

Chapter 1

National Circumstances Relevant to Greenhouse Gas Emissions and Removals

1.1 National Land Use

Japan is located on the east side of Eurasia, and an archipelago stretching approximately between latitudes 24° and 46° north, and consists of four major islands – namely (north to south) Hokkaido, Honshu, Shikoku, and Kyushu – as well as more than 6,800 smaller islands.

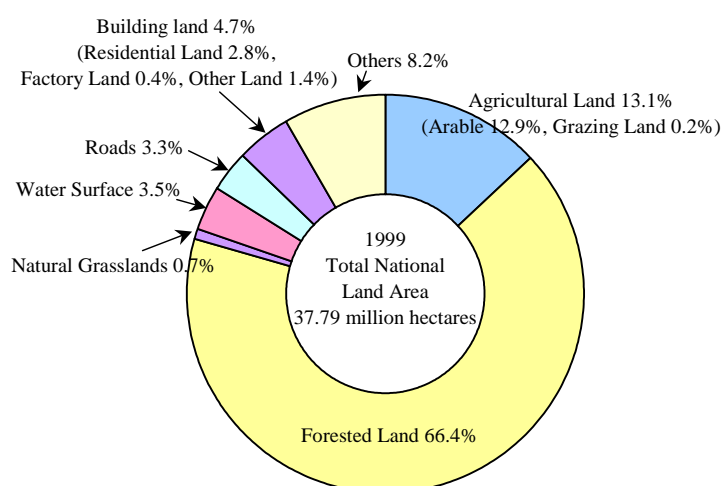


Figure 1.1 Land Use in Japan

Source: 'FY2000 Annual Report on Land Usage Trends'

Notes: The term 'Roads' includes agricultural and forestry roads in addition to ordinary roads.
All data is derived from estimates based on readily available statistics from different sources compiled by the Ministry of Land, Infrastructure and Transportation.

Japanese territory as of 1999 extends over 37,790,000 hectares, or about 0.3 percent of the earth's terrestrial surface, of which about 80 percent is either forested (25.11 million hectares (66.4%)) or agricultural land (4.95 million hectares (13.1%)). In recent years, the total area devoted to forestry or agricultural purposes has diminished, while that used for buildings and roads has increased.

1.2 Climate

Japan stretches over a great distance from north to south with a vast range of climatic zones and has distinct four seasons. The mountain ranges forming the backbone of Japan's main islands also serve to enhance the climatic varieties in different regions of Japan. In winter, northerly cold winds from Siberia (winter monsoon), bring a large amount of snowfall to the coast areas of the Japan Sea, while southerly winds (summer monsoon) make summer hot and wet almost over Japan except Hokkaido.

With such varied natural environments, Japan fosters home to a wide variety of species. With regard to fauna, about 1,400 vertebrates and about 35,000 invertebrates have been identified, while amongst the flora, some 7,000 vascular plants (tracheophytes), 5,500 algae, 1,800 mosses, 1,000 lichens, and about 16,500 fungi (excluding marine species) have been found.

The climate statistics (1971-2000 period average) are shown in Table 1.1 based on report from several meteorological stations, which are considered affected only slightly by urbanization.

Table 1.1 Climate of Japan

		Latitude	Longitude	Elevation	Annual Mean Temperature	Annual Mean of Daily Maximum Temperature	Annual Mean of Daily Minimum Temperature	Annual Precipitation
		(N)	(E)	(meters)	(°C)	(°C)	(°C)	(mm)
Northern Japan	Abashiri	44°01.0'	144°17.0'	37.6	6.2	10.0	2.6	801.9
	Nemuro	43°19.7'	145°35.4'	25.2	6.1	9.4	3.0	1,030.0
	Yamagata	38°15.2'	140°20.9'	152.5	11.5	16.4	7.2	1,125.0
	Ishinomaki	38°25.5'	141°18.2'	42.5	11.4	15.3	7.9	1,064.5
Eastern Japan	Fushiki	36°47.3'	137°03.4'	11.6	13.7	17.7	10.3	2,196.4
	Mito	36°22.6'	140°28.2'	29.3	13.4	18.5	8.9	1,326.0
	Iida	35°30.6'	137°50.3'	482.3	12.5	18.6	7.5	1,606.7
	Hamamatsu	34°42.4'	137°43.4'	31.7	16.0	20.2	12.4	1,875.5
Western Japan	Sakai	35°32.5'	133°14.2'	2.0	14.9	19.0	11.1	1,894.9
	Hamada	34°53.6'	132°04.4'	19.0	15.2	19.1	11.5	1,705.7
	Hikone	35°16.4'	136°14.8'	87.3	14.4	18.5	10.8	1,617.9
	Miyazaki	31°56.1'	131°25.0'	9.2	17.3	22.0	13.1	2,457.0
	Tadotsu	34°16.4'	133°45.3'	3.7	16.0	20.0	12.2	1,090.7
Nansei Islands	Naze	28°22.6'	129°29.9'	2.8	21.5	24.7	18.6	2,913.5
	Ishigakijima	24°19.9'	124°09.8'	5.7	24.0	26.6	21.9	2,061.0

Source: Japan Meteorological Agency, 'Climate Table of Japan'

Note: Annual mean temperatures, annual means of daily maximum, and minimum temperatures are obtained by averaging monthly mean normals calculated for the 1971-2000 base period.

Annual mean temperatures over Japan, which were relatively cool condition except around 1960, began to rise in the early 1990s to reach the warmest condition for more than 10 years. The 1990s has been the warmest decade in the past 100 years. As regards precipitation, annual number of days with less than 1 mm precipitation has been increasing, and the potential of occurrence of drought has become larger.

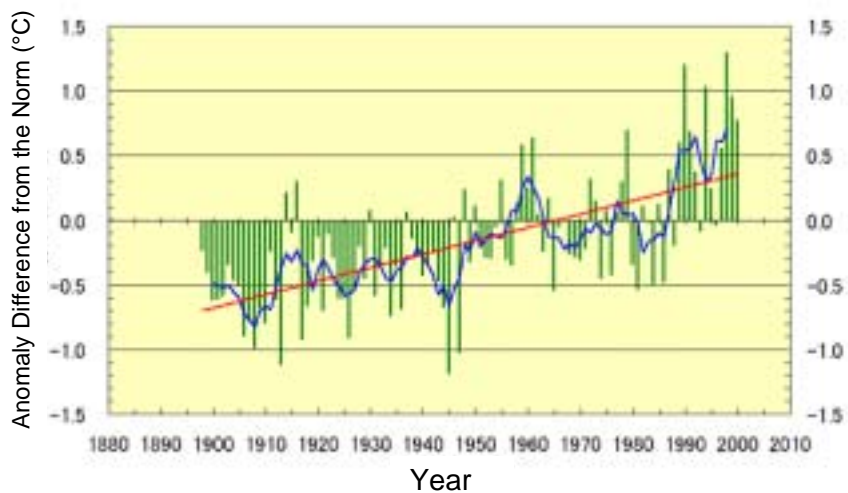


Figure 1.2 Annual mean surface temperature variations in Japan from 1898-2000

Source: Japan Meteorological Agency – ‘Climate Change Monitoring Report 2000’

Note: The ordinate shows the annual mean surface temperature anomalies, which are deviations from 1961-1990 period normals averaged for the 15 stations presented in Table 1.1. The bars indicate annual anomalies. The solid line indicates the five-year running mean. The inclined pale line indicates the long-term linear trend.

1.3 Population and Households

According to the latest population census, as of October 1st 2000, Japan’s population was 126,925,843, representing a 1.1% increase over the previous census (October 1995). The population density was 340 inhabitants per square kilometer. In line with the falling birthrate and increased average longevity, the ratio of the elderly amongst the population has rapidly increased at a higher rate than ever, and the population segment aged 65 or older as of 2000 was 17%. This rate is the highest of all the developed countries.

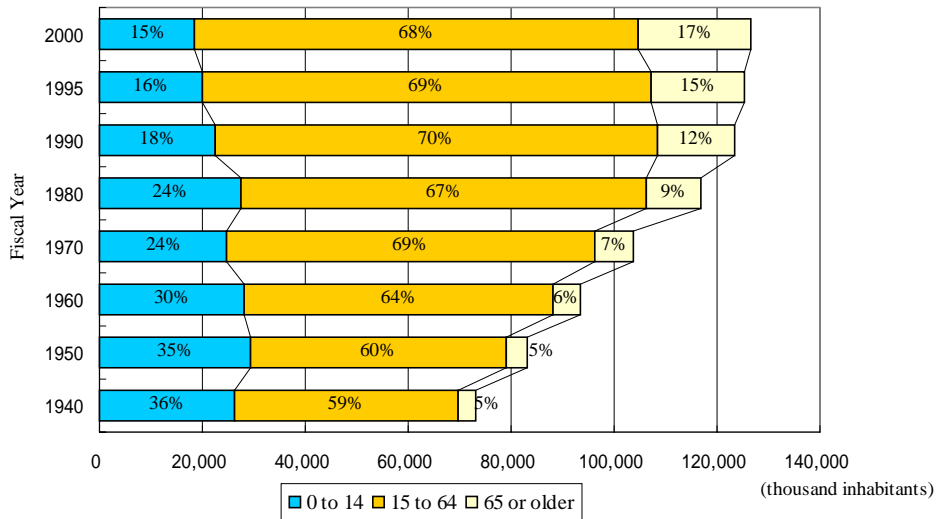


Figure 1.3 Age Distribution of the Japanese Population

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications – ‘Population Census’

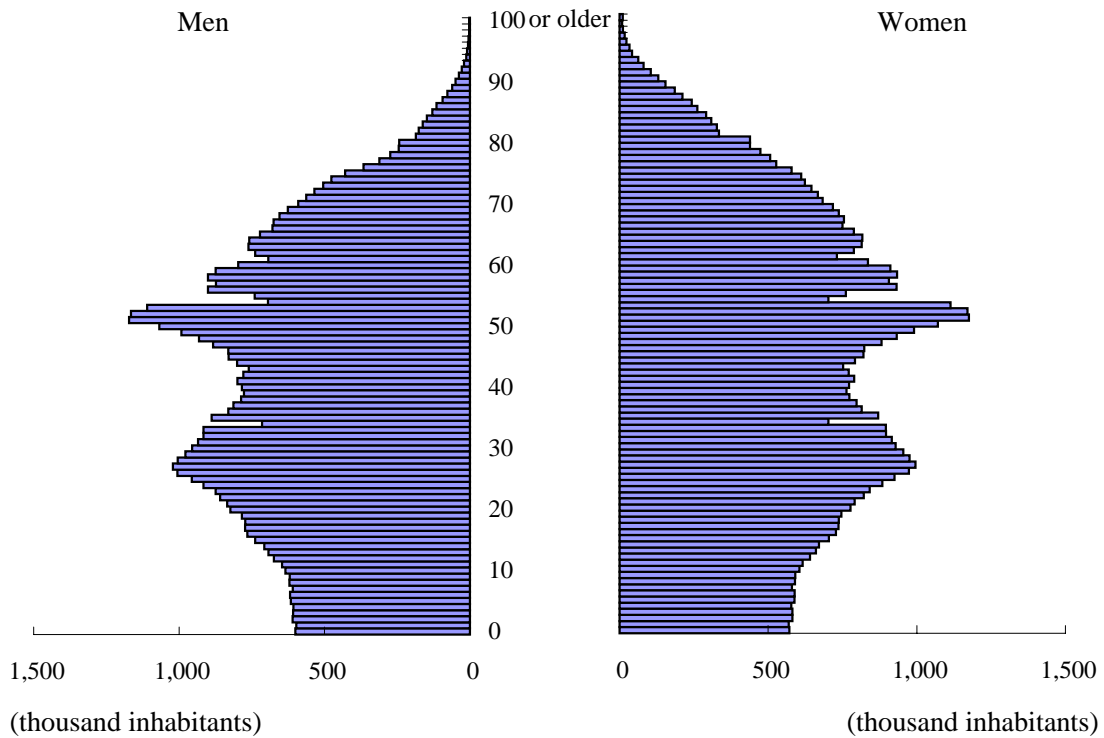


Figure 1.4 Japanese Population Pyramid in 2000

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications – ‘Population Census’

During the 1960s, the years of the so-called Japanese economic miracle when the economy grew very rapidly, the number of people migrating into Japan’s three metropolitan areas substantially exceeded the number leaving, with a net immigration into such areas of approximately 500,000 people per year. But this net immigration into the three metropolises decreased in the 1970s. In nationwide scale, however, as of October 2000, 65 percent of the population lived in the densely inhabited districts (=DIDs) *, showing the continued concentration of the population in metropolitan areas.

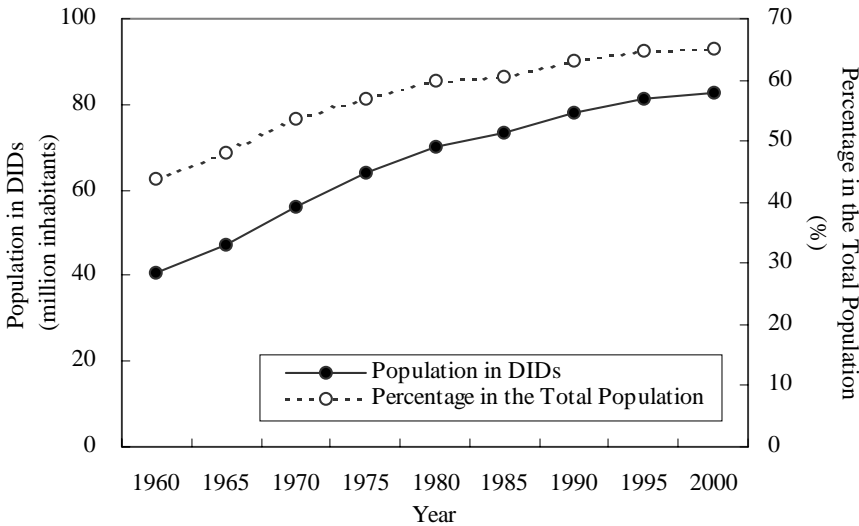


Figure 1.5 Population Residing in Densely Inhabited Districts

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications – ‘Population Census’

*) DIDs: Indicates areas adjacent to the basic unit district with high population density (as a general rule, population density of 4,000 or more inhabitants per square kilometer) within a city, ward, town or village boundary, and whose population is 5,000 or more.

In 2000, there were 46,780,000 households in Japan, 6.6 percent more than in 1995. The average size of households is 2.67 persons in 2000. Since 1970, the number of households has continued to increase and the average size of households continued to decline, reflecting changes in household formation patterns, such as changing from extended family systems to nuclear families and increased numbers of solitary-person households, as well as a reduction in the number of children reflecting the falling birthrate.

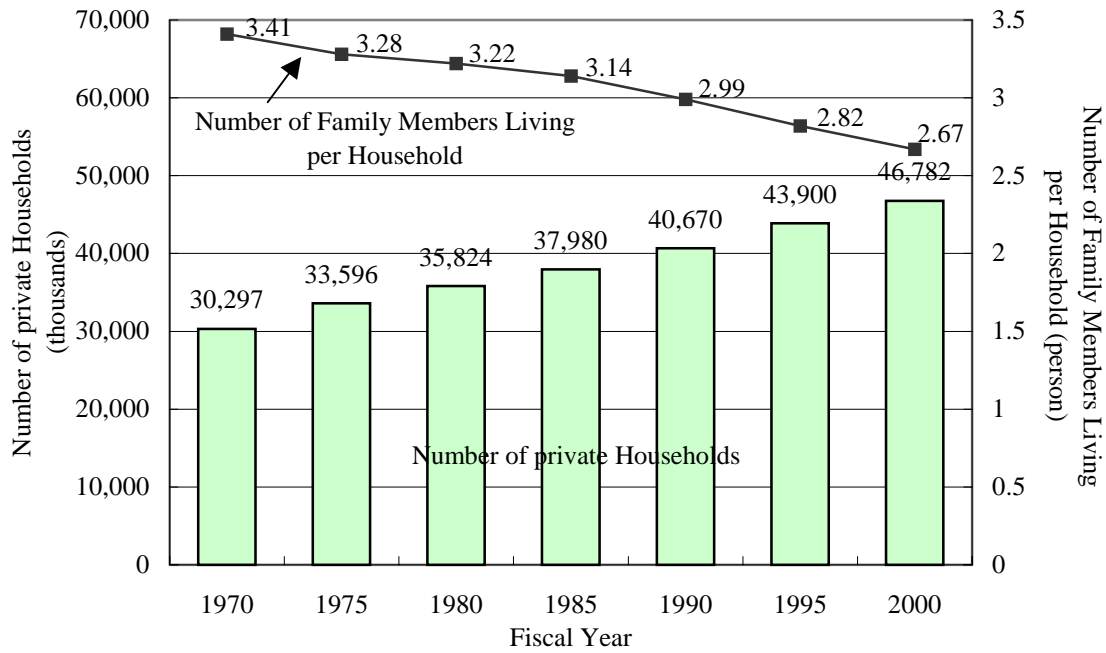


Figure 1.6 The Number and Average Size of Japanese Households

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications — ‘Population Census’

1.4 Houses and Commercial Facilities

According to the ‘Housing and Land Survey of Japan’ in 1998, the total number of houses has reached 50.25 million for a total of 44.36 million households. As a result, the number of houses per household has reached 1.13, representing a continued improvement.

In terms of the quality of such accommodation, the average area of floor space per home has risen to 92.4m², demonstrating a steady improvement overall, but when the details are analyzed, a stark contrast can be seen between owned houses (122.7m²) and rented houses (44.5m²), illustrating the number of small rented houses.

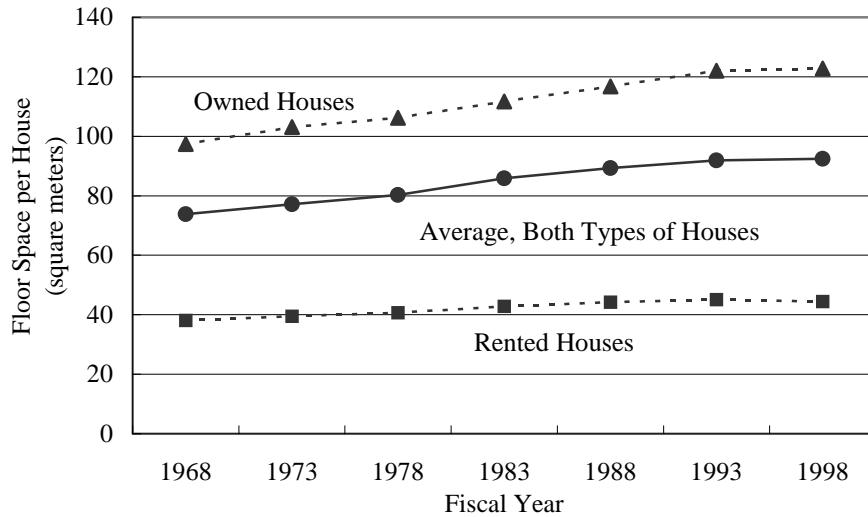


Figure 1.7 Floor Space Areas per House

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications – ‘Housing and Land Survey of Japan’

In Japan, since the period of economic rapid growth, the ratio of tertiary industries, concerning the industrial structure, and in particular the employment structure, has increased. The importance of technology, information, planning and design, etc., for each industry has also increased, and the weight of indirect sectors has increased. In line with the general shift of the Japanese economy towards the tertiary industries as indicated above, the amount of floor space devoted to the business sector has steadily increased. Since 1965, it has increased at an average of 4.1% annually. As a result, the amount of floor space for business sectors in 1999 was approximately quadruple that of 1965.

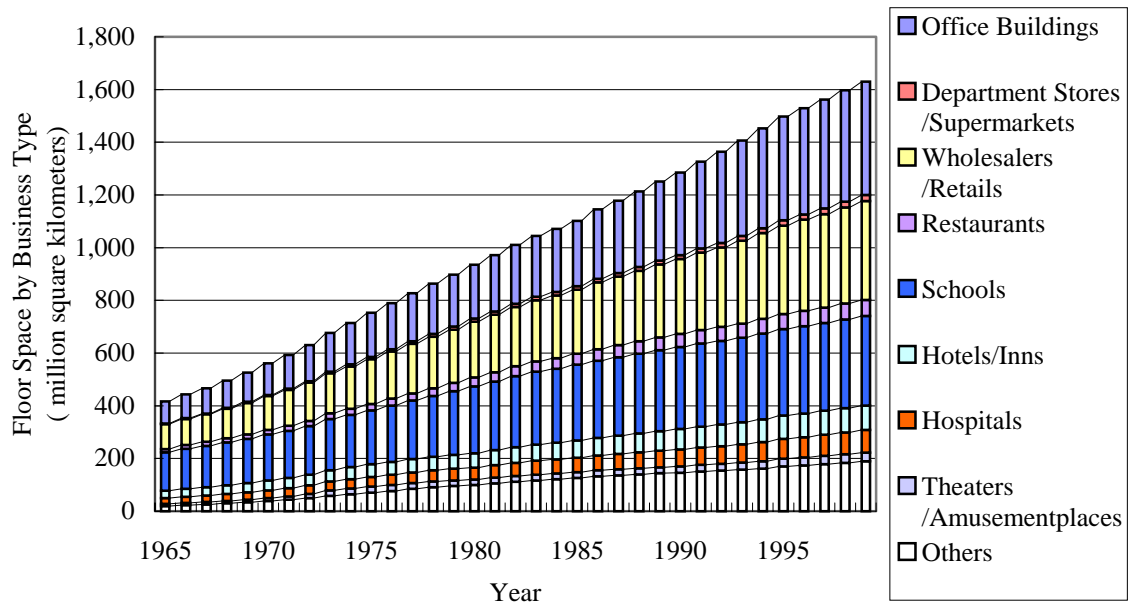


Figure 1.8 Change in Amount of Floor Space by Business Type

Source: The Institute of Energy Economics, Japan – ‘Handbook of Energy & Economic Statistics in Japan’

1.5 Japan’s Industry and Economy

From fiscal 1970 to fiscal 1998, Japan’s gross domestic product (GDP) increased by 2.6 times to 481 trillion yen. During the same period, per capita real GDP increased by about 2.1 times from 1.82 million to 3.8 million yen. The growth process of the Japanese economy by present is explained below.

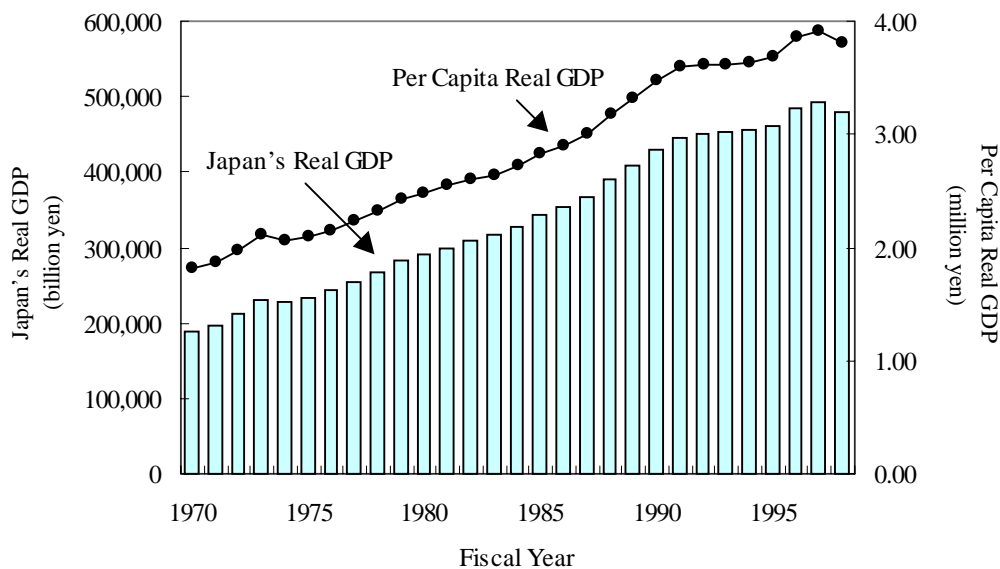


Figure 1.9 Gross Domestic Product from Fiscal 1970 based on 1990 Market Prices

Source: Economic Planning Agency – ‘Annual Report on National Accounts’

Japan’s economy grew extremely rapidly in the 1960s resulting in the development of heavy industry, mainly producing such essentials as steel and petrochemical materials. Synchronously with this, the Japanese economy consumed a large amount of resources and energy. During the same period, the workforce shifted from primary to secondary and tertiary industries. Agricultural production increased despite a reduction in the number of agricultural laborers. Nevertheless, because of the growing income gap compared with other industries, depopulation and other factors, the number of younger laborers working in agriculture villages decreased while the average age of the nation’s farmers increased. At that time, Japanese forestry was primarily practiced by well-dispersed, extremely small businesses operating in steep mountainous areas. It was difficult to improve labor productivity, so forestry faced various problems including a price differential versus imported lumber and other industries. As a result, depopulation of mountain villages continued, the average age of forestry workers increased, and production stagnated.

In the 1970s, following the first oil crisis (1973), in 1974 Japan’s economy recorded its first contraction since the Second World War. Economic growth remained sluggish for some time thereafter. At the same time, the nation’s manufacturing focus shifted from energy-intensive basic industries such as the steel and petrochemical industries to high value-added processing and assembly industries such as electrical appliances and machinery. As income levels rose, the growth of the economy’s services and software components expanded. Tertiary industry (services) came to account for over 50 percent of gross domestic product and total employment. In agriculture, the consistent shares of vegetables and dairy products increased as Japanese dietary habits changed and the nation produced a surplus of rice and other items.

Following the Plaza Accord of 1985, the yen began to grow ever stronger on exchange markets, severely hurting Japanese industry, which was generally very dependent on exports. With the subsequent structural adjustment of the Japanese economy, however, domestic demand expanded, business boomed, the sectorial shares of the financial, wholesale, and retail industries increased, and the prices of land, securities, and other assets skyrocketed.

Then, in the early 1990s, the prices of land, securities, and other assets nose-dived due to monetary tightening and other factors. Combined with an adjustment in consumer durables and capital stock, and reductions in expenditure on consumables from this asset deflation led to the stagnation of economic activities and to a large volume of irrecoverable debts amongst the nation’s financial institutions. Since fiscal 1992, growth of less than 1 percent or negative growth has continued except for in fiscal 1995 and 1996. In particular, since fall 1997, a number of financial organizations have gone bankrupt while the aftereffects of the ‘bubble economy’ have predominated as well as the negative effects of the Asian economic and currency crises, and the reputation of the financial system has been downgraded, resulting in a worsening of the already tough economic status. In terms of the industrial structure, the yen continued to appreciate from the spring of 1990 through the spring of 1995, influencing the processing and assembly industries and spurring on a structural shift among Japanese firms towards greater overseas production. On the other hand, the information, telecommunications, and other nascent industries recorded large growth. In agriculture, competition with foreign producers intensified as the volume of imports increased sharply. In response, Japanese farmers have been strengthening their operations by moving towards larger-scale production and pursuing other rationalization measures.

In terms of the trade balance, black figures of between 10 and 15 trillion yen have been achieved since the 1980s, but the ratio of the nominal GDP has tended to decline from a peak in 1986.

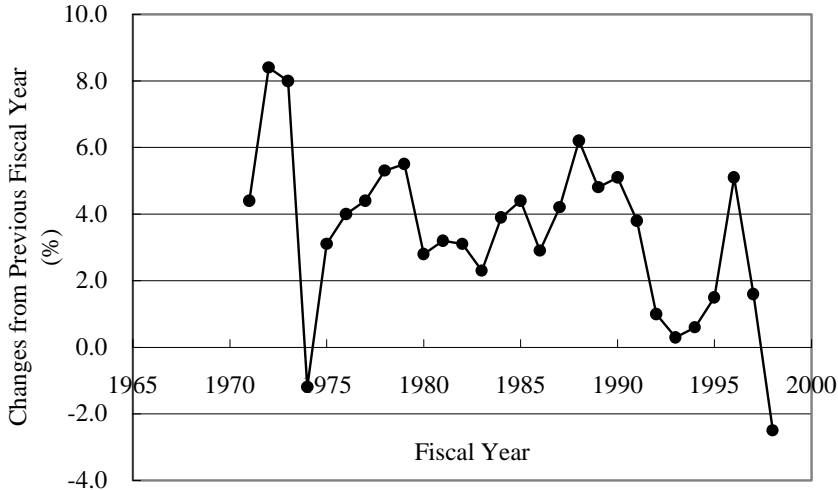


Figure 1.10 Change in Real Gross Domestic Product at 1990 Market Prices

Source: Economic Planning Agency – ‘Annual Report on National Accounts’

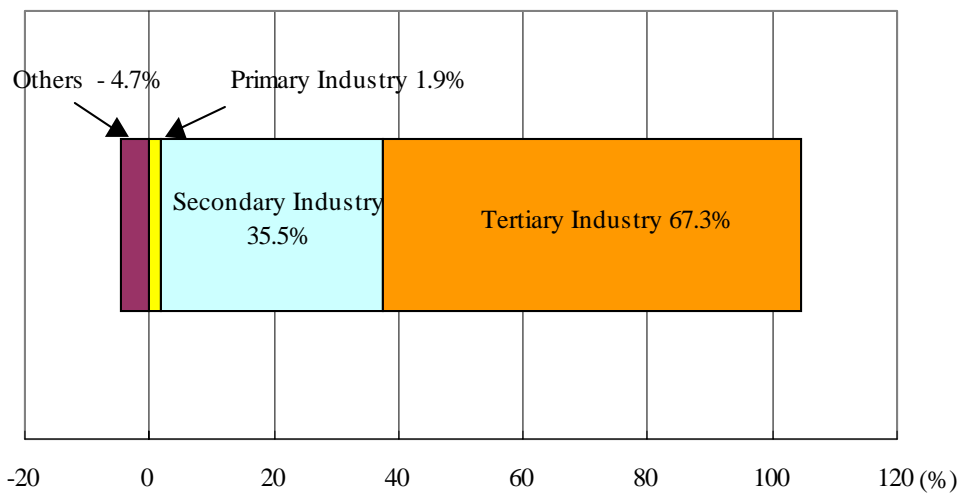


Figure 1.11 Composition Ratio of Real Gross Domestic Product by Economic Activity Type in 1998 at 1990 Market Prices

Source: Economic Planning Agency – ‘Annual Report on National Accounts.’

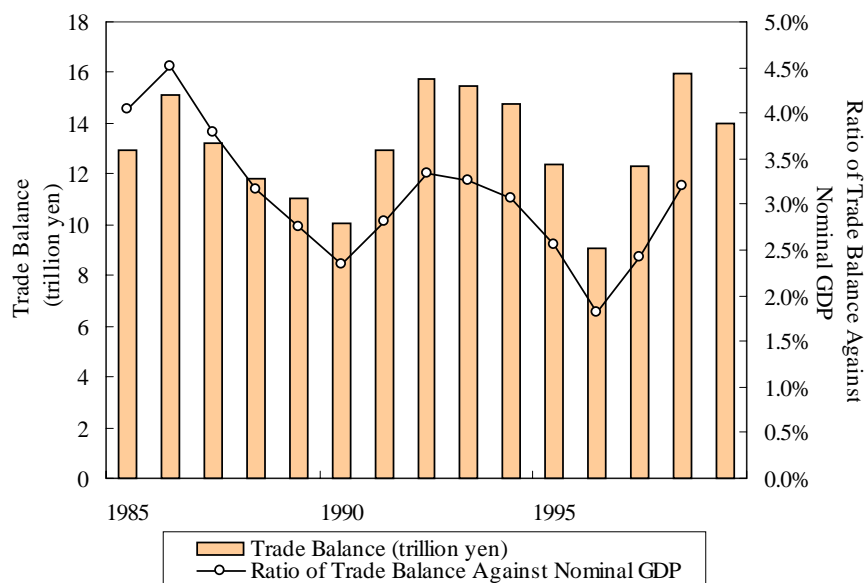


Figure 1.12 Changes in Trade Balance

Sources: Bank of Japan – ‘Balance of Payments Monthly’; Economic Planning Agency – ‘Annual Report on National Accounts’

1.6 Transport

1.6.1 Passenger Transport

Domestic passenger traffic grew significantly throughout the period of rapid economic growth as a result of the popularization of automobiles, improvements to the rapid and comfortable transport system with great mobility and the reduction of traveling time with the network expansion. In particular, private automobile ownership began to grow from about 1960 in line with the growth of income level. As a result, rail traffic's share decreased as road traffic's share increased significantly in the 1960s. Air traffic represented a small fraction of the whole traffic, but its transport volume grew significantly, as its timesaving features and the growth of air transport services with the introduction of jet aircraft in domestic airlines.

Following the first oil crisis, the growth in the whole domestic passenger traffic shrank, but the rise in the standard of living and the increase of recreational time pushed up the passenger travel by motorcar. The introduction of jumbo jets, relatively low airfares and a growing preference for faster modes of transportation caused increase in the volume of air traffic and its share. On the other hand, the share of railways decreased and, it decreased to mere above 40% in the end of the 1970's, which was 75% in 1960.

The growth rate of passenger traffic during the early 1980's lowered, but it suddenly increased in the latter 1980's along with the economic boom (bubble economy). In the 1990's, however, passenger traffic volume and the share of each transportation mode has remained almost constant.

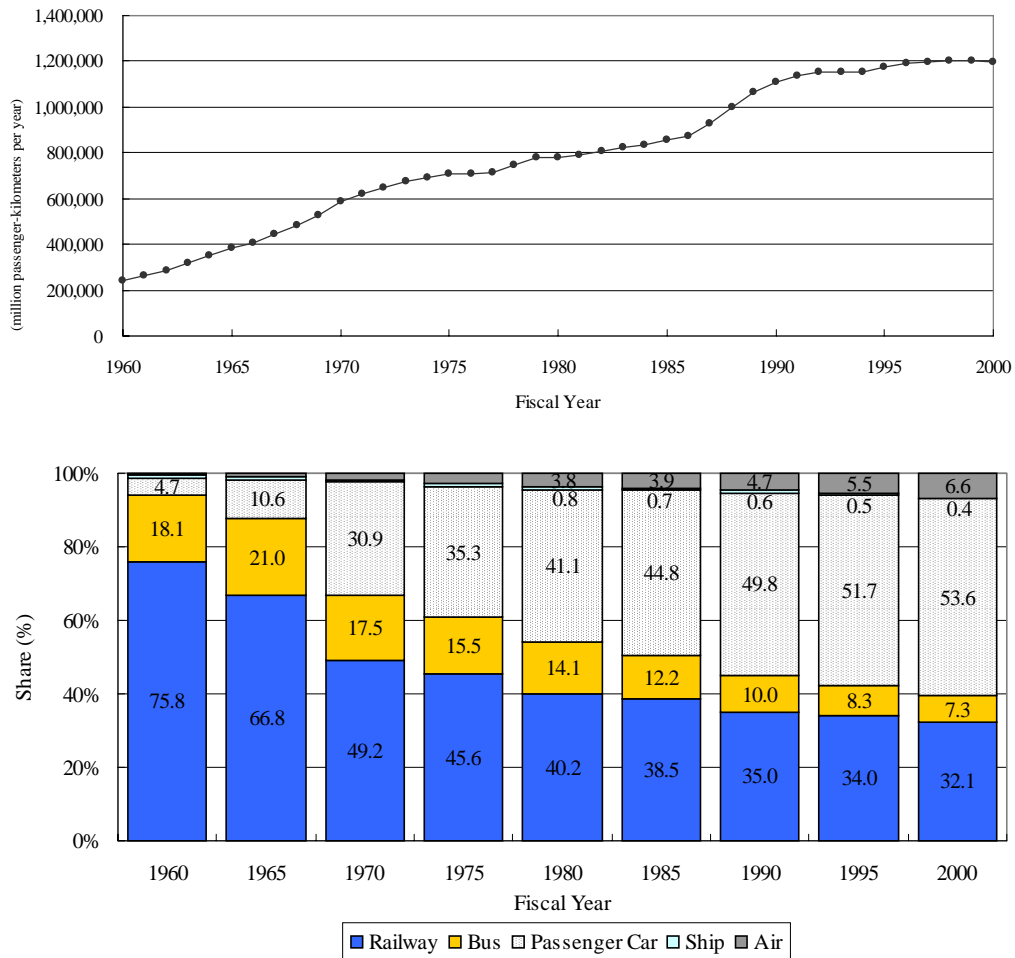


Figure 1.13 Volume of Domestic Passenger Traffic (above) and Modal Shares (below) in Passenger-Kilometers

Source: Ministry of Land, Infrastructure and Transport – ‘Domestic Transportation Statistics Handbook’

Notes: Passenger cars do not include light motor vehicles and private use trucks. Numeric data on passenger cars for fiscal 1994 does not include figures for Hyogo prefecture between January and March 1995 due to the Great Hanshin-Awaji earthquake.

1.6.2 Freight Transport

Domestic freight traffic followed the same upward path as the economic growth during the period of rapid economic growth. Freight road transport showed especially rapid growth, because of increasing demand for transportation of processing components, whose weight are relatively light. Trucking also benefited from the demand for short-distance transport along with the development of industrial complexes in coastal areas near major cities. With the shift of the energy source from coal to oil and the development of heavy industry in coastal areas, domestic sea freight traffic of raw materials for petrochemical, steel and cement

industries and other key heavy industries grew. In contrast, the growth of freight traffic by rail barely increased.

The first oil crisis in 1973 sharply decreased domestic freight traffic in fiscal 1974 and 1975. Freight traffic then gradually increased until fiscal 1979, primarily led by higher demand for civil engineering and construction-related cargos because expenditures for public works increased as part of policies to stimulate the economy. When the second oil crisis struck in 1979, however, domestic demands and shipments of basic and material industries again stagnated and freight traffic shrank as oil consumption decreased with the conversion from oil to other forms of energy.

From the 1980s, Japan experienced industrial restructuring, including a shift from basic materials to processing and assembly, the growth of knowledge-intensive industries, and the transformation of the industrial structure towards tertiary industries. Import demand generated through industrial activities has been reduced in line with the shift to a service-oriented economy. As a result, freight traffic remained flat during this period, decoupled from the economic growth. In the latter half of 1980's, freight traffic turned to increase by a major, domestic, demand-led economic expansion. The modal share of road freight traffic recorded over 50 percent in 1987, as the characteristics of truck transport met the need for small-lot, high-frequency transportation brought on by the advance of the small-volume production of a wide variety of products, and small packet delivery services were upgraded. As a result of the decline in the basic material industries, growth of domestic sea transportation remained rather slack, but it showed some growth with the economic expansion in the late 80's, the domestic sea shipment exceeded their second-oil crisis freight traffic level in fiscal 1990. As the share of airfreight was small, it has been growing to meet the demand for shipping relatively small, light items including machine parts, fresh foods and books. The share of rail freight transportation has steadily declined, but the advance of containerized transport slowed down this decline.

The total freight volume has remained flat since 1991 due to the recession following the collapse of the bubble economy.

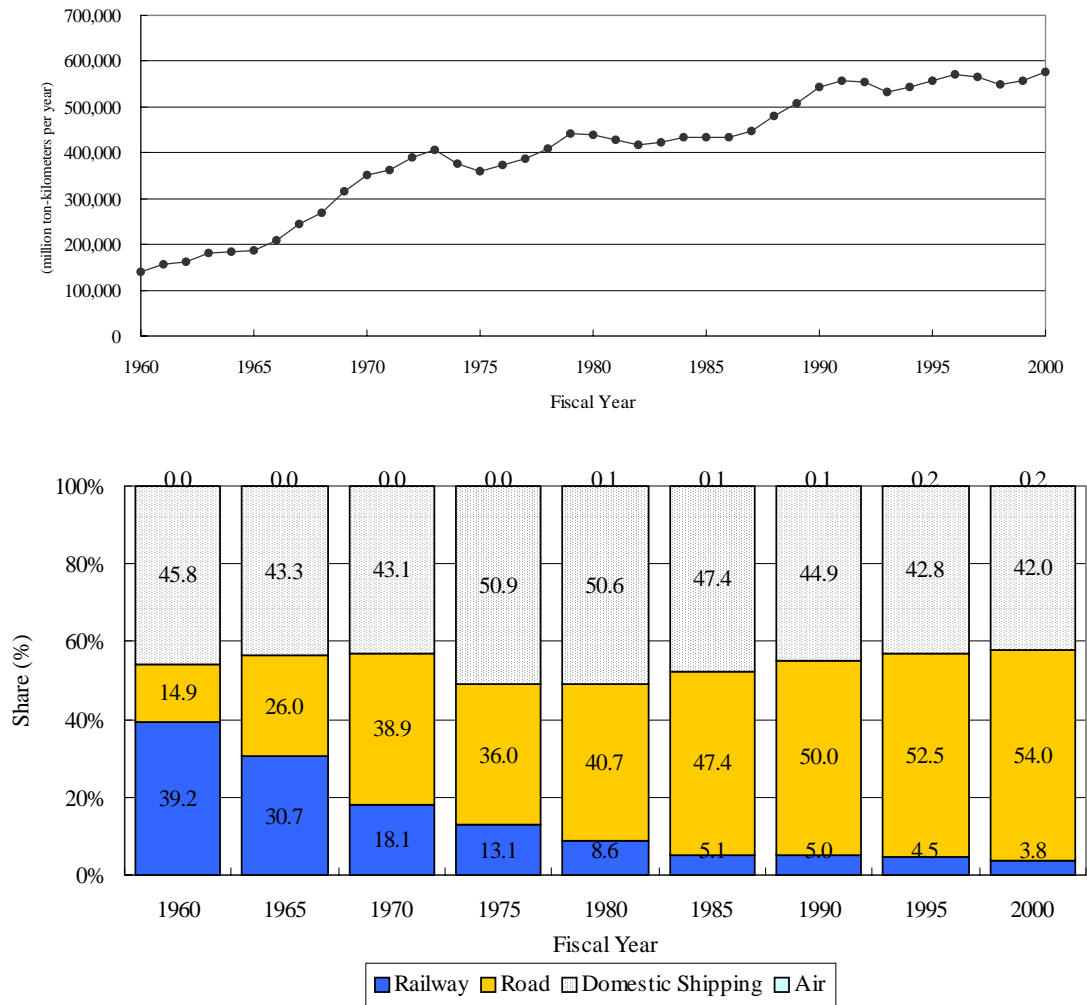


Figure 1.14 Domestic Freight Traffic (above) and Modal Shares (below) in Ton-Kilometers

Source: Ministry of Land, Infrastructure and Transport – ‘Domestic Transportation Statistics Handbook’

Notes: Passenger cars do not include light motor vehicles. Numeric data on passenger cars for fiscal 1994 does not include figures for Hyogo prefecture between January and March 1995 due to the Great Hanshin-Awaji Earthquake.

1.6.3 Motor Vehicle Traffic

Road transport accounts for a large proportion of both passenger and freight traffic. In this section, the number of motor vehicle ownership and vehicle mileage are explained.

Total motor vehicle ownership has increased consistently since the 1960s.

The number of passenger car in fiscal 2000 has increased by 50% since fiscal 1990. However, as the number in fiscal 2000 increased by just 17% over fiscal 1995, its increase rate has slowed down.

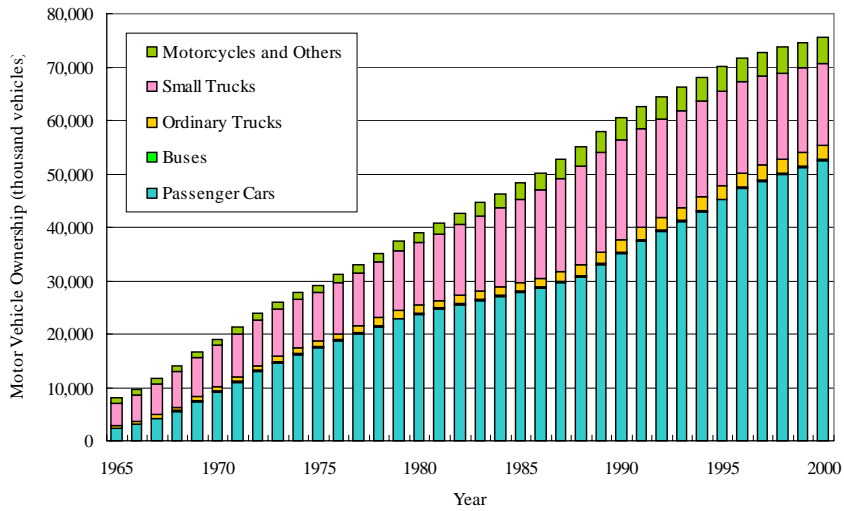


Figure 1.15 Motor Vehicle Ownership

Note 1: Passenger cars includes light weight cars(the engine displacement is 660 cc or less).

2: Small trucks includes light weight trucks(the engine displacement is 660 cc or less).

3. Small special categories of vehicle, scooter (type I) and scooter (type II) are not included

Source: Ministry of Land, Infrastructure and Transport

The total travel distance of trucks, business passenger cars, and buses declined in fiscal 2000 compared to fiscal 1990. The travel distance of private passenger cars significantly increased by around 42% in fiscal 2000 compared to fiscal 1990. However, as the increase in fiscal 2000 was just 15% from fiscal 1995.

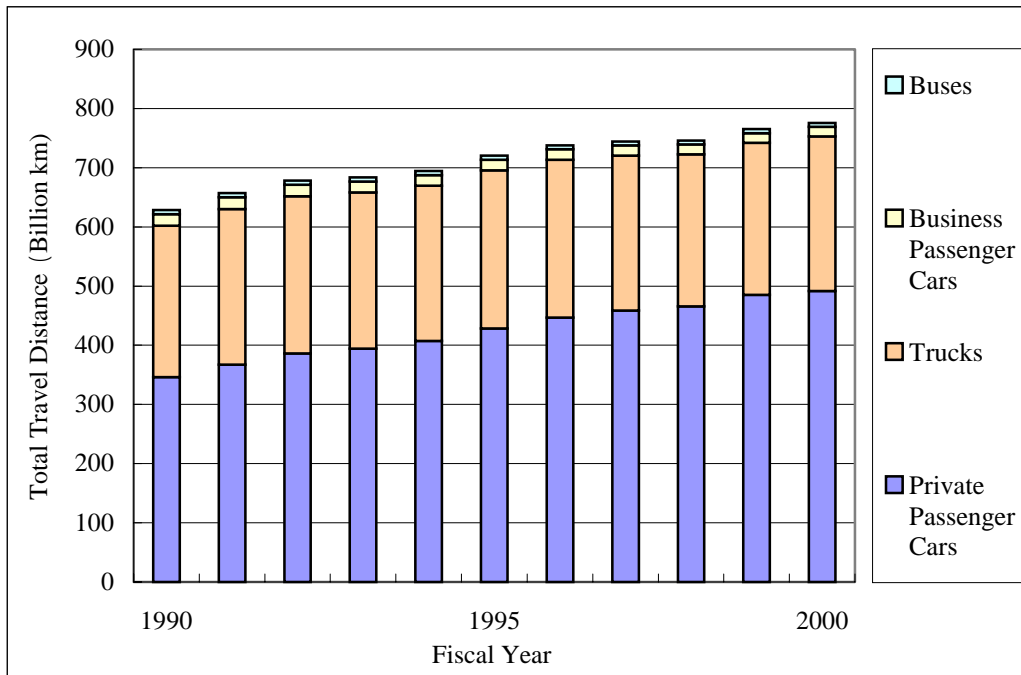


Figure 1.16 Changes in Vehicle Total Travel Distance

Source: Ministry of Land, Infrastructure and Transportation – ‘Annual Statistical Report for Car Transportation’

With regard to private and business passenger cars, which account for a large proportion in the total fleet, preferences have shifted to saloon cars and recreational vehicles (RVs) since 1980, and the ratio of heavy vehicles has increased accordingly. In addition, the average weight of light weight cars (the engine displacement is 660 cc or less) has been increasing following legislation to improve their safety implemented in 1994.

Sales amount of light weight and small vehicles has increased recently, and the preference seems to be separated into two types. However, the preference for large vehicles has still been continued in general, and the number of vehicles whose weight is 1,000kg or less in fiscal 2000 decreased by around 45% compared to fiscal 1980. In the same period, the total number of passenger cars in the 1,001 to 1,500 kilograms category has increased threefold, while those of 1,501 kilograms or more has increased by about 60 times. Thus, the average weight of passenger cars has increased by about 37% over the last 20 years from 942 kilograms in fiscal 1980 to 1,293 kilograms in fiscal 2000.

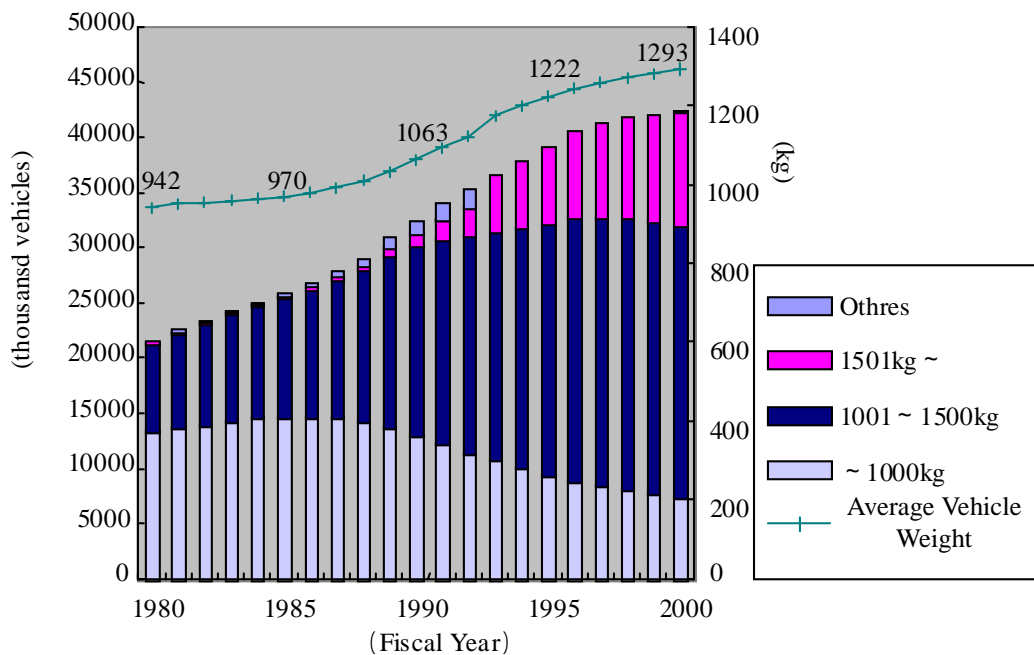


Figure 1.17 Increase in Size (Weight) of Passenger Cars

Source: Car ownership by category (from Ministry of Land, Infrastructure and Transport and Automobile Inspection and Registration Association)

Note 1: Light weight cars (the engine displacement is 660 cc or less) are not included.

2: Multi passenger vehicles (MPV) and minivans that weigh 1,501 kg or more were included under 'Others' until 1992, but they are categorized by weight from 1993 onwards.

1.7 Energy

1.7.1 Consumption

Final energy consumption continued to increase significantly with the Japanese economy's rapid growth during the 1960s and until the first oil crisis in 1973 (Phase I), after which it leveled off and eventually decreased (Phase II). From 1986 onwards (Phase III), however, the economic pickup primed new growth in energy consumption, equivalent to $15,565 \times 10^{15} \text{J}$ in fiscal 1999.

These trends can be summarized for different sectors as follows. Until the first oil crisis in 1973 (Phase I), industrial, residential and commercial, and transport sector energy consumption grew rapidly. From fiscal 1973 until 1986 (Phase II), residential and commercial, and transport sector energy consumption continued to grow, but industrial energy consumption began to decrease. After 1986 (Phase III), the strong economy in the latter half of 1980s boosted energy consumption in the industrial sector for a while, but it leveled off in 1990s. On the other hand, energy consumption in the residential and commercial has significantly increased. In transport sector, it has significantly increased between 1990 and 1995, however, its increase

rate has slowed down over 1995. In fiscal 1999, the industrial sector's share of the total energy consumption in Japan (including non-energy use) was 49%; while the residential and commercial sector's was 26%; and transport's 25%.

Energy consumption trends differ according to the type of energy in question. Electricity and gas consumption have grown uninterruptedly; in fiscal 1999, they were respectively 2.3 times and 3.1 times their fiscal 1973 levels. Coal consumption has been increasing, albeit very gradually. Oil consumption grew rapidly during Phase I, leveled off during Phase II, and has begun to rise again since Japan entered Phase III. Recent growth in demand has been higher for electricity than for other forms of energy consumed by end-users: as a result, the proportion of energy consumed to generate electricity rose from 27 percent of the total primary energy supply in fiscal 1973 to 41% in fiscal 1999.

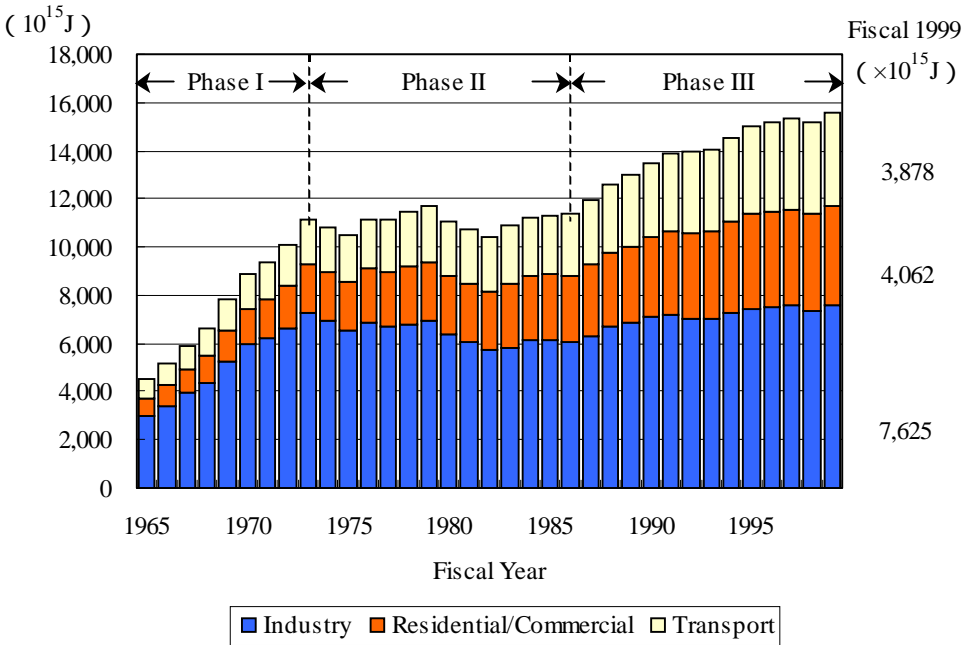


Figure 1.18 Final Consumer Energy Consumption

Source: Agency of Natural Resources and Energy – ‘General Energy Statistics ’

Note: Industrial sector figures include non-energy use.

1.7.2 Supplies

Japan has almost no domestic fossil fuel resources. The ratio of domestic production volumes for the total various fossil fuel supply volume is coal: 2.3%; crude oil: 0.3%; natural gas: 3.3% (all data as of fiscal 1999). Its dependence on foreign sources peaked in fiscal 1973 at 89.4 percent of its energy supply; since then, this dependence has been reduced by efforts to find substitutes for oil; in recent years, foreign

dependence has remained about 80 percent, putting the nation in an extremely vulnerable energy-supply situation.

Japan’s total primary energy supplies reflect increases in final energy consumption; supplies continued to grow at a substantial rate until fiscal 1973 but leveled off after the first oil crisis, and after 1986 there was again a surge of growth. In fiscal 1999, Japan’s total primary energy supply was $22,967 \times 10^{15} \text{J}$.

Oil supplies grew continually during Phase I, shrank during Phase II, and again grew steadily during Phase III. Coal supplies are increasing very gradually. Supplies of natural gas and nuclear energy are growing at a substantial rate. Different energy sources contribute different shares of the total primary energy supply: during Phase I, oil increased its share while coal and hydroelectric power decreased theirs. As a result, oil’s share of total primary energy (the ‘oil dependency’ rate) rose to its peak at 77 percent in fiscal 1973. Oil’s share then began to decrease during Phase II, and leveled off during Phase III, but recently, decreased again and as of fiscal 1999, it was 52%. Coal gradually increased its share following the second oil crisis in 1979 – it was 19 percent in fiscal 1985 – but since then, its share has been reduced or remained level; in fiscal 1999, it accounted for 17 percent. The introduction of alternatives to oil beginning in fiscal 1973 swiftly increased the shares of natural gas and nuclear power, to 13 percent each in fiscal 1999 from two percent and one percent in fiscal 1973, and contributed to Energy Security of Japan.

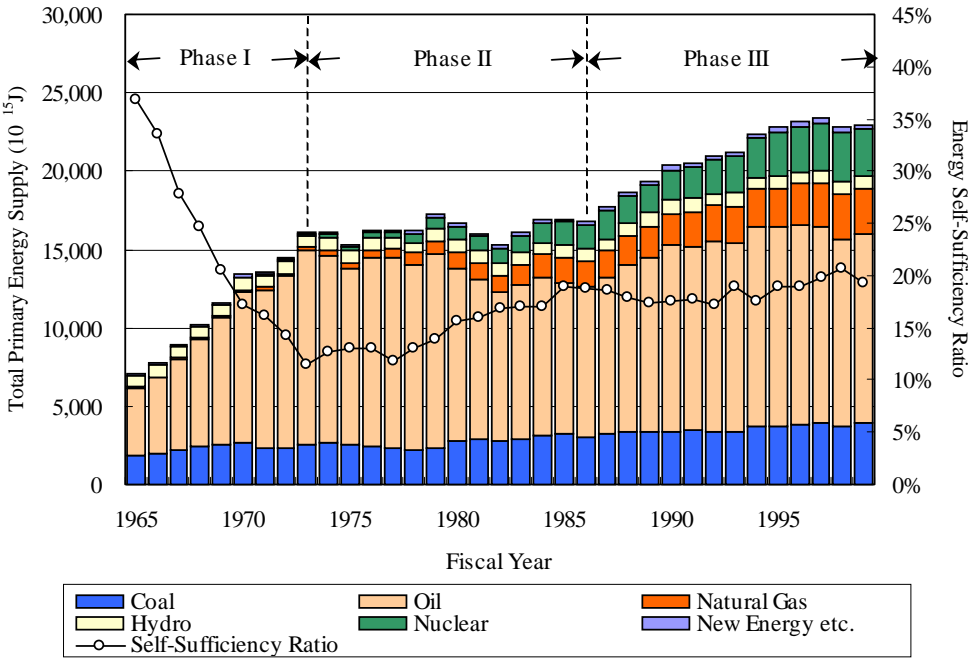


Figure 1.19 Total Primary Energy Supply and Self-Sufficiency Ratio

Source: Agency of Natural Resources and Energy – ‘General Energy Statistics ’

Note: ‘New energy , etc.’ includes geothermal energy.

The total of electric power generation increased by about 24% in fiscal 1990 compared to fiscal 1999, nuclear power by about 57%, thermal power by about 13%. As for thermal power generation, coal increased by about 113% and LNG by about 47%, on the other hand, oil decreased by about 46% in the same period.

1.7.3 Per Capita Total Primary Energy Supply and Total Primary Energy Supply per Unit of GDP

Japan’s total primary energy supply per capita as of 1999 is $181 \times 10^9\text{J}$, a level that has remained steady recently.

Japan’s total primary energy supply per unit of GDP (total primary energy supply per gross domestic production) increased (worsened) during Phase I, but has improved significantly since Phase II as a result of the world-leading introductions of energy-saving facilities and technologies brought about by the oil crisis. Though it has tended to improve during Phase III as well, it has remained static during the 1990s. This is due both to the significant contribution of industry’s massive energy-saving investments in reductions that have already been achieved in energy input per unit of output and to the increase in residential and commercial and transport and vehicles energy consumption due to greater national affluence and a higher standard of living.

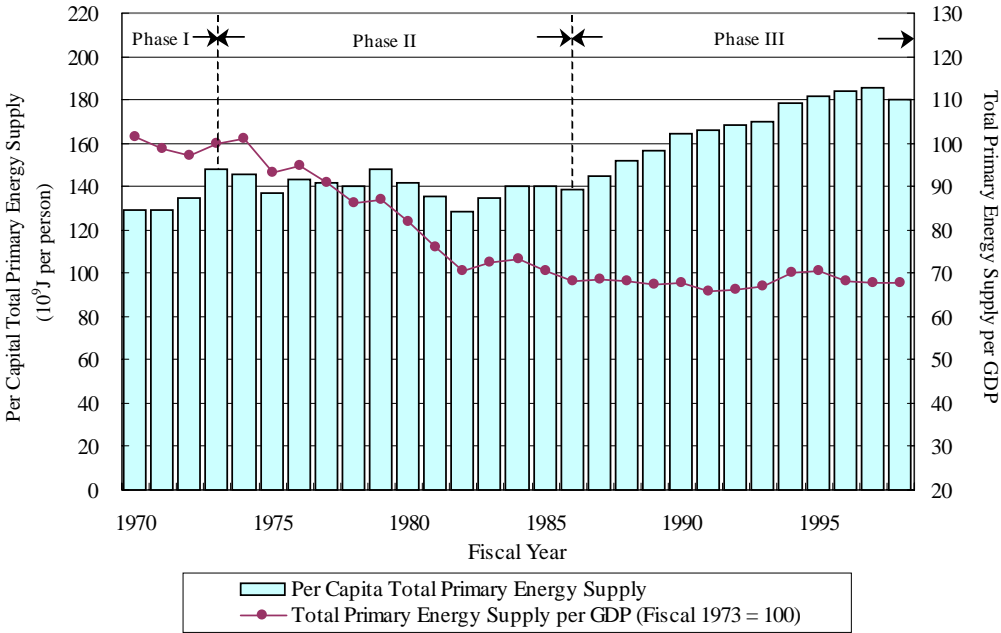


Figure 1.20 Per Capita Total Primary Energy Supply and Total Primary Energy Supply per GDP

Sources: Agency of Natural Resources and Energy – ‘General Energy Statistics’;

Economic Planning Agency – ‘Annual Report on National Accounts’;
Ministry of Public Management, Home Affairs, Posts and Telecommunications
– ‘Population Census’ and ‘The Annual Report on Current Population Estimates’.

1.7.4 Prices

Imported energy was cheap and supplies plentiful during Phase I; prices skyrocketed as a result of the two oil crises, peaking in fiscal 1981 then began to fall, and have been steady since fiscal 1986. The fiscal 1990 yen-denominated price of crude oil* (partially due to the substantial appreciation of the yen) is only slightly higher than it was prior to the oil crisis.

Crude oil prices did shoot up temporarily when the Gulf crisis broke out in 1990 but then returned to the levels prevailing prior to the Gulf War. In 1996, however, the price of crude oil topped \$20 a barrel because of the strong growth of worldwide oil demand, the low inventory system for crude oil and oil products adopted by Western petroleum companies in an effort to reduce costs, coupled with the unstable political situation in the Persian gulf region.

As per the above description, in the first half of the 1990s, the price per barrel changed to around \$20, but the crude oil price fell to \$10 per barrel because global oil stocks had increased in line with a dulling in the increase rate of demand mainly in Asia resulting from the faltering Asian economy due to financial and currency crises from 1997 to 1998.

However, it has skyrocketed to over \$30 in 2000 following the recovery of the Asian economy and OPEC’s decision to cut crude production thereafter. OPEC increased production four times in 2000, and as a result, the crude oil price started to decline from the end of the year, and fell below \$20 for a while. Under these circumstances, OPEC decided to cut production in February 2001 to try to curtail the price crash. Since then, they initiated reduced production additionally from April and September to try to hold the OPEC basket price within \$22 ~ \$28. However, oil prices dropped again due to concern that oil demand may fall due to a global economic slowdown following the September 11th terrorist attacks in USA. In November, the price fell as low as \$16 for a while (Dubai crude oil). As a result of reduced oil prices, OPEC decided to cut production further from January 2002 after receiving signs of reduced production from the non-OPEC oil producers.

*: Crude oil prices are adjusted to correct for price fluctuations caused by exchange rate changes after converting the dollar-based crude oil price to yen in the period concerned.

1.7.5 National Energy Budget and Taxation System

Today, Japan finds it necessary to reform its energy supply and demand structure in order to increase national energy security and positively address global environmental problems.

On the demand side, the government is trying to promote thoroughly efficient energy usage, beginning with energy conservation measures. In terms of supply, efforts are being made to promote the introduction of oil alternative energy such as new energy resources and to strengthen measures to secure a stable supply of oil. In order to further advance these policies, the funds for energy-related measures in the national budget are secured via special accounts. For example, the fiscal 2002 budget allocates 211.3 billion yen (an increase of 23.6 percent over the previous year) for the following the more sophisticated structure of demand and supply of energy policies: technological development of oil alternative energy such as new energy and energy conservation; the conversion to facilities of oil alternative energy such as new energy and of energy conservation, and the spread of them.

Table 1.2 Special Accounts for Coal, Petroleum and the More Sophisticated Structure of Demand and Supply of Energy Policies

(Units: hundred million yen)

Account name	Fiscal 2001 Budget	Fiscal 2002 Budget	Year-on-Year Growth	
Coal Account	1,406	(Note)	-	-
Petroleum and the More Sophisticated Structure of Demand and Supply of Energy Policies	6,298	6,195	-103	-1.6%
Petroleum Policy	4,589	4,082	-507	-11.0%
The More Sophisticated Structure of Demand and Supply of Energy Policy	1,709	2,113	+403	+23.6%
Total	7,704	6,195	-1,510	-19.6%

Sources: Ministry of Finance; Ministry of Economy, Trade and Industry

Note: On the coal account, appropriation of political expenditure ended in fiscal 2001. For fiscal 2002, it will be an estimated account that only seeks to redeem the principal on the original loan (¥8.4 billion).

Table 1.3 Special Accounts for Electric Power Development Promotion Policy

(Units: hundred million yen)

Account name	Fiscal 2001 Budget	Fiscal 2002 Budget	Year-on-Year Growth	
Electric Power Siting Account	2,437	2,446	+10	+0.4%
Electric Power Source Diversification Account	2,425	2,481	+55	+2.3%
Total	4,862	4,927	+65	+1.3%

Source: Ministry of Finance; Ministry of Economy, Trade and Industry

Japan has a system of energy-related taxes that include petroleum tax, and promotion of power-resources development tax. Revenues from petroleum tax are allocated for oil measures, energy conservation measures and new energy measures; while revenues from promotion of power-resources development tax are allocated for measures for siting power generation facilities and the like, and new energy measures through power generation.

An investment promotion tax system on basis energy has been implemented in Japan since fiscal 1981.

In fiscal 1992, Japan also introduced a tax system to promote investment aimed at reforming the energy supply-demand structure. This system provides tax incentives to promote the introduction of energy conservation and new energy equipment.

1.8 Waste

Waste mainly falls into two categories, namely, municipal solid waste and industrial waste. Industrial waste refers to that generated through enterprising activities and is comprised of 20 types specified by cabinet order. Municipal solid waste covers those other than industrial waste, and includes night soil, other household waste disposed of by families, as well as business waste disposed of from offices and restaurants. Even though the total amount of municipal solid waste and the waste disposed per capita per day have decreased after the second oil crisis (1979), it rapidly increased again during the bubble economy period since around 1985, and has been relatively flat from 1989 to 1999. The total amount of municipal solid waste disposed is 51.45 million tons, which equates to about 1.1 kilograms per capita per day in 1999. This is comprised of 34 percent business waste and 66 percent household waste. In terms of the disposal methods, most is incinerated (78%), some is recycled (15%) and the rest buried as direct landfill (7%).

The amount of industrial waste disposed of has not changed significantly since 1990, but has remained fairly static. The total amount of industrial waste disposed of in 1999 was about 400 million tons. After such industrial waste is disposed of, about 171 million tons (43%) is recycled and about 50 million tons (12%) are finally disposed.

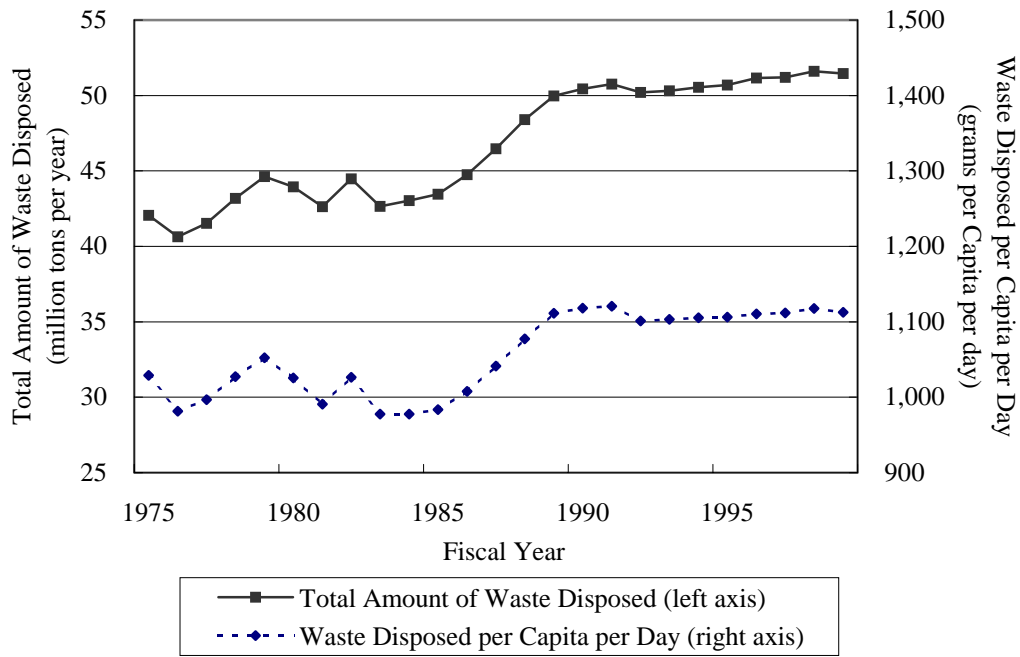


Figure 1.21 Changes in Amount of Municipal Solid Waste Disposed

Source: Ministry of the Environment – ‘Status of Municipal Solid Waste Discharge and Disposal’

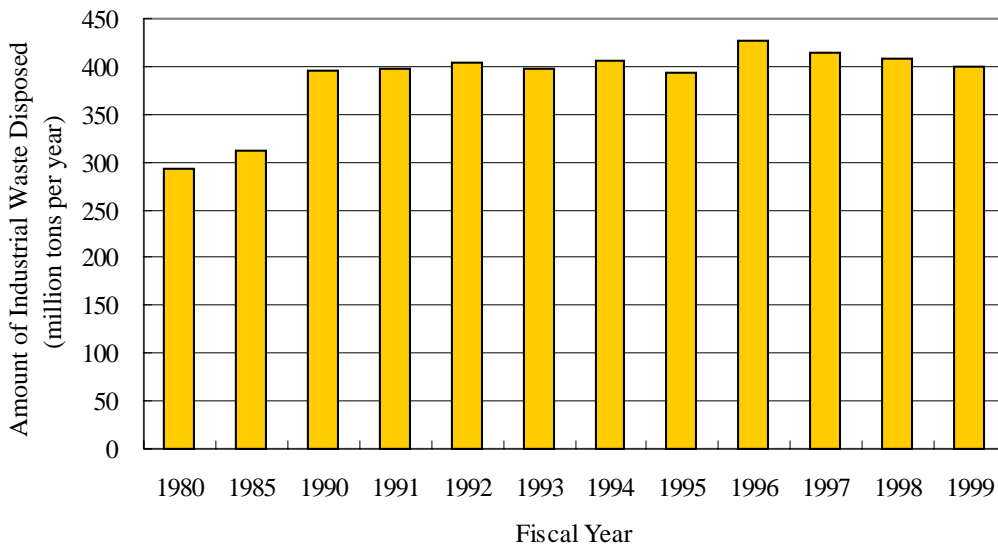


Figure 1.22 Changes in Amounts of Industrial Waste Disposed

Source: Ministry of the Environment – ‘Status of Industrial Waste Discharge and Disposal’

1.9 Agriculture

In Japan, which falls within the Asian Monsoon region, rice cultivation in paddy fields has long formed part of the agricultural system suited to the humid and rainy summer condition. In order to develop paddy field cultivation, measures to improve paddy field irrigation have been implemented, and, as a result, the ratio of irrigated paddy fields out of the total agricultural area in Japan (54.4 percent) is quite high compared to other countries.

However, as Japan is mountainous and does not have much plains (the mountain area accounts for 61 percent of the national land), the conflict among different types of land use has been long observed. The ratio used for agriculture within the national land is about 14 percent and the cultivated field per household is small (approximately 1.6 hectares). Furthermore, the cultivated area has been decreasing year by year, and in 2000, it has fallen to about 20 percent (4.83 million hectares) of the peak period. In terms of paddy fields, new development of paddy fields was restricted in 1969, and since then the total area has declined by the rate of 1 percent per year due to the conversion to other crop field and/or non-agricultural land use. Since the latter half of the 1980s, farmland development has been reduced, with a trend for farmland to be left uncultivated mainly in hilly and mountainous regions, and as a result, the total area under cultivation has also reduced. Such tendency still remains today.

Japan's food self-sufficiency ratio has also fallen significantly. During the period from 1965 to 1999, the food self-sufficiency ratio in terms of calorie base* decreased from 73% to 40%, or 62% to 27% in terms of grain base. The main long-term cause for the decrease is significant change of Japanese eating habits, including increased consumption of meat and fat which rely on imported feed grain and oilseeds due to restrictions on the national land.

*: Food self-sufficiency ratio in terms of calorie base: Ratio of calorific value of food produced domestically over the total calorific value of food (including feed grain) supplied to the total population.

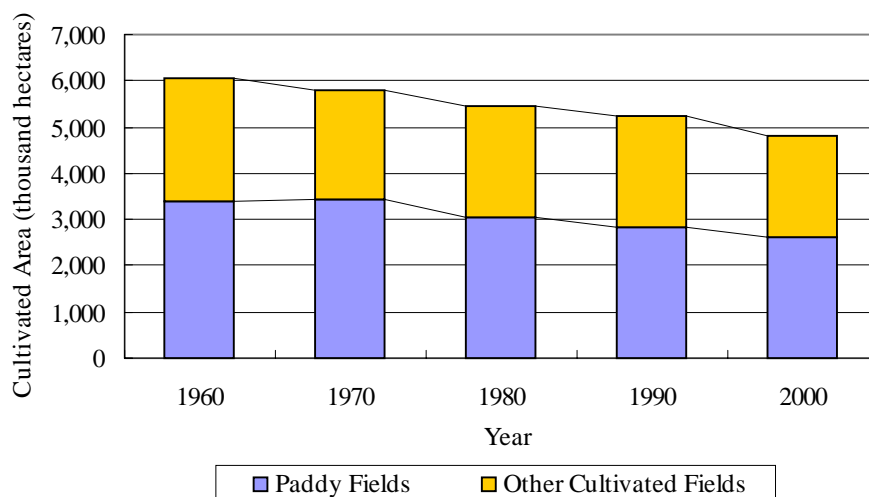


Figure 1.23 Changes in Cultivated Areas

Source: Ministry of Agriculture, Forestry and Fisheries of Japan– ‘Statistics on Cultivated land and Planted Area’

1.10 Forestry

Forestry plays an important role in Japan in maintaining functions for the public benefit such as national land conservation through forestry activities such as thinning and tending as well as providing products such as timber.

Recently, forest cover about 25 million hectares or about 70% of Japan's national land area. It is comprised of national forest: approximately 7.8 million hectares (31%) and non-national forest: 17.3 million hectares (69%). Approximately 10 million hectares (41%) of forest in Japan are planted while the other 15 million hectares (59%) is natural. In terms of the growing stock of forest, its area has roughly doubled since 30 years ago through the active plantation in the 1960s, and has been increasing by about 80 million cubic meters per year, mainly in the area of planted forests.

On the other hand, wood demand in Japan is stable recently around 100 million cubic meters per year. In terms of the specifics, the domestic wood supply has been decreasing, and its supply ratio has become about 20 percent in 1999.

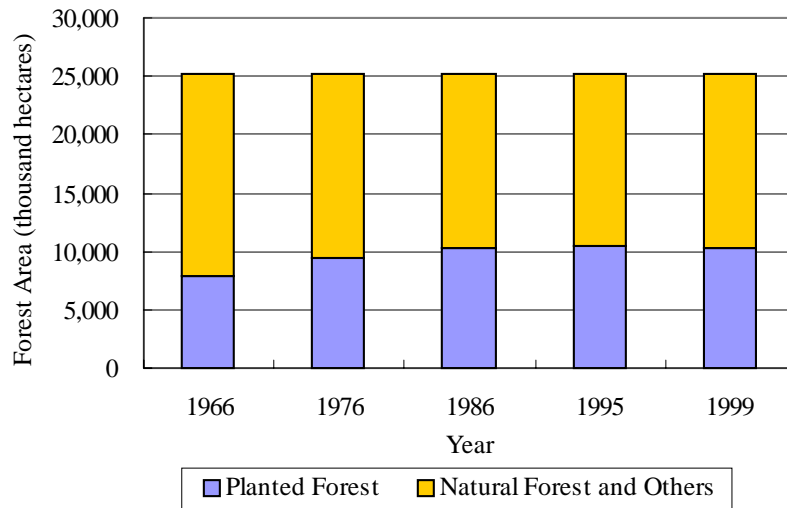


Figure 1.24 Changes in Forested Area

Source: Forestry Agency – ‘Annual Report on Trends of Forestry’

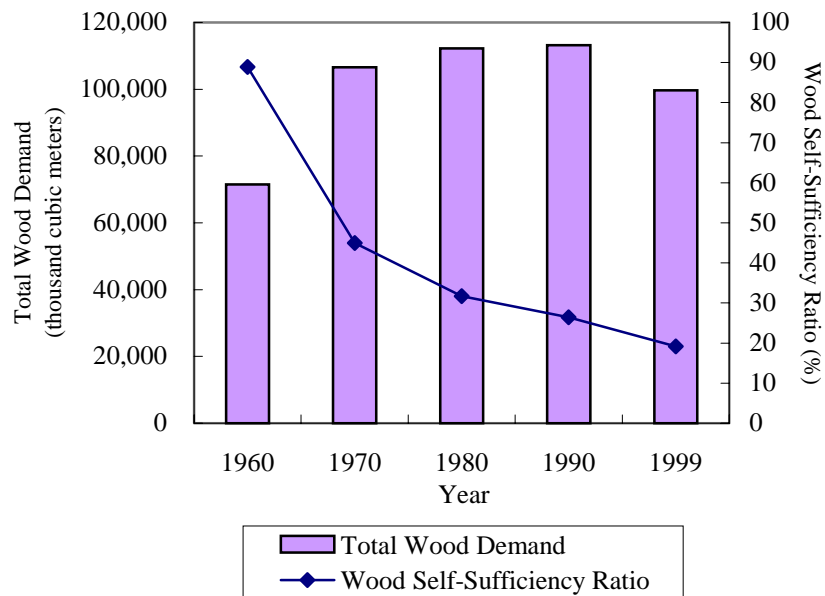


Figure 1.25 Change in Total Wood Demand and Wood Self-Sufficiency Ratio

Source: Forestry Agency – ‘Demand and Supply of Woods’

1.11 Information and Telecommunications

In Japan, the Internet has become more popular since the first half of the 1990s. Recently, the number of users has increased explosively, and it is estimated that as of the end of 2000, that number had reached 47.08 million (74 percent increase over the previous year). In addition to a steady increase in the number of users accessing via PCs, those using mobile phones services that began in 1999 have also rapidly increased.

In line with such an increase, the amount of information provided by companies and government offices that used to be carried out mainly via paper media (such as pamphlets) has shifted to electronic data provision via the Internet. Private and inter-company data exchange and provision have also shifted from paper to electronic media such as e-mail. Furthermore, the market scale for utilizing electronic information (electronic commerce) has rapidly expanded. The value of Business to Business (B-to-B) transactions in 2000 was about 22 trillion yen (a 250 percent increase) while Business to Consumers (B-to-C) deals were worth about 820 billion yen (also a 250 percent over the previous year).

In order to establish an advanced communications network society to meet information and telecommunications requirements that will doubtless increase, high-speed and large volume network foundations will be required throughout Japan. Currently, an optical fiber network has been prepared and is being expanded. As of the end of 1999, preparation rate for optical fiber network averages 36 percent nationwide. The government is trying to complete preparation of an optical fiber network by 2005.

1.12 Administration and Finances

1.12.1 Administration

Under the Japanese Constitution enacted in 1947, sovereign power resides with the people while the judicial, legislative, and executive powers of government are vested, respectively, in the mutually independent Supreme Court, Diet, and Cabinet. The Constitution establishes a parliamentary cabinet linking the Cabinet to the Diet; the Diet designates the Prime Minister; the Prime Minister and a majority of the Ministers of State must be Diet members; and the Cabinet is collectively responsible to the Diet.

Organs of national administration under Cabinet jurisdiction are established – the Cabinet Office and ten ministries: namely The Ministries of Public Management, Home Affairs, Post & Telecommunications; Justice; Foreign Affairs; Finance; Education, Culture, Sports, Science and Technology; Health, Labour and Welfare; Agriculture, Forestry, and Fisheries; Economy, Trade and Industry; Land, Infrastructure and Transport; and Environment. As the chief ministers of state, the Prime Minister and the individual ministers divide responsibility for national administrative duties. Councils are among the representative organs established under law with the object of ensuring that expert opinions and the views of the people are reflected in administrative actions. The main duty of the councils and other advisory bodies is to

investigate and deliberate on the jurisdiction and stipulation of laws and to inform administrative organs of their views. As of April 2001, there were 106 councils and similar organs in existence.

Global environmental problems, including global warming, are addressed by closely coordinating policies among the administrative organs concerned. To insure effective overall coordination, the Cabinet convened the Council of Ministers for Global Environment Conservation in May 1989. This Council decided the 'Action Program to Arrest Global Warming' in October 1990. Under this program, progress of the action was reported every year to the Council and discussed to further promote the action program. In December 1997, the Cabinet convened 'Global Warming Prevention Headquarters' to realize specific and effective global warming countermeasures taking the opportunity offered by the Third Session of the Conference of the Parties to the UNFCCC (COP3, the Kyoto Conference). This headquarters decided the 'Guideline of Measures to Prevent Global Warming' in June 1998, tried to strengthen measures to encourage various sectors and layers of the public to become involved in and cooperate towards the 2010 target, and decided to promote comprehensive measures deliberately to steadily achieve a 6 percent reduction commitment as per the Kyoto Protocol by using all manner of political means. The headquarters annually checks the level of progress of the specified measures for ways to address global warming.

In October 1998, the 'Law Concerning the Promotion of the Measures to Cope with Global Warming' was enacted (enforced in April 1999), outlining the implementation of global warming countermeasures in cooperation with the government, local public organizations, businesses and citizens through the adoption of the Kyoto Protocol. The law clarifies the obligations of the government, local public organizations, businesses and citizens, obliges the government and local public organizations to draw up a plan (implementation plan) to reduce the greenhouse gases emission in line with carrying out their clerical work and operations, and to make public its implementation status, as well as to specify an entrustment system for 'Global Warming Prevention Activities Advisors' who provide advice and encouragement to local residents and a designation system for the 'Prefectural Centers for Climate Change Action' that is a foundation for encouraging and supporting the activities of private organizations.

In April 1999, the Cabinet decided its 'Principles Concerning Global Warming Countermeasures' following the adoption of the above law. It clarifies the basic activities for the government, local public organizations, businesses, and citizens, and also specifies implementation plan details for clerical work and the operation of local public organizations.

In June 1998, the Law Concerning the Rational Use of Energy was revised (enforced in April 1999) mainly from the viewpoint of reduction of CO₂ emission from energy sources, a major constituent of Greenhouse gas. The points of the revision were to strengthen efficiency standards for electrical appliances and automobiles using the top-runner approach, and to strengthen efficiency standards in factories and buildings. The top-runner approach is that products are trying to achieve the standards of energy efficiency that most efficient products supplied domestically on standard year have.

From 1998 to 1999, the basis in Japan for implementing measures to prevent global warming was established, but emissions continued to increase. In order to achieve the commitment stipulated in the

Kyoto Protocol, further measures must be promoted, so global warming prevention measures have been reviewed by Central Environment Council and Advisory Committee for Natural Resources and Energy, etc. In March 2002, new “Guideline for Measures to Prevent Global Warming” was drawn up and officially approved by the “Global Warming Prevention Headquarters”. This new Guideline show an overview of the specific measures with details of how to achieve the 6% reduction commitment stipulated in the Kyoto Protocol, describe targets, measures, and their implementation schedule per greenhouse gas type and category, and also specify the total target amount in Japan for each measure, estimated emission reductions, and policies to promote these measures before concluding Kyoto Protocol.

As of May 2001, local public organizations included 47 prefectures and 3,224 municipalities (cities, towns, and villages) with local assemblies serving as their legislatures; their executive branches being headed by a governor in the case of prefectures and by a mayor in the case of municipalities. The size of the prefectures and municipalities varies.

Since measures to prevent global warming are intimately related to all socioeconomic activities, in addition to the policies of national government organs, the policies and measures implemented by regional and local governments and efforts to induce appropriate behavior on the part of local communities and individual citizens in their daily lives are also extremely important. Bearing in mind the key roles played by local public organizations in global warming countermeasures, since fiscal 1994 the Japanese government has been encouraging the drafting of regional plans for measures to address global warming. At present, 31 prefectures drew up the regional plan. Implementation plans for measures based on the law for promoting global warming countermeasures have been established in 40 prefectures: 412 cities, towns, and villages (as of April 2001), 1,453 members to global warming prevention activities advisors have been entrusted in twelve prefectures (as of April 2001), and ‘Prefectural Centers for Climate Change Action’ have been specified in nine prefectures (as of May 2001). In this manner, Japan’s local public organizations are steadily increasing their efforts to address global warming and the continuing progress is expected.

1.12.2 Finances

Japan’s national finances are administered as follows. Every fiscal year (April 1st to March 31st), the government prepares a budget, which must be approved by the Diet before it is implemented by the administrative organs. The national budget consists of three parts: the general account, special accounts, and government-related operating accounts.

The general account is the record of the national government’s ordinary revenues and outlays. It is sourced from taxes and, when necessary, borrowing by the national government. This account covers the most fundamental national expenses, such as social welfare, education, and defense. In fiscal 2001, ordinary expenditure totaled 48.6589 trillion yen, 1.2 percent over the initial budget for the previous year. The general account totaled 82.6524 trillion yen, a decrease of 2.7 percent. Special accounts are specially

established under the Finance Law independently of the general account in cases where the national government runs certain enterprises, invests certain funds, or allots certain revenues to particular expenditures. There are 38 such special accounts, including the Special Account for Government Enterprises, the Special Account for Food Control, and the Special Account for Insurance. Government-related operations are wholly state-owned financial institutions established via special legislation; National Life Finance Corporation, Japan Finance Corporation for Small Business, and Development Bank of Japan are among the six finance corporations, two banks, one enterprise, and one treasury set up in this way.

The global environmental protection-related component, either having global environmental protection as a direct goal or contributing especially significantly to global environmental protection, was allocated 645.3 billion yen in fiscal 2001 (669.9 billion yen in the initial budget for the previous year): the global warming countermeasures program accounted for 535.8 billion yen of this total (553.1 billion yen in the previous year). Thus, the fiscal 2001 budget allocations for global warming countermeasures account for 1.3 percent of total ordinary expenditures.

Table 1.4 General Account Budget by Major Expenditure Programs

(Units: hundred million yen, %)

	Fiscal 2001		
		Increase from Fiscal 2000	Growth Rate (%)
Social Security	175,552	7,886	4.7
Education and Science	66,472	1,187	1.8
Government Employee Pensions and Others	13,562	694	4.9
National Defense	49,553	195	0.4
Public Works	94,352	12	0.0
Economic Assistance	9,562	280	2.8
(Reference:ODA)	10,152	314	3.0
Small- and Medium-sized Businesses	1,948	5	0.2
Energy Measures	6,139	213	3.4
Major Foodstuff Measures	6,952	99	1.5
Transfer to the Industrial Investment Special Account	1,537	58	3.6
Miscellaneous	54,460	464	0.8
Contingencies for Public Works	3,000	2,000	40.0
Contingencies	3,500	0	0.0
Total	486,589	5,675	1.2

Source: Ministry of Finance

Table 1.5 Global Environmental Conservation-Related Budget

(Unit: hundred million yen)

	Fiscal 1999	Fiscal 2000	Fiscal 2001
Global warming	5,192	5,531	5,358
Ozone layer depletion	39	44	10
Acid deposition	70	70	79
Marine pollution	33	41	25
Trans boundary movement of toxic waste	0.4	0.4	0.5
Tropical deforestation	17	16	44
Decline in number of species	18	19	10
Desertification	14	12	8
Environmental pollution in developing countries	56	48	49
Internationally valued environmental conservation	31	32	30
Unclassifiable	963	886	840
Total	6,433	6,699	6,453

Source: Ministry of the Environment