ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY II

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JAPAN FORESTRY OUTLOOK STUDY

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC

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Contents

INFORMATION NOTE ON THE ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

The Asia-Pacific Forestry Sector Outlook Study (APFSOS) is a wide-ranging initiative to gather information on, and examine, the evolution of key forestry issues as well as to review important trends in forests and forestry. The main purpose of the study is to provide a better understanding of the changing relationships between society and forests and thus to facilitate timely policy reviews and reforms in national forest sectors. The specific objectives are to:

1. Identify emerging socio-economic changes impacting on forest and forestry
2. Analyze probable scenarios for forestry developments to 2020
3. Identify priorities and strategies to address emerging opportunities and challenges

The first APFSOS was completed in 1998, with an outlook horizon to 2010. During its twenty-first session, held in Dehradun, India, in April 2006, the Asia-Pacific Forestry Commission (APFC) resolved to update the outlook extending the horizon to 2020. The study commenced in October 2006 and is expected to be completed by September 2009.

The study has been coordinated by the Food and Agriculture Organization of the United Nations (FAO), through its regional office in Bangkok and its headquarters in Rome, and implemented in close partnership with APFC member countries with support from a number of international and regional agencies. The Asian Development Bank (ADB), the International Tropical Timber Organization (ITTO), and the United Kingdom's Department for International Development (DFID) provided substantial financial support to implement the study. Partnerships with the Asia-Pacific Association of Forest Research Institutes (APAFRI) and the Secretariat of the Pacific Community (SPC) supported the organizing and implementing of national focal points' workshops and other activities, which have been crucial to the success of this initiative. The contributions of many other individuals and institutions are gratefully acknowledged in the main APFSOS report.

Working papers have been contributed or commissioned on a wide range of topics. These fall under the following categories: country profiles, sub-regional studies and thematic studies. Working papers have been prepared by individual authors or groups of authors and represent their personal views and perspectives; therefore, opinions expressed do not necessarily reflect the views of their employers, the governments of the APFC member countries or of FAO. Material from these working papers has been extracted and combined with information from a wide range of additional sources to produce the main regional outlook report.

Working papers are moderately edited for style and clarity and are formatted to provide a measure of uniformity, but otherwise remain the work of the authors. Copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained from:

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1. OVERVIEW OF SOCIAL ECONOMY IN JAPAN

National land

Japan is located on the eastern fringe of the Asian continent. The Japan Islands are part of the orogenic zone of the Pacific Rim and the geological structure is complex with many folded mountains, volcanic zones, and fault lines. It consists of 6,000 or more islands, and the major islands are Hokkaido, Honshu, Shikoku, and Kyushu. The area of national land was estimated at 37.79 million ha in 2005.

Climate

The climate varies from the sub-tropical zone in Okinawa to the sub-frigid zone in Hokkaido. Monsoons strongly influence the country, and southeast monsoons bring much rainfall from June to August. The monsoons from the continent bring bitter coldness to the northern region from November to March, and the regions facing the Sea of Japan experience heavy snowfall.

Population

As of October 2005, the population in Japan was 127.76 million, and the population density was 343 persons/km^2, which is very high. The growth rate of the population is 0.1%, and 1.25 children are born per female in the population. As a result, the birth rate is falling and the population is aging.

Also, according to the national census in 2005, the number of general households had increased to 49.53 million households, while the number of family members in one household was 2.58 persons, which showed a decline.

Land use

The area of national land in 2005 was about 37.79 million ha. The area of forests was 25.12 million hectares, which accounted for 67.4% of the land area. Agricultural land accounted for 4.78 million ha (12.6%); building sites 1.85 million ha (including residential areas and industrial areas, etc. [4.9%]); aqueous surfaces, rivers and waterways accounted for 1.34 million ha (3.5%); roads accounted for 1.32 million ha (3.5%); and uncultivated fields 280,000 ha (0.7%).

Industry

The labor force was 66.5 million people on average and the unemployment rate was 4.4% in 2005. The proportion of employees per three industrial sections were: primary industry 4.8%, secondary industry 26.1%, and tertiary industry 67.2%, and the ratio of the tertiary industry has been increasing. The proportion of the workforce employed in forestry was 1.2% in 1950, which has declined to 0.1% as of 2005.

Economy

The Japanese economy has been transforming itself through a high-growth period following the postwar recovery period of 1945-1955, the oil crises in 1973 and 1978, a sluggish period due to the appreciation of the yen in the mid1980s, growth driven mainly by domestic demand since 1987 and another slow period after the burst of the economic bubble in 1990. The real growth rate was lower than 1% from 1992 to 1994. The economy hit rock bottom in 2002, after which it began to recover.

The gross domestic product (GDP) in 2005 was 502 trillion yen, and the nominal growth rate was 1.3%. The GDP of the forestry sector was 357.6 billion yen, and the ratio of forestry production against the total figure was 0.1%.

In terms of international trade, while total exports were 65.7 trillion yen in 2005, total imports were 56.9 trillion yen and both tended to be on the increase. Imports of wood amounted to 1.2 trillion yen and accounted for 2.1% of the total imports.

Energy supply

The supply of primary energy in Japan accounted for 5,681 trillion kcal in the fiscal year 2005, 82.4% of which was imported.

Since the two oil crises in the 1970s, the energy structure dependent highly on oil has been changed and the use of alternative energy sources such as nuclear power and natural gas has been promoted for expansion. As a result, the dependency ratio on oil decreased from 71.9% in the fiscal year 1970 to 49%, while the ratio of nuclear power increased from 0.3% to 11.7% and that of natural gas increased from 1.2% to 14.9%. As of 2005, hydropower accounted for 3% and fuelwood and charcoal accounted for less than 1%.

2. LEGAL AND INSTITUTIONAL FRAMEWORK ON FORESTS

Law

Currently, the Forest Act and the Forest and Forestry Basic Act are the main Acts concerning forests and forestry in Japan. The overview and the history of each Act are covered hereunder.

Forest Act

The current Forest Act is the Third Forest Act enacted in 1951, and its history goes back to the First Forest Act enacted in 1897.

When the First Forest Act was enacted in 1897, forests had been devastated in various regions because of the huge demand for timber caused by the progress of the industrial revolution. Therefore, the purpose of the Forest Act was to protect forests from being ruined and to conserve national land. Supervisory control and the protection forest system were established in order to conserve national land.

Later, capitalism was developed through the Japanese-Sino War and the Japanese-Russo War. Concomitantly, the industrial demand for forestry was heightened and there was a need to give any rule to the Forest Act to promote the forestry industry. To this end, the Second Forest Act was promulgated in 1907 with the additional rules concerning the use and control of the land and the establishment of forest owners' cooperatives.

After World War II, on the back of the restoration of the land ruined and devastated during the war, the Third Forest Act was promulgated in 1951. The Act aimed at "the sustainable growth of the forests and the improvement of forest productivity in order to contribute to the conservation of national land and the development of national economy", and has been operational to date. In this Third Forest Act, the forest planning system was newly introduced in addition to the promotion and control of the forestry administration, the protection forest system, and the forest owners' cooperatives which existed in the previous Forest Act.

Forest and Forestry Basic Act

Following reconstruction from the war damage after World War II and the special procurement demand for the Korean War, there was a strong demand for wood and the wood price rose significantly in Japan. Furthermore, Japan entered a period of high economic growth in the 1960s, and a huge demand for wood was generated. On the back of such social and economic situations, the Forestry Basic Act was promulgated in 1964, which included the provision that "the government shall establish a basic plan concerning forest resources and a long-term forecast concerning the supply and demand of important forest products and publicize these."

In response to this, the Forest Act was revised to include the text, "In conformity with the Forestry Basic Act, the Nation-wide Forest Plan should be established for nation-wide forests every 5 years based on a cycle of 15-year term". The forest planning system was established according to "Basic Plan and Long-term Forecast" set under the Forestry Basic Act.

As a result, the forest system was established based on the Nation-wide Forest Plan set by the Minister of Agriculture and Forestry; the Regional Forest Plan for Non-national Forest set by the prefectural governor for private and public forests, and the Basic Management Plan for National Forest set by the Director-General of the Forestry Agency.

In 2001, the Forestry Basic Act was revised significantly and the renamed Forest and Forestry Basic Act was promulgated. It had been 37 years since the promulgation of the former Basic Act on Forestry and the economic and social surroundings in Japan had changed significantly as a result of the rapid economic growth and the considerable advancement of internationalization. At the same time, there was a drastic change of the environments surrounding the forests and forestry such as the diversified demands for forests by the people. Given the situation, there was a need to revise the past forest policy mainly focusing on timber production into one that pursued the continuous demonstration of the multifunctional roles of the forests and the sustainable and sound development of forestry.

Moreover, the government renewed the Basic Plan and renamed it as the Basic Plan on Forests and Forestry in which the following items are described.

- Basic forest policy measures
- Targets concerning the demonstration of the multifunctional roles of the forests and the supply and use of forest products
- Measures to be addressed by the government comprehensively and systematically

Also, along with the enactment of the Forest and Forestry Basic Act, the Forest Act was revised to include the promotion of forest management corresponding to each of the public functions of the forests in the forest planning system, and to clarify the direction of forest management.

National forest management

The national forest was established concurrently with the process to establish Japan as a modern country, and the National Forest Land Act was promulgated in 1899.

The national forest had been managed separately by the Forest Bureau of the Ministry of Agriculture and Forestry, the Forestry Bureau of the Imperial Household Ministry, and the Hokkaido Agency of the Home Ministry until the end of World War II. In 1947, the management entities were unified under the extra-ministerial bureau of the Ministry of Agriculture and Forestry to manage the national forest in an integrated manner.

Currently, there are seven Regional Forest Offices under the Forestry Agency, and 98 District Forest Offices per watershed area to manage the national forest, accounting for about 20% of the national land and about 30% of the forest area.

After the end of World War II, wood production was valued even in national forest as the demand for wood increased through the recovery of the economy and the high economic growth. However, given the diversified needs of the people in recent years, the management policy has been altered to emphasize the public functions of forests. Currently, the purpose of forest management is to maintain and conserve forests, to provide sustainable and systematic forestry products, and to utilize the national forest for public health.

Further, based on the "Administrative Reform Promotion Act" enacted in 2006, it has been decided to incorporate part of the national forest projects into an Independent Administrative Legal Entity by the fiscal year of 2010.

Forest planning system

In Japan, forests are managed under the Forest Planning System which covers forests all over the country based on the Forest Act and Forest and Forestry Basic Act. Considering the long-term growth period of the forests, the system aims to balance the supply and demand for forest products such as wood and to secure the full demonstration of public functions of the forests by promoting their preservation and cultivation and the improvement of forest productivity in a planned manner. It is expected that by clarifying the basic directions of the policy concerning forests and forestry, this will improve the efficiency of policy implementation and provide a guideline on forestry management operations for forest owners. The forest planning system is described in Figure 1.

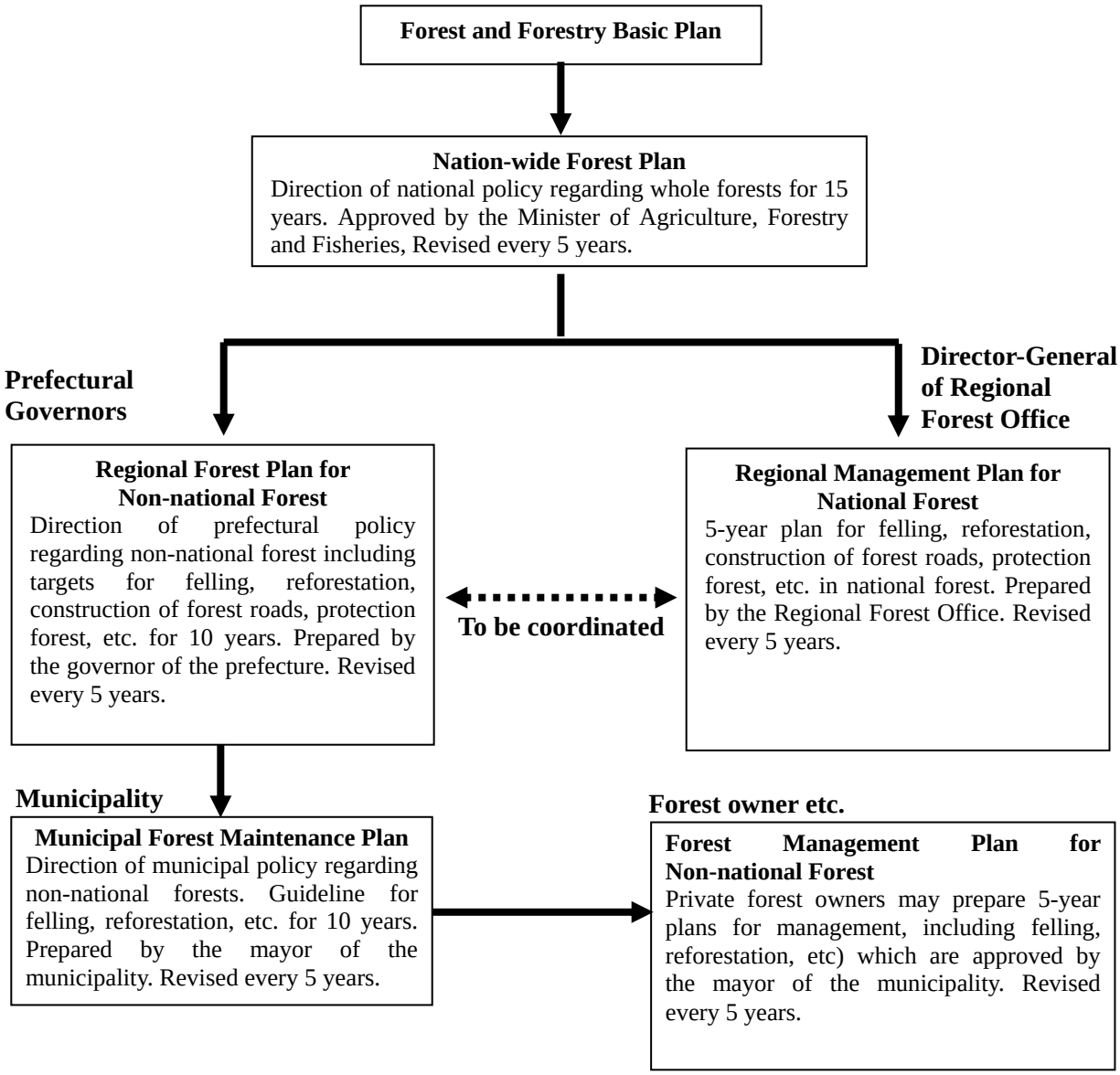


Figure 1. Forest Plan system

Note: The current Forests and Forestry Basic Plan was promulgated in 2006. The National Forest Plan was promulgated in 2004.

3. MANAGEMENT AND CONSERVATION OF FORESTS AND FOREST RESOURCES

Current state and trend of forest resources

Changes in forest area and growing stock

The forest area in Japan has remained almost unchanged for the past ten years. At the end of the fiscal year 2002, the forest area accounted for 25.12 million ha corresponding to 67% of the area of national land.

The total growing stock of forests had reached 4 billion m^3 at the end of March 2002, almost double the figure of 1.9 billion m^3 at the end of the fiscal year 1966. It has been on a constant increasing trend after World War II. The annual total growth of forests is 81 million m^3.

The major characteristics of the transition of forest resources show an increase in planted forests. The total growing stock of planted forests increased four-fold from 1966 to 2002. Currently, the resources of the planted forests account for 40% of the total forest area or 60 % of the total growing stock.

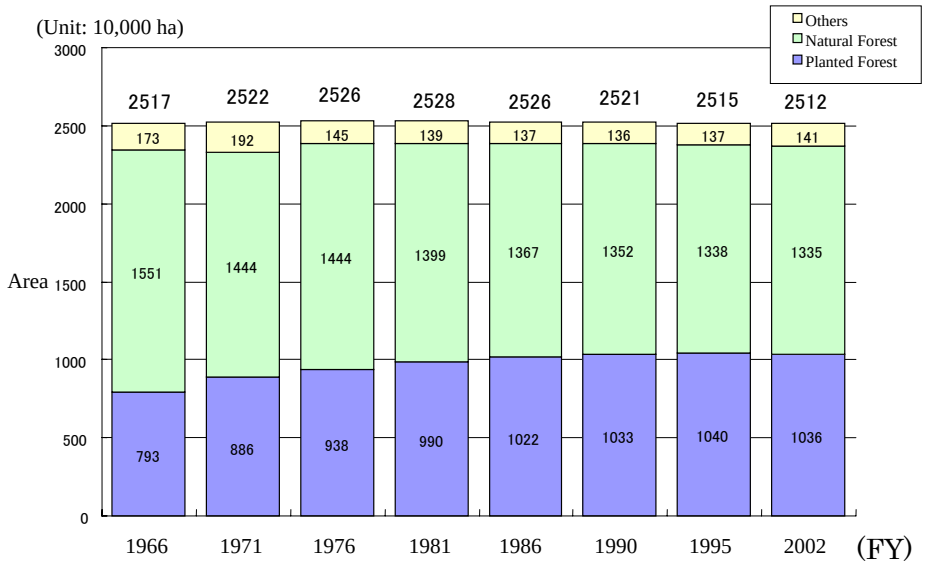


Figure 2. Changes in area of forest

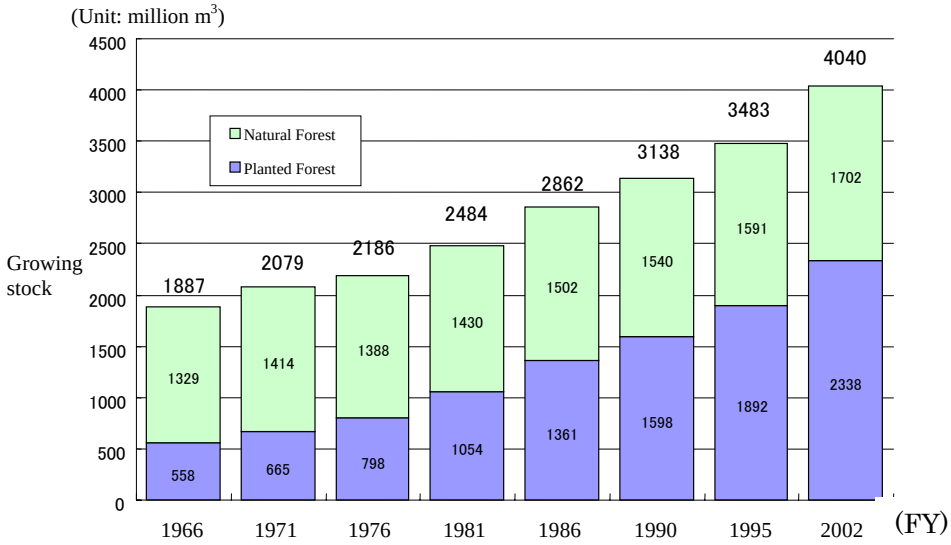


Figure 3. Changes in growing stock of forest

Increase of older planted forests

Large areas of planted forests were established after the end of World War II. Afforestation in the postwar period started on cut-over land where large-scale deforestation had been conducted to secure necessary goods during the war and the materials for reconstruction. In 1955-1975, while the demand for wood increased on the back of the high economic growth, natural forests were harvested mainly for pulpwood, and the afforestation activities were actively conducted on such cut-over lands. After 1970, the rate of deforestation declined, owing to the decrease in available forest resources and the increase in the supply of imported timber. Concomitantly, the rate of afforestation also decreased significantly. Accordingly, the distribution of planted forests by age class is uneven in Japan with higher distribution in around 40-year-old trees. Many of the planted forests still require management such as thinning. These forests will become ready for harvesting when they reach 50 years or more.

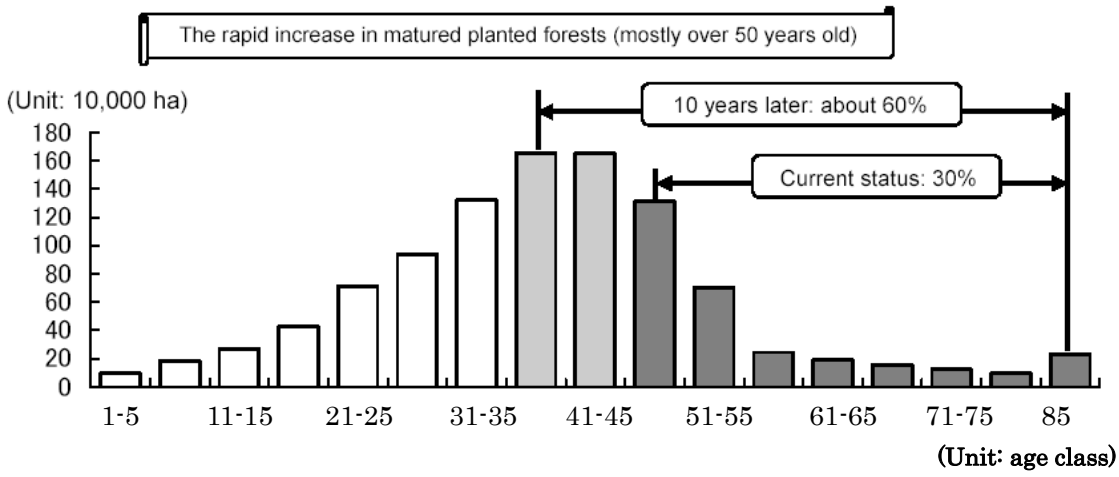


Figure 4. Area of planted forest by age class in Japan

Source: Forestry Agency.
The status is as of March 31, 2005, part of which includes estimates.

Trend of tree thinning

In Japan, forests requiring thinning account for about 80% of the total planted forests, and the promotion of thinning has become a challenge to secure healthy forests.

In response, the government has been promoting comprehensive measures such as effective thinning operations through the introduction of high-density forest road systems and high-performance machinery, and the development of the use of timber from thinning.

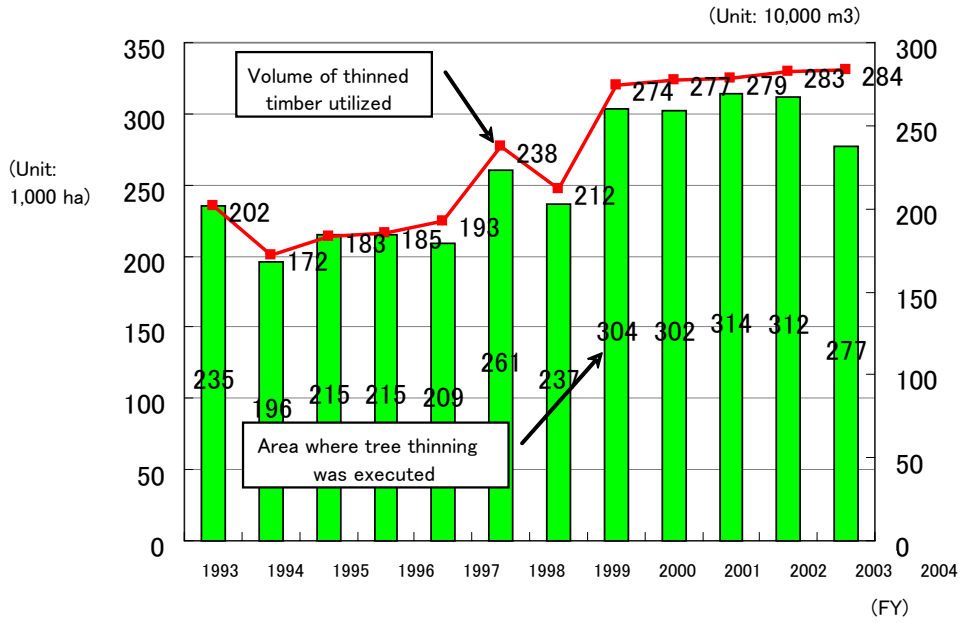


Figure 5. Area where tree thinning was executed and volume of thinned timber utilized

Source: Forestry Agency.
Note: The area where tree thinning was executed is based on the private and public forests.

Ownership of forests

About 30% of forests in Japan are national forests; about 10% are public forests owned by prefectures and municipalities; and about 60% are private forests, a situation almost unchanged since 1955. Most of the national forest exists in watershed areas of remote mountains. Many are found extensively in east Japan, where primary forests are widely distributed.

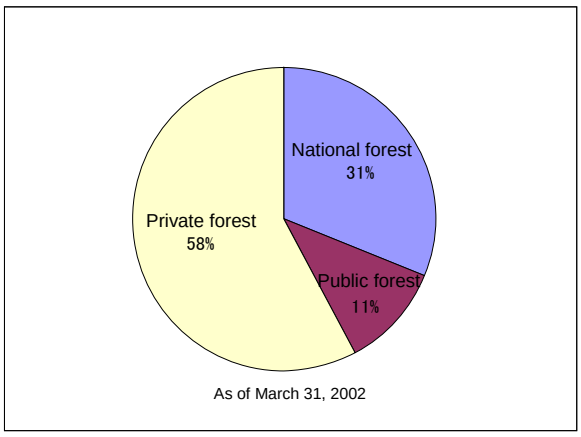


Figure 6. Ratio of forests according to ownership

Forest health

Forest damaged by pests and diseases

In Japan, the worst damage to forests by pests is generated by pine wilt disease. Pine nematodes carried by the Japanese pine sawyer beetle cause the disease by invading the body of a tree. Pine forests in 45 prefectures excluding Hokkaido and Aomori prefectures have been damaged in this way. Though damage by pine wilt disease (timber volume) nation-wide had peaked out in 1979 and has been decreasing, it has recently been reported that areas damaged by the disease have expanded to include those at higher latitude and elevation, etc. which were previously untouched. Damage in the Tohoku region accounts for about 30% of the total (Figure 5).

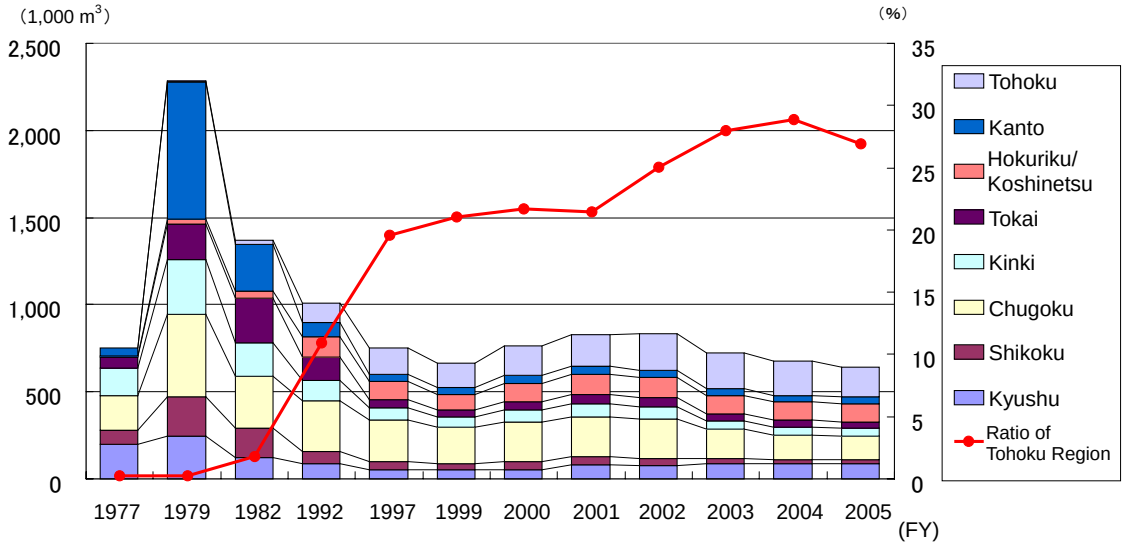


Figure 7. Changes in damage quantity by pine weevil (private and public forests)

On the other hand, the collective dieback recently of deciduous oak (*Quercus serrata* and *Quercus crispula*) triggered by *Raffaelea quercivora* transmitted by the oak platypodid beetle (*Platypus quercivorus*) has rapidly expanded mainly on the mainland along the Sea of Japan (Figure 6). Damage is caused when oak platypodid beetles carrying huge amounts of *Raffaelea quercivora* enter the trunks of oaks.

Therefore, it is important to take appropriate measures against these pests so that the spread of the damage is prevented.

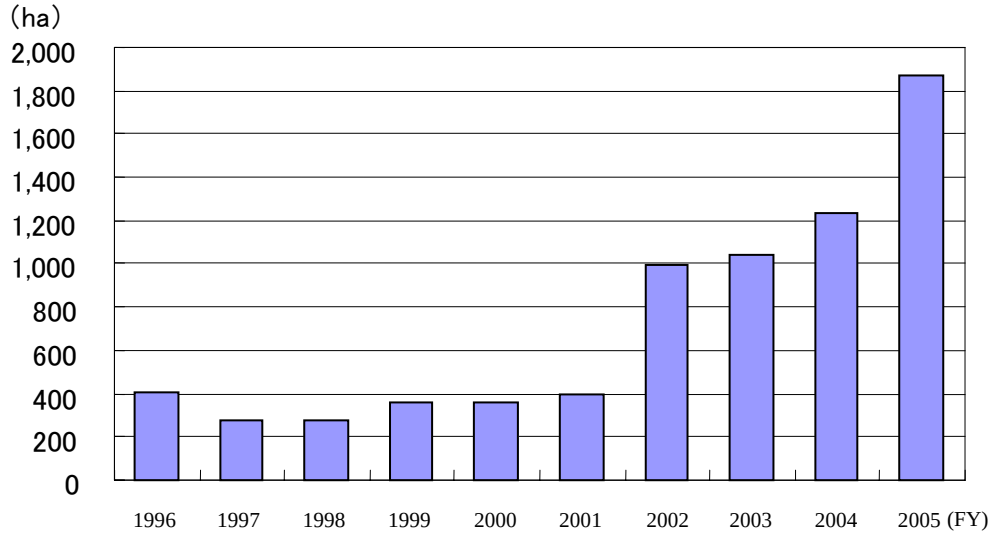


Figure 8. Changes in damage by *Raffaelea quercivora* transmitted by oak platypodid beetle (*Platypus quercivorus*)

Measures against forest damage caused by wild animals

Recently the forest area damaged by wild animals such as deer and bears accounted for 6,000-8,000 ha annually, of which 50-60% of the damage was caused by deer (Figure 9). Damage to bark caused by peeling by deer is particularly problematic for forestry management, as it will lead to the loss of the economic value of trees nurtured for many years.

In recent years, damage to forests caused by wild animals has expanded to new areas, owing to the expansion of habitats of wild animals. The loss of biodiversity as a result of feeding damage to understory vegetation and soil erosion caused by animal trampling have raised concerns about wild animals' influence on the public functions of forests.

In order to address these problems, measures have been introduced including installation of damage-preventive facilities such as guard fences and tubes and population management. However, serious conditions still remain and it is necessary to develop and spread new preventive technologies, to train damage control experts, and to develop the monitoring/control system.

Furthermore, while coordinating the measures to protect against wild animal damage with the ministries and agencies concerned, it is important to promote them from the long-term perspective. This may include the promotion of broader and more effective damage-control measures as well as the management and conservation of the forests with consideration for wild animal habitats.

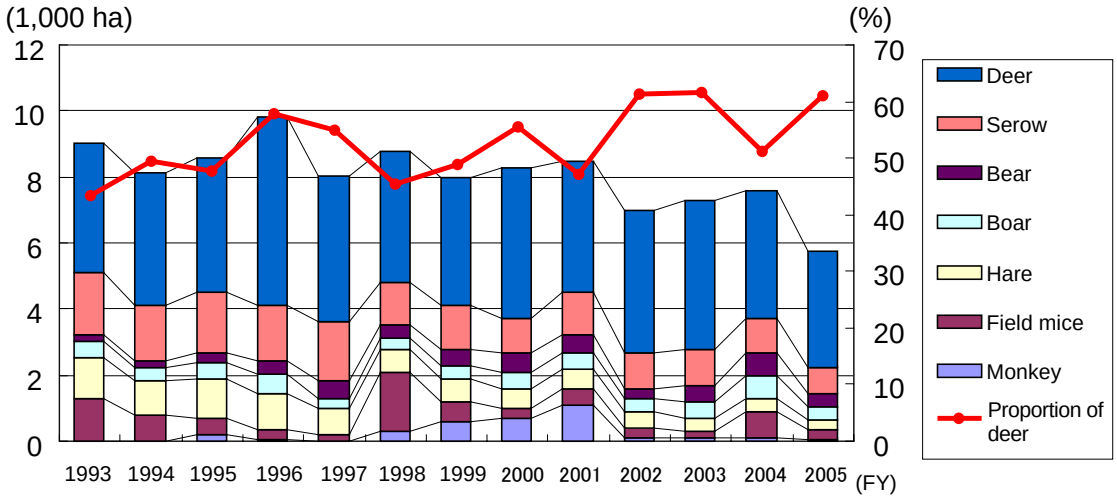


Figure 9. Changes in forest area damaged by wild animals

Measures for forest fire

Forest fires have been decreasing in the long run, although there are short-term fluctuations. Forest fires occurred 2,215 times in 2005, and the area affected by fire accounted for 1,116 ha (Figure 10).

In general, the occurrence of forest fire is concentrated between winter and spring (December to April). Most fires are caused by human careless.

Therefore, it is important to implement awareness-raising activities in order to improve people's awareness of fire control especially during the spring time when the number of visitors entering the mountains increases.

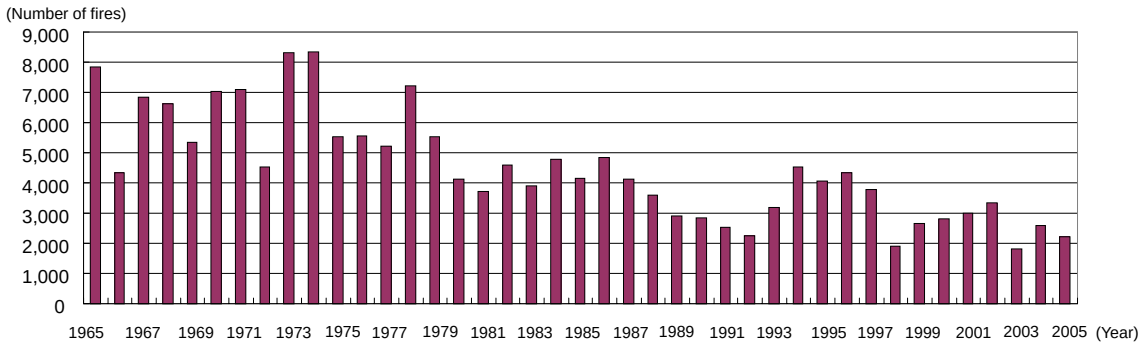
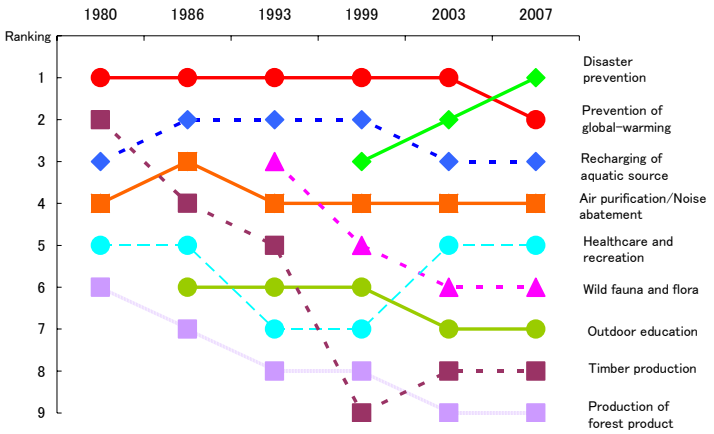


Figure 10. Changes in number of forest fires

People's diversified needs for forests

There was a strong demand for timber production in 1965-1974 on the back of the rapid demand for timber and a strong emphasis on plantation activities after World War II, focusing on coniferous trees such as Japanese cedar (*Cryptomeria japonica*) and Japanese cypress (*Chamaecyparis obtuse*). However, along with the rapid growth of the economy and internationalization thereafter, demands placed on forests have expanded and shifted to purposes other than timber production, with ecological services such as the conservation of water resources or the prevention of global warming etc. achieving prominence; it is strongly recognized that forests should meet not only the needs for timber production but also diversified needs. Given the situation, the Forestry Basic Act enacted in 1964 was revised in

2001 and the new Forest and Forestry Basic Act was formulated pursuing the demonstration of the multifunctional roles of the forests and the sustainable and sound development of forestry.



Source: General Administrative Agency of the Cabinet "Survey concerning Forest and Forestry" (1980), "Survey concerning Green and Trees" (1986), "Survey concerning Forests and Green" (1993), "Survey concerning Forests and Life" (1999), and Cabinet Office "Survey concerning Forests and Life" (2003 and 2007)
Note
1) Three answers were selected from multiple options.
2) Listed options exclude "None", "Don't know", or "Others"

Figure 11. Changes in expected roles of forest

Prevention of global warming

Contribution of forests to preventing global warming

Forests play an important role in mitigating global warming by absorbing carbon dioxide from the air, through photosynthesis, and by storing the carbon in trunks and branches.

Moreover, because the carbon stored in the trunks etc. will remain stored continuously in wood and wood products even after trees are cut, wooden houses are called "the second forest". It is also expected that because wood and wood products can be used eventually as an energy source, this will reduce the use of fossil fuels. In addition, because carbon dioxide emitted by burning wood and wood products had originally been absorbed from the air, they do not emit additional carbon dioxide into the air.

Therefore, in order to address global warming, there is a need to establish a cycle that consists of the proper management and conservation of forests, the use of wood produced from matured forests, and reforestation on cut-over lands.

Promotion of "10-Year Action Plan on the Mitigation of Global Warming by Forest Carbon Sinks"

In Japan, the "Global Warming Prevention Outline" (decision made by Global Warming Prevention Headquarters on March 19, 2002) was devised according to the conclusion of the Kyoto Protocol in 2002. In response, the Ministry of Agriculture, Forestry and Fisheries stipulated a "10-Year Action Plan on the Mitigation of Global Warming by Forest Carbon Sinks" in December of the same year, and decided to introduce measures for ten years from 2003 to 2012 at the national and municipal levels; these included: 1) management of healthy forests, 2) promotion of proper management and conservation of protection forests, 3) promotion of the use of wood materials and woody biomass, 4) promotion of public

participation in forest management and other initiatives, and 5) strengthening of the system for reporting on, and monitoring of, carbon sinks.

Development of the "Kyoto Protocol Target Achievement Plan"

In response to the enactment of the Kyoto Protocol in 2005, the Cabinet Council developed the "Kyoto Protocol Target Achievement Plan". In order to achieve the target committed by Japan to reduce carbon emissions by 6%, the plan aims to secure carbon absorption by the forests approximately at 13 million carbon tons (47.67 million carbon dioxide tons and approximately 3.8% of the total emissions of the reference year). Forest carbon sinks are an important component of Japan's strategy for the mitigation of global warming.

The plan emphasizes the importance of further promoting the management of forests. Therefore, in addition to measures taken by the government, including the consideration of cross-sectional measures, cooperation and efforts from each entity such as local governments, forest owners, employees in forestry and forest industry, and the public are needed. Also, a new environment tax pushes broader entities to address the problem based on monetary incentives and is a funding source to implement CO_2 emission reduction and forest sink measures. The effects of the environment tax, including influence on the national economy and the international competitiveness of industries, and the related measures taken by foreign countries, make it necessary to proceed with a comprehensive review based on the understanding and cooperation by the people and business entities.

Submission of the report of Japan's assigned amount and the current state of greenhouse gas emission in Japan

In August 2006, Japan organized a national system to calculate the amount of emissions and absorption of greenhouse gases and submitted the outline of the system to the Framework Convention on Climate Change as the report of Japan's assigned amount pursuant to the Kyoto Protocol. The definition of forest and the concrete approach toward forest management were reported as the main subjects.

Also, the total greenhouse gas emission and absorption for the fiscal year 2005 was reported in May 2007, and the forest-related absorption (absorption by afforestation/reforestation, deforestation, and forests subject to forest management) based on the Kyoto Protocol was about 9.7 million carbon tons equivalent to about 2.8% of total emissions of the reference year.

Necessity to accelerate forest carbon sink measures

The first commitment period of the Kyoto Protocol started from 2008, and it is essential to achieve the target for forest carbon sinks, i.e. an absorption of 13 million carbon tons, in order to achieve the 6% emission reduction commitment for Japan.

45% of Japan's forests are managed forests where practices for establishment and maintenance of forests, including planting and thinning, have been carried out by humans. An estimate based on the latest data with a scenario to keep the current level of forest management revealed that current levels and practices are insufficient to secure the target of absorbing 13 million carbon tons, through forest carbon sinks. In order to secure the shortfall, it is necessary to accelerate the pace at which measures are implemented.

Therefore, the forest sink measures including forest management such as thinning should be promoted strongly based on understanding and cooperation among a wide range of people as seen in the campaign "National Movement for Fostering Beautiful Forests in Japan" launched by the government.

Prevention of disasters

Geologically, Japan is located on precipitous and brittle land, and mountain disasters such as landslides and landfalls can happen easily. As of 2005, there were about 236,000 sites with higher risks of mountain disasters.

In 2004 a record high number of 10 typhoons hit Japan, and the Niigata Chuetsu earthquake also struck. Typhoon No.14 in September 2005 and the cataract of rain caused by the seasonal rain front in July 2006 caused significant damage. In March 2007, the Noto Peninsula earthquake hit the area. In recent years, the frequency of regionally concentrated heavy rains has been increasing, causing significant damages regionally.

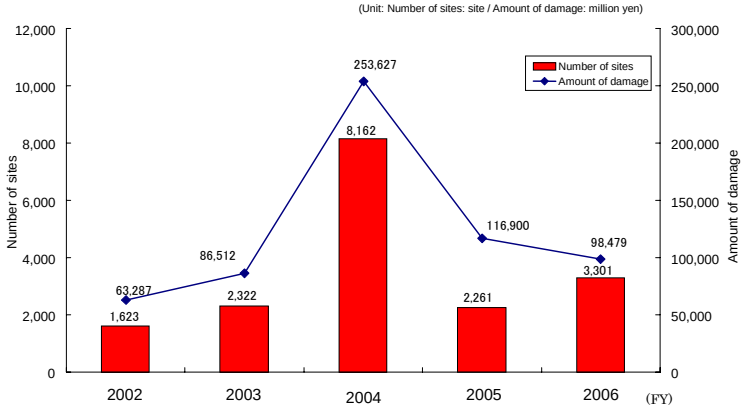


Figure 12. Number of mountain disasters and amount of damage in the past five years

Considering the natural condition of Japan and the change in the way mountain disasters have occurred in recent years, it is important to promote forest conservation facilities and the maintenance and afforestation of forest areas with high water penetration and retaining capacity in order to prevent mountain disasters and to contribute to the improvement of local safety.

Measures against Japanese cedar pollinosis

Japanese cedar pollinosis has become a social issue mainly in urban areas, of which the estimated number of patients has exceeded 10% of the total population of Japan. The pathogenic mechanism has not been elucidated well, though the influences of air pollution and the changes in lifestyles including diet have been pointed out. It is necessary to promote measures against pollinosis such as the clarification of the cause, the prevention and treatment, and the actions against the emergence of pollen in a comprehensive manner. To this end, relevant ministries and agencies have been actively working in coordination on the measures.

As pollen control measures, the Forestry Agency has been working on 1) the development and spread of Japanese cedar with no-pollen or less pollen, 2) the conversion of planted cedar forests in the metropolitan area to broad-leaf forests and mixed forests of broad-leaf and coniferous trees, and the intensified thinning of cedar forests with more male flowers, and 3) research for estimating the pollen outbreak sources which influence the pollen dispersion to the metropolitan area (Figure 13). It is important to work on these measures continuously and to promote effective pollen control measures based on research results into pollen outbreak sources.

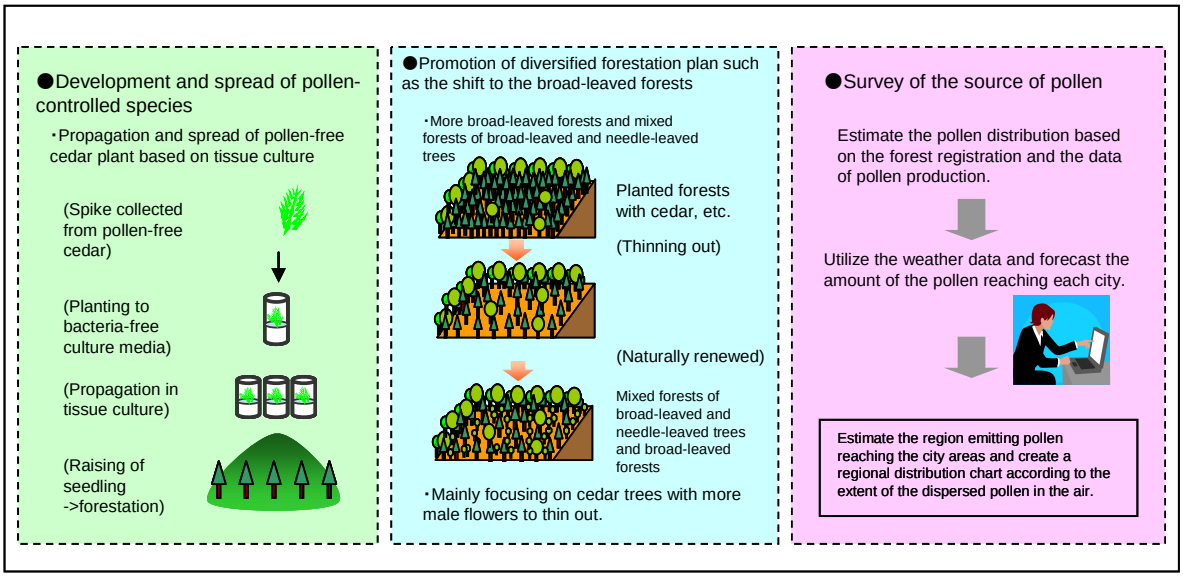


Figure 13. Major countermeasures against hay fever by the Forestry Agency

Independent tax system

An increasing number of prefectures are introducing an independent tax system for "Conservation of forest environment" and "Fostering awareness of the people to maintain and conserve the forests ". Since its introduction by Kochi Prefecture in the fiscal year 2003, 23 prefectures had introduced a new tax system by the fiscal year 2007. (Table 1).

Examples of projects utilizing an independent tax system include one that promotes thinning which is a nation-wide issue, one to convert planted forests to mixed forests of broad-leaf and coniferous trees, and one that support people's participation in forest management. These projects are developed to promote forest management corresponding to the issues of each region.

Such approaches will contribute to the better understanding of the importance of the public functions of forests and to the fostering of awareness to support forest management and conservation by the entire community.

Table 1. Introduction of independent taxation concerning forest

Prefecture	Title	Year introduced
Kochi Prefecture	Forest environment tax	2003
Okayama Prefecture	Prefectural tax for forestation in Okayama	2004
Tottori Prefecture	Forest environment conservation tax	2005
Kagoshima Prefecture	Forest environment tax	
Ehime Prefecture	Forest environment tax	
Shimane Prefecture	Tax for forestation with water and green vegetation in Shimane	
Yamaguchi Prefecture	Prefectural tax for forestation in Yamaguchi	
Kumamoto Prefecture	Forestation tax for water and green vegetation	
Fukushima Prefecture	Forest environment tax	2006
Nara Prefecture	Forest environment tax	
Hyogo Prefecture	Prefectural tax for green vegetation	
Oita Prefecture	Forest environment tax	
Shiga Prefecture	Prefectural tax for Biwa-lake and forestation	
Iwate Prefecture	Prefectural tax for forestation in Iwate	
Shizuoka Prefecture	Prefectural tax for forestation	
Miyazaki Prefecture	Forest environment tax	
Kanagawa Prefecture	Overassessment measures for individual prefectural tax for conservation and recharging of aquatic source	2007
Wakayama Prefecture	Forestation tax in Kinokuni	
Toyama Prefecture	Forestation tax for water and green vegetation	
Yamagata Prefecture	Environment tax for green vegetation in Yamagata	
Ishikawa Prefecture	Forest and environment tax in Ishikawa	
Hiroshima Prefecture	Prefectural tax for forestation in Hiroshita	
Nagasaki Prefecture	Forest and environment tax in Nagasaki	

Note: The table lists prefectures that introduced the tax by fiscal year 2007. The titles listed here are according to the name generally used in each prefecture

Protection forest system

The protection forest system was established as a legislative designation based on the enactment of the Forest Act in 1897. Under this Act, the Minister of Agriculture, Forestry and Fisheries or the prefectural governor designate forests where there is a particular need to provide public services, such as water resource conservation, disaster prevention, and public health etc. as *Protection Forests*. In order to secure the expected functions corresponding to the purpose of specific protection forests, cutting and/or modification of these forests is regulated. The area of protection forests at the end of fiscal year 2005 was 11.65 million ha (accounting for 46% of the forest area across the country and 31% of the area of national land). The Nation-wide Forest Plan has set the target to maintain 12.45 million ha of protection forests by the end of fiscal year 2018 and to proceed with systematic designation of protection forests.

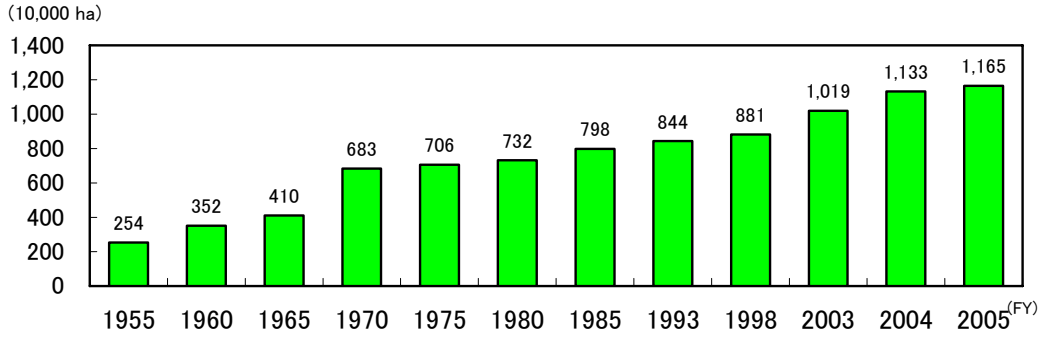


Figure 14. Changes in area of protection forest
Source: Forestry Agency.

Table 2. Area of protection forests planned under the National Forest Plan

Areas of protection forests (Unit: 1000 ha)			
Total	Protection forests for recharging of aquatic source	Protection forests for disaster prevention	Protection forests for healthcare and preservation of scenic beauty
12,451.0	9,267.8	3,061.7	854.5

(Note) Because there are protection forests specified to achieve more than one goal, the total will not match the breakdown.

Protected forest system and green corridors

Protected forest system

A number of pristine forest ecosystems and forests inhabited by valuable wild flora and fauna are present within the National Forest. The National Forest encompasses the entire Shirakami Mountains, and more than 90% of Yaku Island and the Shiretoko (land area), all of which are registered as UNESCO World Natural Heritage Sites.

The protected forest system was launched to protect valuable forests in the National Forest in 1915 and efforts have been made for management and conservation of these forests. Protected forests are classified into seven categories including "Forest ecosystem conservation area" and "Protected forest for plant community" according to their purpose. In the fiscal year 2005, 13 sites were added including the “Protected forests for habitats of Blakiston's Fish Owl”. In addition, the area of existing protected forests was expanded. As a result, protected forests accounted for 680,000 ha as of April 1, 2006 (Table 3). In August 2006, it was decided to specify 80% of the national forests of Ogasawara Islands as a forest ecosystem conservation area – also listed in the tentative list of the World Heritage in Japan as a natural heritage in January 2007.

These protected forests are managed based on the natural transition and according to the purpose of each forest. At the same time, the precious natural environment is managed and conserved by the restoration of vegetation, including through the installation of protective fences.

Table 3. Protected forests established (unit: number of sites and 1,000 ha)

Type of protected forest	Purpose	Number of sites	Area
Forest ecosystem conservation area	Protection of forest ecosystems, wildlife and genetic resources.	27	400
Forests for the conservation of genetic resources	Protection of genetic resources of all flora and fauna comprising the forest ecosystem	12	36
Forest for the preservation of genetic resources of tree species.	Protection of gene pool of timber species and endangered species	326	9
Forest for the protection of plant colonies	Protection of rare plants and trees in high mountains that are valuable for scientific research	380	183
Forests for the protection of specified creature habitats	Protection of habitats and breeding areas of rare and endangered fauna	36	21
Forests for the protection of specified geographical features etc	Protection against erosion of unique landforms and geological features such as types of rock, spring areas and glaciated sites.	35	30
Forests for local culture	Protection of local forests that have cultural, spiritual and symbolic significance.	34	3
Total		**850**	**683**

Note: The table shows numbers as of April 1, 2006.

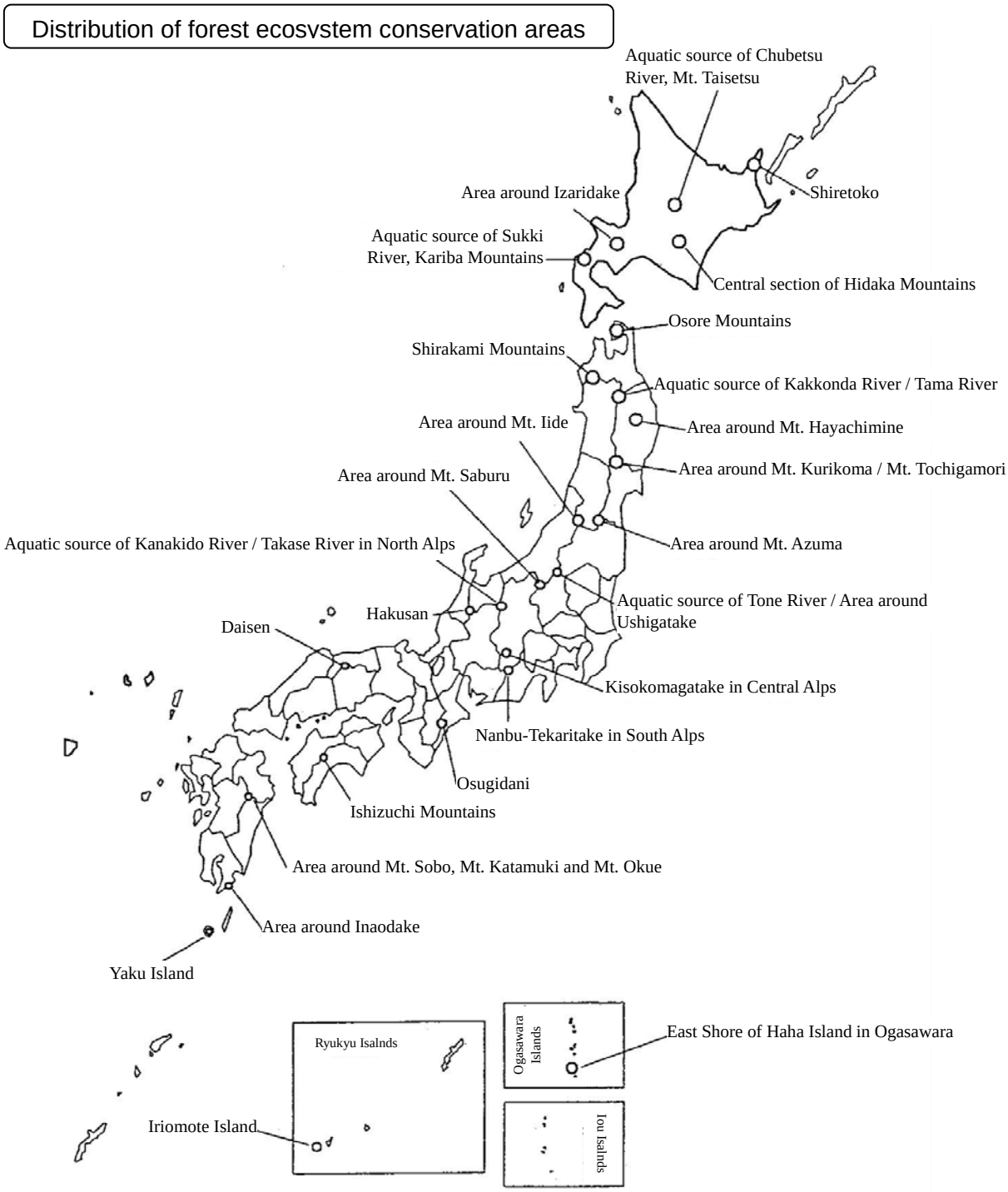


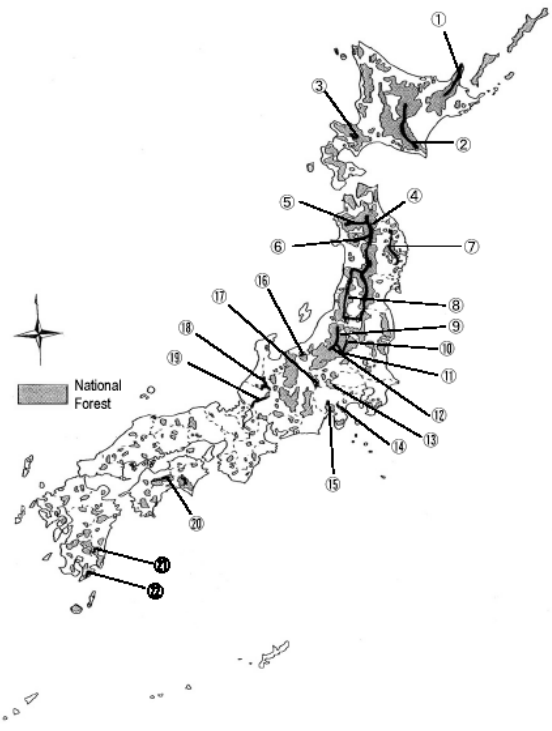
Figure 15. Distribution of forest ecosystem conservation areas

Green corridors

In order to induce the exchange of wildlife populations and to conserve biodiversity and genetic diversity by providing channels connecting habitats, a network of "green corridors" has been established in the national forests since 2000. The network connects protected forests with cooperation from adjacent private and public forests. Twenty-two green corridors

had been designated by 2006.

In "green corridors", feeding environments for rare wild species and habitats for prey have been maintained by selectively cutting the planted forests. In addition, monitoring is implemented to assess the state of forests and habitats/growth of wildlife.



Source: Forestry Agency

(As of April 1, 2006)

Name	Area (1,000 ha)	Distance (km)
① Shiretoko Peninsula Green Corridor	12	36
② Taisetsu Hidaka Green Corridor	19	83
③ Shikotsu Muine Green Corridor	7	30
④ Ou Mountains Green Corridor	79	400
⑤ Shirakami Hakkoda Green Corridor	22	50
⑥ Hachimantai Taiheizan Green Corridor	11	60
⑦ Kitakami Highlands Green Corridor	27	150
⑧ Chokai-Asahi Iide-Azuma Green Corridor	64	260
⑨ Green Corridor Echigo Line	27	70
⑩ Nikko Nasu-Shiobara Green Corridor	18	75
⑪ Green Corridor Nikko Line	13	38
⑫ Green Corridor Mikuni Line	13	52
⑬ Chichibu Mountains Green Corridor	6	44
⑭ Tanzawa Green Corridor	4	43
⑮ Mount Fuji Green Corridor	2	24
⑯ Amakazari Togakushi Green Corridor	4	17
⑰ Yatsugatake Green Corridor	6	21
⑱ Hakusan Mountains Green Corridor	43	70
⑲ Etsumi Mountains Green Corridor	24	66
⑳ Shikoku Mountains Green Corridor	18	128
㉑ Aya River Upstream Green Corridor	2	5
㉒ Osumi Peninsula Green Corridor	1	22
Total 22 locations	422	1744

Figure 16. Location of green corridors

4. FORESTRY AND MOUNTAIN VILLAGES

Trend of forest management

Ownership of private forests

Private forests account for about 60% of forests in Japan. In terms of the breakdown of ownership, the number of forest owners holding forests larger than 1 ha is about 1.2 million. Among them, forest owners holding forests smaller than 20 ha account for 90%.

Table 4. Number of forest owners and areas per size of private forest area

Category			Total (1ha～)	1～20ha	20～50ha	50～100ha	100～500ha	500ha～
Number of forest owners	Private forest		1,168,872	1,103,993	45,737	11,722	6,490	930
			100%	94%	4%	1%	1%	0%
		Household engaged in forestry	1,018,752	972,312	35,891	7,546	2,749	254
		Company	19,960	16,493	1,479	776	929	283
		Others	130,160	115,188	8,367	3,400	2,812	393
Area of forest in possession (1,000 ha)	Private forest		9,347	4,026	1,326	776	1,243	1,977
			100%	43%	14%	8%	13%	21%
		Household engaged in forestry	5,715	3,462	1,020	488	489	256
		Company	1,529	73	47	54	201	1,154
		Others	2,103	491	259	234	552	567

Source: Ministry of Agriculture, Forestry and Fisheries “2000 Census of Global Agriculture and Forestry”.

Type of management

There are about 200,000 forestry management entities including owners of forests holding forests of 3 ha or larger, who have conducted silvicultural activities or harvesting in the past five years, and 90% of them are based on private operation. Individual entities engaged in forestry business as the main livelihood account for 2% only.

Table 5. Forestry management entities according to management type

		Number of forestry management entities	
		Number of management entities	Ratio
Corporate		8,500	4%
	Company	3,238	2%
	Other incorporations	5,262	3%
Non-Corporate		189,466	96%
	Private management	177,368	90%
	Others	11,572	6%
Total		197,966	100%

Source: Ministry of Agriculture, Forestry and Fisheries “2005 Census of Agriculture and Forestry”.

Note: The forestry management entity falls under any of the following requirements: 1) The area of the mountain forests in possession is 3 ha or larger and the entity has prepared the forest management plan covering 2005 in the term of the plan; 2) The area of the mountain forests in possession is 3 ha or larger in which the entity has engaged in silviculture or deforestation in the past five years; 3) The entity is consigned to engage in silviculture/nurturing; 4) The entity is consigned to engage in material production in the area of 200 m^3 or larger.

Table 6. Ratio of main employment type of household engaged in forestry (%)

	Employed			Self-employed	
	Employed by a specific employer	Working away from home	Day worker / Temporary worker	Forestry	Other than forestry
2005	56.6	0.3	3.2	2.1	37.7

Source: Ministry of Agriculture, Forestry and Fisheries "2005 Census of Agriculture and Forestry"
Note: The data indicate "the main source of income for the household" of an individual forest management entity, and the ratio excludes "others" such as temporary real estate revenue.

Profitability

Regarding the price of wood, which is the main source of income for forestry management, the current stumpage price of Japanese cedar is about 20% of the price level of 1990 whereas the price of raw wood is about 50% of the price level of 1990 and the prices have been declining in the long run. On the other hand, prices in the logging industry have gone up by about 20% since 1990. The profitability of forestry has deteriorated, and the motivation of the forestry management entities for forestry management has been decreasing.

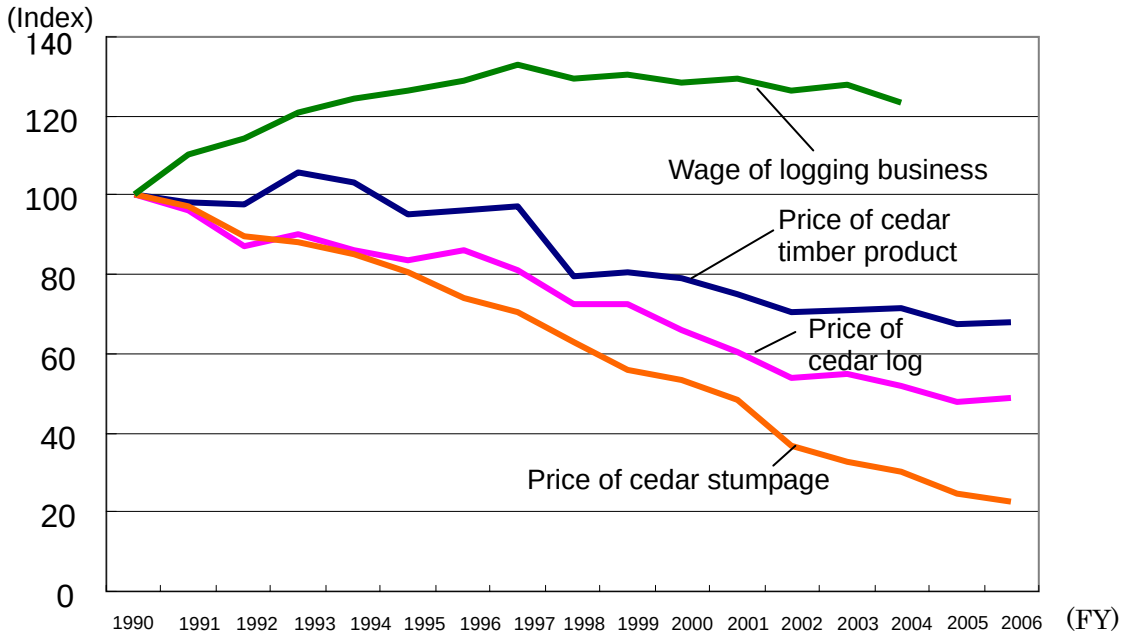


Figure 17. Changes in wood price

Source: Japan Real Estate Institute "Value of timber land & timber stumpage"
Ministry of Agriculture, Forestry and Fisheries "Lumber price", Ministry of Health, Labor and Welfare, "Survey report of wages per employment type of forestry worker"

Note: The figure for 1990 is used as an index of 100 in all cases.
The price of timber-mill products is square sawn timber (unseasoned wood), the material is medium-sized logs, and the stumpage price is per $1m^3$ of the material used.

Trend of forestry production activity

Forestry production activities

In private forests, the number of forestry management entities engaged in forestry production activities in 2005 had decreased in comparison to 2000 in all activities.

While the areas where planting, weeding, and harvesting were conducted decreased or remained the same, the area where thinning was conducted increased.

Table 7. Number of management entities engaged in forestry operations per task and worked area

Unit: management entity, ha

	Forestation		Weeding		Tree thinning		Final cutting	
	Number of entities	Area	Number of entities	Area	Number of entities	Area	Number of entities	Area
2000	24,518	29,863	141,820	290,648	80,407	186,480	8,377	15,045
2005	16,570	24,282	87,059	232,276	80,118	249,524	5,102	15,318

Source: Ministry of Agriculture, Forestry and Fisheries "2000 Census of Global Agriculture and Forestry" and "2005 Census of Agriculture and Forestry"

Scale of log production

As for the forestry management entities engaged in log production, entities with production of 5,000 m^3 or more produced 62% of the total log production, and the ratio has been rising. However, in terms of the number of management entities, entities with production of 500 m^3 or less account for 76% of the total.

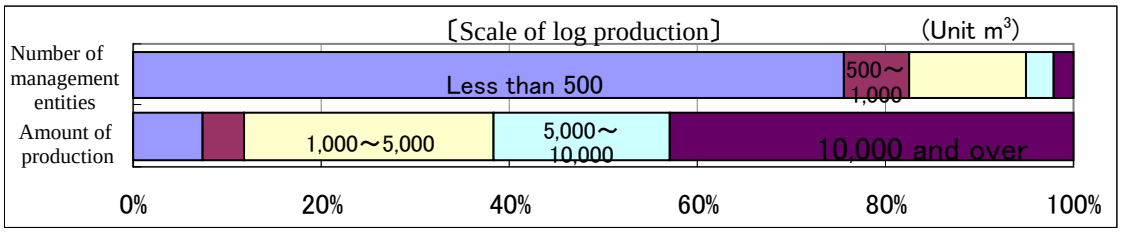


Figure 18. Scale of log production of forestry management entities

Source: Ministry of Agriculture, Forestry and Fisheries "2005 Census of Agriculture and Forestry".

Trend of labor productivity for log production

Labor productivity per scale of log production of the forestry management entities that produced logs through consignments or the purchases of stumpage was 4.4 m^3/man-day in 2005 on aggregate average, which improved from 3.2 m^3/man-day in 2000. Moreover, the productivity in 2005 improved in all scale classes in comparison to 2000. Larger scale entities have higher productivity.

However, comparing the production cost of logs (final harvesting) with various other countries, the cost in Japan is high at 7,000 yen/m^3, which is more than twice that of Sweden, Finland, and Austria.

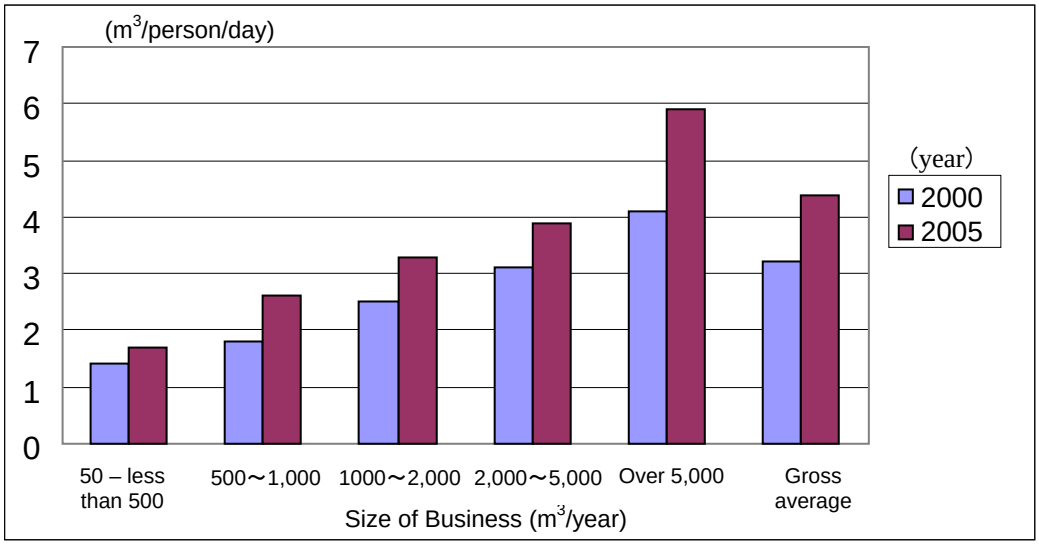


Figure 19. Productivity per scale of log production

Source: Ministry of Agriculture, Forestry and Fisheries "2000 Census of Global Agriculture and Forestry" and "2005 Census of Agriculture and Forestry" (approximate numeric value)

Note: Miyake-village in Tokyo and seven municipals in the area of the Niigata-Chuetsu earthquake are excluded from the figures for 2005.

Table 8. Comparison of production costs of material (final cutting)

	Material production cost (1,000 yen/ m^3)
Sweden	1.5
Finland	1.4
Austria	3.1～3.6
Japan	7

Source: Forest Policy Research Institute "Forest Policy Research Institute Report No. 64" (March, 2003), Forestry Agency "Survey Report of Material Production Cost"
Note: Foreign exchange rate is based on 1 SEK = yen 17 and 1 Euro = yen 120.
The figures of Sweden and Finland are for 1996; Austria is for 2002; Japan (tree species: Cedar) is for 2003.

Trend of forest owners' cooperatives

Roles and overview of forest owners' cooperatives

Forest owners' cooperatives have been implementing forest management according to the Forest Owners' Cooperative Associations Act. Forest owners accounting for about 70% of the area of private and public forests are cooperative members.

There were 846 forest owners' cooperatives across the country at the end of fiscal year 2005; many cooperatives have been merged into larger cooperatives to reinforce the business infrastructure.

On the other hand, forests owned by the members of forest owners' cooperatives are small-scale and dispersed. About 90% or more of the private forest owners own forests of 20 ha or less.

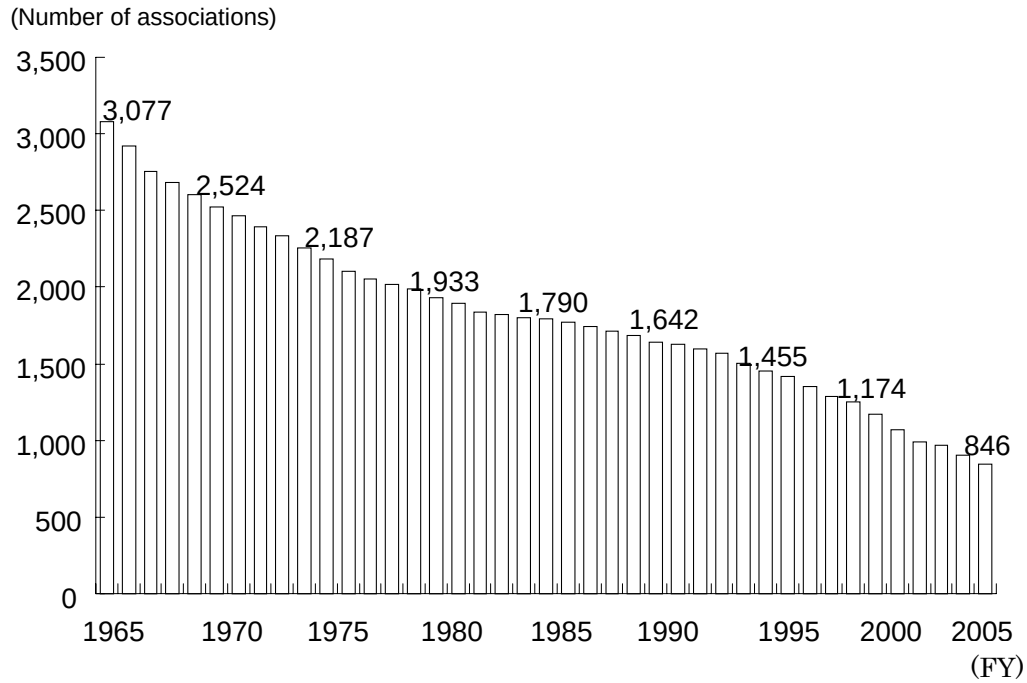


Figure 20. Progress of consolidation of forest owners' cooperatives

Table 9. Outline of forest owners' cooperatives (end of fiscal year 2005)

Number of forest owners' associations	846 Associations	Per association
Number of members	1,620,000 persons	1,922 persons
Area of private and public forests in the region	15,800,000 ha	18,767 ha
Area of forests owned by the members	11,150,000 ha	13,240 ha
Ratio of members	71 %	71 %
Paid-up capital	51,581,000,000 (Yen)	61,261,000 (Yen)
Full-time board members	470 persons	0.6 persons
Full-time employees	7,558 persons	9.0 persons

Source: Forestry Agency "2005 Statistics of forest owners' associations"

Note:

1 Number of forest owners' associations is based on the number authorized by the prefectural governors. Others are the figures for 842 associations submitted "Questionnaire of Forest Owners' Associations".

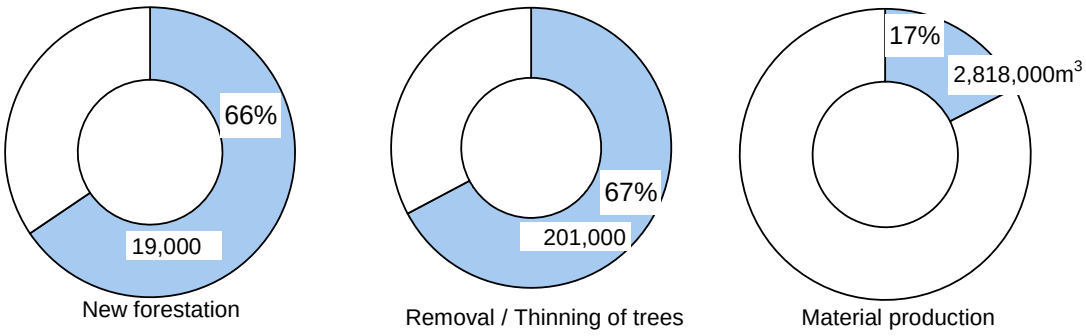
2 "Per association" is the number divided by the number of associations submitted the questionnaire.

3 "Area of private and public forests in the region" doesn't include the area owned by prefectures.

Businesses conducted by forest owners' cooperatives

While the forest owners' cooperatives engage in about 70% of tending activities such as planting and improvement cutting across the country, they engage in 20% or less of raw wood production including final cutting and thinning.

While planting and tending are expected to decrease, thinning is expected to increase. It is necessary to promote log production further including thinning.



Source: Ministry of Agriculture, Forestry and Fisheries "2005 Report of Wood Demand and Supply", Forestry Agency "2005 Statistics of forest owners' associations", Business document of Forestry

Figure 21. Share of business conducted by forest owners' cooperatives (fiscal year 2005)

Workers engaged in forestry

Workers engaged in forestry have been decreasing over the long term due to the stagnation of forestry production activities etc. Over the last ten years, the number of workers engaged in forestry has decreased from about 90,000 persons in 1995 to about 50,000 persons in 2005. Also, the ratio of workers over 65 years old accounts for more than 25% of the total and the

aging of workers has been advancing.

In recent years, the number of newly employed persons has been about 2,000 persons annually, which has increased by 50% since 2003 since measures for increasing new employees in forestry were taken.

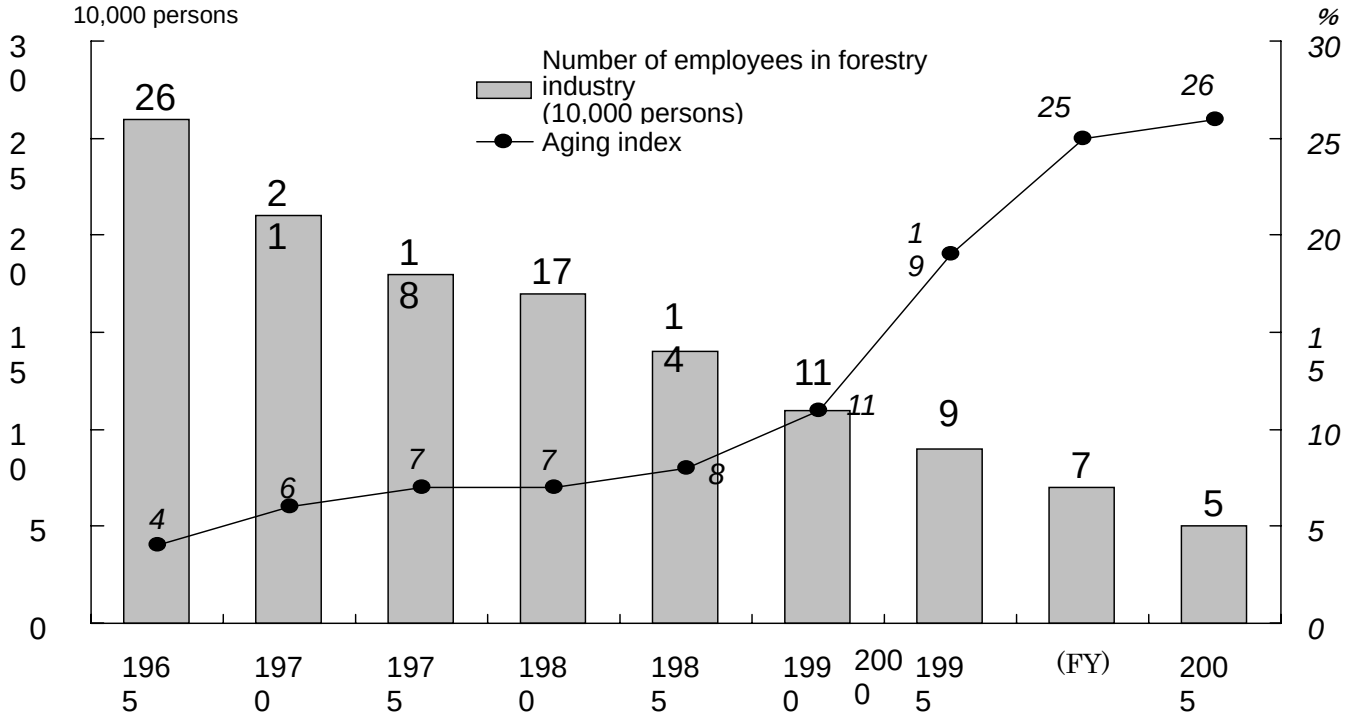


Figure 22. Changes in number of persons engaged in forestry and the aging index

Source: National Census.
Note: Aging index shows the ratio of persons 65 years old or over against the total number.

Trend of special forest products

In Japan, although the production of special forest products increased until the first half of the 1990s, it has been declining since then. The ratio of charcoal and fuelwood was high until the 1960s, but in recent times fuelwood has been substituted completely by oil and gas. More recently, the demand for mushrooms has expanded rapidly due to the diversification of dietary habits

Currently, mushrooms account for about 80% of the production of special forest products, and the remainder includes charcoal, bamboo shoots, horseradish, and mountain plants.

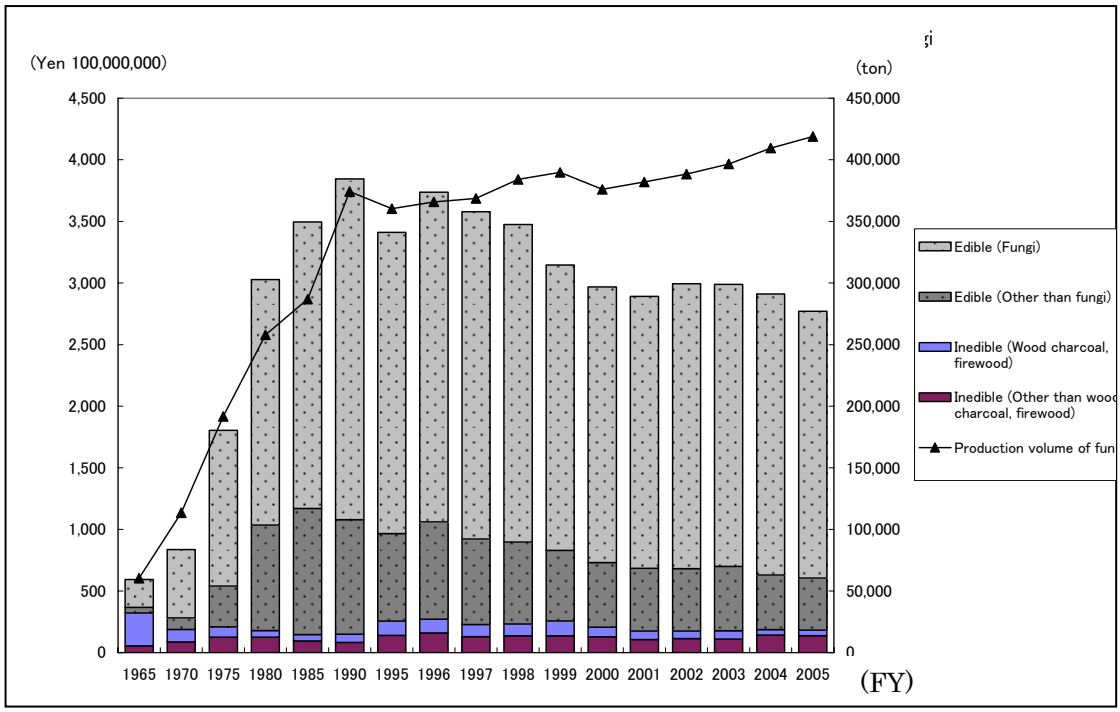


Figure 23. Changes in production amount of special forestry products and production volume of fungi

Trend of mountain villages

The area of mountain villages across the country (districts of "Mountainous Village Requiring Promotion" which are specified based on the "Mountainous Village Development Act ") accounts for 50% of the area of national land, and 90% of this is covered with forests. In the mountain villages, primary industry including forestry has predominated. In the past, the production activities of such industry have contributed to sustaining the vitality of mountain communities and forest management has been conducted daily by local people especially to meet needs for wood for fuelwood and charcoal.

However, the population has decreased significantly since the period of high economic growth. From 1965 to 2005, while the national population increased by 30%, the population in the mountain villages decreased by 40%. In 2000, the population in the mountain villages accounted for about 3.6% of the national population. Also, in addition to the depopulation and aging of the population, there is a concern over the increase of forests held by non-resident owners; for example, the area of forests owned by non-resident owners accounted for 1/4 of the private forest area (2005 Census of Agriculture and Forestry Industry).

In order to maintain the multifunctional roles of the forests, it is important that people continue to live in the mountain villages and manage/maintain the forests. In addition to the above-mentioned features, if the current situation remains unchanged (i.e. the deteriorated profitability of forestry), the delayed upgrading of infrastructure for production, and declining local vitality due to sluggish economic activities, the extent of poorly managed forests would increase and may compromise the multifunctional roles of the forests.

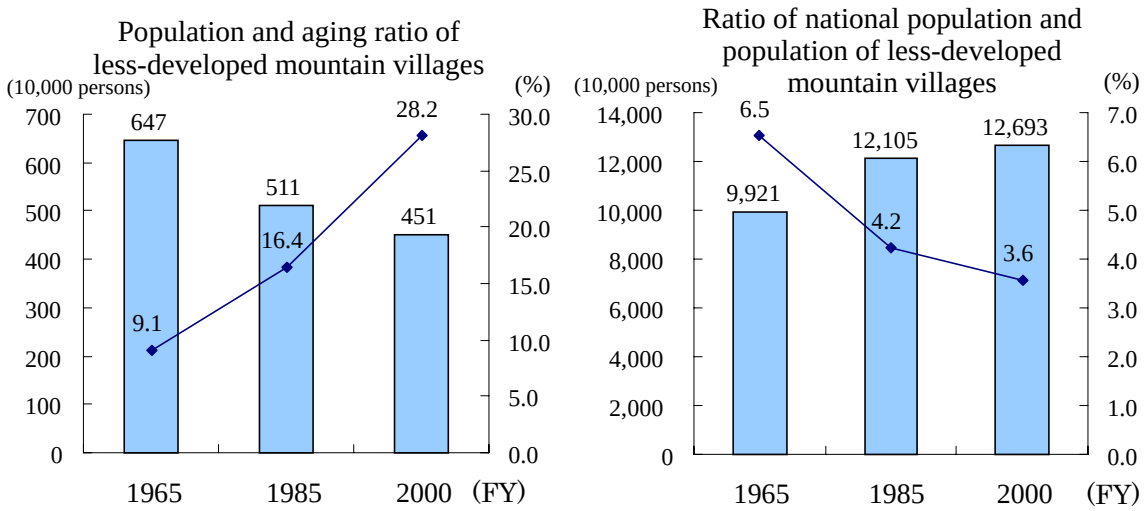


Figure 24. Changes in population of less-developed mountain villages

Source: Ministry of Internal Affairs and Communications "National Census" and Ministry of Agriculture, Forestry and Fisheries "Survey of mountain-village".

The following measures for mountain villages have been taken including the management/conservation of the forests, the development of forestry, and the promotion of the use of wood, on the basis of the Forest and Forestry Basic Act and the Basic Plan for Forest and Forestry.

Securing opportunities for employment
To secure diverse employment opportunities through the development of forestry and the forest industry as a key industry, taking advantage of unutilized resources such as woody biomass etc., and the creation of new businesses (forest and mountain-related businesses) that promote special local products.

Promoting intercommunication between cities and mountain villages
To promote the maintenance of community facilities such as drainage facilities, to support highly motivated activities coordinated between cities and mountain villages, and to conduct awareness raising to contribute to the revitalization of mountain villages along with the maintenance of the production base for forestry such as forest roads.

Comprehensive use of forests
To provide areas for recreation, environmental education on forests with cooperation from educational institutions, and healthcare enhanced by forest products.

Enthusiastic activities are seen in some areas. Examples include the increase of forestry workers based on the immigrants from cities, the increase of younger generations participating in experiential activities in the mountainous village, and creation of a new industry making the best use of abundant forest resources. In addition, it is expected that the baby-boom generation reaching the retirement age may return to the mountain villages.

5. WOOD INDUSTRY

Overview of supply and demand of wood

Overview of supply and demand of wood in Japan

Demand for wood

The demand for wood both for construction purposes and paper manufacturing expanded with the economic expansion in the high growth period of the 1960s. While the demand for wood (roundwood equivalent) was 45.28 million m^3 in 1955, it reached the record high of 117.58 million m^3 in 1973.

After 1970, the demand for wood (roundwood equivalent) exceeded 100 million m^3 until 1997 (excluding 1975 and the period from 1981 through 1986). However, the demand for wood both for sawnwood and pulp and chips has been decreasing recently. It has been below 90 million m^3 since 2002 and reached 85.86 million m^3 in 2005.

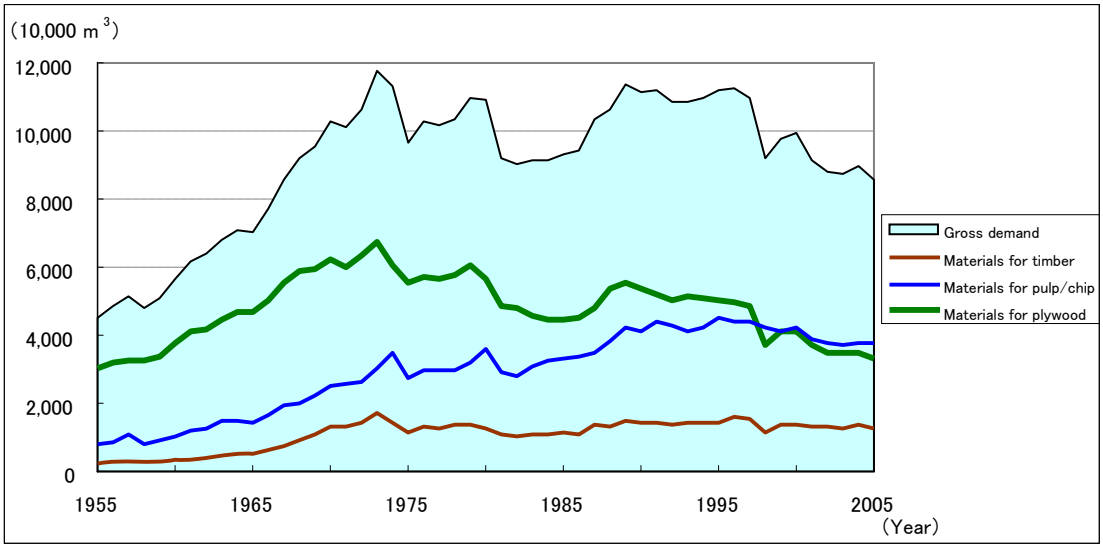


Figure 25. Changes in demand for wood (roundwood equivalent) in Japan

Source: Forestry Agency "Wood Demand and Supply Chart".

Supply of domestic wood

The supply of domestic wood has been decreasing since the peak at 52.74 million m^3 in 1967, and has been below 20 million m^3 since 1998. Accordingly, the self-sufficiency rate of industrial wood was below 50% in 1969, and below 20% in 1999.

Recently, however, the supply of domestic wood has turned round to increase after reaching rock bottom at 16.08 million m^3 in 2002; it recovered to 17.18 million m^3 in 2005 and the self-sufficiency rate has recovered to the 20% level for the first time after seven years. This is mainly due to the increase in the supply of sawnwood and plywood used for construction. Especially, the increase in wood for plywood accounts for approximately the half of the total increase. The self-sufficiency rate of industrial wood by use in 2005 shows sawnwood at 35%, pulp and chips at 12%, and plywood at 7%. Domestic wood for sawnwood and plywood gained 2 points and 3 points year over year.

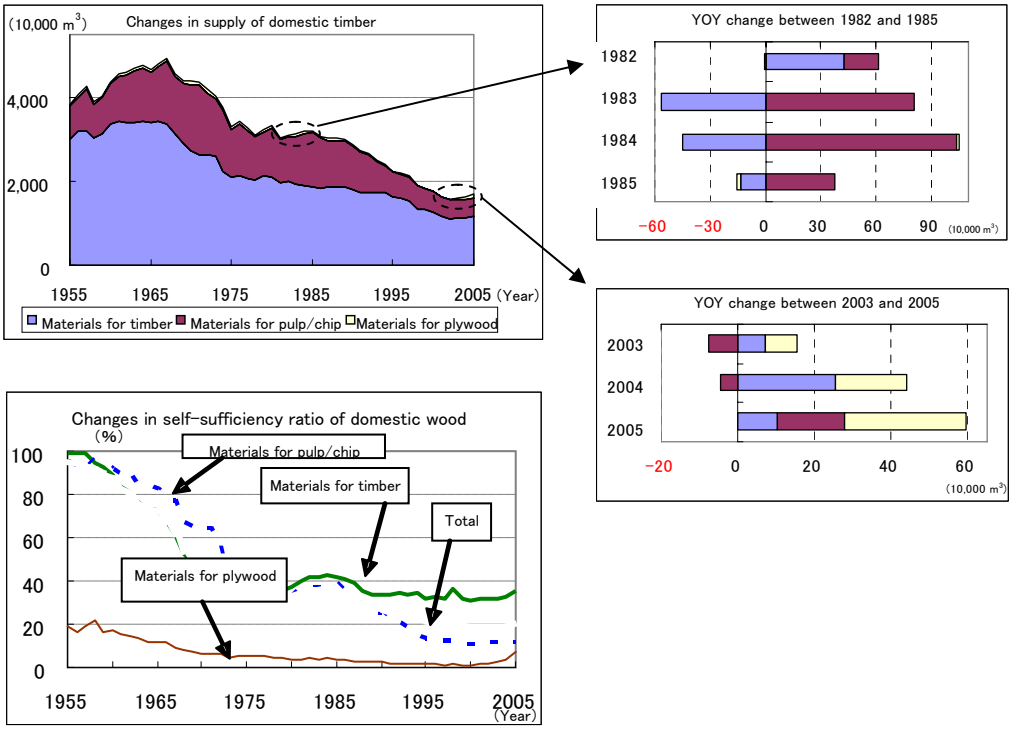


Figure 26. Changes in supplied volume of domestic timber and self-sufficiency rate

Source: Forestry Agency "Wood Demand and Supply Chart".
Note: Because "the Material for Others" is negligible among the supplied volume of domestic lumber, it is not shown in the changes in the supply.
YOY = Year over year

Supply of imported wood and patterns of imports

Imported wood has been constantly expanding its share since the start of full-scale imports to Japan in the 1960s, imports reached a record high of 89.48 million m^3 (roundwood equivalent) in 1996.

As a result, the supply of imported wood has increased to cover 80% of the total demand for wood in Japan. The type of import and the exporting countries have changed according to resource situations, economic circumstances, and industrial policies etc. of the exporting countries.

The pattern of imports has changed from logs to wood products due to the policies of many exporting countries. The import of wood products exceeded the import of logs in 1987, and has exceeded 80% since 2003.

In terms of use, almost all wood for paper making has been imported as partially processed products (i.e. chips or wood pulp) since the 1960s. The import of processed products exceeded 50% for plywood in 1995 and for sawnwood in 1996. In 2005, the import of both sawnwood and plywood products approached 70%.

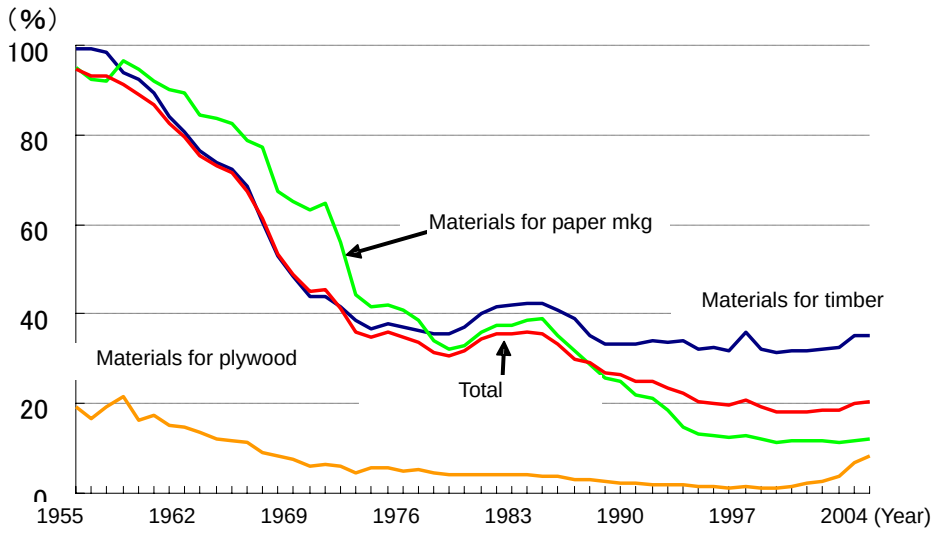


Figure 27. Changes in ratio of imported wood and wood products

Source: Forestry Agency "Wood Demand and Supply Chart".

Along with the expanding import of wood products, exporting countries have also been changing. As for sawnwood and laminated wood, the demand for laminated wood of white wood and lamina for laminated wood from Europe is increasing, while the share of sawnwood and laminated wood from the USA and Canada is decreasing. Moreover, imports of laminated wood and plywood from China have expanded.

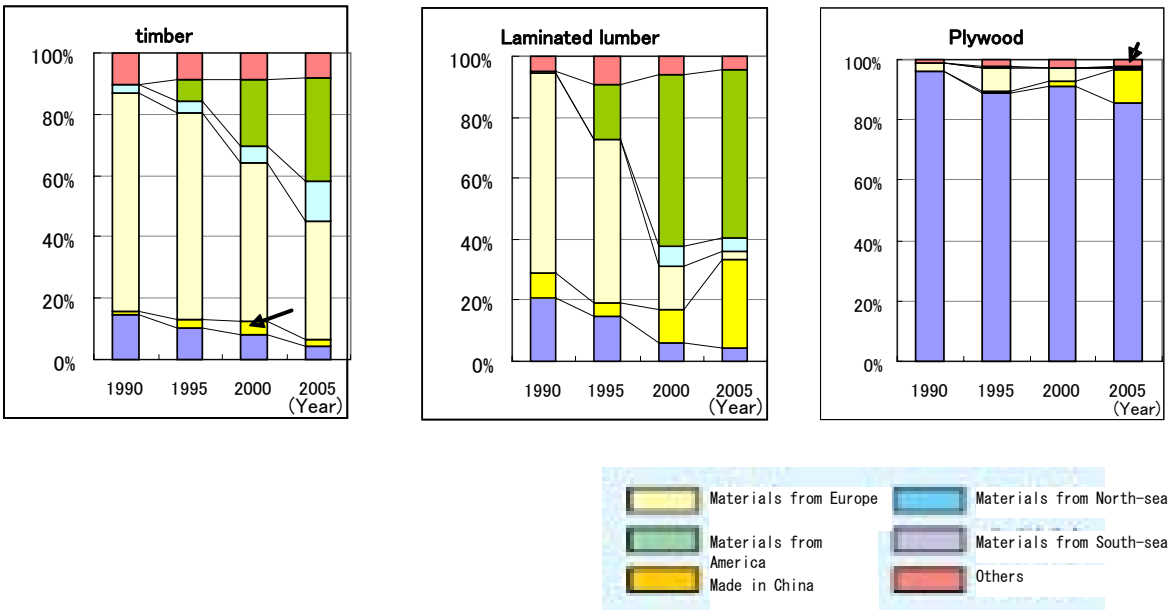


Figure 28. Changes in share of wood products in recent years

Source: Ministry of Finance "Trade Statistics of Japan".
Note: Imported products from China are labeled "Made in China" since they are national rather than regional imports.

Overview of supply and demand of wood by use

Wood for sawnwood

The demand for wood for sawnwood accounted for more than 60% of the total demand for wood in the early 1970s. This has been decreasing in the long term and reached 32.9 million m^3 in 2005 or 38% of the total. However, within the domestic wood supply, wood for sawnwood accounted for 70% of the total. Accordingly, the trend of its supply and demand has a significant influence on the supply and demand of domestic wood.

Wood for sawnwood is used mostly for construction purposes, and its demand is largely influenced by the trend in new housing starts. In 1973 when the new housing starts hit the record high of 1.91 million houses, the demand for wood for sawnwood also hit the record high of 67.47 million m^3. Recently, the number of new housing starts has remained in the range of around 1.2 million annually, and the demand for wood for sawnwood has also been declining.

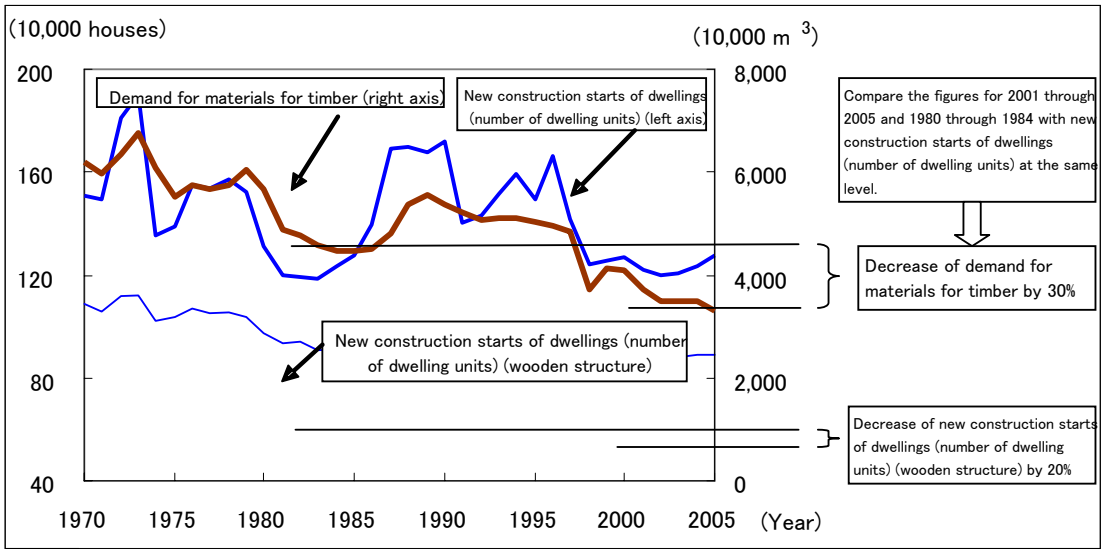


Figure 29. Trend in new construction starts of dwellings (number of dwelling units) and demand for materials for timber
Source: Forestry Agency "Wood Demand and Supply Chart", Ministry of Land, Infrastructure, Transport and Tourism "Annual Report on Construction Statistics".

Wood for pulp and chips

The demand for wood for pulp and chips in 2005 accounted for 44% of the total demand for wood at 37.61 million m^3; this has exceeded the demand for wood for sawnwood since 1998 and has maintained the highest share of any wood product.

Because wood for pulp and chips is mostly for paper manufacturing, its demand is influenced largely by the trend of paper and paper board production. Although the production of paper and paper board in Japan increased steadily in the past, it has remained unchanged since 1996.

Demand for wood for pulp and chips was rising until it reached about 45 million m^3 in 1995. Recently, however, has declined and was 37.61 million m^3 in 2005. This is because the production of paper and paperboard has peaked out while the use of recycled paper has

increased.

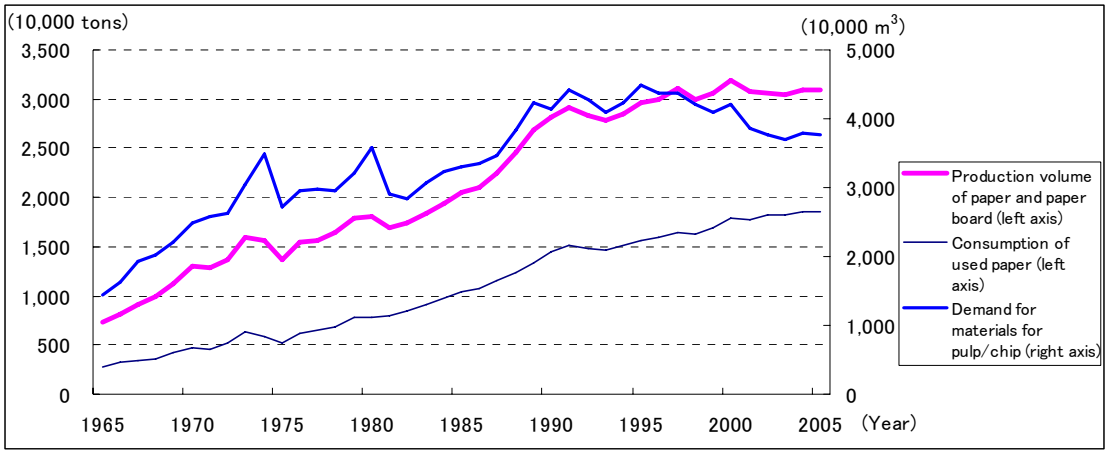


Figure 30. Changes in production of paper and paperboard, consumption of used paper, and demand for materials for pulp and chips

Source: Forestry Agency "Wood Demand and Supply Chart", Ministry of Economy, Trade and Industry "Annual Statistics of Paper, Printing, Plastic and Rubber Products".

Wood for plywood

The demand for wood for plywood in 2005 accounted for 15% of the total demand for wood at 12.59 million m^3.

The demand for wood for plywood peaked out at about 17 million m^3 in 1973. In the first half of the 1980s, it declined to 10 million m^3 and recently has stayed in the range of 13 million m^3. While the demand for wood for sawnwood decreased by 40% from 1989 to 2005, the demand for wood for plywood decreased by 10% which was a smaller decrease than the former.

Plywood manufacturers have shifted the materials for plywood from broad-leaf trees from Southeast Asia and the Western Pacific to coniferous trees from Russia, and the ratio of plywood made from softwood against the total plywood produced domestically increased from 30% in 1998 to 70% in 2005.

In addition, in recent years, it has become more common to utilize domestic coniferous trees as material for plywood. Especially since 2002, the supply of Japanese cedar as the material for plywood has been growing significantly. As a result of this, the self-sufficiency rate of wood for plywood in 2005 rose by 3 points YOY to 7%.

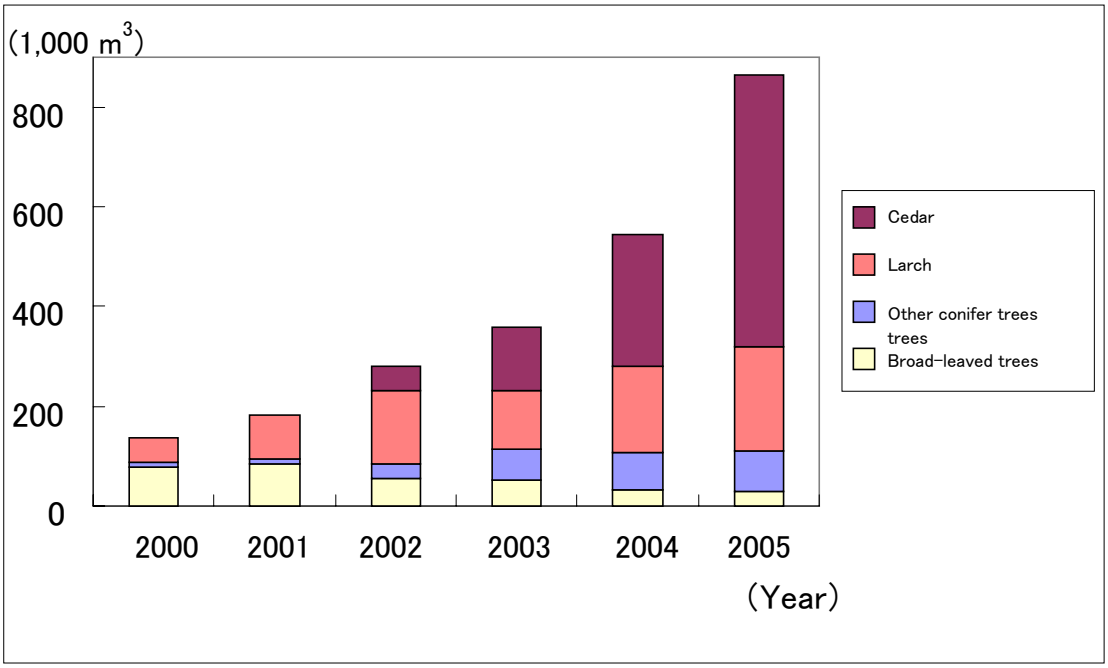


Figure 31. Changes in supply of domestic logs for plywood

Source: Ministry of Agriculture, Forestry and Fisheries "Report of Wood Demand and Supply".

Overview of the price of wood

The price of wood products (Japanese cedar) increased significantly in the 1960s along with the increasing demand for construction materials under the high economic growth. In particular, the price jumped in 1972 and 1973 when housing starts reached a peak. After this, the price generally increased until 1980 when it hit a record high level on the back of inflation and the rising price of the competing sawnwood (of the western hemlock). While the price kept declining thereafter until 1986, an upswing occurred between 1987 and 1993. However, since then the price has been declining until the present due to the decrease in demand. The price in 2005 was the same as the level of 1972.

On the other hand, regarding the price of imported wood, the considerable appreciation of the yen after the Plaza Accord in 1985 which led to the decline of the yen-based price of all imported goods was a major reason for the expansion of imported wood. Since wood is distributed as an international commodity, the demand for wood in both producer and consumer countries has influenced the import price of wood in Japan in a complex manner. For example, in addition to the fluctuation of the foreign exchange market, the following factors will also influence the price: housing starts in the USA, demand for wood in China, and measures taken to control illegal logging in various supplier countries.

Moreover, in industries where domestic wood and imported wood compete with each other for the same use, the imported wood which dominates the share has a tendency to impact the price formation of the wood products distributed in Japan. For example, regarding materials for posts, western hemlock has influenced the price of Japanese cedar in the past, and recently, laminated wood of white wood from Europe has replaced western hemlock and dominates the materials for posts. Today, it has a large impact on the price formation of kiln-dried Japanese cedar.

The imported price of logs, wood products, and plywood in 2006 increased on the back of the increasing transportation cost based on the high oil prices and the appreciation of the Euro as

well as the globally increasing demand for wood, including in China.

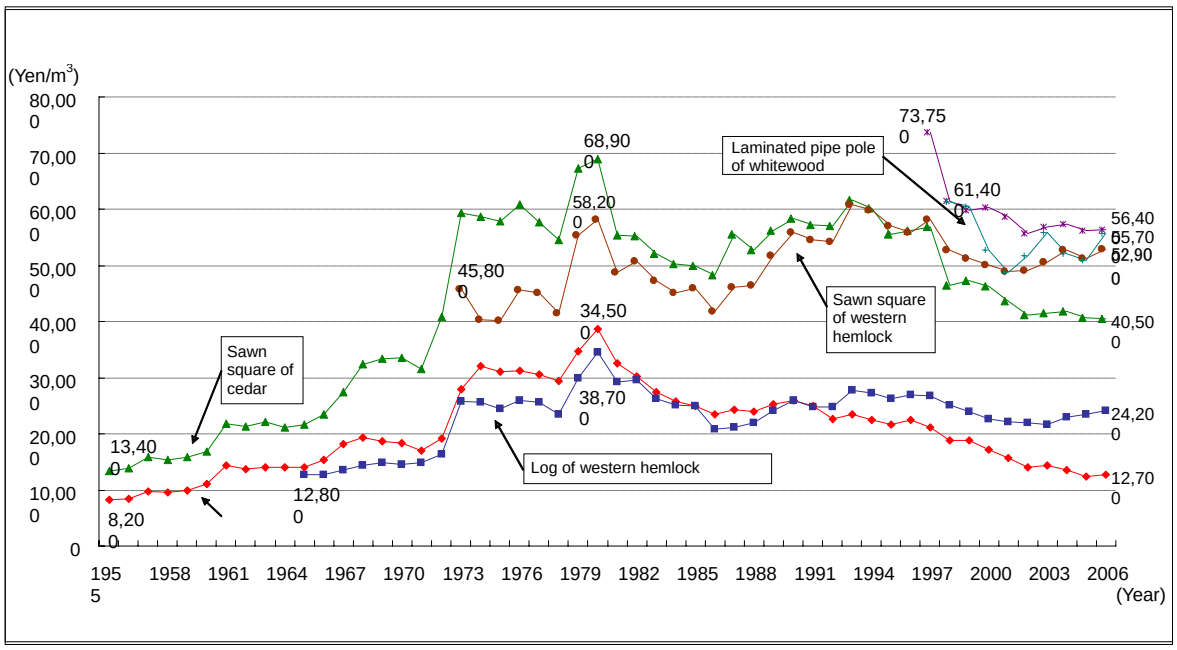


Figure 32. Changes in wood price (wood products)

Change in needs of structural wood for housing use

These days, the construction period of a house has been shortened and the inside of a house tends to be excessively dried due to the use of air conditioners after the completion of construction. Under these circumstances, there is a growing demand for products of assured quality and performance including dimensional stability, considering the possible dimensional changes of wood products after the completion of the housing construction.

Moreover, a pre-cut system in which the joint of timber is processed in a factory was rapidly accepted after 1985, because it can shorten the construction period and help reduce the cost in the shortage of carpenters. The ratio of the pre-cut used in the post and beam construction method (Figure 33) has significantly increased from 8% in 1990 to 79% in 2005. The pre-cut requires materials with dimensional suitability which fit the automated processing system. Along with the advancement of the pre-cut, the demand for laminated wood and dried wood has been increasing.

Given this, the ratio of laminated wood used in the post and beam construction method drastically increased from 2% in 1993 to 45% in 2002. (Figure 34) Moreover, the ratio of kiln-dried wood production in the production of wood for construction (Figure 35) increased from 13% in 1999 to 23% in 2005.

Wood for construction accounts for 80% of the shipped wood products in Japan, and the trends in the demand for housing construction have a strong influence over the demand for wood.

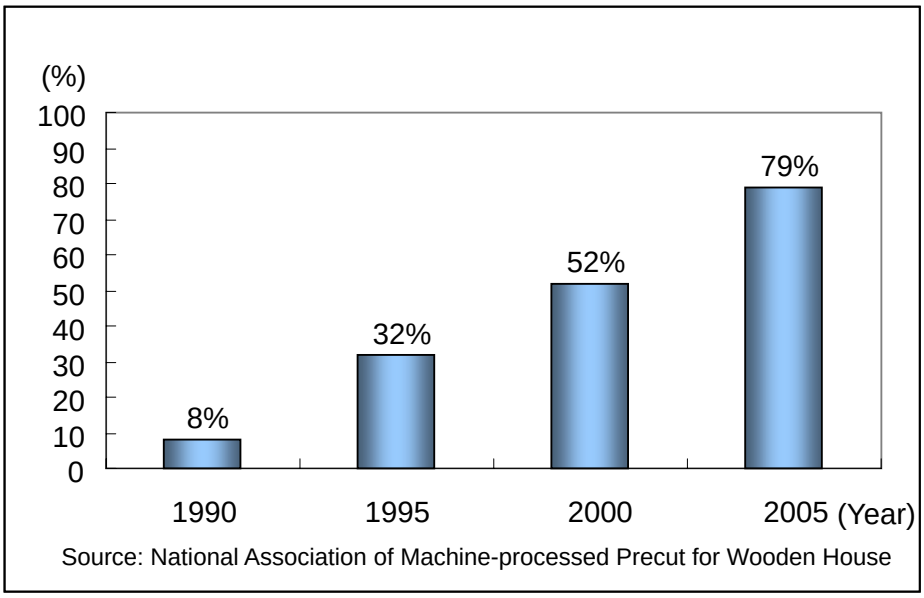
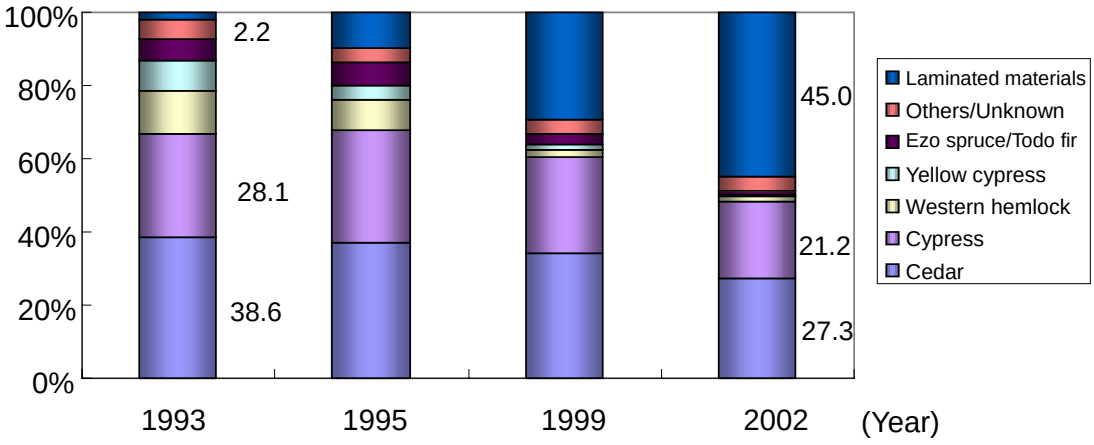
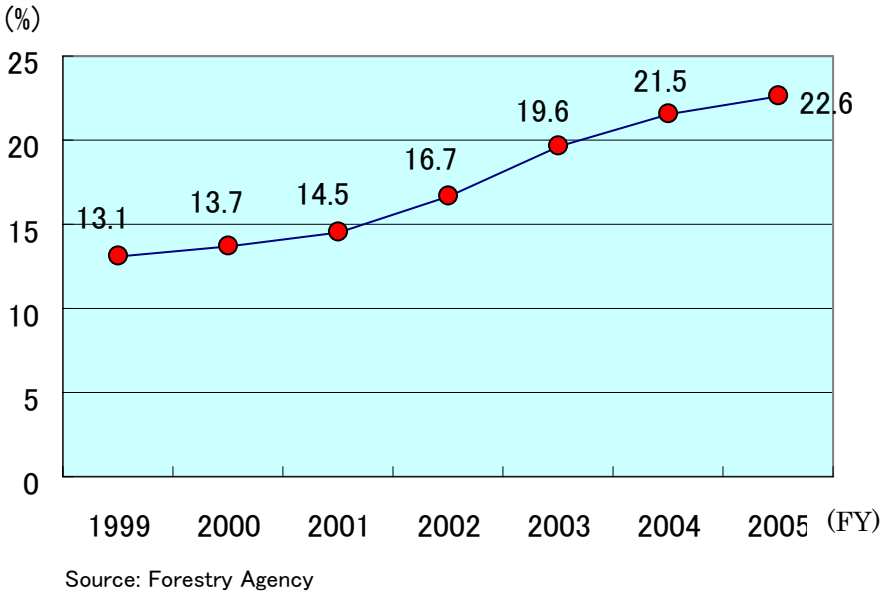


Figure 33. Ratio of pre-cut timber used in timber framework houses



Source: Housing Loan Corporation "Survey report on key data concerning housing and construction"

Figure 34. Ratio per tree species as posts used for timber framework houses



Source: Forestry Agency

Figure 35. Ratio of kiln-dried timber production in timber products for construction

Trend in wood exports from Japan

Regarding the situation of Japanese wood exports, the value of exports was 10.5 billion yen in 2005 and 9.6 billion yen in 2006 respectively. China and the USA are major importing countries, which account for 50% of the total value of export. Wood and wood products make up half of exported goods and the rest includes woodwork and wooden goods. Especially, the export of logs is increasing mainly for China and the volume of log exports was 30,388 m^3 in 2006, which was a 40% increase from 2005.

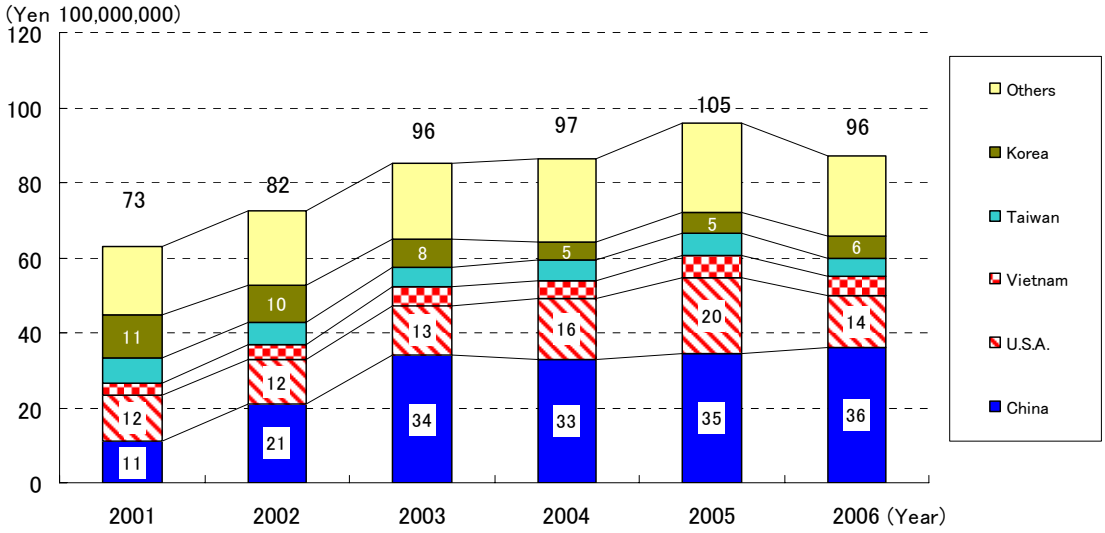


Figure 36. Changes in breakdown of export destinations of wood

Source: Ministry of Finance “Trade Statistics of Japan”.

Measures to tackle illegal logging

Since the Kyushu and Okinawa G-8 Summit in 2000, Japan has consistently been insisting on the importance of tackling illegal logging based on the principle that "Illegally harvested timber should not be used". In the Gleneagles G8 Summit (July, 2005), G-8 countries agreed to address illegal logging with concrete measures and Japan stated its concrete measures domestically and internationally including the elimination of any illegally harvested wood from government procurement according to the Climate Change Initiative.

Since April 2006, Japan has introduced a government procurement policy favoring wood and wood products that have been harvested in a legal and sustainable manner, in accordance with the "Law on Promoting Green Purchasing". The Forestry Agency promulgated the "Guideline for Verification on Legality and Sustainability of Wood and Wood Products" in February, 2006. Moreover, Japan has been working with Indonesia based on bilateral discussions to monitor the logging status using satellite data and to develop timber traceability technology as illegal logging countermeasures. Japan has also been supporting projects such as promotion/education on legal and verified wood through the International Tropical Timber Organization (ITTO) as multi-lateral cooperation. Moreover, Japan has been working with other countries, international organizations and NGOs through the Asia Forest Partnership (AFP) and participating in the Forest Law Enforcement and Governance (FLEG) process in various regions such as East Asia, Africa, Europe and North Asia.

6. FUTURE OUTLOOK AND TARGET

Need for a new basic plan

Increase of population and economic expansion/growth are expected globally. There are concerns over environmental issues which are becoming more serious due to social and economic structural failures in mass production and consumption, and deforestation and degradation of forests occurring worldwide. However internationalization and computerization have brought major innovations to economic activities.

In Japan, to exacerbate the problem, a declining birthrate and an aging population have been causing unprecedented change in the social structure.

Under these circumstances, major changes will have to occur regarding forests and forestry in Japan.

Enhancement of available resources

In order to enhance the demonstration of the multifunctional roles of the forests, it is necessary to conduct forestry practices such as planting and thinning in a proper and timely manner so that the soundness of the forests is ensured.

However, in addition to the lack of appropriate forestry practices such as thinning of the planted forests established after the war, replanting has not been conducted after harvesting in some forests. If the situation continues without the appropriate management of forests, there is a concern that degradation of forests, especially planted forests, will continue, which may seriously impact people's lives in the future.

On the other hand, although the area of mature planted forests is rapidly expanding, the forest owners' motivation to conduct final cutting is low. Accordingly these forests have not been fully utilized as resources.

Thus many mature planted forests are likely available for promoting diverse forest management according to targets such as converting planted forests to broad-leaf forests or increasing the area of long-term rotation forests in order to secure the soundness of forests with consideration to utilize them as resources. Therefore, regarding mature planted forests, it is necessary to conduct appropriate forest practices such as selective cutting or thinning at reduced costs in addition to the ongoing thinning of the young planted forests, especially those of fast-growing species.

Diversified national needs for forests

In recent years, in order to meet Japan's commitments to the international community and to contribute to resolving global environmental issues, particularly to meet targets pursuant to the Kyoto Protocol, one of Japan's prime tasks has been to promote improved management of the forests.

Moreover, regular mountain disasters are occurring due to the frequency of localized landslides. Also, the difference of the precipitation between the most pluvious years and years with low rainfall has tended to expand. Under these circumstances, regional floods and droughts can occur easily. Forest damage caused by wild animals such as deer is also increasingly serious.

It is becoming more important to address various needs such as the conservation of biodiversity and landscapes or utilization of forests as sites for environmental education,

production of medicinal therapies or recreation. Also, there is a need to promote measures to control pollen from Japanese cedar in order to secure comfortable living environments.

Given these circumstances, it is necessary to promote the management and conservation of forests so their multifunctional roles can fully be demonstrated.

Change in demand structure for wood and the new movement

Apropos house construction, which accounts for the majority of the demand for wood, the need for high quality wood, including wood with high dimensional stability and strength, for sawn timber is increasing. This trend corresponds to increasing requirements for pre-cut products (materials processed in advance in a factory for the post and beam construction method used for residential houses) in response to the shorter construction period of houses, the necessity to reduce costs, and the shortage of skilled carpenters. Moreover, large-scale consumers, such as leading housing manufacturers, need stable and large-scale supplies of wood.

On the other hand, imports of wood and wood products from the USA have been declining due to the vigorous demands from the USA housing market. Also, the import of wood from Russia has been declining due to increasing demand in China. As for European materials, although imports of products mainly of lamina (boards consisting of laminated materials) has been increasing, the import of logs has been decreasing.

Despite these circumstances, the utilization of domestic wood has been sluggish due to the delay in the development of a stable supply system corresponding to consumer needs and the low ratio of dried wood among domestic wood. However, owing to improvements in the processing technology and the distribution system of raw wood, curved wood and short wood that were underutilized are now utilized mainly for laminated wood and softwood plywood.

Also, efforts have been actively made to expand the market. For example, some companies are working on the export of wood to China where the demand for wood is increasing along with rapid economic growth.

Delayed structural reform of forestry and the forest industry

It is necessary to advance the structural reform of forestry and the forest industry by expanding the scale of forestry management, reducing costs, improving the quality of wood and wood products, and increasing the forest area.

However, the motivation of forest owners has decreased due to the rising number of non-residential forest owners and the declining profitability of forestry owing to the ongoing decline of wood prices. The ownership structure of private forests and the forestry business entities still remains small-scale and forestry production activities are sluggish. Furthermore, the population engaged in forest and forestry businesses has been diminishing and aging.

Also, because the forest industry mainly consists of small-scale lumber mills with low productivity, the production, processing and distribution of wood in Japan are generally small scale and dispersed. In particular, the distribution of wood tends to have multiple steps, which is inefficient and expensive.

Thus, because the structural reform of forestry and the forest industry has been delayed, and the ownership structure and the production organization cannot overcome the small-scale issue, the industry cannot address the consumer needs for large-scale and stable supply of wood at low cost.

Target of the Basic Plan for Forest and Forestry

The Basic Plan for Forest and Forestry based on the Forest and Forestry Basic Act (Act No.161, 1964) has been established envisaging the coming 20 years and to attempt comprehensive and systematic promotion of measures concerning forests and forestry. Key aspects of the Basic Plan are discussed below.

Focus on the viewpoints of people and consumers: The benefits brought by forests will widely influence people's lives and the forests will require extremely long periods of time to grow. Therefore, it is important to develop measures concerning forests and forestry in the long-term perspective corresponding to geographical conditions, social conditions and the needs of the people so that they can enjoy the benefits of forests for years to come. Also, it is necessary to provide people who are willing to be involved in forests with various opportunities such as forest management activities.

Moreover, it is important to ensure that forest products such as wood and mushrooms will be supplied according to the needs of the consumers. Specifically, it is necessary to develop measures for the large-scale and stable supply of domestic wood at low cost and for supplying products of high quality and performance according to the needs of the housing manufacturers.

Additionally, it is necessary to increase opportunities for providing accurate information, so that people and consumers can obtain correct knowledge of forests, forestry, and forest products, and be able to select forest products properly.

Contribution to environmental conservation: Forests provide habitats for various species that support ecosystems as well as having significant effect on hydrological cycles.. The multifunctional roles of forests can be demonstrated through their proper management and conservation, the maintenance of ecosystem components such as soil and various organisms in a good condition, and the maintenance of a sound ecosystem.

The restoration of forests destroyed by landslides will contribute to the creation of a rich environment as well as to the conservation of national land.

Particularly in recent years, in line with the global trend to promote sustainable forest management, the role of forests has gained more importance regarding their potential as carbon sinks and value for conserving biodiversity. Measures against illegal logging have also become a significant challenge.

Development of forestry policy based on the new trend: In spite of the limiting conditions surrounding forestry and the forest industry, there are some enthusiastic and innovative projects such as forest owners' cooperatives that generate high productivity by integrating forestry practices and highly efficient technology for export of wood.

Moreover, there are new trends such as innovative forestry practices, commercial businesses participating in forest management, and mountain villages in which elderly people operate businesses that fully utilize abundant forest resources.

In implementing measures concerning forests and forestry, it is necessary to develop the forestry policy which will aggressively push forward such movements.

Basic concept to set up a target: The targets in the Basic Plan shall serve as the guideline for the management and conservation of forests by forest owners, the business activities of the forestry and forest industry, and the consumption of wood and wood products, in the course of promoting measures concerning forests and forestry. In order to properly maintain and

conserve forests and demonstrate the multifunctional roles of the forests continuously for the upcoming 20 years and to attempt the proper use of wood supplied through appropriate forest management for the coming ten years, the target is to be set at a feasible level when each issue is resolved by appropriate measures for issues focused on in each time period.

Target concerning multifunctional roles of forests: In regard to mature planted forests which are expected to increase in the future, the Basic Plan on Forest and Forestry includes policies to develop these into sound and diverse forests such as mixed forests of coniferous and broad-leaf trees, broad-leaf forests, or long-term rotation forests to meet diversified needs of the people. To demonstrate the multifunctional roles of forests, the forests are classified into "Forest for water and soil conservation", "Forest for symbiosis with people", and "Forest for cyclic use of resources" according to the functions to be focused on. The following targets have been set as feasible until 2015 (ten years) and for 2025 (20 years).

Table 10. Targets to demonstrate multiple functions of forests

	2005	Status of forests to be achieved		(Reference) Status of forests to be pursued
		2015	2025	
Forest for water and soil conservation (10,000 ha)				
Single-storied forests	730	730	720	410
Multi-storied forests	70	90	130	540
Natural forests	900	870	850	750
Symbiotic forest with people (10,000 ha)				
Single-storied forests	40	40	40	20
Multi-storied forests	10	10	10	40
Natural forests	270	260	260	260
Forest for resource cyclic use (10,000 ha)				
Single-storied forests	270	270	260	240
Multi-storied forests	20	20	30	100
Natural forests	220	220	210	170
Total forest area (10,000 ha)				
Single-storied forests	1030	1030	1020	660
Multi-storied forests	90	120	170	680
Natural forests	1380	1350	1320	1170
Total	2510	2510	2510	2510
Gross accumulation (million m^3)	4340	4920	5300	5450
Accumulation per ha	173	196	211	217
Total amount of growth (million m^3)	81	69	58	54
Growth per ha	3.2	2.8	2.3	2.1

Note: 1) The forest areas are rounded off to 100,000 ha and the breakdown and the total may not necessarily match.
2) “Status of forests to be achieved” and “Status of forests to be pursued” in terms of the forest area is calculated in reference to the figures for 2005.
3) The figures for 2005 are for March 31, 2005.

Targets concerning supply and use of wood and wood products: In the context of the supply and use of wood and wood products as part of the Basic Plan for Forest and Forestry, the target for the supply and the use of wood is set for the next ten years. The target for the supply of wood for the next 20 years is included as a reference. These targets are based on the outlook for the total demand for wood for the next ten years.

Table 11. Target of wood supply

(Unit: Timber volume: million m ^{3})

		(Actual) 2004	(Target) 2015	(Reference) 2025
Wood supply		17	23	29
Breakdown of reference	Forest for water and soil conservation		16	18
	Symbiotic forest with people		1	1
	Forest for resource cyclic use		6	10

Table 12. Target of use per category

(Unit: million m ^{3})

Category of use	Use amount		Total demand	
	(Actual)	(Target)	(Actual)	(Target)
	2004	2015	2004	2015
Materials for timber	11	14	37	33
Materials for pulp/chip	4	5	38	41
Materials for plywood	1	3	14	15
Others	1	1	2	2
Total	17	23	91	91

Note: Others include pickets, logs for Shiitake mushroom, and fuel-wood.

7. MEASURES TO BE IMPLEMENTED COMPREHENSIVELY AND SYSTEMATICALLY BY THE GOVERNMENT

This section explains the comprehensive and systematic government measures stipulated in the Basic Plan for Forest and Forestry. There are four major pillars: 1) to demonstrate the multiple functions inherent to forests in response to the needs of the people now and in the future; 2) to attempt the sustainable and sound development of forestry given the existence of the available resources and the change of the demand structure of wood; 3) to secure the supply of wood products and promote their utilization; and 4) to manage the national forests, accounting for 30% of the total forest area.

Measures concerning demonstration of the multifunctional roles of the forests

Developing diverse forests by the promotion of broad-leaf forests and longer-term management: Introduction of forest management methods for forest owners to choose, promotion of effective management methods such as zoned and clustered tree thinning, and promotion of the extension and stabilization of technology to streamline afforestation and cultivation.

Development and extension of low-cost and efficient operation systems: Promotion of the development/extension of cheaper and more efficient operation systems that employ the forest road network and the latest technology, the establishment of model forests for demonstration, capacity building, and enhancing the forest road network.

Promotion of effective pollen-control measures based on research into pollen outbreak sources: Promotion of research for estimating cedar forests causing the pollen dispersion, collaborative forest management activities between the pollen outbreak source areas and the metropolitan area, the conversion of planted cedar forest into mixed forests of broad-leaf and coniferous trees, intensified thinning of cedar forests with more male flowers, and diffusion of non-pollen cedar trees

Contribution to prevention of global warming: Promotion of comprehensive measures supported by each entity such as the central government, the local governments, the parties involved in forestry and the wood industry, and the public, such as the maintenance of sound forests, proper management and conservation of protection forests, and the participatory approach in afforestation.

Promotion of effective forest conservation to secure the safety and comfort of the public: Promotion of systematic implementation of both national and private forest projects as well as coordination of erosion control projects, accurate assessment of the higher risk of mountain disaster areas and watershed conservation, and promotion of projects to prevent disasters along with the development of regional evacuation systems.

Promotion of measures against forest damage caused by forest pests and diseases and wild animals: Promotion of preventive measures in areas freshly damaged by the pine weevil and damage control measures for the damage caused by wildlife, and establishment of broad-leaf forests and mixed forests of broad-leaf and coniferous trees as wild animal habitats.

Activation of mountain villages to support forests: Promoting urban participation in mountain village activities, support for the creation of industry that uses forest resources, and development of special forest products, along with facilitation of interaction between cities and mountain villages.

Promotion of afforestation activities by the corporate sector: Promotion of the development of the environment that facilitates private companies' participation in forest management

including planning/proposing activities, developing support systems, evaluating the activities and disseminating relevant information.

Enhancement of environmental education on forests: Promotion of training to improve planning and coordination capacity, dissemination of relevant information.

Promotion of measures to tackle illegal logging: Promotion of a government procurement policy favoring wood and wood products verified to have been harvested in a legal manner, support for producer countries based on bilateral cooperation, stipulating that “Illegally harvested timber should not be used”.

Measures concerning development of sustainable and sound forestry

Expansion of the scale of forestry management: Promotion and the extension of forest practices with clear description of the scope of the practices by the forestry business entity and the cost, and reviewing subsidies to support the forest management practices by business entities in order to support business entities that aim at forest practice intensification.

Recruiting and training younger employees: Promotion of training for the younger generation to provide skills and technology required to work in forestry.

Promotion of activities for forestry organizations: Promotion of the activities of organizations that will conduct forestry practices such as forest owners’ cooperatives in order to intensify forestry practices by forest owners who have lower management motivation and clarification of the area where forestry practices should be conducted.

Measures for securing the supply and the use of wood and wood products

Development of a stable wood supply system: Promotion of a stable supply system with cooperation between private and public forests and the national forests, securing stumpage inventories, developing an appropriate balance between demand and supply, training of the business entities that will produce logs.

Selection and concentration of support for enlarging the scale of lumber and wood processing: Promotion of support for enlarging lumber and wood processing based on concentrated support for business entities with higher business efficiency potential, and the establishment of a system that enables the comprehensive use of wood.

Meeting consumer needs and strengthening the supply and sales strategy: Promotion of the campaign "Building wooden houses with known materials and producers" in the metropolitan area, addressing consumers’ needs, developing the usage of timber from thinning, and the labeling of the quality and the performance of the wood.

Strategy information dissemination based on the targets including the corporate sector and the public: Promotion of the measures for the use of wood based on company characteristics, educational activities concerning the use of wood, MOKUIKU (The Education For Wood Products Use), and the use of wood in the public sector through cooperative work by relevant ministries and agencies.

Aggressive expansion of the foreign market: Promotion of the collection/analysis/provision of accurate information on timber exports, the building of strategies corresponding to countries on which marketing will be focused, and public relations’ activities for domestic wood.

Promotion of the comprehensive use of woody biomass: Promotion of the building of stable and effective production systems, research and development for utilization.

Measures concerning the management of national forests

The national forests account for about 30% of the forest area in Japan and about 20% of the national land area. They are located in remote areas or watershed areas which are important in terms of the conservation of national land. By taking advantage of such properties, the following measures will be promoted based on closer cooperation with the parties involved in private and public forests.

- Designation of the protection forests and the conservation of national land based on forest conservation from the viewpoint of the entire watershed area
- Positive contribution to prevention of global warming by promoting appropriate resource management utilizing forest GIS and diversified and sound forest maintenance
- Sustainable and systematic provision of wood and wood products and as well as for wood products for the restoration of cultural assets, along with positive measures for development of a stable supply system of roundwood
- Support for environmental education on forests conducted by prefectures

Moreover, the proper monitoring of the status of protected forests and the conservation and management of the natural environment such as the designation of “Green Corridors” will be promoted.