ implements the projects based on requests from prefectures.

Forest conservation projects include hillside work to stabilize mountain slopes, torrent work to stabilize the lower part of mountain slopes by controlling the erosion of mountain streams, and landslide prevention work dedicated to areas where part of the slope move in lumps slowly and repeatedly due to groundwater. In addition, adjustment of the number of trees and planting trees in protection forests are implemented to maintain the health of protection forests, under the necessity.

2. History and Accomplishments of Forest Conservation Projects

(1) History of Responses to Frequent Forest Devastation and Mountain Disasters

The devastation of forests had progressed when the use of forest resources expanded. However, Japan's forests have recovered and enriched since forest conservation projects were launched as a national project in 1911 during the Meiji period, and planned projects had been implemented with advanced technologies after World War II.

The Situation until the Edo Period

In Japan, people have obtained many resources from forests which are necessary for economic activities since its recorded history. They used wood for buildings and tools, fuelwood for living and industries such as salt and iron manufacturing, and plants and fallen leaves for farmland fertilizers. The devastation of forests had expanded until the Edo period due to population growth and economic development, and it occurred debris flows in mountainous area, floods in low area, and blown sand damage in coastal area.

At the same time, forest conservation measures such as setting mountain areas where logging was banned, and afforestation through tree planting, were implemented. These are the origin of the principle of current forest conservation.

The Beginning of Forest Conservation Projects in the Meiji Period

After the Meiji period started in 1868, the frequency of disasters increased because growing modern industries needed more forest resources and accelerated deforestation. To cope with the problem, modern legislation was progressed, and the Three Flood Control Acts: the River Act, the Erosion Control Act, and the Forest Act, were enacted in the period 1896-1897. Protection forest system was established in the Forest Act, and it continues to the present day.

In 1911, the Meiji government launched forest conservation projects as public projects to accelerate forest restoration, and forests started to recover (Fig. 2).

Responses to Forest Devastation and Frequent Mountain Disasters due to World War II

Deforestation progressed during and after World War II, and the areas of afforestation-abandoned sites reached approximately 1.5 million hectares. In addition, large typhoons caused mountain disasters and flood damage frequently.

In 1948, the "Five-Year Plan for Forest Conservation" was started. In 1951, the GOJ established a system of protection area for forest conservation in the revised Forest Act. As a result, forest conservation projects were positioned under the Forest Act and linked to the protection forest system. In 1954, the Temporary Measures Act for Protection Forest Consolidation was enacted, and the GOJ promoted the designation of protection forests (Fig. 3).

At the same time, afforestation is also encouraged through the GOJ's support as a public project. The Act on Temporary Measures for Afforestation was enacted in 1950. The first National Tree Planting Ceremony was held in the presence of His Imperial Majesty in the same year and continues to the present (Fig. 4).

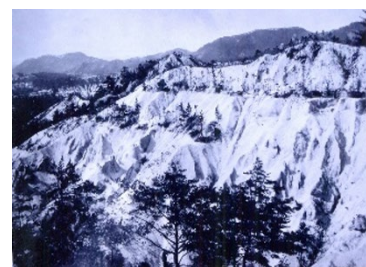
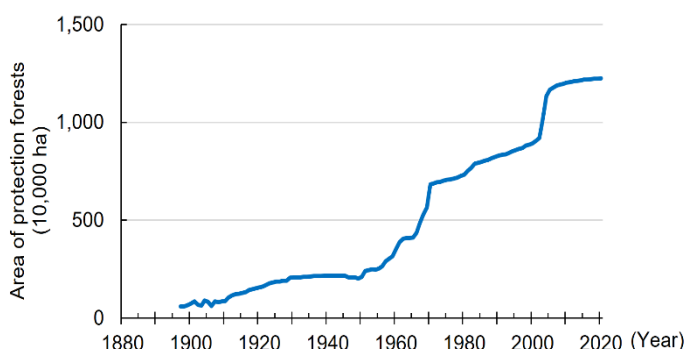


Fig. 2 Forest devastation before implementing forest conservation projects
(1913, Siga Prefecture)



Sources: Forestry Agency "Handbook of forestry Statistics" and "Handbook of forest and forestry Statistics"

Fig. 3 Changes in the area of protection forests



Fig. 4 The 1st National Tree Planting Ceremony
(© Yamanashi Prefecture)

Development of Forest Conservation Measures

The Act on Emergency Measures for Forest Conservation and Flood Control was enacted in 1960. Since then, the GOJ has formulated and implemented the Five-Year Plan for Forest Conservation Projects nine times. At the same time, developed engineering techniques accelerated afforestation in devastated areas, including remote collapsed areas (Fig. 5).



Under working



19 years after work

Fig. 5 Restoration of devastated areas by hillside work (Shodoshima-Town, Kagawa Prefecture)

In 2004, the Act on Emergency Measures for Forest Conservation and Flood Control and

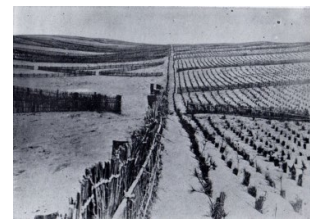
the Temporary Measures Act for Protection Forest Consolidation were abolished as the restoration of rich forests had progressed. After that, the Forestry Agency has been implementing forest conservation projects based on the "forest development and conservation project", which was established under the Forest Act.

In 2013, the Forestry Agency selected 60 representative sites that have especially contributed to national land conservation and announced them to the public because the 100 years had passed since the forest conservation projects started and most of the sites were covered by the rich forests.



Since the Edo period, people have created coastal disaster-prevention forests in various regions with ingenuity to deal with severe blown sand damage which was caused by the sediment supply from devastated upstream areas. The coastal disaster-prevention forests protect people's livelihoods and agriculture and provide beautiful landscapes of white sands and green pine trees in the present day.

Furthermore, considering that coastal forests mitigated the tsunami damage caused by the Great East Japan Earthquake in 2011, development of healthy coastal disaster-prevention forests, which contribute to achieving comprehensive disaster-prevention functions, is implemented across Japan.

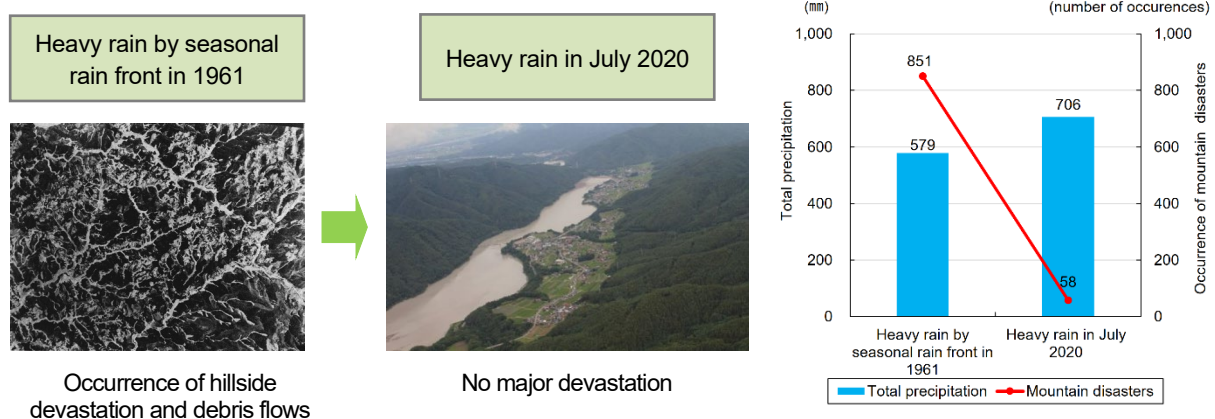


Afforestation and windbreak fences
(1918, Kaga City, Ishikawa Prefecture)

(2) Reduction of Mountain Disasters

The restoration and growth of forests through forest conservation measures and forest management have made Japan's land more resilient to mountain disasters.

In many areas, it was observed that the number of locations where disasters occur decreased significantly over 50 years, when compared under the condition that heavy rain of the same level hit the area (Fig. 6). In Japan as a whole, the area affected by mountain disasters decreased from an average of about 11,000 ha per year in the period 1955-1959 to an average of about 320 ha per year in the period 2018-2022.



Sources: The information on the "Heavy rain by seasonal rain front in 1961" was surveyed by the Forestry Agency. The total precipitation and the number of mountain disasters of Heavy rain in July 2020 were surveyed by the Japan Meteorological Agency and the Forestry Agency, respectively.

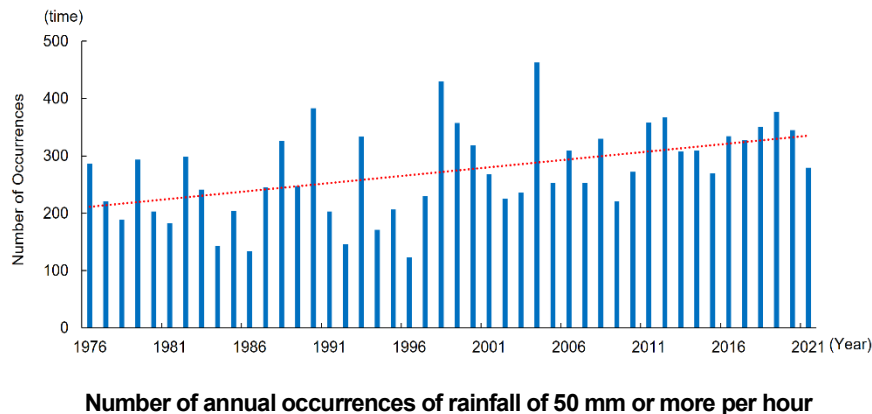
Fig. 6 Reduction of mountain disasters in the Inadani region of Nagano Prefecture

3. Intensification and Morphological Changes of Mountain Disasters Caused by Climate Change

(1) Increase in Heavy Rain Caused by Climate Change

In recent years, the annual frequency of short-term heavy rain has increased, and the total precipitation during a specific period due to linear rainbands has also increased (Fig. 7).

The IPCC Sixth Assessment Report released in 2021 predicts that the frequency and intensity of extreme events such as heavy rain will increase globally.



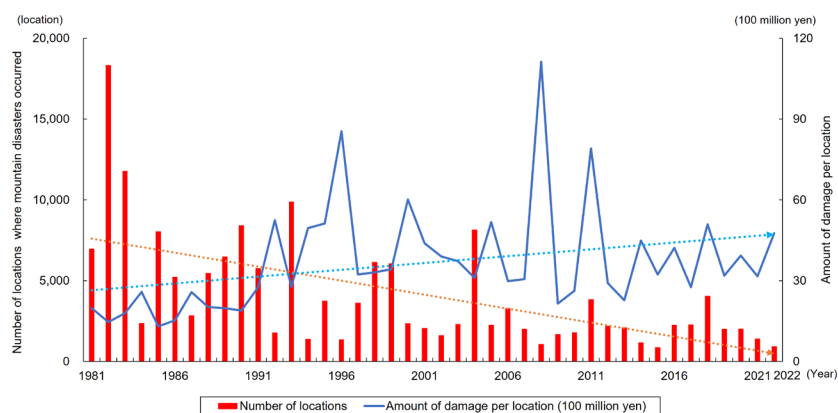
Source: The Forestry Agency created this chart based on the website of the Japan Meteorological Agency.

Fig. 7 Increase in short-term heavy rain

(2) Intensification and Morphological Changes of Mountain Disasters and the Policy of Countermeasures

The GOJ considered the policy to strengthen advanced disaster prevention countermeasures responding to mountain disasters, which are intensifying and changing in mechanism.

In recent years, the scale of mountain disasters in one place has increased and the disaster mechanism has also changed (Fig. 8), while the restoration and growth of forests have significantly reduced the number of mountain disasters such as shallow landslide. It is assumed that the reason is climate change, which has caused heavier and more frequent rain.



Source: Survey by Forestry Agency

Fig. 8 Number of locations where mountain disasters occurred and the amount of damage per location

In future forest conservation measures, it is crucial to strengthen the advanced disaster prevention countermeasures against the impact of climate change through enhancing forest function in national land conservation and improving forest conservation facilities in high-risk locations effectively.

The Forestry Agency analyzed and grasped the characteristics of recent disasters and discussed the effective and efficient advanced disaster prevention countermeasures in the "Study Group on Future Forest Conservation Measures for Heavy Rain Disasters". The group made the following recommendations in March 2021.

a) Collapse of slightly deeper layers than the topsoil

A large amount of rainwater permeates deep layers of forest soils, and the phenomenon of collapse of slightly deeper layers than topsoil, where tree roots do not penetrate, has been observed. The phenomenon may cause more sediment to flow down with driftwood. It is necessary to work on measures to reduce the risk of collapse and to monitor the signs of collapse in locations that the debris flow may cause damage to downstream settlements.

To deal with the problem, it is recommended to identify sites where taking countermeasures or monitoring is necessary and to promote construction work to reinforce slopes (Fig. 9).



Fig. 9 Occurrence of collapse of slightly deeper layer than the topsoil and the countermeasures

b) Increase in the erosion caused by mountain streams

There are concerns that the increased flow of mountain streams during heavy rain will increase the amount of erosion and sediment runoff and increase the risk that trees along the stream become driftwood.

To deal with the problem, it is encouraged to stabilize the entire stream by installing different types of erosion control dams according to the condition of the stream. For example, in areas close to villages, thick and strong erosion control dams should be installed to protect the villages from debris flow. In areas far from villages, small-scale dams should be installed in steps to prevent the erosion caused by mountain streams. As for driftwood generation, it is recommended to install driftwood trapping dams, to remove dangerous trees in mountain stream areas, and to implement forest transformation (Fig. 10).



East Japan typhoon in 2019
Marumori-Town, Miyagi Prefecture
(Longitudinal erosion of
mountain streams: 2-3m)



Fig. 10 Increase in the erosion caused by mountain streams and the countermeasures

c) Simultaneous occurrence of mountain disasters due to linear rainbands and other related events

There is a concern that mountain disasters may occur simultaneously in areas where linear rainbands have occurred.

To deal with the problem, it is encouraged to increase the implementation rate of forest conservation measures in areas where the risk of debris flows and other disasters is exceptionally high and to utilize existing facilities effectively by increasing these capacity.

d) Intensification of flood damage and driftwood disasters

There is a concern about the intensification of flood damage in downstream areas due to intense and frequent heavy rains. It is also problematic that sediment and driftwood may obstruct river water flow and increase the flood damage.

To maintain forest soils with penetrability and water retention capacity, it is encouraged to combine the management of protection forests and simple civil engineering work to prevent soil runoff. Developing erosion control dams and countermeasures against driftwood are also effective to deal with the problem.

4. Future Forest Conservation Measures in Response to Climate Change

(1) Positioning in the Basic Plans and Others

The GOJ has positioned forest conservation measures for disaster prevention and mitigation in the Basic Plan for National Resilience and the Basic Plan for Forest and Forestry.

The Basic Plan for National Resilience, approved in December 2018, states that the GOJ will strengthen mountain disaster measures for advanced disaster prevention and mitigation. The "Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation,

and Building National Resilience" was also approved by the Cabinet simultaneously. Based on this plan, the GOJ and prefectural governments implemented measures, such as installing forest conservation facilities and driftwood countermeasures, in locations where especially urgent measures are required.

In 2020, the Cabinet approved the "Five-Year Road Program for Disaster Prevention, Mitigation and National Resilience", which promotes measures against intensified wind and flood damage as the priority measures to continue building national resilience. As for the forest conservation projects, strengthening the development of forest conservation facilities has been implemented in the areas such as mountain disaster hazard zones and areas around important infrastructure.

In June 2021, the GOJ revised the Basic Plan for Forest and Forestry and the National Forest Plan. The plans will implement the following initiatives based on the "Summary of Study Group on Future Forest Conservation Measures for Heavy Rain Disasters" to promote practical forest conservation projects and others.

- (1) Suppression of sediment runoff through carefully placing erosion control dams in mountain disaster hazard zones
- (2) Enhancing the conservation of forest soils through a combination of forest management and installation of step work to mountainside slopes
- (3) Logging of dangerous trees in areas of mountain streams and mitigation of the risk of driftwood disasters by forest transformation and other related measures
- (4) Preparation against tsunamis and wind damage by strengthening management of coastal disaster prevention forests and other forests

These initiatives will be implemented under the collaboration with "River Basin Disaster Resilience and Sustainability by All", based on the "Five-Year Road Program for Disaster Prevention, Mitigation and National Resilience" and other plans.

(2) Specific Initiatives

The GOJ and local governments will conduct intensive forest conservation measures, collaboration with "River Basin Disaster Resilience and Sustainability by All", extension of the lifespan of existing facilities, utilization of ICT and taking non-structural measures.

Promotion of Forest Conservation Measures for National Resilience

The GOJ set a goal that the implementation rate of forest conservation measures will be increased from 65% in FY2020 to 80% in FY2025 in areas with particularly high urgency among mountain disaster hazard zones in the "Five-Year Road Program for Disaster Prevention, Mitigation and National Resilience". The Forestry Agency is implementing the measures intensively for achieving the goal.

The measures implemented under the "Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience" have been effective in various areas, such as suppressing sediment runoff under heavy rains.

Collaboration with River Basin Disaster Resilience and Sustainability by All

Based on the intensification and the frequency of flood damage due to the effects of climate change, the Ministry of Land, Infrastructure, Transport and Tourism, other related ministries and agencies, local governments and other related institutions are collaborating on the "River Basin Disaster Resilience and Sustainability by All", in which all relevant parties work

together to mitigate flood damage throughout the basin. In March 2021, the "River Basin Disaster Resilience and Sustainability by All" projects were formulated and announced for all first-class river systems, and forest management and forest conservation measures were positioned in these projects.

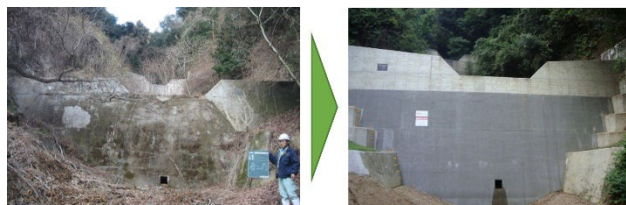
The Forestry Agency is implementing works such as thinning and installing step work to improve the water retention capacity of forests. Also, it is working on suppressing sediment and driftwood runoff so as not to block rivers.

Measures to Extend the Lifespan of Forest Conservation Facilities

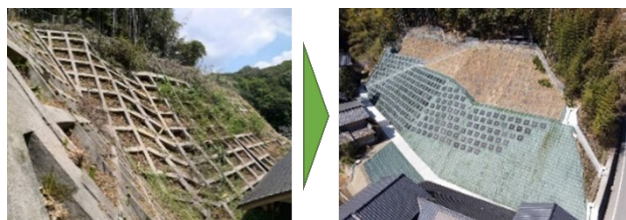
Local governments and the GOJ (Regional Forest Offices) promote effective use of dilapidated facilities by improving and enhancing their functions for efficient advanced disaster prevention measures (Fig. 11).

Initiative for Effective and Efficient Measures Utilizing New Technologies

The utilization of 3D laser scanners, aerial lasers, drones, ICT backhoes, wearable cameras and other new technologies is being promoted in various places to implement projects safely and efficiently in response to the increase in amount of restoration work, especially work in dangerous sites.



Enhancing functions and extending lifespan of existing dams by raising and thickening
(Kobe City, Hyogo Prefecture)



Improving the stability of mountainside slopes by renewing aging facilities
(Onomichi City, Hiroshima Prefecture)

Providing Information on Mountain Disasters

The GOJ uses remote systems to monitor some high risk mountain disaster hazard zones and provides the information to prefectural governments and municipalities for early detection and response to disasters.

The GOJ and prefectural governments are providing map information on mountain disaster hazard zones and conducting disaster prevention lectures to residents in hilly and mountainous villages by cooperating with efforts to develop local evacuation systems.

Fig. 11 Extending the lifespan and enhancing functions of forest conservation facilities

5. Disaster-Resilient Community Development Promoted by the Whole Forest and Forestry Policies

The GOJ promotes the development of disaster-resistant societies through managing and conserving forests appropriately, considering forests as "Green social capital". It takes forest conservation measures and more comprehensive policies for forest and forestry.

To bring out the multiple functions of forests, including the function of land conservation, the forest planning system secures appropriate forest management through zoning according to the function of forests to be emphasized, a notification system of logging and afforestation, and other efforts and promotes the establishment of diverse forests according to natural and social conditions.

In addition, the Forestry Agency implements measures for promoting forest management activities: support for forest owners' activities through forest management projects,

development and spread of technologies for reducing afforestation costs, and the accumulation and consolidation of forests with the Private Forest Management Entrustment System. These measures are implemented because forest management, including thinning and reforestation, has not progressed in recent years due to a decline in the management motivation of forest owners and an increase in forests where the ownership is unclear.

Also, the Forestry Agency promotes the development of forestry road systems, which are resistant to disasters. Such road systems serve as substitute roads when disasters such as heavy rains damage national roads and municipal roads and contribute to preventing and resolving village isolation.

Maintenance and creation of forests through forest conservation measures and forest management contribute to adaptation measures against the intensification of mountain disasters and floods caused by climate change, and also contribute to climate change mitigation by strengthening CO₂ absorption function of forests. In addition, the maintenance and improvement of forest functions through forest conservation measures meet the concept of Ecosystem-based disaster risk reduction (Eco-DRR) and Green Infrastructure.

Thus, forests are seen as "Green social capital", which brings various benefits to the people, including disaster prevention and mitigation. Managing and conserving forests appropriately with integrated policies for forest and forestry is expected to contribute to developing sustainable society.

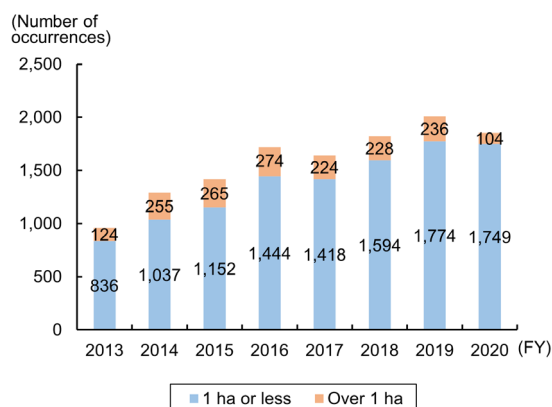
Forests and Forestry Topics for FY2022

Topic 1: Review of Forest Land Development Control System for the Appropriate Introduction of Solar Power Generation

In Japan, there has been a growing social need to review the Forest Land Development Control System for coexistence of solar power generation facilities and local communities due to concerns about disasters and deterioration of landscapes caused by increasing forest land development activities to install solar power generation facilities.

The committee on forest land development control standards concerning solar power generation, established by the Forestry Agency, recommended to lower the threshold of development area subject to the regulation based on the occurrence of sediment runoff caused by forest land development for installing the facilities.

Based on the recommendation, the Forestry Agency amended the Order for Enforcement of the Forest Act regarding the forest land development related to solar power generation facilities to lower the threshold of development area subject to the regulation from over 1 ha to over 0.5 ha in September 2022 (enforced in April 2023).



Source: Survey by Forestry Agency

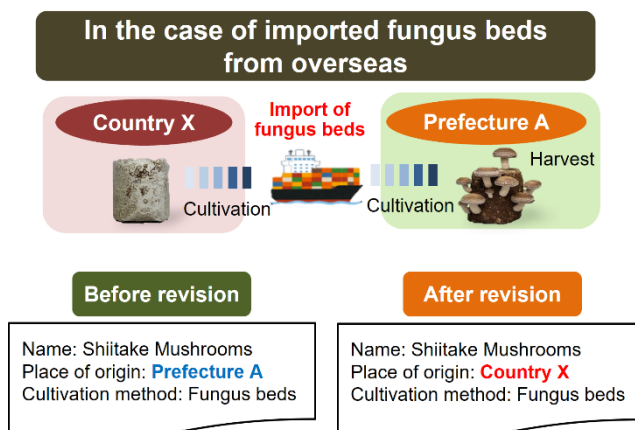
Note: "Over 1 ha" shows the number of forest land development control in each fiscal year (new permits only). "1 ha or less" shows the number of logging notifications for solar power generation submitted in each fiscal year.

Fig. Number of forest land development aimed at installing solar power generation facilities

Topic 2: New Labeling of the Origin of Shiitake Mushrooms Has Started

Japan's food labeling rules stipulated that the place of origin of shiitake mushrooms should be labeled as the place of harvest. However, due to the recent increase in imported fungus beds, it became difficult for consumers to distinguish between shiitake mushrooms derived from fungus beds inoculated/cultivated in foreign countries and those inoculated/cultivated domestically.

Since the environment in the early stages of cultivation strongly affect the quality of the fruiting body of shiitake mushrooms, the Consumer Affairs Agency revised the rules shown in "Food labeling standards Q&A" in March 2022 to require that the label indicate the inoculated place of shiitake mushrooms as the place of origin in order to provide consumers the opportunity to make informed and independent food choices.

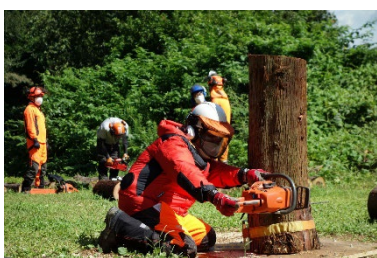


Topic 3: Toward the Attractive Forestry Industry where Forestry Workers can Work with a Sense of Purpose ~Revision of "Basic Policy concerning the Security of Forestry Work Force"~

The Forestry Agency revised the Basic Policy concerning the Security of Forestry Work Force in October 2022 to promote to secure the forestry workforce for wood production, reforestation and nurturing of forests toward the realization of "Green growth" as indicated in the Basic Plan for Forest and Forestry revised in June 2021.

The main revisions are as follows:

- Promoting the securing and development of human resources with knowledge and skills necessary to realize the "New forestry," such as reforestation and ICT
- Strengthening safety measures taken by small-scale management entities and promoting the introduction and development of high-performance forestry machinery to address the high incidence of occupational accidents
- Promoting the initiatives for new entries and start-ups into the forestry industry according to local situations
- Promoting active participation and retention of female workers and considering appropriate acceptance of foreign workers



Training in the safe use of chainsaws

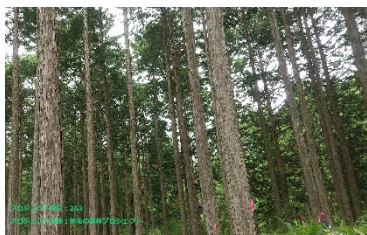


A female forestry worker handling a high-performance forestry machinery

Topic 4: Creating a Virtuous Cycle of Forest Management and Companies' Decarbonization Efforts through the J-Credit

The J-Credit scheme is a domestic carbon crediting system operated by the GOJ, designed to certify greenhouse gas (GHG) emissions reductions and removals achieved through validated projects as "credits". When companies with the aim to achieve decarbonization of their activities purchase credits derived from forest management projects, the payment for the credits is expected to ramp up forest management activities, further contributing to the realization of carbon-neutral society by 2050.

The Forestry Agency, along with other J-credit administrators, revised the standards and methodologies for the forest management projects in August 2022 to allow for enhanced reforestation after final-felling, which is a key to ensure forest carbon removals.



TOCHIMOU Wood Industry Co., Ltd. acquired credit certification for the first time in Tochigi Prefecture in 2022 and sold 50 CO₂ tons each to three local companies with the Ashikaga Bank, Ltd acting as an intermediary.



In addition, the Forestry Agency has established a new initiative, "Forests × Decarbonization Challenge," to promote forest management activities by companies from the perspective of "decarbonization", and awarded ten companies for their efforts in 2022.

<https://www.maff.go.jp/e/policies/forestry/attach/pdf/index-28.pdf>



Topic 5: Business with the Timber Harvesting Rights System in National Forests Has Started

The Timber Harvesting Rights System is a system in which private enterprises can acquire the right to harvest trees steadily in certain designated areas of national forests for a certain period while ensuring multiple functions of the forest.

Based on the system, the Forestry Agency designated ten areas nationwide from September to October 2021, with each area of about 200 to 300 ha (clear-cutting equivalent) for a period of about ten years. Furthermore, the Forestry Agency has publicly solicited and decided forestry contractors that receive the timber harvesting right in eight areas by October 2022. Logging and other operations have started in sequence.

The system is expected to strengthen the management base of the forestry contractors with the timber harvesting right as well as the timber supply chain in the region.