CRITERION 2

MAINTENANCE OF PRODUCTIVE CAPACITY OF FOREST ECOSYSTEMS

Many communities depend on forests directly or indirectly for a wide range of forest-based goods and services. The sustainable provision of these services is clearly linked to the productive capacity of the forest. If this capacity is exceeded there is the risk of ecosystem decline and collapse.

For forests to be sustainable it is necessary to understand the levels at which goods and services may be extracted or used without undermining the functioning of forest ecosystems and processes. The nature of goods and services provided by forests change over time due to social and economic trends, and technological developments. Change in the productive capacity of forests may be a signal of unsound forest management practices or other agents that are affecting forest ecosystems in some way.

INDICATOR 2.a

Area and percent of forest land and net area of forestland available for wood production

Rationale

This indicator measures the availability of forestland for wood production compared with the total forest area of a country. It provides information that will help assess the capacity of forests to produce wood to meet society's needs.

Current state and Trend

About 99 % of the total forest area of Japan is basically available for wood production. The total area of forests precluded from wood production is approximately 340 thousand ha, which include some protection forests[11], where logging operations are totally prohibited not to hinder the functions of forest ecosystems considerably, as well as the forests located within the Wilderness Conservation Areas[12] and Special Mother Tree Forests[13], in which logging operations are legally prohibited in principle.

Besides those banned forests, logging operations are regally restricted in the 52 % of Japan's forests, in which legal procedure, such as advanced government permit[14], is required for logging operations. Other protection forests where logging operations are not prohibited and the forests within natural parks are in this category. For other forests, notification[15] to the relevant government office is required for logging.

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[11] Refer to page X for the ***Protection forests***.

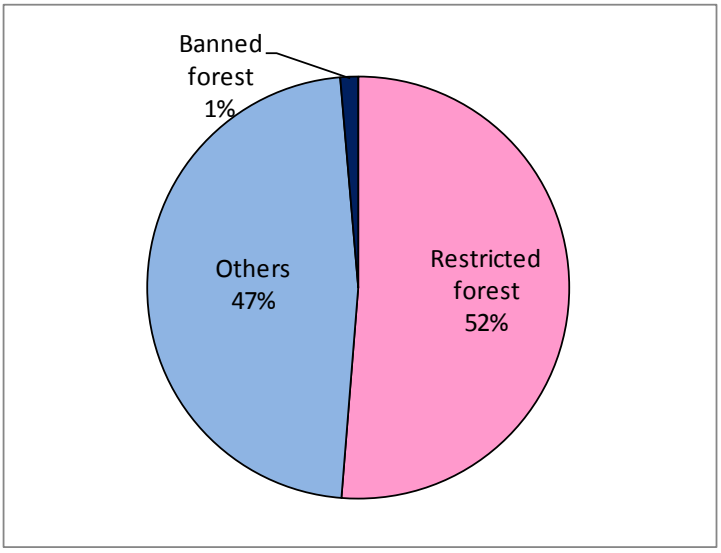
[12] ***Wilderness Conservation Area*** is the designated area to be preserved under the Wilderness Conservation Act for its well maintained original natural environment without any human disturbances. Logging operations are totally prohibited within the area.

[13] ***Special Mother Tree Forest*** is a designated group of trees recommended under the Forestry Seeds and Seedlings Act for the collection of good seeds and seedlings.

[14] ***Advanced government permit*** is required for logging in the protection forests and the forests within the special areas of wilderness conservation and natural parks.

[15] ***Notification*** is required for logging operation and plantation on logged over forests.

Figure 34: Composition of forests by extent of legal protection



Sources: Forestry Agency

INDICATOR 2.b

Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production

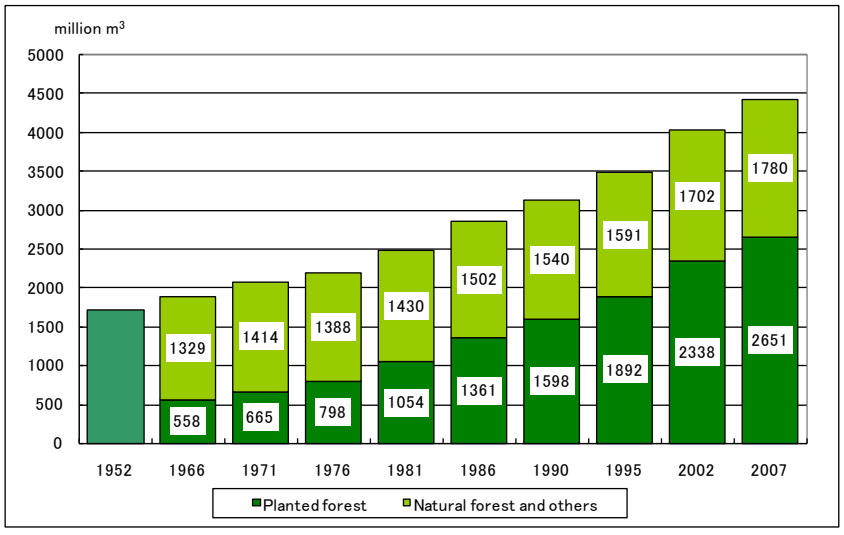
Rationale

This indicator measures the growing stock[16] and annual increment of forest area available for wood production to meet society's needs. The annual increment and growing stock can be related to the volume harvested each year to provide a means to demonstrate the sustainable management of forest resources.

Current state and trend

The total growing stock of Japan's forests in 2007 is approximately 4.7 billion m^3 and its annual increment is 80 million m^3. Planted forests occupy about 60% of the total growing stock and 80 % of the annual increment. Both the total growing stock and total annual increment have constantly increased since the 1960's owing to the rapidly growing planted forests normally composed of merchantable tree species[17].

Figure 35: Change in growing stock and annual increment of Japan's forests

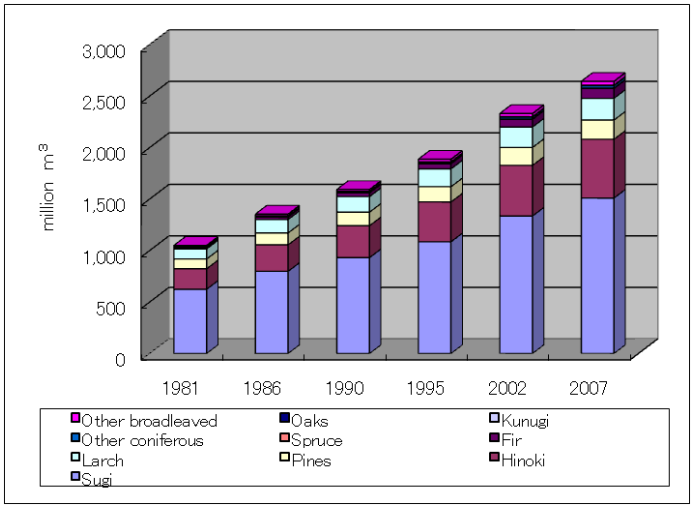


Sources: Forestry Agency. State of Forest Resources

[16] ***Growing stock*** is the volume of the stem of standing trees in forests.

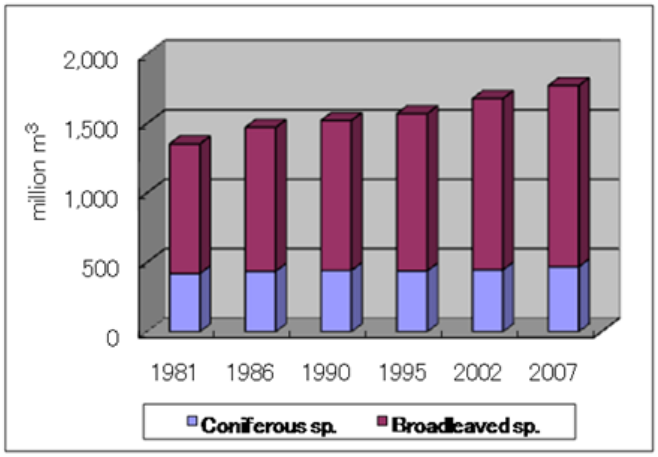
[17] ***Merchantable tree species*** are those from which merchantable goods, such as timber, wood chips and fuel wood, can be produced. Most of the tree species found in the planted forests in Japan are regarded as merchantable tree species.

Figure 36: Change in growing stock of planted forests



Sources: Forestry Agency. State of Forest Resources

Figure 37: Change in growing stock of natural forests

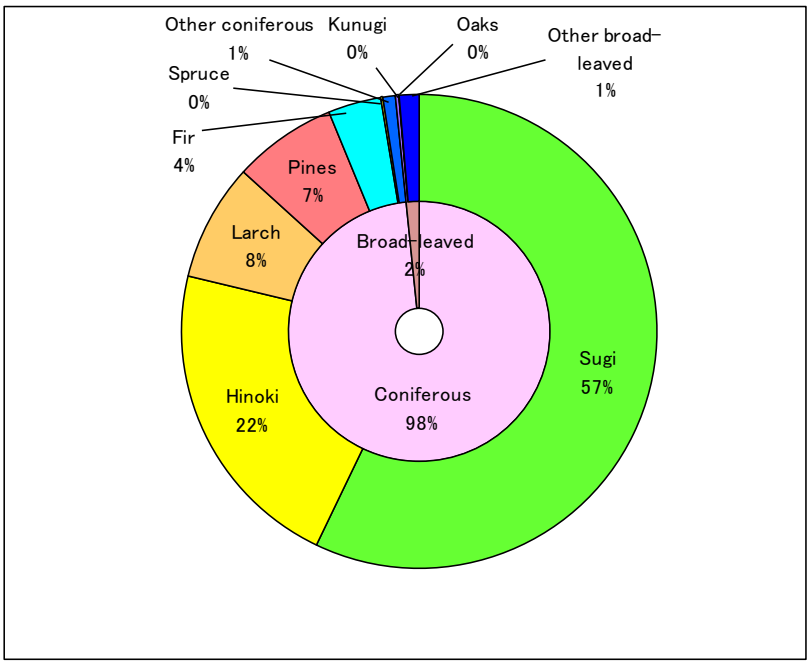


Sources: Forestry Agency. State of Forest Resources

Among planted species, Sugi holds the highest and Hinoki follows both in growing stock and in annual increment of planted forests. Both Sugi and Hinoki are popular tree species of Japan which have long history of tree breeding[18] and plantation. For natural forests, on the other hand, broadleaved species occupies about 70 % and coniferous species occupies about 30% both in the growing stock and in the annual increment.

[18] ***Tree breeding*** is an activity to improve the genetic features of trees, such as the growth and damage resistance.

Figure 38: Composition of species in growing stock of planted forests



Sources: Forestry Agency. State of Forest Resources

INDICATOR 2.c

Area, percent and growing stock of plantations of native and exotic species

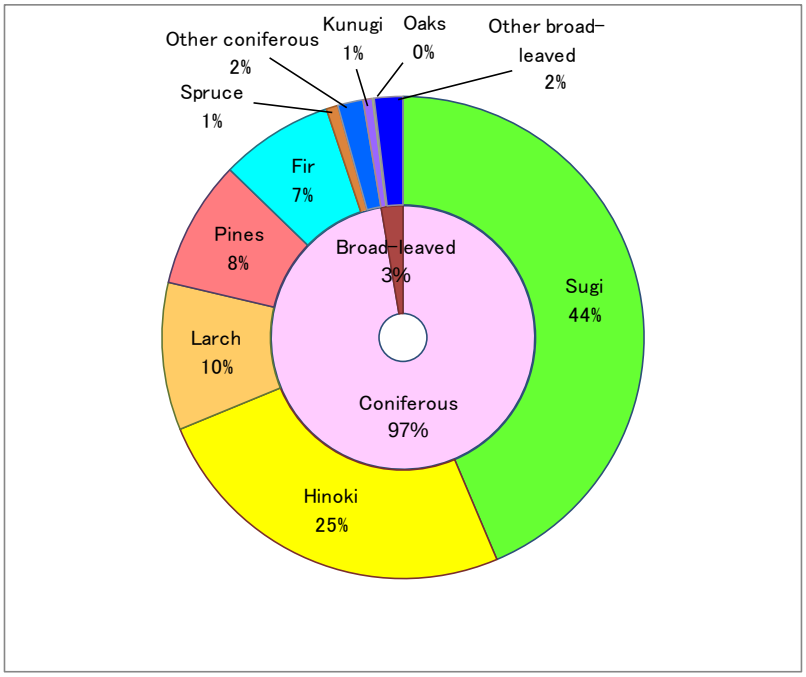
Rationale

This indicator provides information on the nature and extent of plantation forests. Changes in the area of plantation reflect society's present and future needs or the impact of competing land use on forest cover. The use of both native and exotic plantation species may enhance the range and quantity of goods and services available.

Current State and Trend

Planted forests cover approximately 10 million ha in Japan, accounting for 40 % of its total forest area. Regarding the species composition, Sugi holds the highest, occupying 43 % and followed by Hinoki and Larch, occupying 24 % and 10 % respectively. The major plantation species found in Japan are all native species.

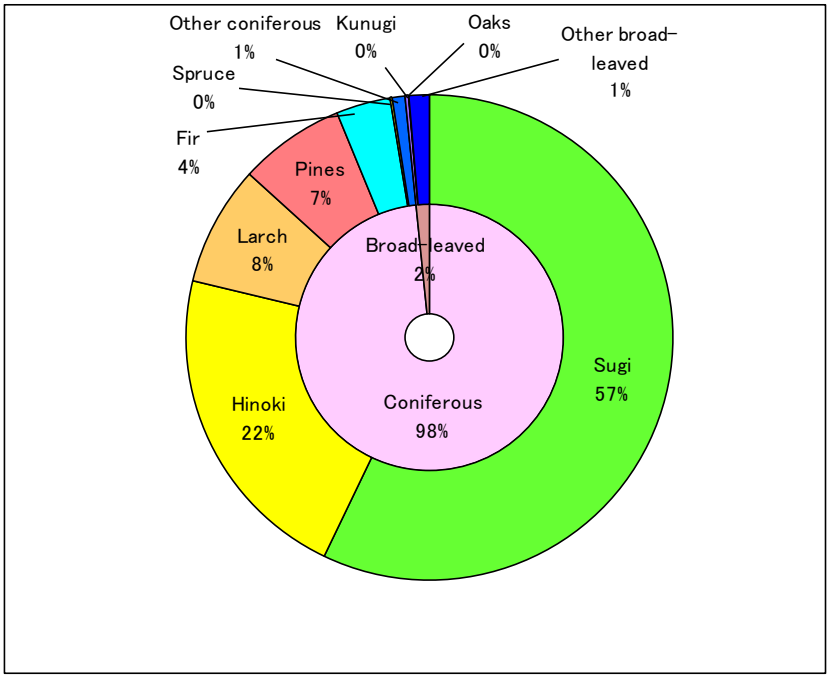
Figure 39: Composition of species in area of Japan's planted forests



Sources: Forestry Agency. State of Forest Resources

The growing stock of the planted forests in 2007 is approximately 2.9 billion m^3, accounting for about 60 % of the total growing stock of Japan. Sugi occupies 57 %, then Hinoki and Larch (*Larix leptolepis*) occupy 22 % and 8 % respectively.

Figure 40: Composition of species in growing Stock of planted forests

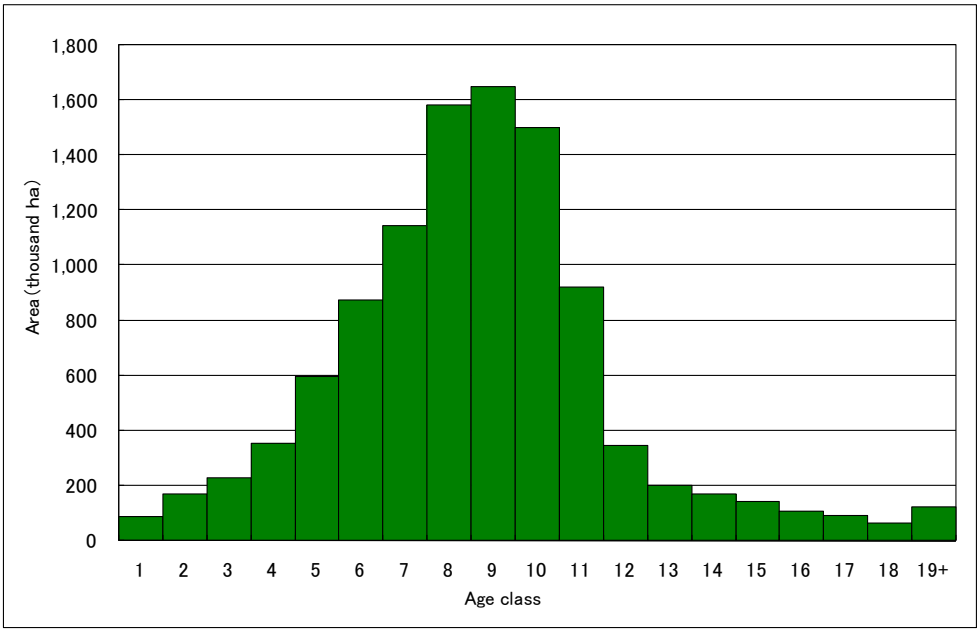


Sources: Forestry Agency. State of Forest Resources

In Japan, both area and growing stock of the planted forests of exotic species, such as European Spruce (*Picea abies*) and Strove Pine (*Pinus strobus*) is very limited due to their relatively poor performance in the field. The popularity of Sugi in the planted forests, on the other hand, is attributed to the historically developed suitable varieties and nursery techniques, as well as its original adaptability to the climate and soil of Japan.

The majority of the planted forests of Japan were established during the late 1950's through early 1960's when the consumption of wood, including construction timber and pulp wood, was increasing under the rapidly growing economy. The major part of the planted forests, therefore, still remains in a development stage which requires periodic care, such as thinning.

Figure 41: Age class distribution of Japan's planted forests



Sources: Forestry Agency. State of Forest Resources

INDICATOR 2.d

Annual harvest of wood products by volume and as a percentage of net growth or sustained yield

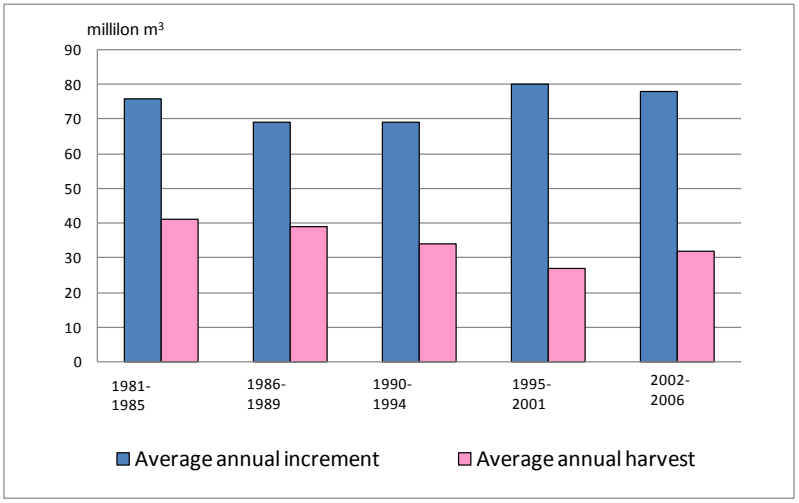
Rationale

This indicator compares actual harvest levels against what is deemed to be sustainable. The purpose is to assess whether forests are being harvested beyond their ability to renew themselves or are being under-utilised for wood products.

Current State and Trend

The average annual increment of the total growing stock of Japan's forests in the last 25 years stays around 70-80 million m^3 whereas the total volume of annual harvest for the same period remains around 30-40 million m^3. As a result, the growing stock of Japan's forests, particularly that of planted forests, has constantly increased, as shown in Figure X provided for Indicator 2.b.

Figure 42: Change in average annual increment and harvested volume



Sources: Forestry Agency

Such long term trend is mainly due to the higher percentage of younger planted forests which do not much contribute to the volume of harvest but the annual increment of the growing stock. The constant decline in the profitability of timber production due to the falling timber price and rising labor cost further

brought the downward trend in the volume of harvest throughout the 1980's and 1990's. The upturn in the harvested volume in recent years is attributed to the increase in the volume of thinning as a result of the concerted efforts of forest owners, forest-related industries and the national and local governments.

INDICATOR 2.e

Annual harvest of non-wood forest products

Rationale

This indicator reports on the sustainability of the harvest of non-wood forest products. The well being of indigenous and other communities dependent on non-wood forest products may be closely allied to the forest's ability to maintain its productive capacity over time.

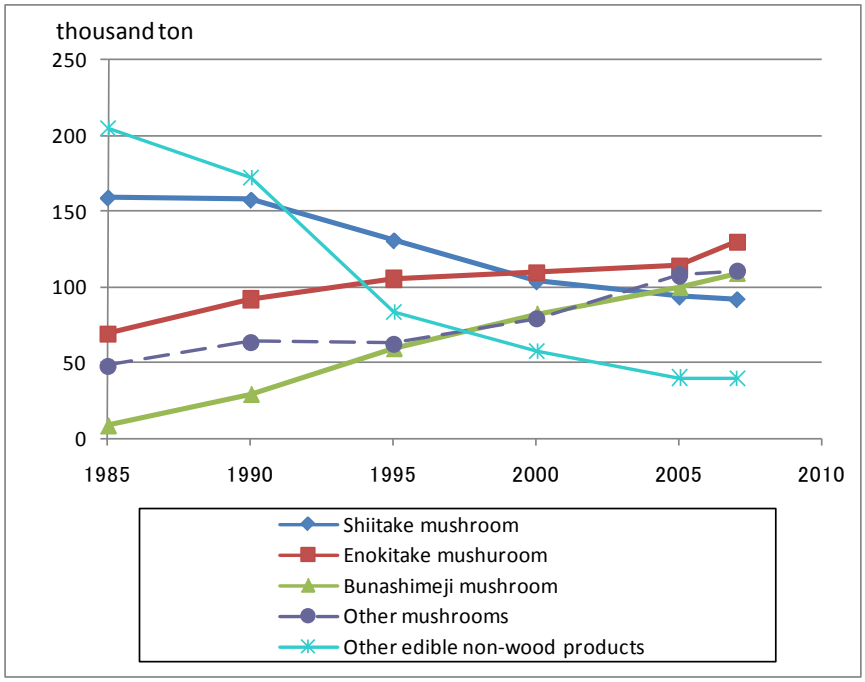
Current State and Trend

A wide variety of edible wild plants, mushrooms and nuts have been collected in forests by the people living of local communities in Japan. Because much of those non-wood forest products are collected for their own consumption or for limited distribution, no reliable statistics are available.

Responding to the diversified needs of consumers, various non-wood forest products are now cultivated and marketed by community based cooperatives and enterprises, which contribute to the household of community dwellers and local economy.

Among those commercialized non-wood forest products, edible mushrooms hold the majority of the production volume. In the category of "others", bamboo shoots and chestnuts are decreasing, whereas horse radish maintains its volume.

Figure 43: Change in volume of production of non-wood forest products



Sources: Forestry Agency

Box2: Edible Wild Plants in Japan

More than two thousand species of wild plans have been consumed in Japan in a variety of forms, such as boiled, deep-fried or preserved. Popular edible wild plants include young shoots of certain ferns, such as bracken fern and roval fern and young sprouts of trees and plants, such as angelica trees.

CRITERION 3

MAINTENANCE OF FOREST ECOSYSTEM HEALTH AND VITALITY

The maintenance of forest health and vitality is dependent upon the ability of the ecosystem's functions and processes to recover from or adapt to disturbances. While many disturbance and stress events are natural components of forest ecosystems, some may overwhelm ecosystem functions, fundamentally altering their patterns and processes and reducing ecological function.

Decline in forest ecosystem health and vitality may have significant economic and ecological consequences for society including a loss of forest benefits and the degradation of environmental quality.

Information gained on the impacts of biotic and abiotic processes and agents may inform management strategies to minimise and mitigate risk. The maintenance of forest ecosystem health and vitality is the foundation of sustainable forest management.

INDICATOR 3.a

Areas and percent of forest affected by biotic processes and agents (e.g. insects, disease, invasive alien species) beyond reference conditions

Rationale

This indicator identifies the impact that biotic processes and agents have on forests. Where change due to these agents and processes occurs beyond a critical threshold, forest ecosystem health and vitality may be significantly altered and a forest's ability to recover could be reduced or lost. Monitoring and measuring the effects of these processes provides information helpful in the formulation of management strategies to mitigate risk.

Current State and Trend

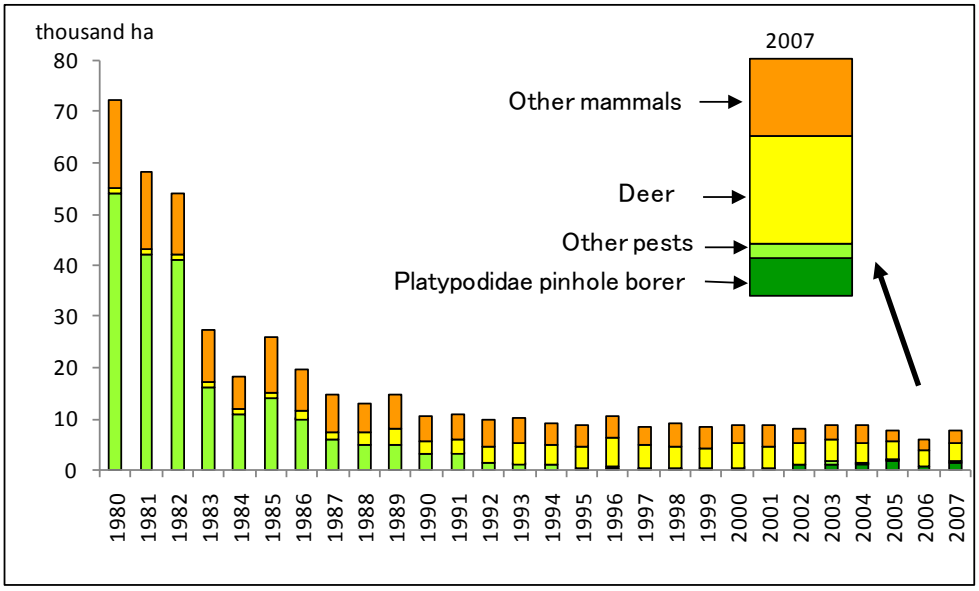
In Japan, biotic damages on forests largely decreased in the 1980's. The damages caused by deer (*Cervus nippon*), on the other hand, started to increase in the late 1980's. The damages caused by Platypodidae pinhole borer (*Platypus quercivorus*), which commonly known as "oak withering disease", is also increasing in recent years.

Among a variety of biotic damages, pine beetle syndrome[19] has caused the most significant damages to Japan's forests. The volume of damaged trees recorded the highest of about 2.4 million m^3 in 1979 after a sharp increase in 1978. Although the damage has declined since then, it is still found in 45 prefectures excluding Hokkaido and Aomori Prefecture.

The pine beetle syndrome is a highly infectious tree disease caused by exotic pine wood nematodes (*Bursaphelenchus xylophilus*). The symptom was first found in 1905 and subsequently spread out nationwide. The discovery of its infection process consequently led to the enactment of a legislation in 1977, by which an institutional arrangement for a prompt and strategic aerial chemical control was introduced. These measures have successfully kept the damage to the level around one-fourth of the peak.

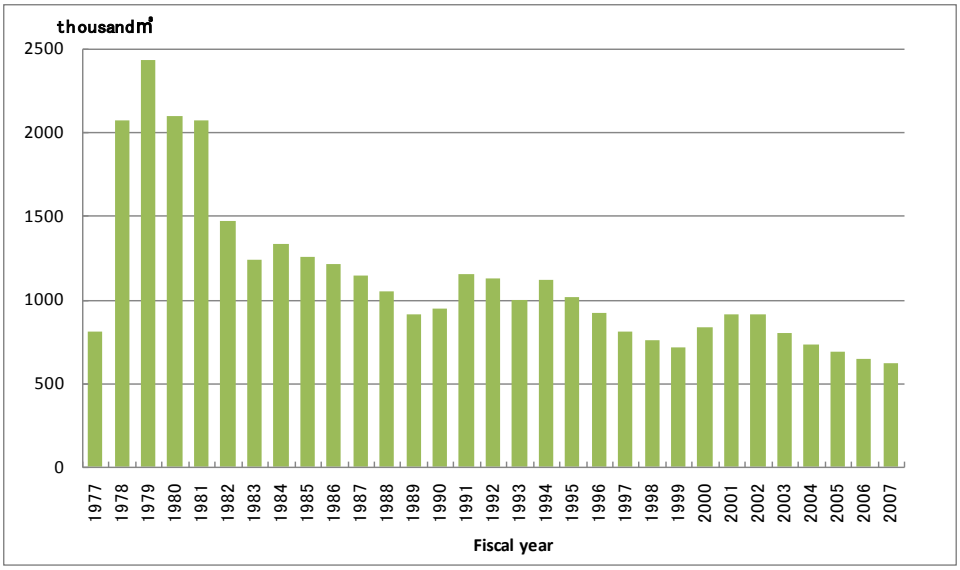
[19] ***Pine beetle syndrome*** is a physiological lesion, which may result in weakening and withering of pine trees, caused by pine wood nematodes carried by spotted pine long-horn beetles (*Monochamus alternatus*).

Figure 44: Change in area of biotic damages



Sources: Forestry Agency. Statistics on forest and forestry

Figure 45: Change in volume damaged by pine beetle syndrome



Sources: Forestry Agency. Statistics of forest and forestry, etc.

The damage on forests caused by deer started to rise in the late 1980's. Recently, around 4 thousand hectares of forests are damaged every year by deer, occupying about 60% of the total of damaged area by wild animals and birds. Young shoots of planted seedlings and bark of matured trees are mainly eaten by deer.

The rise in the damaged area is assumingly due to the increase in the population of deer and the expansion of its distribution partly resulted from the decline in the number of hunters.

INDICATOR 3.b

Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

Reference

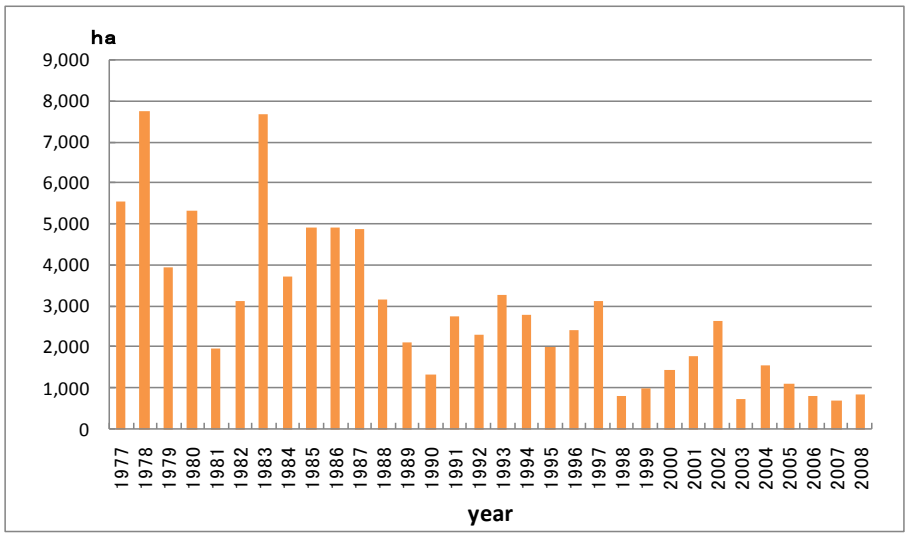
This indicator identifies the impact that abiotic agents, both natural and human-induced, have on forests. Where change occurs due to these agents and processes beyond a critical threshold, forest ecosystem health and vitality may be significantly altered and a forest's ability to recover from disturbance could be reduced or lost. Monitoring and measuring the extent of forest affected by physical agents provides information to guide the formulation of management strategies to mitigate risk.

Current State and Trend

The area of forests burnt by forest fire in Japan has shown downward trend since the 1970's. In consequence, the annual damage has declined from the level exceeding 10 thousand ha in the 1960's to the level lower than 2 thousand ha in recent years.

The causes of forest fires in Japan are mostly human-induced, such as the careless handling of bonfire and cigarettes. The declining trend of forest fire damages is a result of the awareness raising activities, including forest patrolling and nationwide campaign for forest fire prevention, institutional development for early warning and control and the encouragement of aerial fire-fighting operations with a use of helicopters.

Figure 46: Area of forests burnt by forest fires



Sources: Fire and Disaster Management Agency

CRITERION 4

PROTECTIVE FUNCTION

Soil and water underpin forest ecosystem productivity and functions. Forest ecosystems play an important role in the regulation of surface and groundwater flow and, together with associated aquatic ecosystems and clean water, they are essential to the quality of human life.

The interaction of soil, water and topography influence the character and health of streams and rivers flowing through and from forests. Monitoring change in the chemical, physical, and biological characteristics of soil, water and aquatic systems provides valuable information to support sustainable forest management.

Forest management activities can significantly alter forest soils, water quality and associated aquatic habitats. Inappropriate management may result in soil compaction, the loss of the soil A horizon, loss of riparian buffering capacity, increased sediment loads in streams, degradation and destruction of aquatic habitats and altered flow regimes. Change in water flow can also create an increased risk of flooding or the complete desiccation of streams. Both have harmful implications for human safety, property, and economies.

Soil and water resources may be protected through the allocation of land for that purpose or through appropriate management regimes and best management practices.

4.1 PROTECTIVE FUNCTION

Healthy and productive forests depend on the maintenance of the soil and water resource. Forests also regulate these resources by moderating the flow of water, controlling erosion and preventing catastrophic events such as flooding, avalanches and mudslides.

INDICATOR 4.1.a

Area and percent of forest whose designation or land management focus is the protection of soil or water resources

Rationale

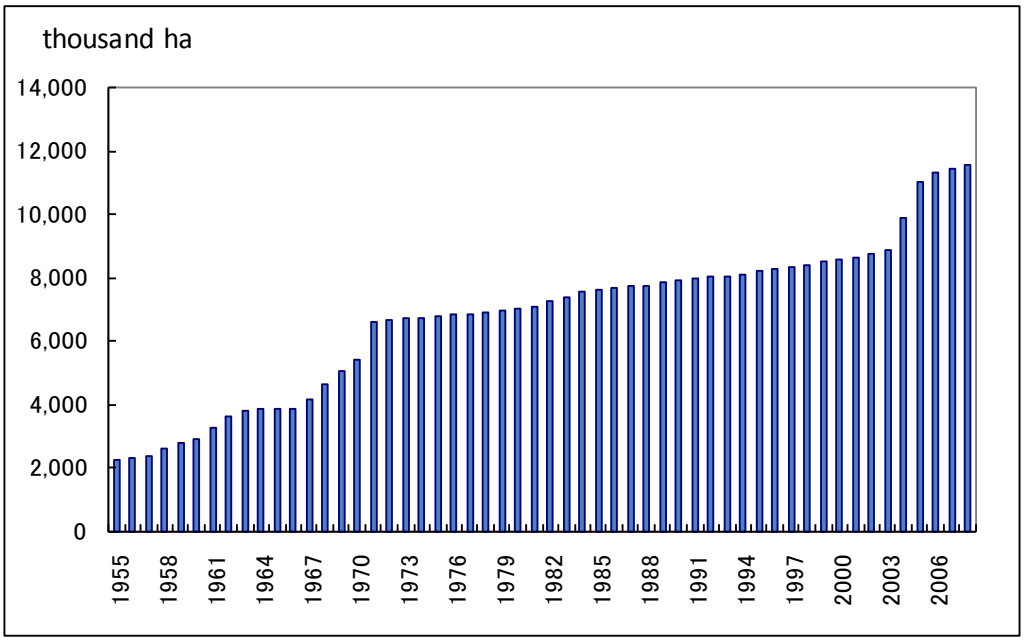
The area and percent of forest designated or managed primarily for the protection and regulation of soil and water reflects the importance of these resources to society, including the trade-offs made between other uses.

Current State and Trend

Currently, 1.2 million ha of forests, which account for 46 % of the total area of Japan's forests, are designated as the protection forest for the conservation of soil and water resources. The area of these protection forests has constantly increased since their establishment in 1897.

Protection forests are designated by the Minister for Agriculture, Forestry and Fisheries or the governors of respective prefectures in accordance with the Forest Act with a primary objective of securing environmental services provided by forests and consequently the life and property of the people. As a consequence of the repeated disasters partly resulted from the devastated forest land caused by the over-harvest during the war and post war periods, designation and restoration of protection forests was expedited from 1954 under a series of 10 year plans. In the early 2000's, the area of protection forests further expanded, in particular in national forests, in response to the enactment of the Forests and Forestry Basic Act under the rise of public concern about the multiple functions of forests.

Figure 47: Change in area of protection forests designated primarily for protecting soil and water resources



Sources: Forestry Agency

Table 3: Categories of protection forests

Category No1	Headwater conservation
2	Soil conservation
3	Erosion control
4	Shifting sand control
5	Windbreak
6	Flood control
7	Tide damage prevention
8	Drought prevention
9	Snow damage prevention
10	Mist mitigation
11	Avalanche prevention
12	Stone crumbling prevention
13	Firebreak
14	Fish trap
15	Navigation target
16	Public health provision
17	Historical and scenic site conservation

Sources: Forest Act

4.2 SOIL

Forest soils support forest productivity and other ecological and hydrological functions through their ability to hold and supply water and nutrients, store organic matter and provide habitats for plant roots and for a wide range of soil organisms. Not maintaining the soil resource may result in a decline and degradation in forest health and the provision of other environmental services.

INDICATOR 4.2.a

Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

Rationale

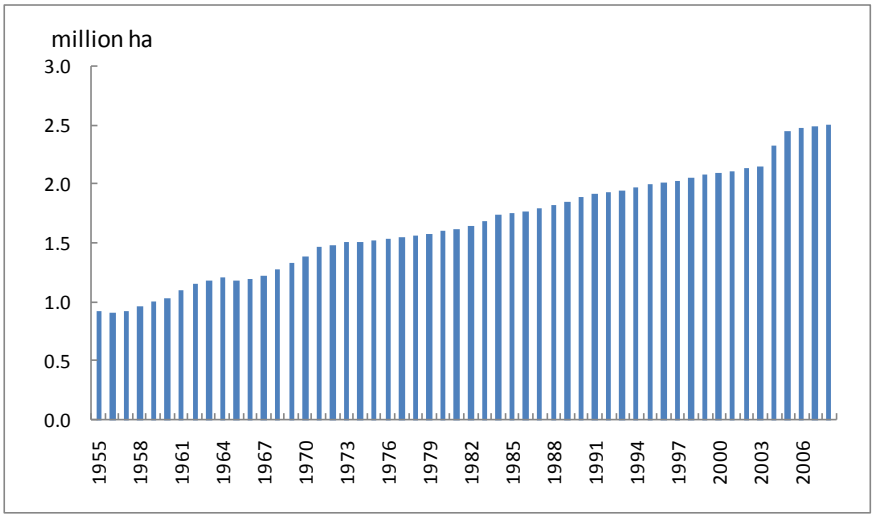
This indicator provides information about the extent to which soil resource protection, legislation and best management practices have been identified and integrated into forest management activities. Inappropriate activity may result in the loss of soil nutrients, forest productivity and other ecosystem services that soils provide.

Current State and Trend

Approximately 3 million ha of forests are managed primarily for the protection of soil resource currently under the scheme of protection forests. For the protection forest, restrictions on logging operation are imposed according to the objectives of designation. A technical guideline is also provided for the effective and efficient implementation of the forest conservation program[20] which is carried out for the restoration of devastated forests and forest land .

[20] ***Forest conservation program*** is a government program to carry out a variety of works, including forest improvement and construction works, with an objective of improving the conservation functions of forests. It is implemented mainly for the protection forests.

Figure 48: Change in area of protection forests designated for protecting soil resource



Sources: Forestry Agency

For about 43 % of the privately owned forests and forests owned by local public entities, forest management plans are currently established by forest owners and approved by the relevant local or national governments. Upon the approval of each management plan, key elements of management practices, such as rotation age, yield and regeneration scheme, are checked with qualifying criteria, which are set up for sustaining forest resource base, as well as the environmental services provided by forests, including the protection of soil and water resources.

INDICATOR 4.2.b

Area and percent of forest land with significant soil degradation

Rationale

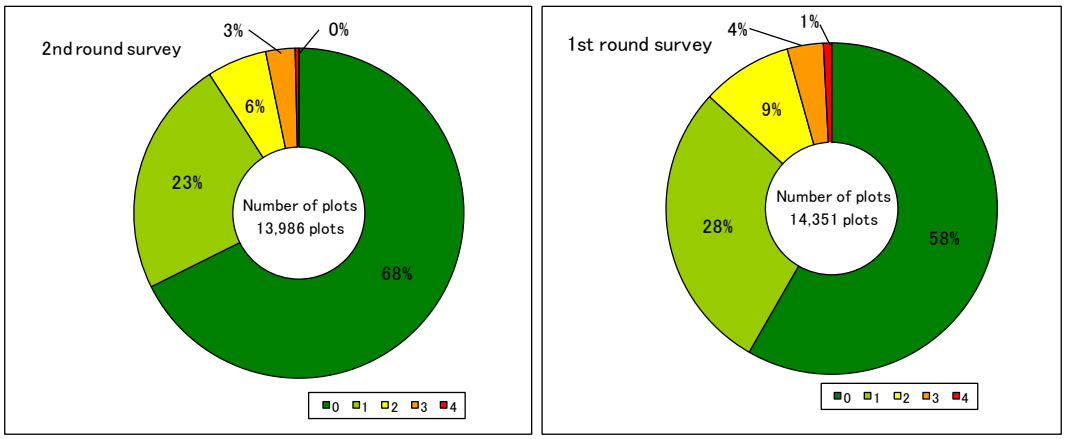
This indicator provides information on the extent of significant soil degradation in forests likely to affect productivity, hydrology, ecosystem processes or social and cultural benefits. This indicator is primarily concerned with degradation caused directly or indirectly by human activity.

Current State and Trend

In about 3 % of the total area of Japan's forests, soil erosion is suspected according to the results of Forest Resource Monitoring Survey conducted during 2004-2008. Soil erosion is observed mainly in forests distributed in mountain areas with fragile geological features, represented by 56 monitoring spots where no tree species are found or alpine coniferous species are dominant. Among 327 monitoring spots with soil erosion, X spots are located in planted forests or along forest roads indicating possible relations to human activities.

The systematic gap observed between the results of the first and the second rounds of the Forest Monitoring Survey implies the need of objective criteria to be used on site to classify the degree of soil erosion.

Figure 49: Composition of classified degrees of soil erosion



Sources: Forestry Agency. Forest Resource Monitoring Survey

4.3 WATER

Water is one of the most valuable of forest ecosystem services. Forests and how they are managed, influence the quantity, quality and timing of surface and ground water flows. Changes to water quality and flow can have a severe impact on forest resources as well as human wellbeing. In addition, associated forest aquatic and riparian habitats are some of the most biologically diverse and productive forest ecosystems.

The quality and quantity of water flowing from forested areas is commonly regarded as an indicator of the quality of forest management. Water quality is widely understood to be a measure that captures many potential impacts on forest sustainability and a good indicator of overall ecosystem health.

INDICATOR 4.3.a

Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources

Rationale

This indicator provides information about the extent to which water resources have been identified and safeguarded during forest management. This indicator is primarily concerned with activities that may affect riparian zones[21], water quality, quantity and flow rather than the designation of land for water-related conservation. The protection of the water resources and associated forest and aquatic ecosystems[22] is vital for the human populations dependent on them.

Current State and Trend

In the management of 9 million ha of forests, the protection of water resource is given the highest priority in Japan. The harvest of these forests, which are designated protection forests for the protection of water resource, is to be permitted by the prefectural governments only when the total area of logged over forests within each watershed does not exceed the pre-determined level. A technical guideline, including standard specifications, is also set up in order to ensure the effective and efficient implementation of the conservation works for the restoration of devastated forest land and forests.

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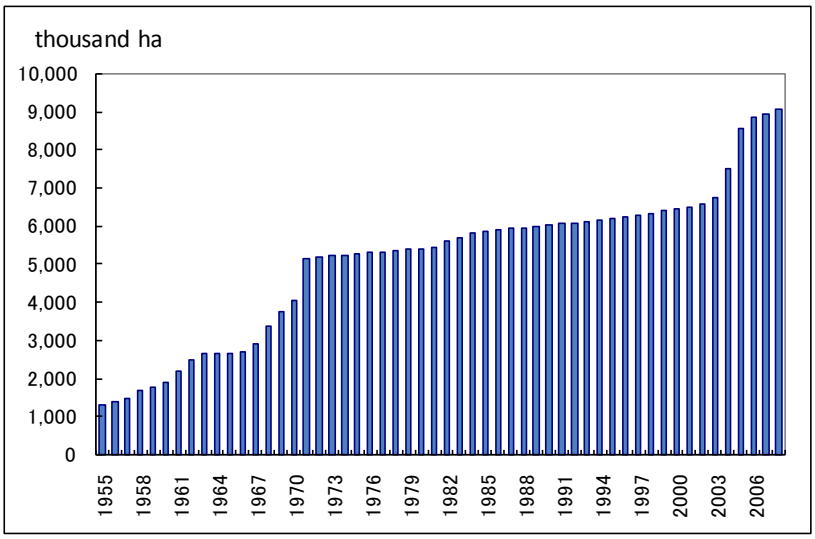
[21] ***Riparian zone*** is an area along streams. Riparian zone, which occurs in a variety of forms, such as forest, grassland and wetland, plays an important role in conserving soil and biological diversity, as well as conserving water resources and aquatic ecosystems.

[22] ***Aquatic ecosystem*** is an ecosystem found in water bodies, such as oceans, rivers, lakes and wetlands.

Figure 50: Change in area of protection forests designated for protecting water resources



Sources: Forestry Agency

For about 43 % of privately owned forests and forests owned by the local public entities, forest management plans are currently established by forest owners and approved by the relevant local or national governments. Upon the approval of each management plan, qualifying criteria on the key elements of management practices, including rotation age, yield and regeneration techniques, are applied taking into account the conservation of environmental benefits, including the protection of soil and water resources.

INDICATOR 4.3.b

Area and percent of water bodies, or stream length, in forest area with significant change in physical, chemical or biological properties from reference conditions

Rationale

This indicator provides information relating to water quality in forests. Significant changes in the physical, chemical or biological properties of water in forest lakes, rivers and streams may reveal the extent to which management activities or natural events are affecting water quality. Maintaining water quality is important for human use and consumption and to support healthy forest and aquatic ecosystems. Where water quality is being adversely affected by human activity, forest management practices may be adapted to protect water values.

Current State and Trend

No systematic nationwide monitoring of water quality has been conducted in Japan.

With the aim of comparing and monitoring changes in water quality in forest areas, the Forestry and Forest Product Research Institute (FFPRI) has created the “Database on Water Quality of Forest Rain Streams” based on the data collected in specific locations. According to the Database, no significant change in the water quality has been observed in streams.

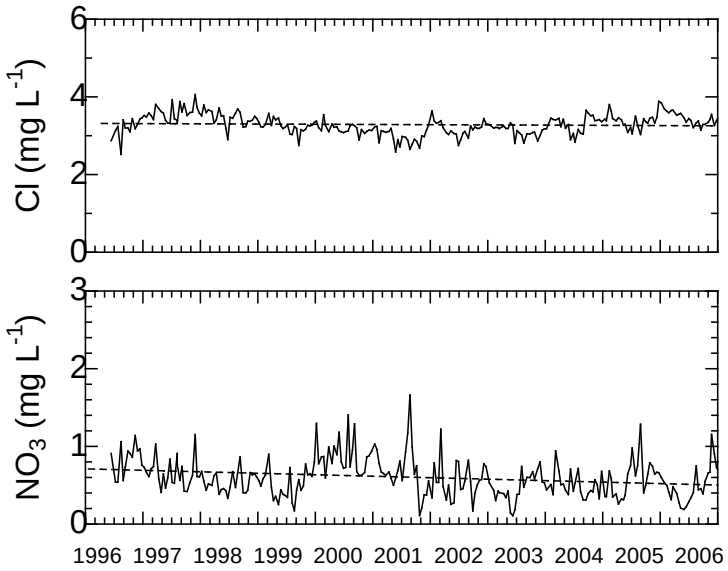
Box 3: Monitoring of Water Quality

It is known that bare lands in the watershed tends to increase the density of chlorinate ions (Cl) and nitrate ions (NO3).

An example of the results of monitoring on the quality of stream water being conducted by the Forestry and Forest Products Research Institute (FFPRI) indicates a stable trend at a lower level in the density of both Cl and NO3 in the long-run, as shown below.

It is assumed that both forest ecosystems and aquatic ecosystems in this watershed have been well maintained.

Figure 51: Change in water quality in Ichinomata National Forest managed by Shimanto District Forest Office



Sources: Forestry and Forest Products Research Institute

CRITERION 5

MAINTENANCE OF FOREST CONTRIBUTION TO GLOBAL CARBON CYCLES

Forests are renewable and one of the largest terrestrial reservoirs of biomass and soil carbon. They have an important role in global carbon cycles as sinks and sources of carbon. Carbon stocks in forests include above ground biomass, below ground biomass, dead and decaying organic matter and soil carbon. Carbon is also stored in wood products.

The biosphere has a significant influence on the chemical composition of the atmosphere. Vegetation draws CO2 from the atmosphere, through photosynthesis and returns it through respiration and the decay of organic matter. The interchange between the biosphere and atmosphere is large; approximately a seventh of total atmospheric CO2 passes into vegetation each year.

Global climate change could have significant impacts on the structure, distribution, productivity, and health of temperate and boreal forests as well as impacts on forest carbon stocks and fluxes, and the prevalence of forest fires, disease and insect outbreaks, and storm damages.

Forest management practices also affect the carbon cycle and fluxes. Deforestation has a negative impact, but management activities that maintain and enhance the carbon stored in forests and forest products over the medium to long term can make a positive contribution to mitigating atmospheric carbon dioxide levels. In addition, biomass from forests can be used as a substitute for fossil fuels thereby reducing greenhouse gas emissions.

Change in the global carbon cycle and associated climate change will have major impacts on human wellbeing, especially rural communities and indigenous peoples dependent directly on the natural environment.

INDICATOR 5.a

Total forest ecosystem carbon pools and fluxes

Rationale

This indicator provides information about the total amount of carbon stored in forest ecosystems. It also describes changes, fluxes or flows in carbon between forests and the atmosphere. A better understanding of these processes will aid the development of appropriate responses to the effects of climate change.

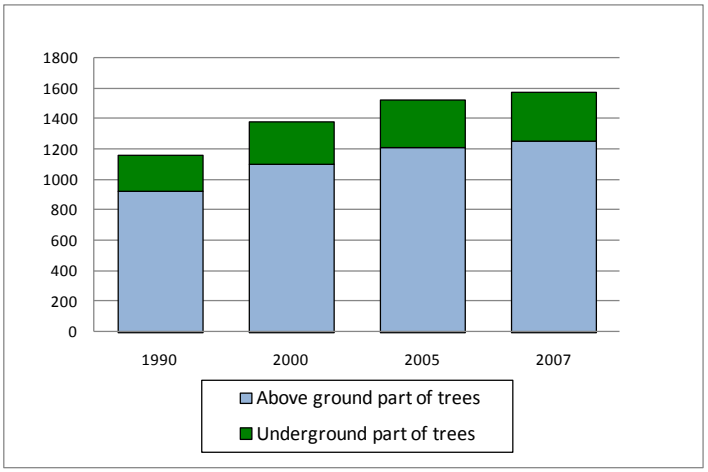
Current State and Trend

The total amount of carbon currently stored in trees in Japan is approximately 1.6 billion carbon tons. About 80% of the carbon stock is stored in the above ground part of trees[23] and the rest is stored in their underground part[24].

No nationwide data is currently available for the carbon stock contained in other components of forest ecosystems. No reliable data for the carbon fluxes is currently available either.

Regarding the carbon flux, it is estimated that Japan's forests absorbed about 23 million tons of carbon from the atmosphere in 2007.

Figure 52: Change in amount of carbon stored in trees



Sources: Forestry Agency

[23] ***Above ground part*** includes stems, bark, branches and leaves.
[24] ***Underground part*** includes living roots.

INDICATOR 5.b

Total forest product carbon pools and fluxes

Rationale

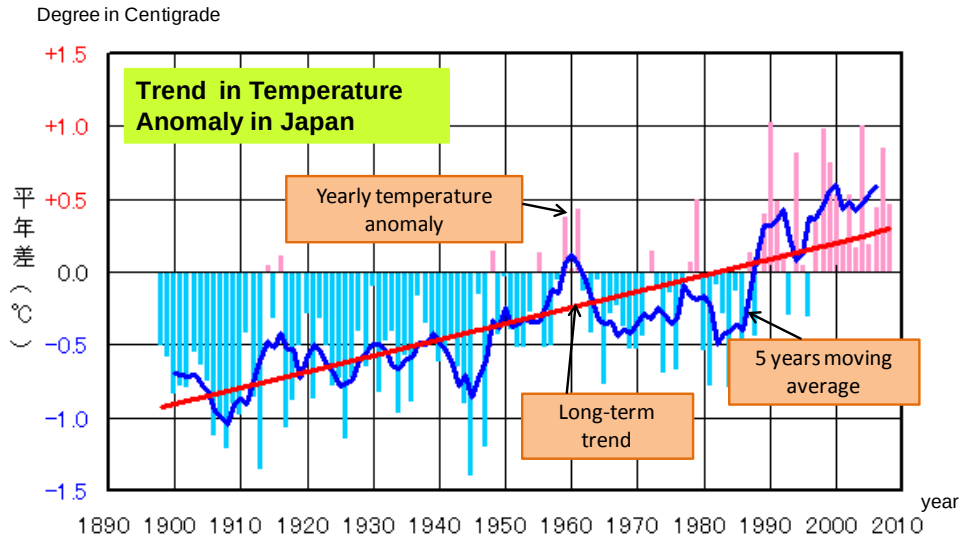
This indicator provides information on the role that forest products play in storing, cycling and releasing carbon. Forest products delay the release of carbon into the atmosphere and are more sustainable than products with manufacturing processes that have significant carbon footprints.

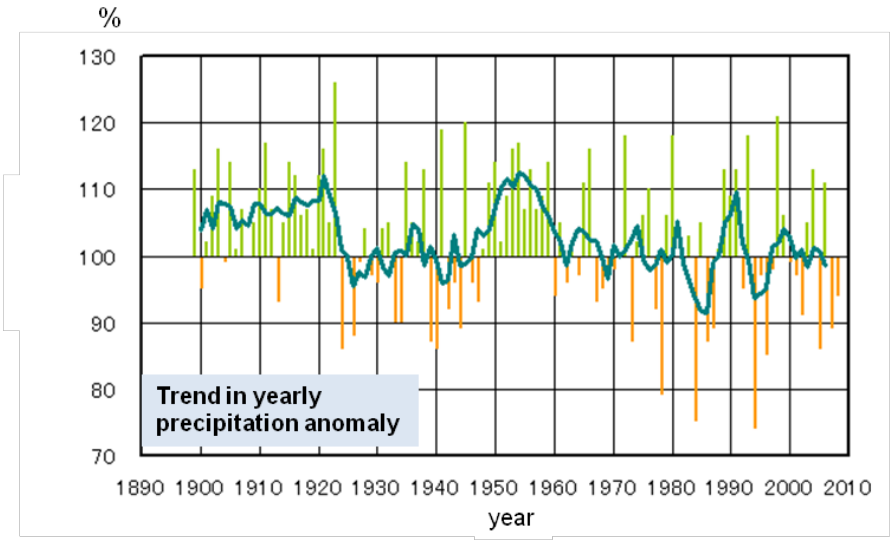
Current State and trend

No reliable data is currently available for this indicator. Appropriate set of data for this indicator will be further investigated taking account of the results of ongoing deliberations under the Framework Convention for Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) on carbon balance related to the harvested timber.

Box4: Changing Climate in Japan

According to the Meteorology Agency, the average annual temperature in Japan has risen at a rate of 1.11 degrees in C. per hundred years in the long run. The fluctuation in the annual precipitation has also increased since 1898 when the data started to be compiled.





INDICATOR 5.c

Avoided fossil fuel carbon emissions by using forest biomass for energy

Rationale

This indicator provides information about the amount of energy produced from forest biomass and the extent to which it offsets the need to burn fossil fuels, thereby benefitting the global carbon budget and lowering carbon emissions.

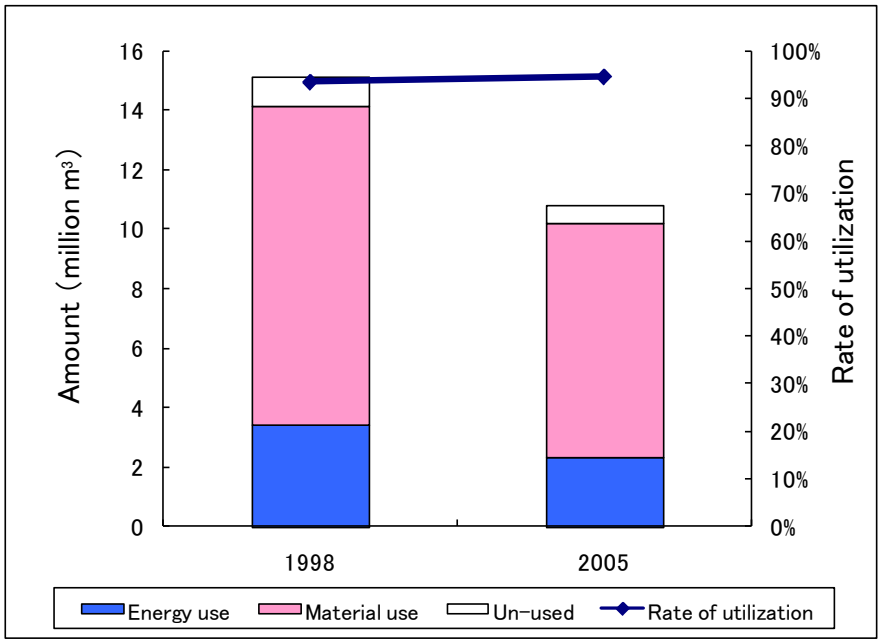
Current State and trend

More than 90% of the wood residuals generated in wood processing facilities, such as sawmills, have been utilized in Japan. The energy use of these wood residuals accounts for about 20%, which coincides approximately 2 million m^3 in 2005.

The percentage of the recycled construction wood wastes has quickly improved from about 40% in 2000 to about 70% in 2005. The percentage of the recycled wood wastes used as the energy source exceeded 50% in 2005, which amounts 6 million m^3.

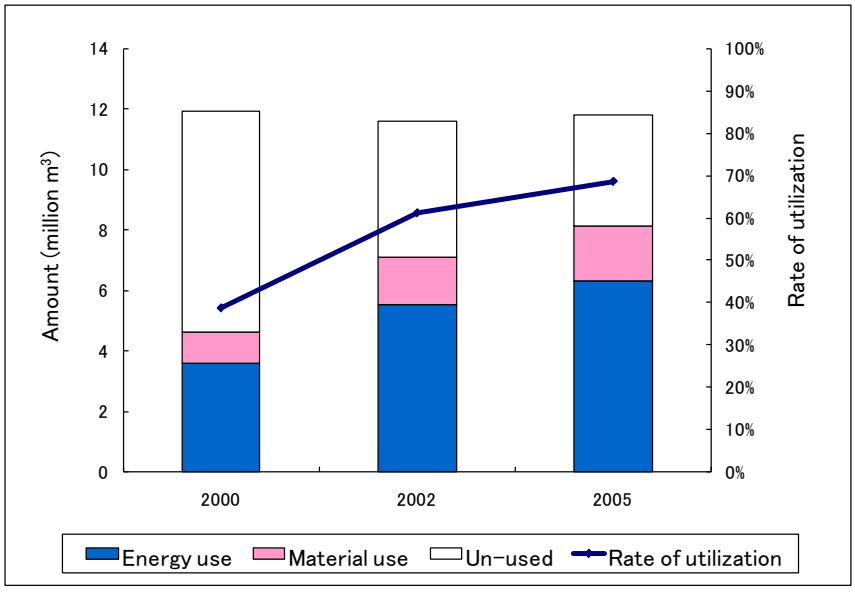
It is estimated that the carbon emission from fossil fuel equivalent to about one million carbon tons was avoided in 2005 by the energy use of wood residuals and construction wood wastes.

Figure 53: Change in percentage and volume of used wood residuals



Sources: Ministry of Agriculture, Forestry and Fisheries, Forestry Agency

Figure 54: Change in percentage and volume of recycled construction wood wastes



Sources: Ministry of Land, Infrastructure, Transport and Tourism

CRITERION 6

MAINTAINANCE AND ENHANCEMENT OF LONG TERM MULTIPLE SOCIO-ECONOMIC BENEFITS TO MEET THE NEED OF SOCIETY

Forests provide a wide variety of social, cultural and economic goods, services and other benefits that contribute to meeting the needs of society. Many people and communities, including indigenous peoples, are dependent on forests for their livelihood and well being. Information on the production and consumption of forest products, investment and employment in the forest sector, forest-based recreation and tourism, and other social and cultural forest values illustrate the many benefits forests provide.

6.1 PRODUCTION AND CONSUMPTION

These indicators provide information on the contribution of wood and non-wood products, and environmental services, to national and local economies. The value, volume and revenues associated with domestic production and consumption of forest products and services, including through international trade, demonstrates the type and scale of the contribution of forests to domestic economies. They also provide information about market conditions relevant to forest management and the forest sector.

INDICATOR 6.1.a

Value and volume of production of wood and wood products, including primary and secondary processing

Rationale

This indicator provides information on the value and volume of wood and wood products at various stages of processing. It reflects the importance of forests and the wood processing sector to domestic economies.

Current State and Trend

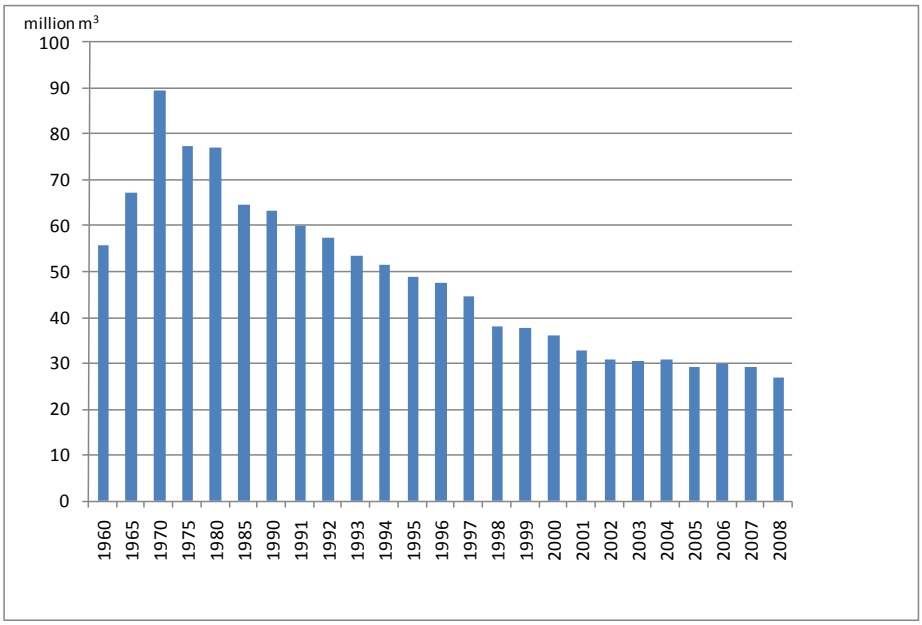
The total volume of wood products produced in Japan, including those produced from the imported round wood, is estimated approximately 27 million m^3 in 2008 in round wood equivalents. The total volume of production has been declining since the late 1990's after a sharp increase in the 1960's followed by the hovering period in the 1970's through 1990's.

The total volume of ex-factory delivery of major wood products, including sawn timber, plywood and wood panels, is around 12 million m^3 in 2008. It has been in a declining trend similar to the total volume of wood production in round wood equivalents.

The total value of the ex-factory delivery of major wood products, on the other hand, is around 2.6 trillion Japanese yen in 2008. It has been declining since the beginning of the 1980's.

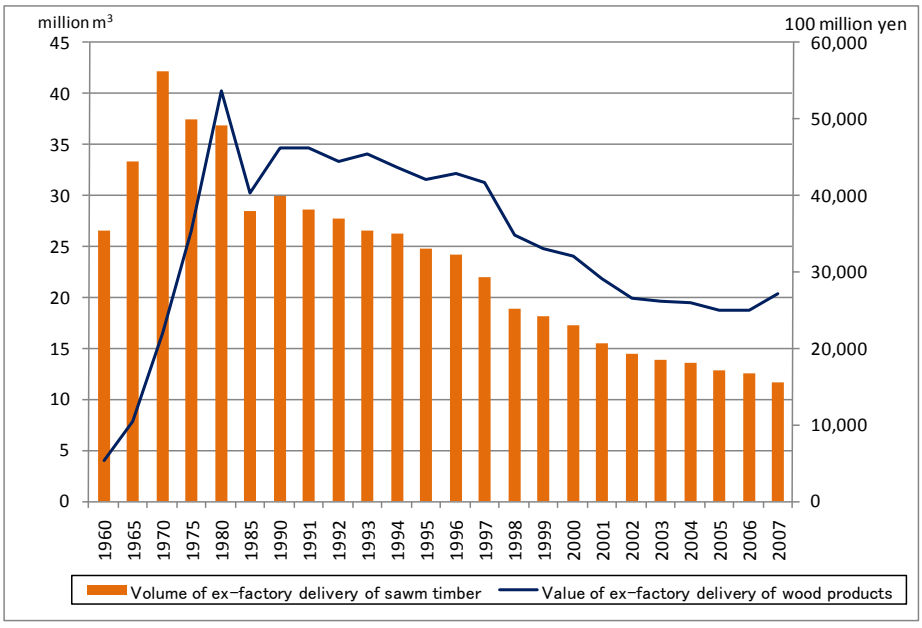
The gap observed between the peaks of the volume and the value is presumably due to the sharp increase in the prices caused by the oil crisis in 1973.

Figure 55: Change in wood production in roundwood equivalents



Sources: Forestry Agency

Figure 56: Volume change in ex-factory delivery of sawn timber and total value of ex-factory delivery of major wood products



Sources: Ministry of Agriculture, Forestry and Fisheries,
Ministry of Economy, Trade and Industry

INDICATOR 6.1.b

Value of non-wood forest products produced of collected

Rationale

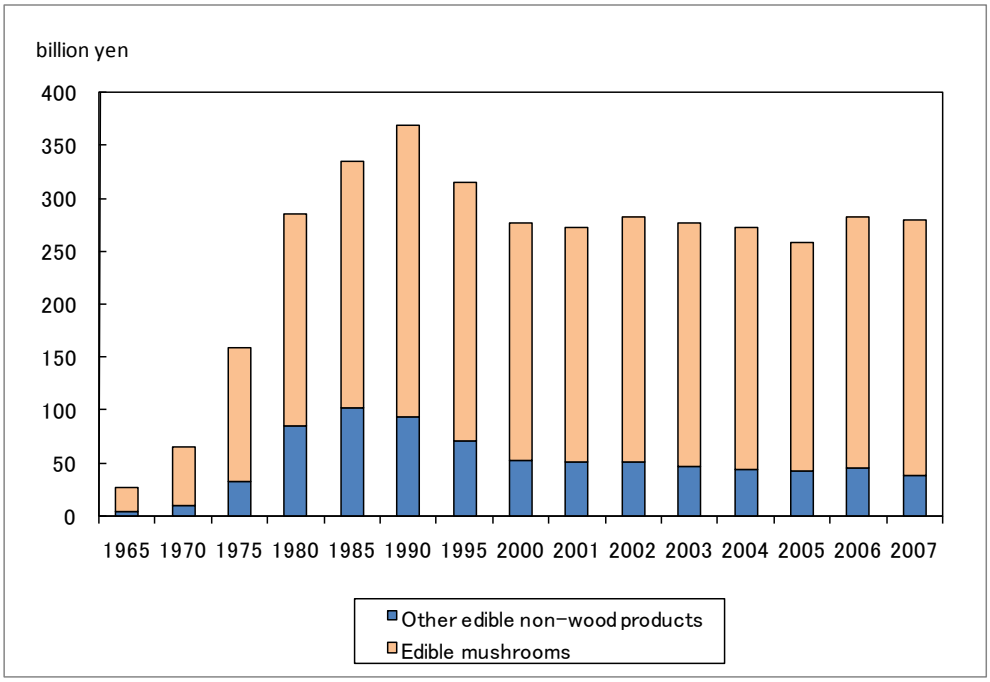
This indicator provides information on the value of non-wood forest products. The collection, processing and use of non-wood forest products are important dimensions of the economic value of forests. In some countries, non-wood forest products are vital to the livelihoods and lifestyles of indigenous and other rural communities.

Current State and Trend

There is no complete information on the amount and value of non-wood forest products collected or produced in forests, as mentioned in the section for the Indicator 2.e. The available information on the major edible non-wood forest products indicates that the values of a variety of wild plants and bamboo shoots collected or produced in forests stay around 7 billion yen and 5-6 billion yen respectively in recent three years.

The total value of the edible non-wood forest products produced in Japan, which are mostly grown by private firms, cooperatives, farmers and small forest owners, has been stable around 250-300 billion Japanese yen since the beginning of the 1990's. Responding to the diversifying needs of consumers, the value of the production of edible non-wood forest products, particularly edible mushrooms, continued to increase throughout the 1970's and 1980's. The hovering trend of the production value in recent years is resulted from the constant increase in the imported non-wood forest products, including Shitake mushroom and bamboo shoots.

Figure 57: Change in the total production value of edible non-wood forest products



Sources: Forestry Agency

INDICATOT 6.1.c

Revenue from forest-based environmental services

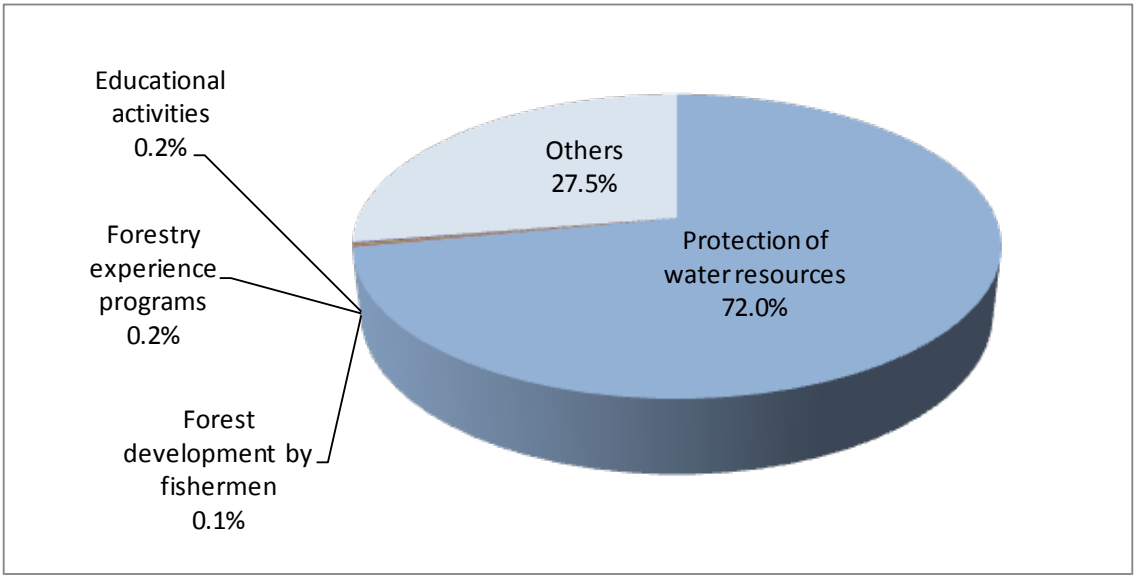
Rationale

This indicator provides information about forest-based environmental services for which markets and revenues are emerging or currently exist. Forest-based environmental services are or may become an important component of the economic value of forests.

Current State and Trend

In Japan, 630 local governments are contributing to the improvement of about 240 thousand ha of forests located out of their administrative boundaries in 2005. For more than 70 % of such forests, the main objective of the effort of the local governments is to protect the water resource, which their citizens are relying on, in more than 70 % of those forests. The forms of contribution vary from the subsidization of forest operations to the direct management through the purchase of forests.

Figure 58: Composition of objectives of upstream forest improvement



Sources: Ministry of Agriculture, Forestry and Fisheries. Census of Agriculture and Forestry

By 2008, twenty nine prefectural governments have introduced local taxation related to forests, such as forest environment tax. In most cases, the

objective of the taxation is to create additional revenue to be used to improve, restore or protect forests with higher conservation values and to promote the public awareness of the environmental services provided by forests. The rate is normally fixed to 500-1,000 Japanese yen *per annum* per resident with a certain level of income, and levied on the top of the resident tax. The total amount of the newly generated revenue is estimated around 20 billion Japanese yen in 2008.

Table 4: List of prefectures which introduced new local taxation for forests

Year of introduction	Name of prefecture
2003	Kochi
2004	Okayama
2005	Tottori, Shimane, Yamaguchi, Ehime, Kumamoto, Kagoshima
2006	Iwate, Fukushima, Shizuoka, Shiga, Hyougo, Nara, Oita, Miyazaki
2007	Yamagata, Kanagawa, Toyama, Ishikawa, Wakayama, Hiroshima, Nagasaki
2008	Akita, Ibaragi, Tochigi, Nagano, Fukuoka, Saga
2009	Aichi

Sources: Forestry Agency
Note: Produced by the hearing from the prefecture governments.

INDICATOR 6.1.d

Total and *per capita* consumption of wood and wood products in round wood equivalents

Rationale

This indicator provides information on consumption, including consumption *per capita*, of wood and wood products. The quantity consumed illustrates society's dependence on forests as a source of raw materials.

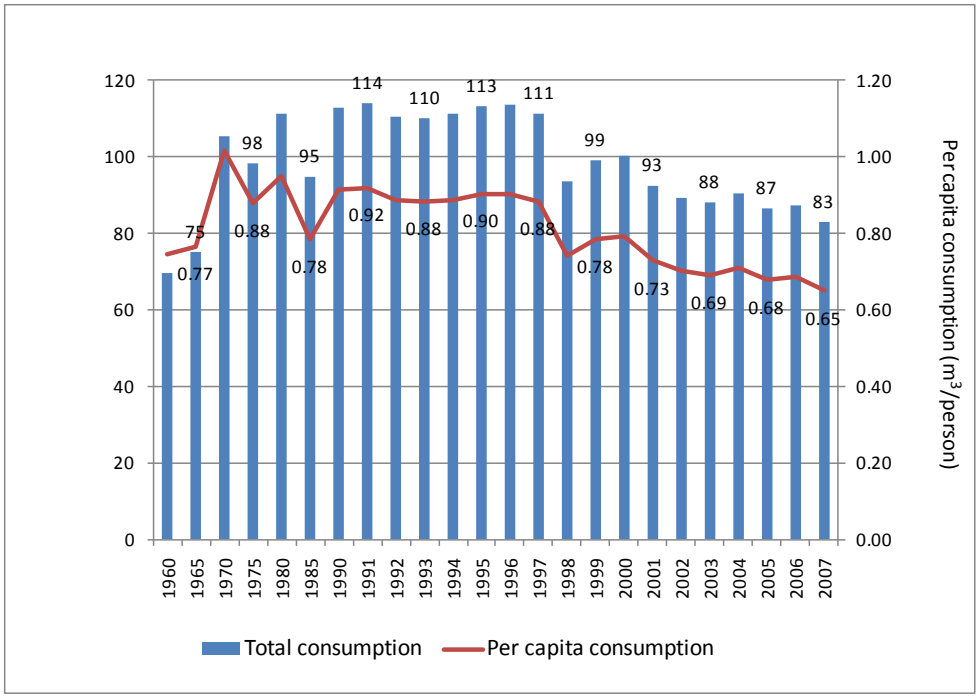
Current State and Trend

About 7.9 million m^3 of wood and wood products in round wood equivalents was consumed in Japan in 2008. The total consumption of wood and wood products has been in a declining trend since the late 1990's following the constant increase in the 1960's and 1970's and the leveling off in the 1980's and 1990's.

The consumption of wood products is normally affected by the level of housing starts as well as the development of substitutes and the consumption patterns, including the unit use of wood in housing construction in the long run.

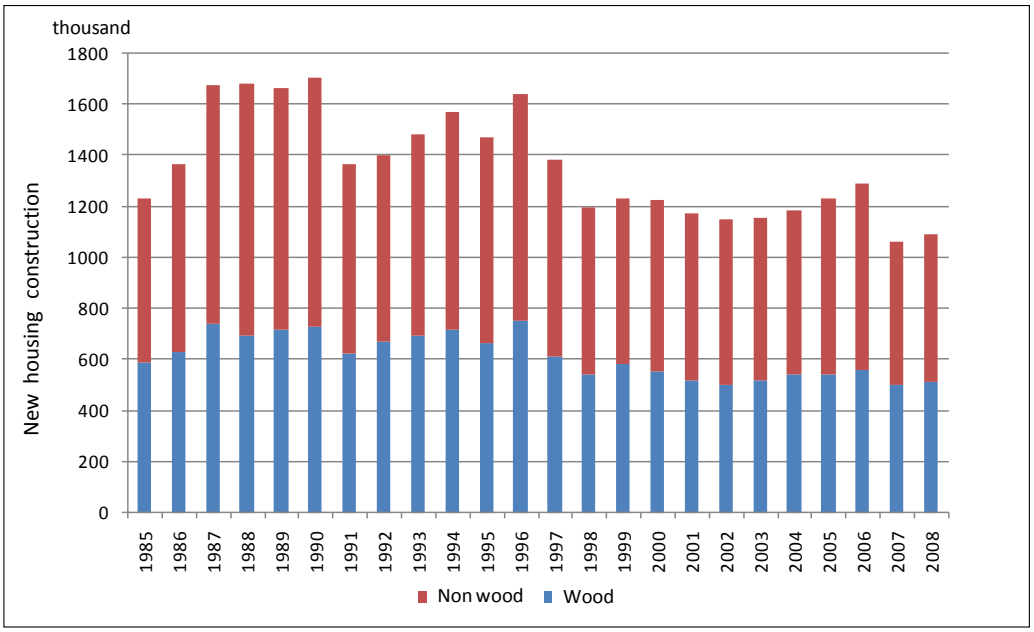
The *per capita* consumption of wood and wood products has also declined since the late 1990's as the total consumption decreased.

Figure 59: Change in total and *per capita* consumption of wood and wood products



Sources: Forestry Agency,
Ministry of Internal Affairs and Communication. National Census, etc.

Figure 60: Change in new housing construction



Sources: Ministry of Land, Infrastructure, Transport and Tourism

INDICATOR 6.1.e

Total and *per capita* consumption of non-wood forest products

Rationale

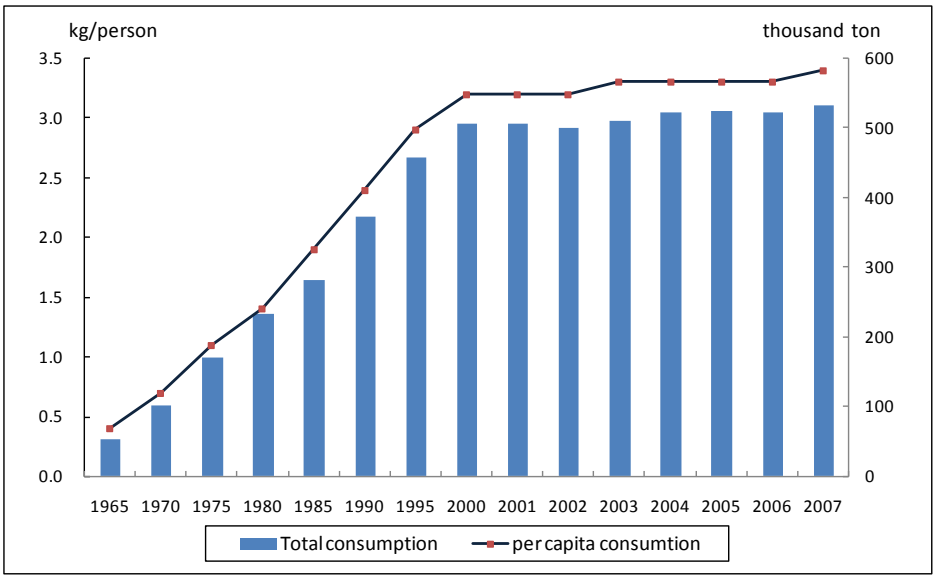
This indicator provides information on the consumption of non-wood forest products. The quantity consumed illustrates society's dependence on forests as a source of these products.

Current State and Trend

Currently, more the 500 thousand tons of edible mushrooms, which is equivalent to around 3.3 kilograms *per capita*, are consumed every year in Japan. Both the total amount and *per capita* consumption of edible mushrooms, one of the major non-wood forest products produced in Japan, has constantly increased.

Introduction of new items, such as Maitake (*Grifola frondosa*) and Bunashimeji (*Hypsizigus marmoreus*), in response to the diversifying consumers' needs, as well as the increasing less expensive imports have contributed to the expansion of the consumption. The level of domestic production of the edible mushrooms, on the other hand, has been hovering since the late 1990's, as described under 6.1.b.

Figure 61: Change in total and *per capita* consumption of edible mushrooms



Sources: Forestry Agency

INDICATOR 6.1.f

Value and volume in round wood equivalents of exports and imports of wood products

Rationale

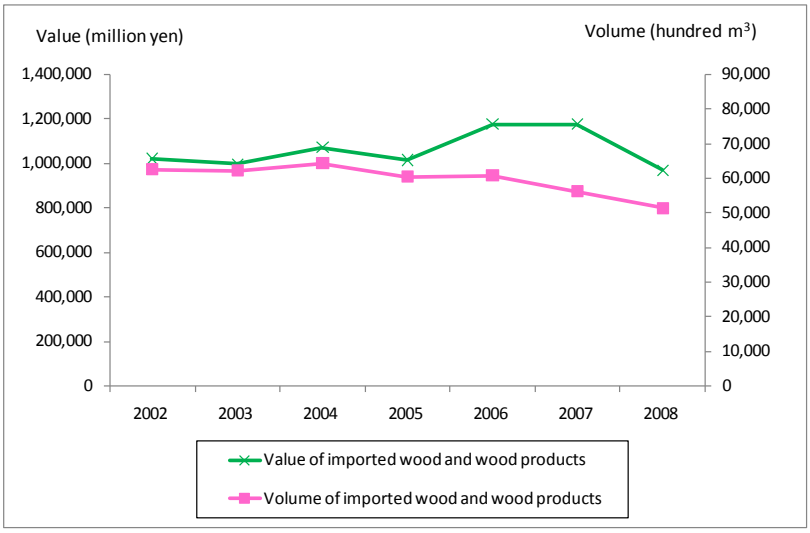
This indicator provides information about the value and size of a country's exports and imports in wood and wood products and their contribution to the domestic economy. International trade in wood products may be a significant factor in the management, commercial use and economic value of forests.

Current State and Trend

About 5 million m^3 of wood and wood products with the value of approximately one trillion Japanese yen were imported to Japan in 2008. Both the value and volume of the imported wood products are in a declining trend in recent years as the total consumption decreases.

Wood chips hold the highest in both value and volume followed by sown timber.

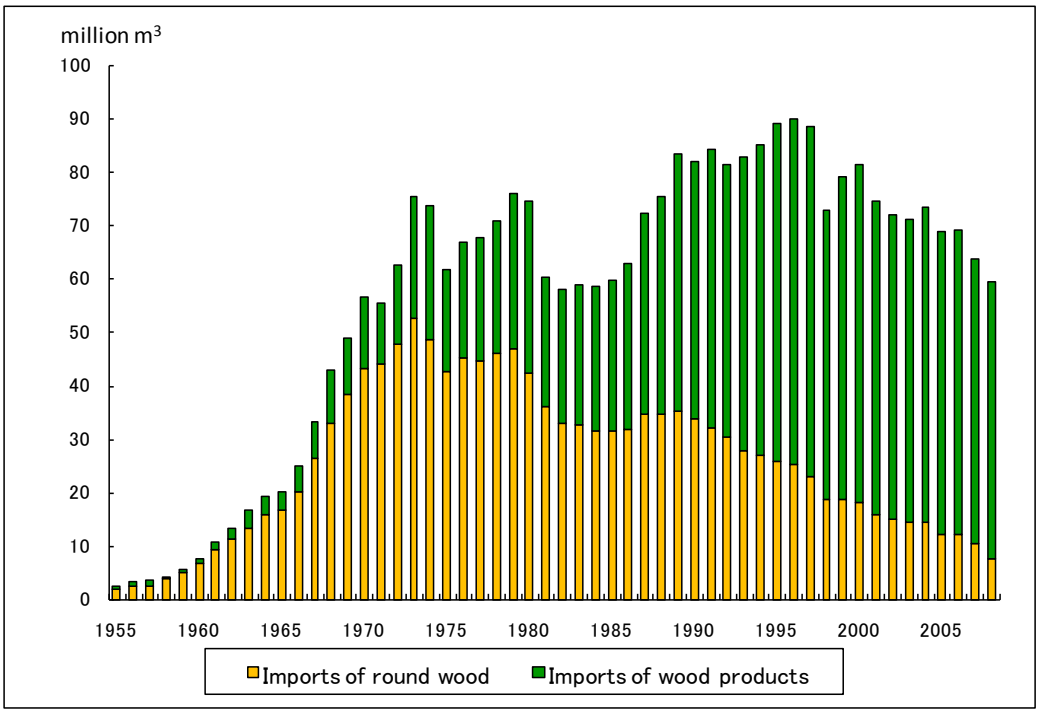
Figure 62: Change in the value and volume of imported wood and wood products into Japan



Sources: Forestry Agency,
Ministry of Economy. Trade and Industry, Ministry of Finance. Statistics of Industry,
Ministry of Finance. Statistics of Foreign Trade

Import of wood and wood products to Japan has escalated both in quantity and share in the total wood consumption since the removal of import duties on round wood in the late 1950's. Wood and wood products were in short supply during the periods of post war recovery and the beginning of the succeeding economic growth in the 1950's and early 1960's. The imported round wood, which dominated the market in the earlier stage, was gradually replaced by the imports of wood products, such as plywood and sown timber. The share of round wood in the total volume of wood import is around 13 % in 2008 in round wood equivalents.

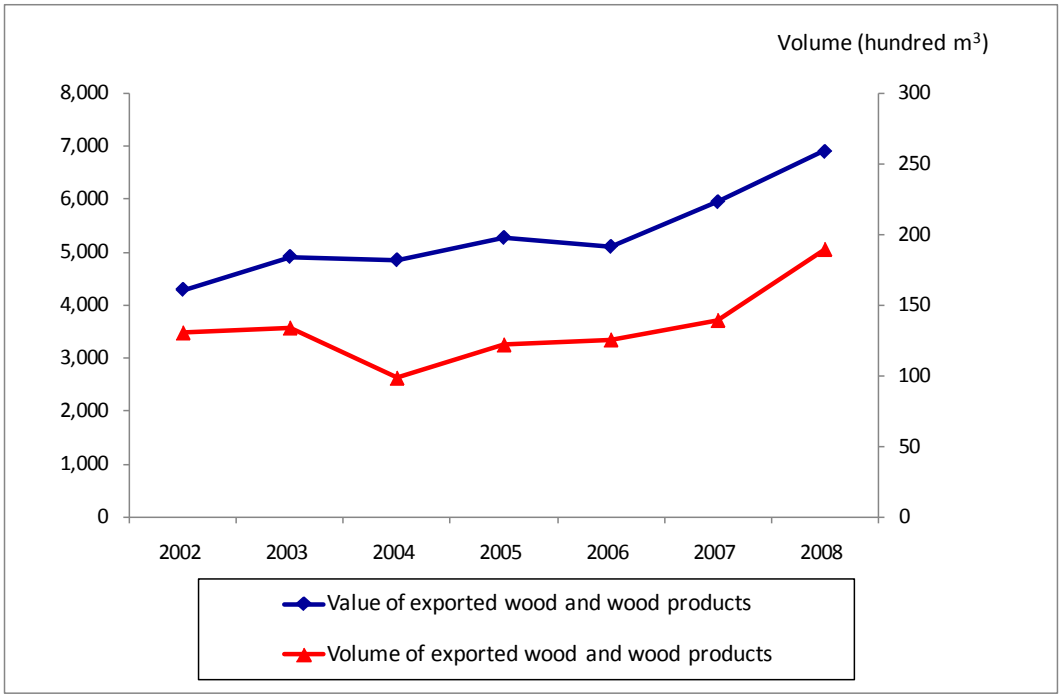
Figure 63: Change in volume of import and total consumption of wood and wood products in round wood equivalents



Sources: Forestry Agency

About 20 thousand m^3 of wood and wood products, with the value of about seven billion Japanese yen, were exported in 2008 from Japan. In recent years, the export of wood and wood products from Japan is expanding both in value and volume, as a result of the concerted efforts of the concerned in the forestry and wood industry sectors. The major item of the export is sawn timber.

Figure 64: Change in value and volume of exported wood and wood products from Japan



Sources: Forestry Agency,
Ministry of Economy, Trade and Industry. Statistics of Industry,
Ministry of Finance, Statistics of Foreign Trade

INDICATOT 6.1.g

Value of exports and imports of non-wood forest products

Rationale

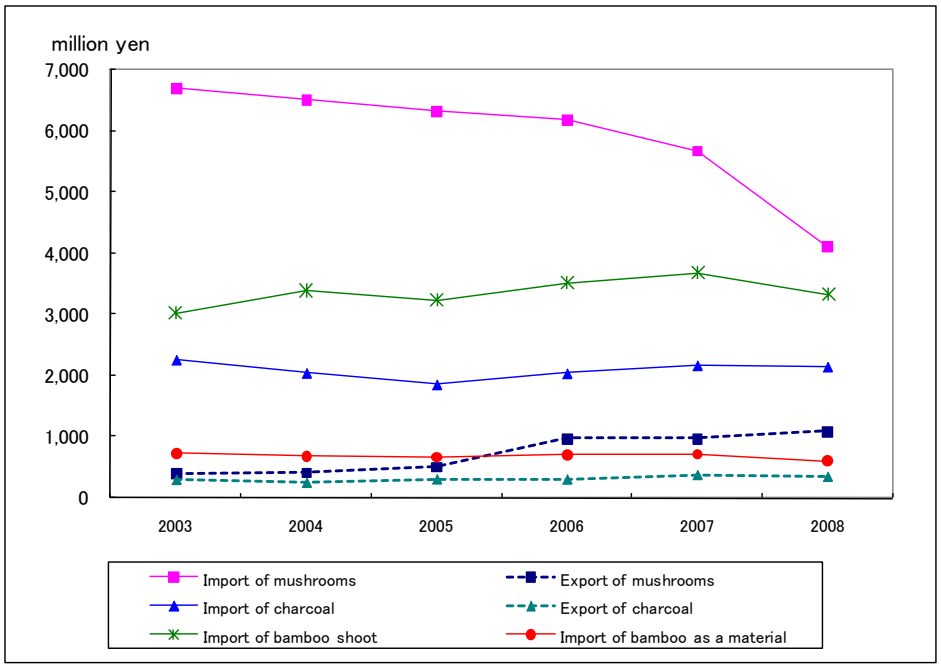
This indicator provides information about the value of a country's exports and imports of non-wood forest products and their contribution to the domestic economy. International trade in non-wood products may be a significant factor in the management, commercial use and economic value of forests.

Current State and Trend

The total value of the non-wood forest products imported to Japan is about 39 billion Japanese yen in 2008. Among the imported non-forest products, edible mushrooms hold the highest in the value, followed by bamboo shoots and charcoal. The import of edible mushrooms is in a declining trend recently due to the growing public concern for the safe and reliable food, as well as the increasing consumption in exporting countries.

The export of edible mushrooms, on the other hand, is in an upward trend as a result of the efforts of producers and the organizations concerned.

Figure 65: Change in import and export of non-wood forest products



Sources: Forestry Agency

INDICATOR 6.1.h

Export as a share of wood and wood products production and imports as a share of wood and wood products consumption

Rationale

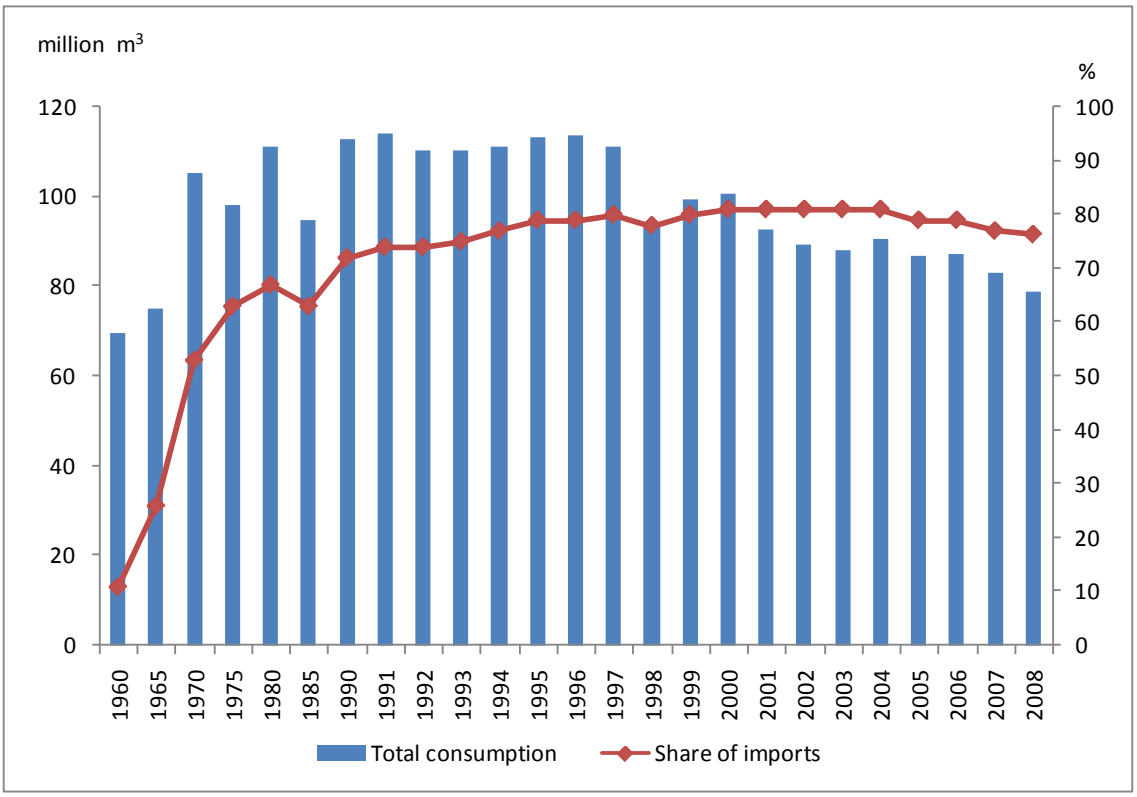
This indicator provides information on the relative importance of international trade in wood and wood products to domestic production. Wood and wood product exports can be a significant source of revenue for domestic economies. Imports may supplement or substitute for production from domestic forest sources.

Current State and Trend

In 2008, the imported wood and wood products accounts for 76 % in the total volume of consumption in Japan in round wood equivalents. The share of imports has been falling since the highest of 8 % recorded during 2000-2004. Such trend is partly attributed to the increasing use of growing domestic resources in the wood industry, coupled by the shrinking total wood consumption caused by the current economic downturn.

The share of imports had continuously risen until the early 2000's since the round wood market was opened in the late 1950's responding to the rapidly growing needs for wood and wood products, as described in the section for the Indicated 6.1.f.

Figure 66: Change in share of imports and total consumption of wood and wood products



Sources: Forestry Agency

The share of exports in the total volume of produced wood and wood products, on the other hand, is still negligible on the %age although foreign markets are starting to develop.

INDICATOR 6.1.i

Recovery of recycling of forest products as a percent of total forest products consumption

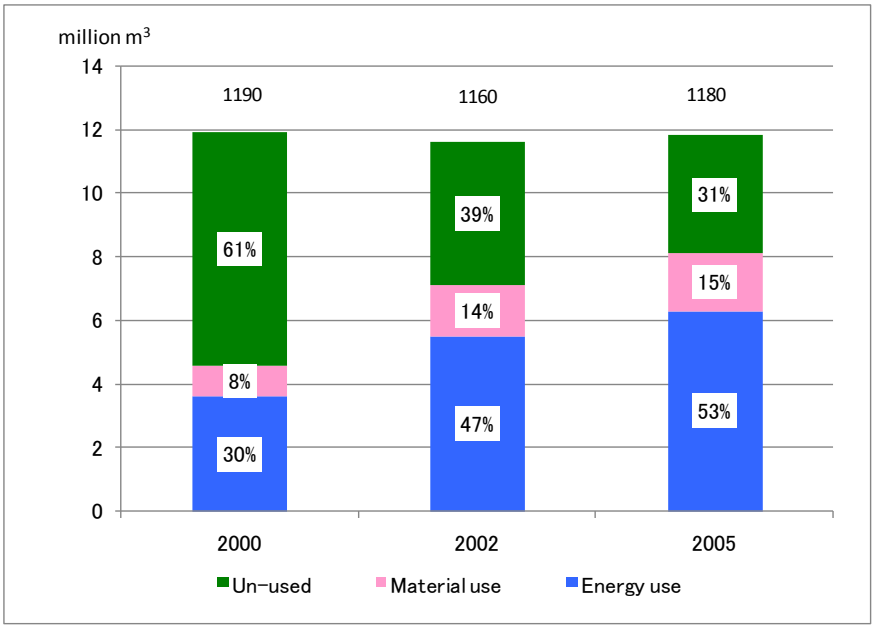
Rationale

This indicator provides information on the extent to which forest products are recycled or recovered. Recycled and recovered products are an important source of wood fiber for many industries and may compete with or substitute for harvested wood. Such products can help meet the demand for forest products without increasing harvest levels.

Current State and Trend

The percentage of recycled wood wastes generated in the construction sector, such as the wood parts of deconstructed houses, boosted from about 40% in 2000 to 70% in 2005. The energy use of the recycled wood wastes is particularly increasing. Such dramatic progress in the utilization of construction wood wastes is attributed to the legislations enacted to encourage the reuse and recycling of resources.

Figure 67: Change in the use of construction wood wastes



Sources: Ministry of Land, Infrastructure, Transport and Tourism

6.2 INVESTMENT IN THE FOREST SECTOR

These indicators provide information on long-term and annual expenditures to enhance forest management, forest-base enterprises, and the knowledge and skills of people who are engaged in the forest sector. Maintaining and enhancing the long-term multiple socio-economic benefits derived from forests depends in part on investment in the forest sector, including both long-term capital investments and annual operating expenditures.

INDICATOR 6.2.a

Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services and recreation and tourism

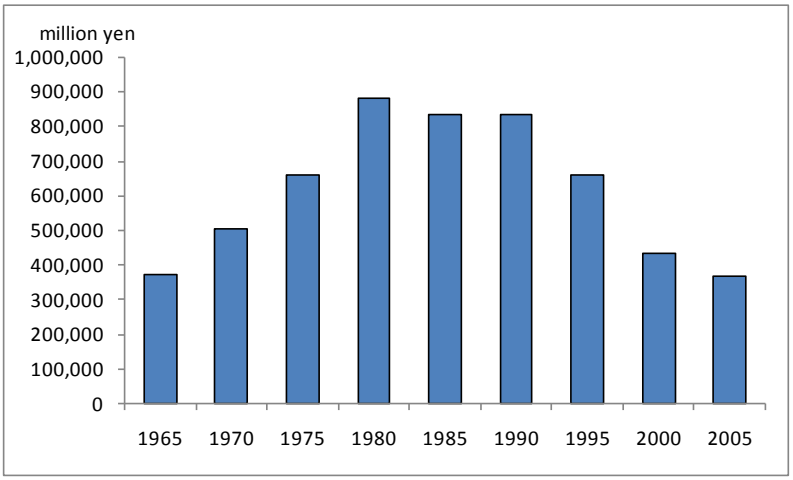
Rationale

This indicator quantifies investment and expenditure in developing, maintaining and obtaining goods and services from forests. Maintaining and enhancing forests and their benefits often depends on regular investments in restoration, protection and management, as well as in operations, forest industry and forest-based environmental services. When the capacity to protect, manage and use forests is eroded through lack of funding, the benefits that forests provide may decline or be lost.

Current State and Trend

The total value of the annual capital investment in forestry in 2005 is estimated approximately 370 billion Japanese yen. The capital investment in the forest sector has continuously dropped since the 1980's due to the constant unfavorable management conditions, such as the successive decline in wood prices and the worsening profitability of wood production.

Figure 68: Change in the value of capital investment in forest sector

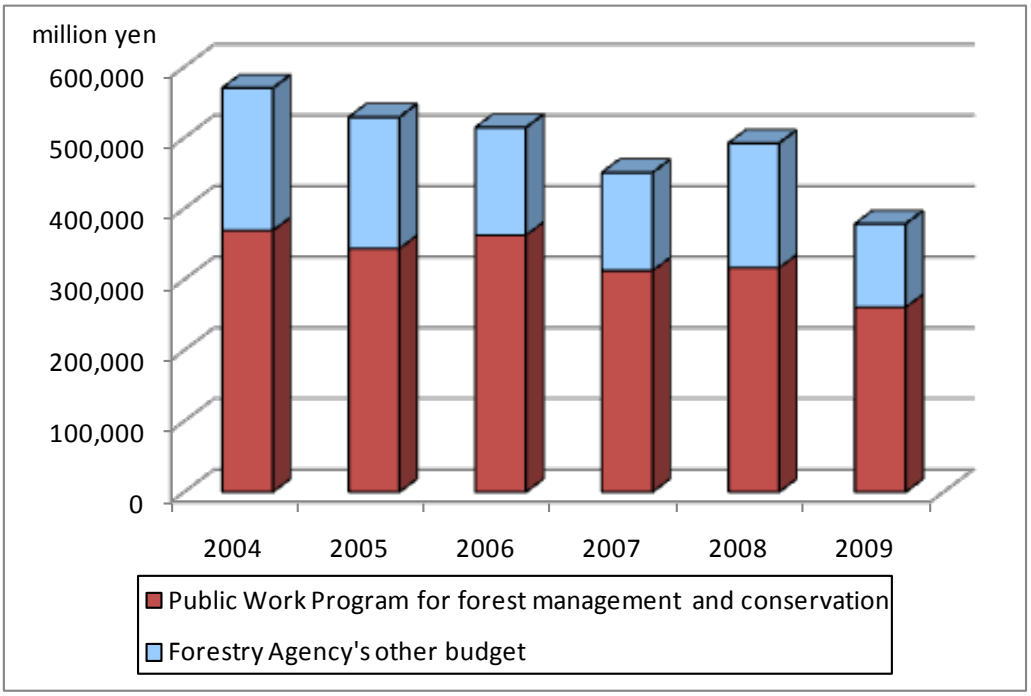


Sources: Ministry of Internal Affairs and Communication

The level of the annual expenditure of the Forestry Agency on the Public Work Program implemented specifically for the improvement and conservation of forests stays around 300 billion Japanese yen in recent years. The expenditure on forests occupies around 4-5 % of the total expenditure of the national government on the Public Work Program, which covers a broad range of the development of infrastructure including forests.

The total expenditure on the Public Work Program is in a declining trend in recent years under the government's budgetary policy to strictly restrain the whole expenditure through the exhaustive review throughout the overall spending. The recovery in the expenditure on forests in 2009 resulted from the allocation of the supplementary budget prepared against the current economic downturn.

Figure 69: Change in Forestry Agency's budget for the forest-related Public Work Program



Sources: Forestry Agency

INDICATOR 6.2.b

Annual investment and expenditure in forest-related research, extension and development, and education

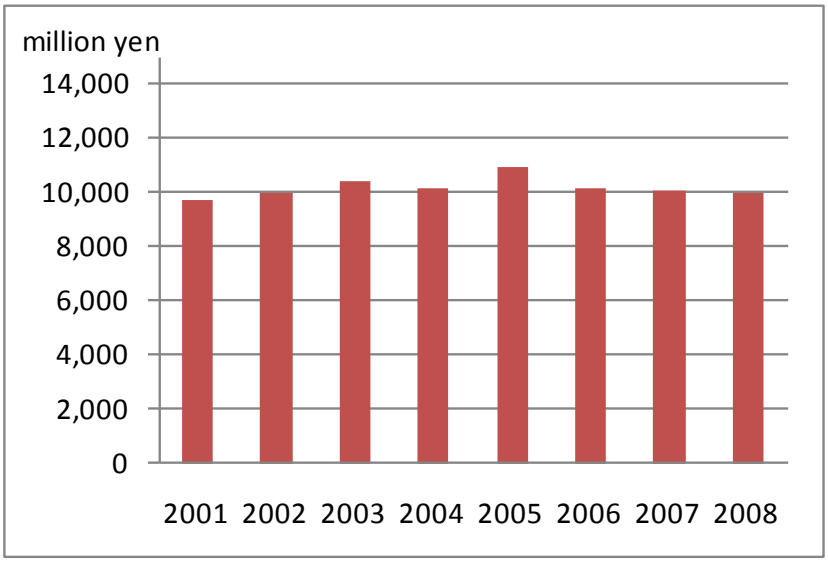
Rationale

This indicator provides information on annual investment and expenditure in forest-related research, extension and development, and education. Research underpins scientific understanding, including the ability to practice improved forest management and to develop and apply new technologies. Education, including extension activities, increases public awareness of the multiple benefits provided by forests.

Current State and Trend

The total expenditure of the Forestry and Forest Product Research Institute (FFPRI) in the research activities, including personnel expenses, stays around 10 billion yen in recent years. Although forest-related research activities are carried out by other public and private research institutes, no information is currently available due to the difficulties in separating the research expenditure on forest from other expenses.

Figure 70: Change in the total expenditure of the FFPRI in research activities



Sources: Forestry and Forest Products Research Institute, Forest Tree Breeding Center. Annual Report

6.3 EMPLOYMENT AND COMMUNITY NEEDS

Forest-based and forest-related employment is a useful measure of the social economic importance of forests at the national and local level. Wage and income rates and injury rates are indicators of employment quality. Communities whose economies are concentrated in forest industry, or who rely on forests for subsistence purposes, may be vulnerable to the short or long-term effects of economic or policy changes in the forest sector. These indicators provide information on levels and quality of forest employment, community resilience to change, use of forests for subsistence purposes and social equity through the distribution of financial benefits from forests.

INDICATOR 6.3.a

Employment in the forest sector

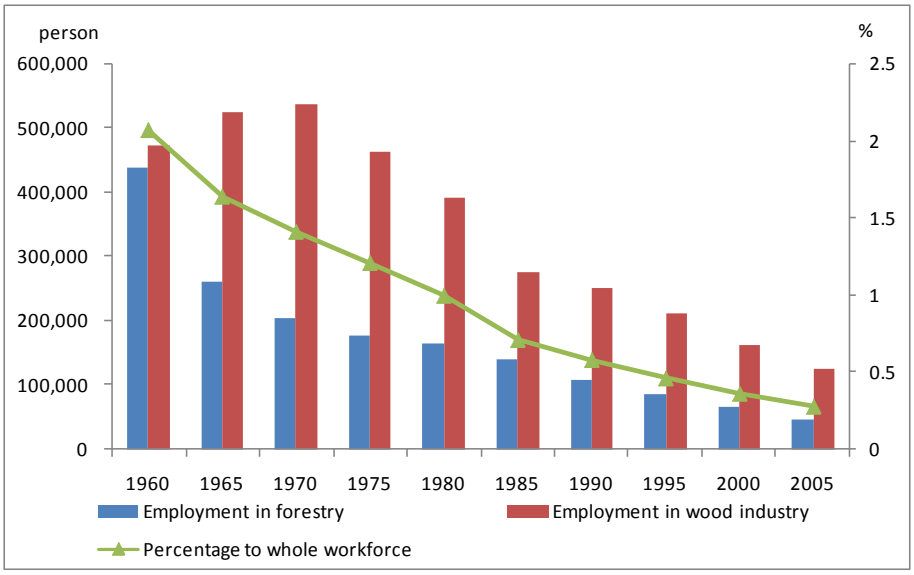
Rationale

This indicator provides information on the level of direct and indirect employment in the forest sector. Employment is a widely understood measure of economic, social and community wellbeing.

Current State and Trend

Around 170 thousand persons are working in the forest sector in Japan in 2005, including about 50 thousand persons engaged in forestry and about 130 thousand persons working in the wood industry. Reflecting the prevailing difficult circumstances in forestry and wood industry, the size of the workforce in the forest sector has constantly shrunk since the 1970's. The number of new comers into forestry, on the other hand, has increased since 2003 when the program for the "Green Employment"[25] started.

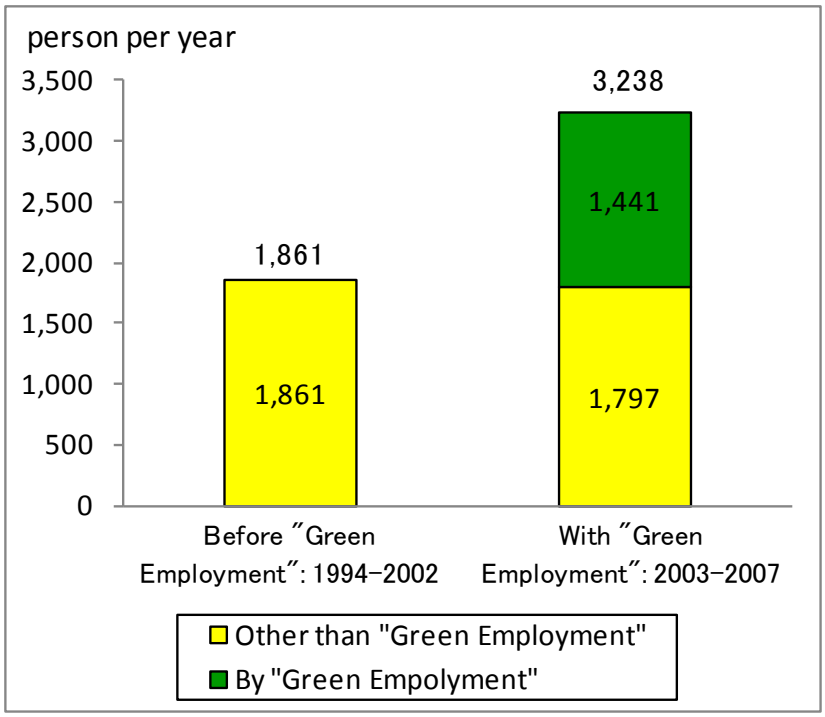
Figure 71: Change in employment and percentage of recruit in forest sector



Sources: Ministry of Internal Affairs and Communication. National Census
Forestry Agency

[25] ***Program for the "Green Employment"*** is a government program to give technical trainings to the new comers into forestry.

Figure 72: New recruitment to forestry sector



Sources: Forestry Agency. White Paper on Forest and Forestry

Box:5 International Cooperation for C&I Development and Application

For the purpose of sharing the knowledge acquired through the Montreal Process, Japan International Cooperation Agency (JICA) has organized an international training course every year since 2007 inviting officers from developing countries on the Pacific Rim to Japan. During the forty-day training course, participants are given opportunities to learn the basics and to experience the application of the criteria and indicators.

INDICATOR 6.3.b

Average wage rates, annual average income and annual injury rates in major forest employment categories

Rationale

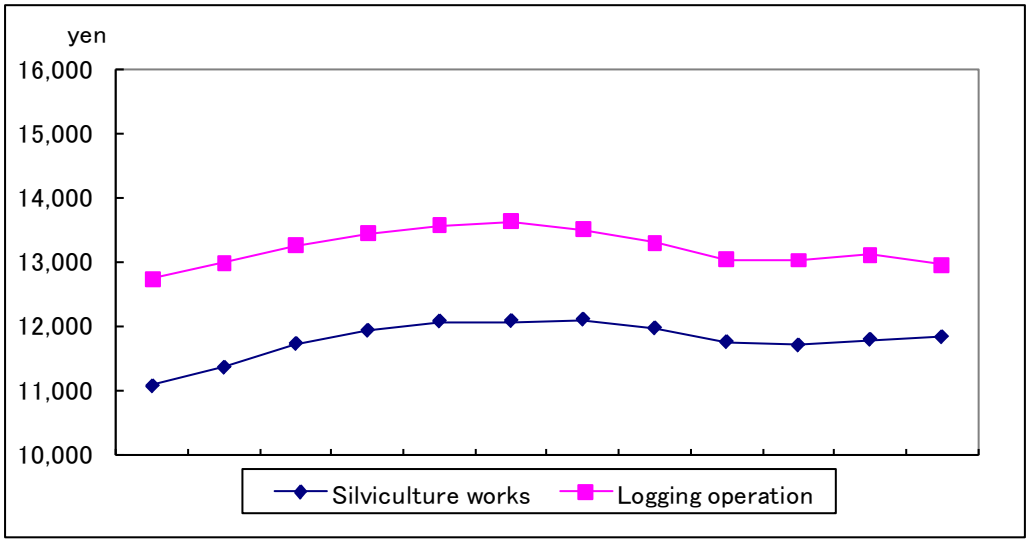
This indicator provides information on average wage and income rates, and injury rates. These are important aspects of employment quality and may influence the ability of the forest sector to recruit and retain its workforce.

Current State and Trend

The average daily wage of forest workers in 2007 is around 12 thousand Japanese yen for sylviculture works and 13 thousand Japanese yen for logging operations. In the real term, the wage level of forest workers has been relatively stable in recent years.

Among the forest workers hired by the forest cooperatives, one of the major contractors in the forest sector, about 70 % are working on a daily basis and 20 % are salary workers.

Figure 73: Change in average wage of forest workers

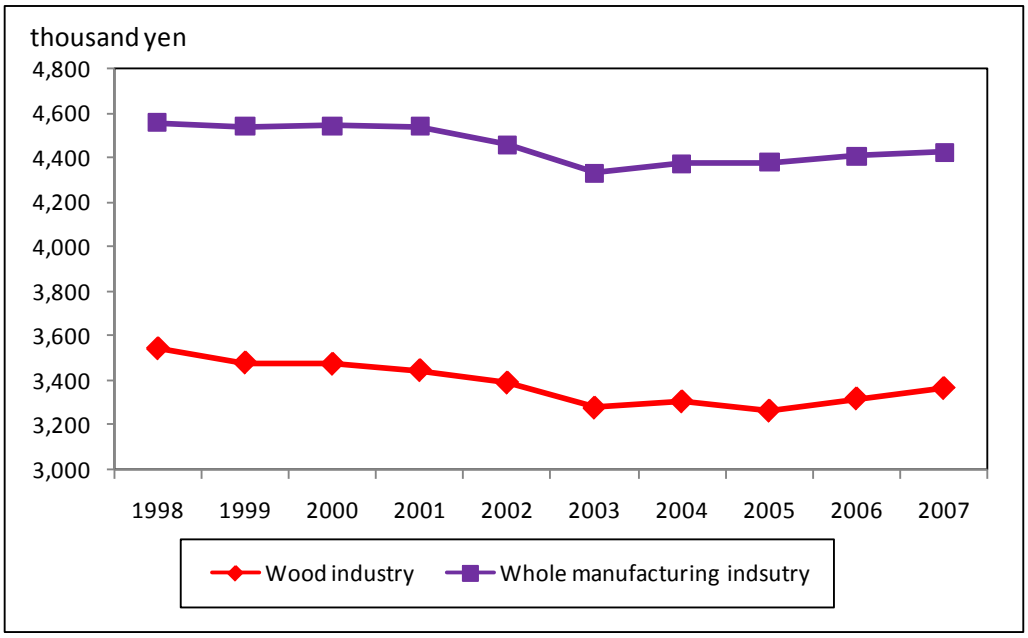


Sources: National Chamber of Agriculture

The current level of the average annual income of wood industry

employees is around 3.4 million Japanese yen, which is equivalent to 75 % of the average income in all manufacturing industries. The level of the income of wood industry employees is rather improving in recent years after the downward trend since the late 1990's.

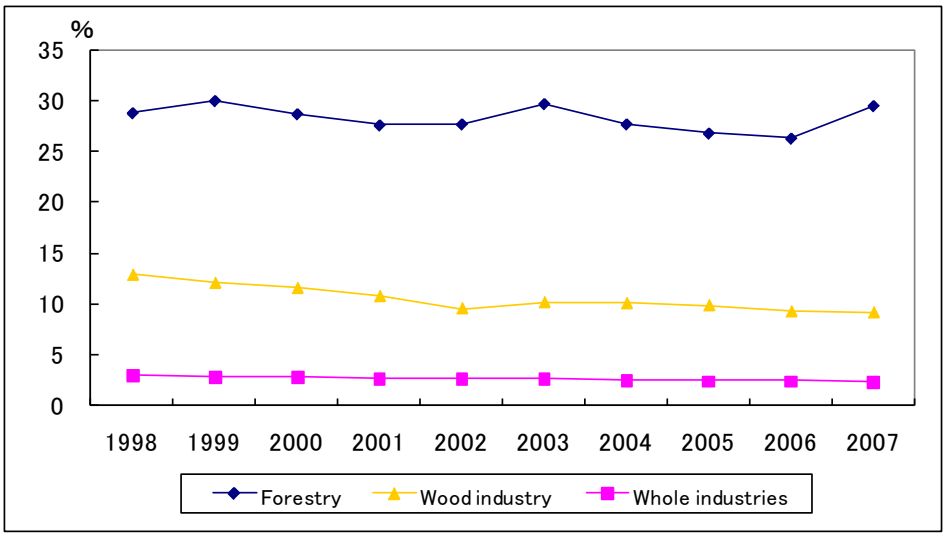
Figure 74: Change in average income rate of wood industry employees



Sources: Ministry of Economy, Trade and Industry. Statistics of Industry

Because of the nature of works which frequently require the handling of massive objects on steep slopes, the *par annum per thousand* injury rate of forest workers is about 13 times as high as the average of all industries.

Figure 75: Change in injury rate in forestry and wood industry



Sources: Forestry Agency

INDICATOR 6.3.c

Resilience of forest-dependent communities

Rationale

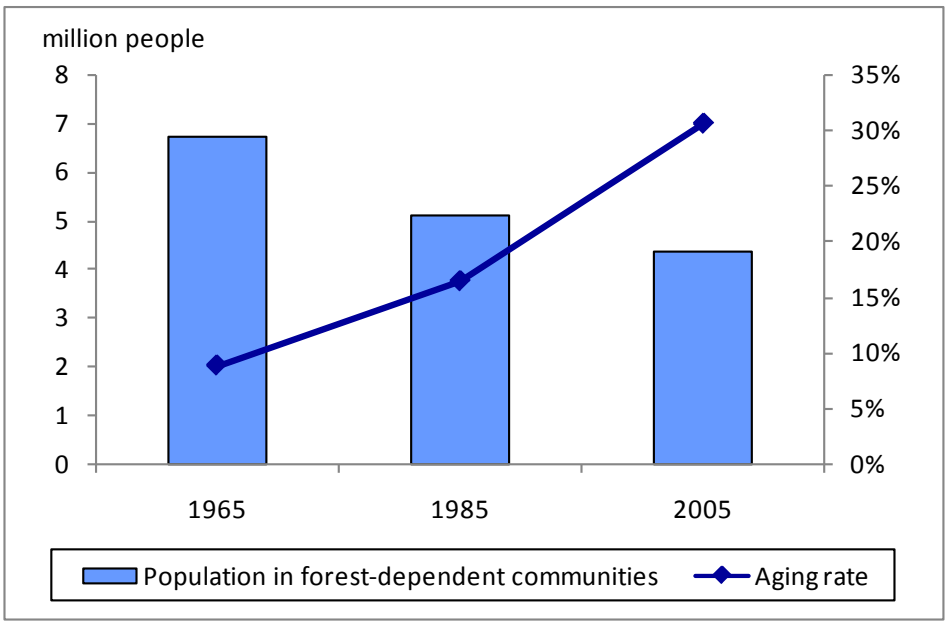
This indicator provides information on the extent to which communities dependent on forests for their wellbeing, livelihoods, subsistence, quality of life or cultural identity are able to respond and adapt to social and economic change.

Current State and Trend

The population of the forest-dependent communities has decreased in the last forty years while the total population of Japan has expanded. The aging is rapidly in progress as well in the forest-dependent communities compared with the national average. Various indices on the living conditions, such as the infrastructure development and medical access, show the inferiority of the forest-dependent communities.

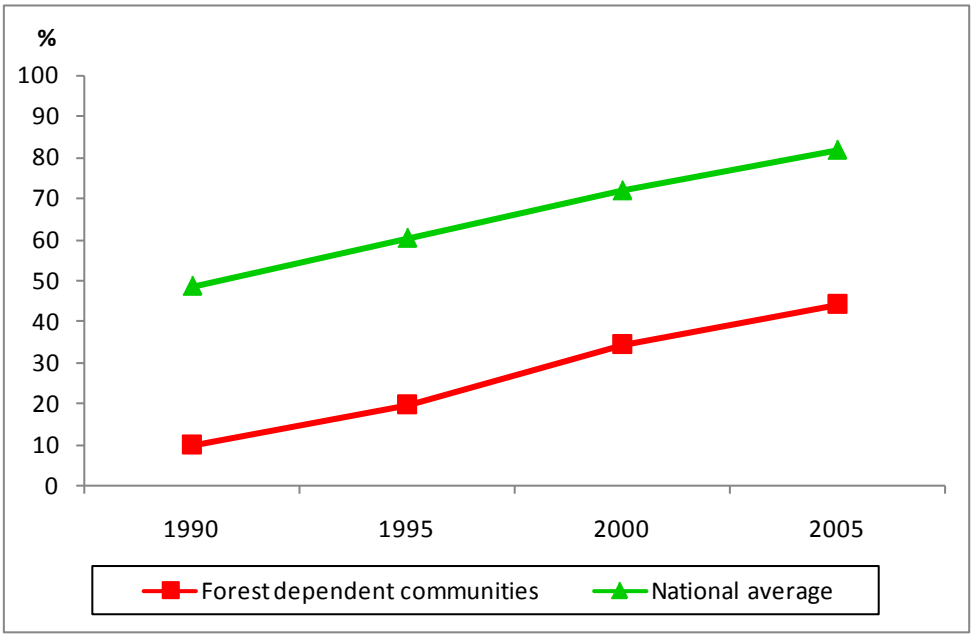
It is considered that all these figures demonstrate the declining resilience of forest-dependent communities.

Figure 76: Change in population and aging rate of forest-dependent communities



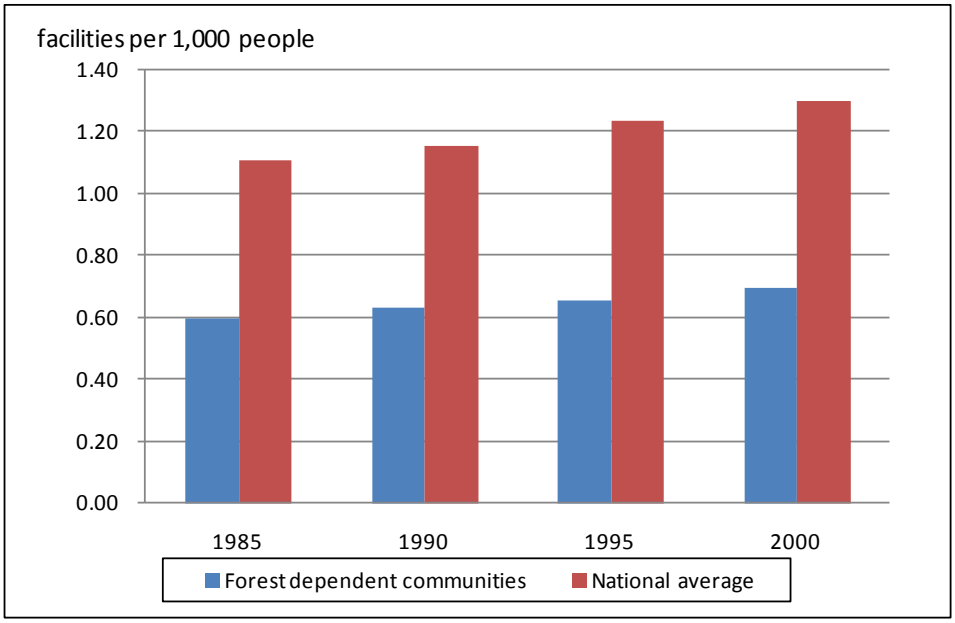
Sources: Ministry of Agriculture, Forestry and Fisheries

Figure 77: Change in the rate of flush lavatory



Sources: Ministry of Internal Affairs and Communication,
Ministry of Agriculture, Forestry and Fisheries

Figure 78: Change in the average number of medical facilities per thousand people



Sources: Ministry of Agriculture, Forestry and Fisheries,
Ministry of Health, Labor and Welfare

INDICATOR 6.3.d

Area and percent of forests used for subsistence purposes

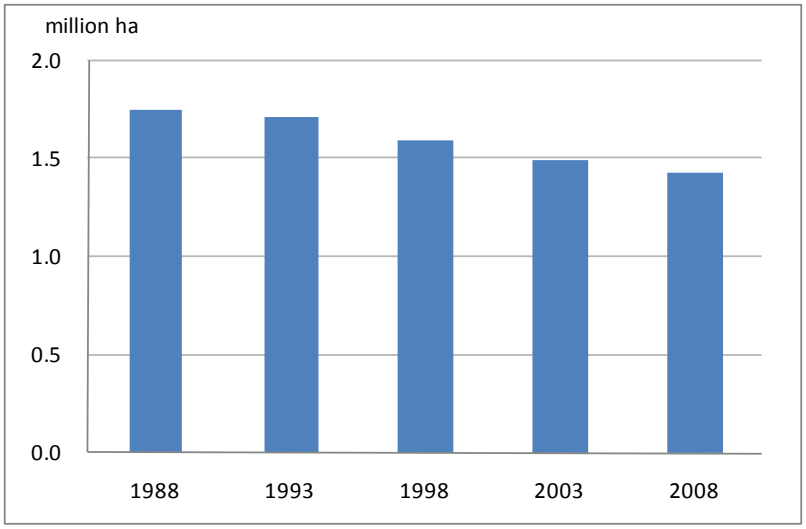
Rationale

This indicator provides information on the extent to which indigenous and other communities rely on forests as a source of basic commodities, such as food, shelter and medical plants. In some countries, the survival of cultural identity and the practice of forest-based subsistence livelihoods may be closely linked.

Current State and Trend

About 1.4 million ha of national forests, which are called common forests, are reserved for the customary use of local communities. By contract with the district forest office concerned, members of the community based groups can collect commodities for daily consumption, such as fuel wood and edible wild plants and mushrooms, for a limited amount of payment. Although the use of national forests is limited to the public undertakings, local communities are given exceptional status for such customary use. The total area of the reserved forests has constantly decreased because of the decline in local communities resulted from the diminishing and ageing population.

Figure 79: Change in the area of community use in the national forests



Sources: Forestry Agency

INDICATOR 6.3.e

Distribution of revenues derived from forest management

Rationale

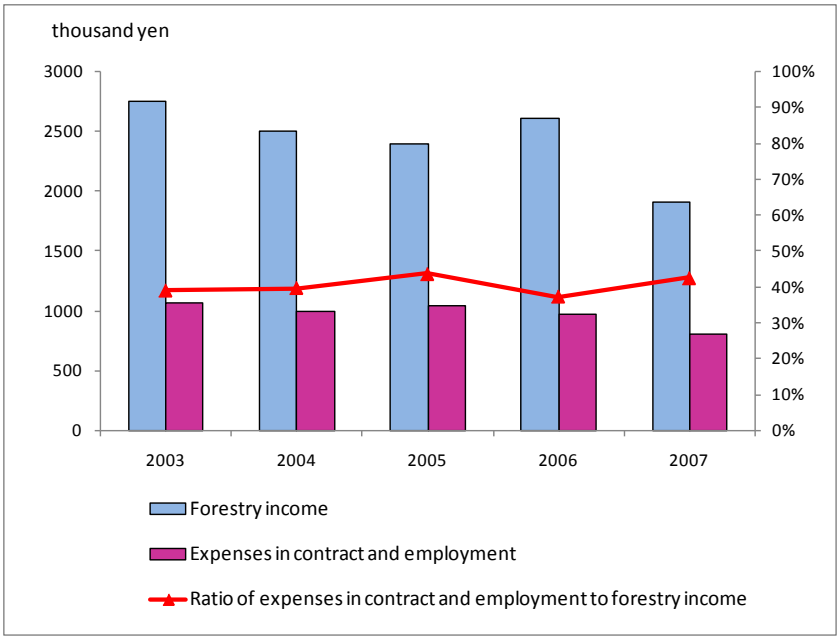
This indicator provides information about the flow and distribution of revenues from forest services, management and use back into forest-based communities, wider society and the forest sector. The way in which revenues and financial benefits arising from forests are distributed provides a measure of social equity.

Current State and Trend

The per house hold annual forestry income, including timber sales, and annual expenses in contracts and labor for forest management and profit of forest owners are 2 million Japanese yen and 800 thousand Japanese yen respectively in 2007. It is considered, therefore, that due to the diminishing profit rate resulted from the falling prices of wood and wood products, the conditions of forest management has been declining in Japan.

About 40 % of the revenue generated from forest resources was directly distributed to the local community.

Figure 80: Change in forestry income and expenses in contract and employment for forest management



Sources: Ministry of Agriculture, Forestry and Fisheries

Note: Forestry income and expenses in contract and employment are per house hold

6.4 RECREATION AND TURISM

Forests have long been used as a place for recreation and other leisure activities. These activities provide local employment, generate income and contribute to the quality of life of urban and rural communities. Environmental quality, location, availability of on-site services and accessibility are important to forest-based recreation and tourism. Levels of use are an indication of the extent to which forests are valued by society for these uses.

INDICATOR 6.4.a

Area and percent of forests available and/or managed for public recreation and tourism

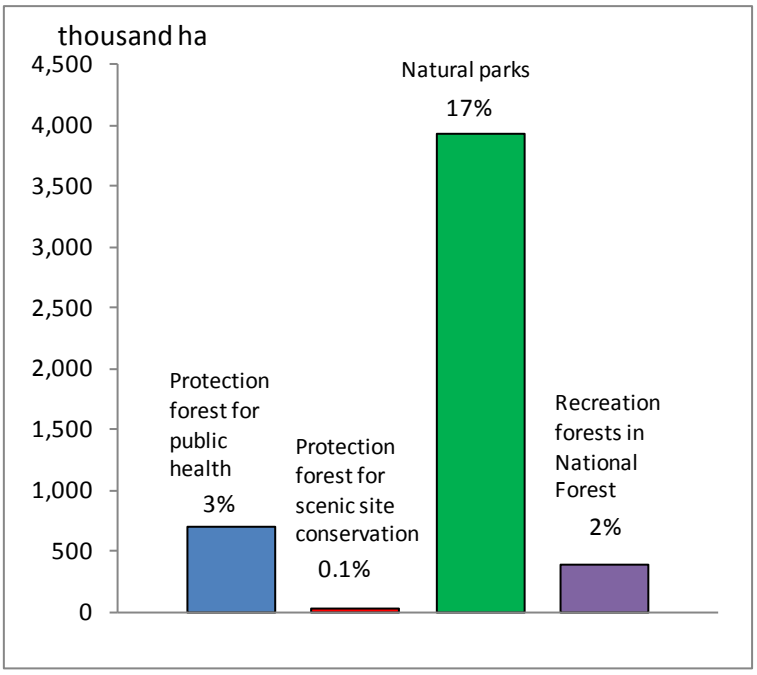
Rationale

This indicator provides information on the area and extent of forests available and/or managed for recreation and tourism activities. The pressure and demands placed on forests and associated facilities reflect their importance as a location for a wide range of recreation and tourism uses.

Current State and Trend

Forests primarily available for the public recreation include about 4 million ha of forests distributed in natural parks, about 0.4 million ha of protection forests designated for recreation and scenery and 0.4 million ha of national forests managed for recreational use and scenic conservation.

Figure 81: Area and share of forests managed for recreational and tourism purposes



Sources: Forestry Agency

INDICATOR 6.4.b

Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available

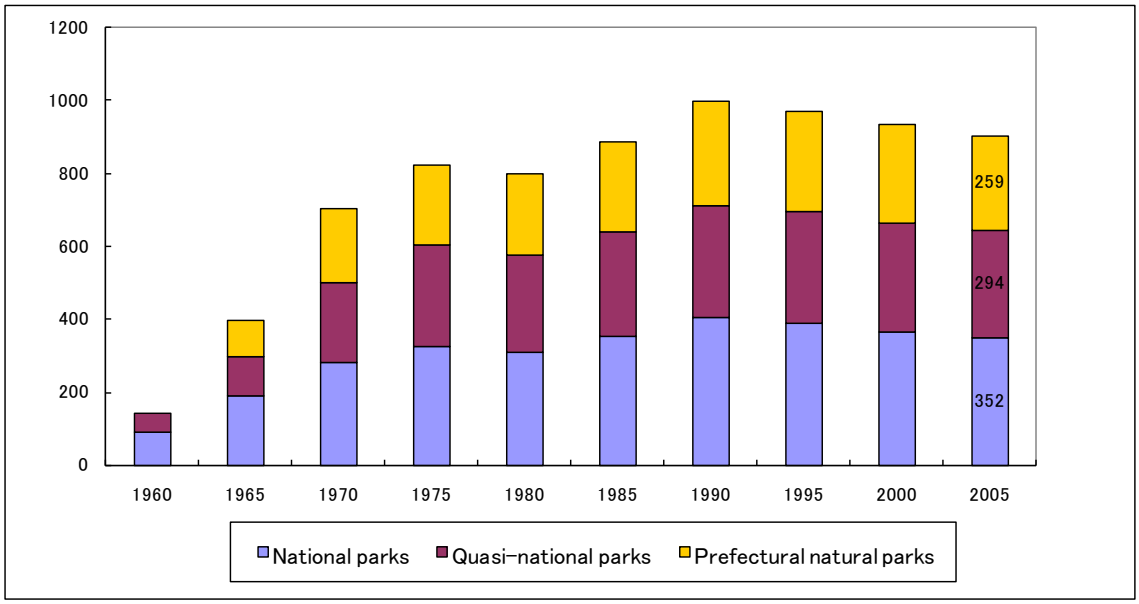
Rationale

This indicator provides a measure of the level and type of recreation and tourism use in forests, the distribution of recreational pressure and the facilities available to meet demand. The extent to which people participate in forest-based leisure activities reflects the importance of forests for recreation and tourism and the need for appropriate infrastructure.

Current State and Trend

Every year, about one million people visit natural parks in Japan. The number of visitors has been relatively stable in the last thirty years. The sharp increase in the 1960's and 1970's is attributed to the improved public awareness of natural parks and outdoor activities as a result of the enactment of Natural Park Act in 1957.

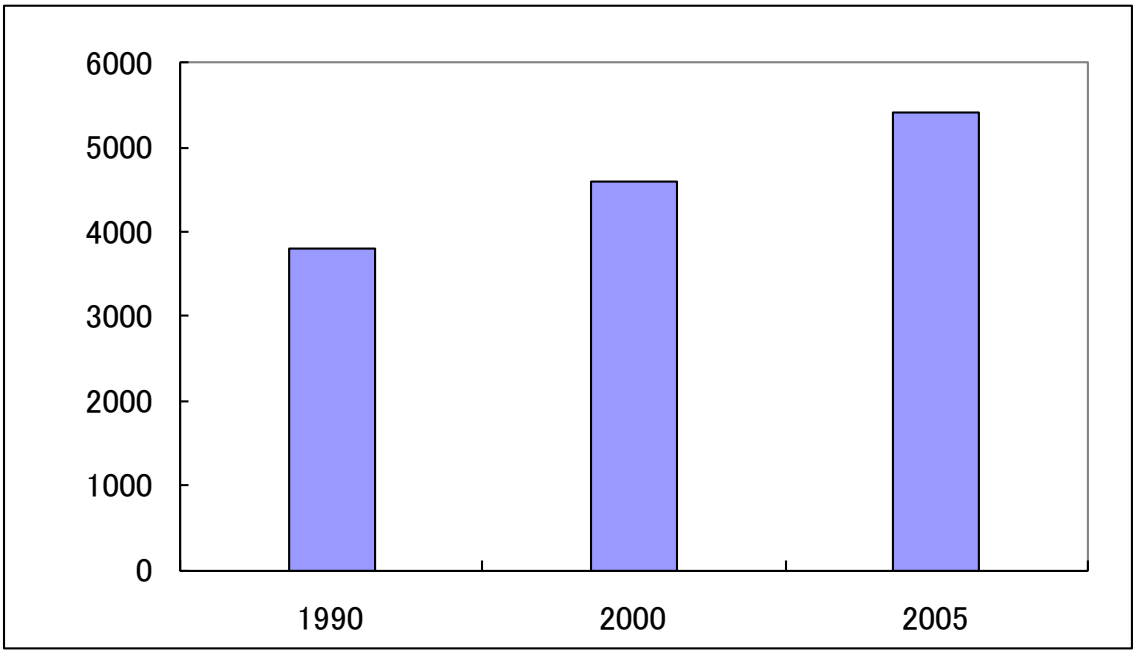
Figure 82: Change in the number of visitors to natural parks



Sources: Ministry of Environment

More than five thousand facilities are currently available for recreational and tourism activities in and around forests in Japan. Such facilities include camping grounds, ski slopes, field athletic and orienteering courses, as well as cycling roads and horse riding courses surrounded by forests. Responding to the expanding needs for forest-based recreation and tourism, the number of available facilities increased in the 1960's, through the 1980's.

Figure 83: Change in the number of facilities for forest recreation and tourism



Sources: Ministry of Agriculture, Forestry and Fisheries. Census of Agriculture and Forestry

About 400 thousand ha of national forests in total are currently reserved as the "forests for recreation" in 11 hundred separate locations. The recreational forests with suitable natural environment for in-forest activities provide a broad range of citizens and citizen groups with a variety of opportunities, such as forest wanderings, nature observation, forest education and forestry practicing.

6.5 CULTUAL, SOCIAL AND SPIRITUAL NEEDS AND VALUES

There are many social, cultural and spiritual connections between forests and people. These values may be deeply held and may influence attitudes to forests and their management.

Spiritual and cultural associations between indigenous people and forests often form part of their identity and livelihood. Beliefs, values, traditions and knowledge may have shaped forest management for many generations.

Other forest-dependent and local communities will have developed their own associations with forests and bring different approaches and attitudes to forest management. Urban populations also have needs to be met by forests and bring a different perspective to forest management.

INDICATOR 6.5.a

Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values

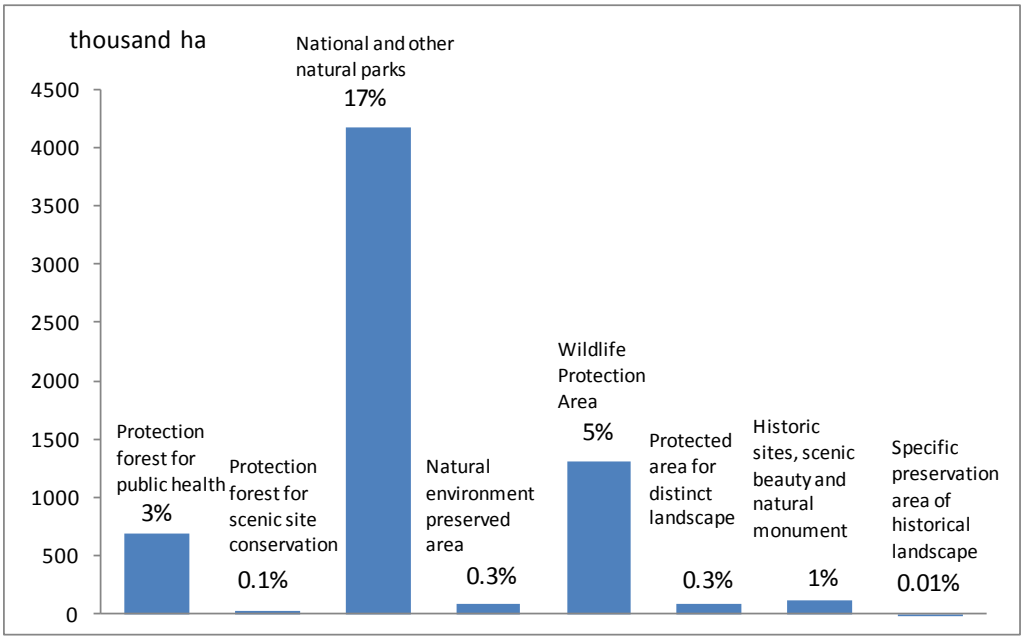
Rationale

This indicator measures the extent of forests managed primarily for cultural, social and spiritual needs and values. The protection of these qualities is important to the identity and quality of life of indigenous people and all other communities with strong ties to forests and is a reflection of the extent to which these values and needs are recognized by society.

Current State and Trend

Forests legally protected and managed primarily for the protection of a variety of cultural and spiritual needs and values include about 4 million ha of forests distributed in natural parks, X million ha of wildlife reserves, X thousand ha of protection forests designated for recreational use and X thousand ha of forests designated as cultural assets, natural monuments and cultural heritages. Besides these legally protected forests, some national forests are managed for such purposes.

Figure 84: Area and percentage of forests legally protected for cultural, social and spiritual needs and values



Sources: Forestry Agency

INDICATOR 6.5.b

The importance of forests to people

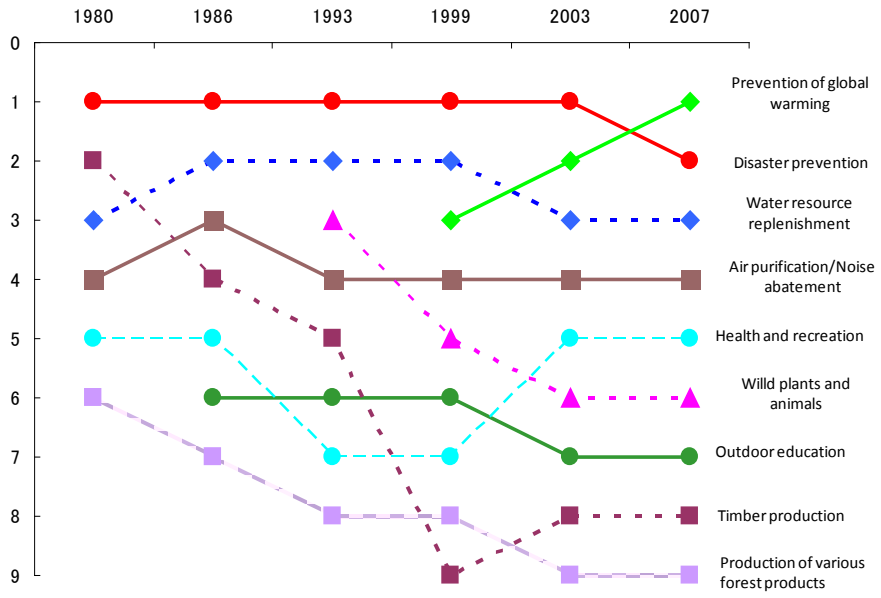
Rationale

This indicator provides information on the range of values that communities and individuals hold for forests. These values shape the way people view forests, including their behaviors and attitudes to all aspects of forest management

Current State and Trend

Currently, “prevention of climate change” is on the top of the public expectation among a variety of services provided by forests, according to the results of a series of public surveys conducted by the Ministry of Cabinet. The “prevention of disasters” and the “conservation of water resource” have maintained the higher ranking from the beginning of the surveys. The “wood production”, on the other hand, has declined over time to hold the second from the bottom currently.

Figure 85: Change in public expectations on forest



Sources: Cabinet Office. Opinion polls on forest and livelihood