Abridged and Illustrated for Easy Understanding

Quality of the Environment in Japan 2002

Movement Towards Construction of Sustainable Society

Ministry of the Environment

To Readers:

This booklet is based on the 2002 edition of the White Paper on the Environment, officially announced by the Cabinet of the Japanese Government in May. In preparing this booklet, the text of the White Paper has been edited to make it more accessible and easier to understand for the general public.
The theme of this year's White Paper is "movement towards construction of sustainable society." We understand that this is the time for tackling structural reform of the entire society and is a good opportunity for moving towards a sustainable socio economic system, and also to introduce practical measures for various subjects and new concepts as the background.

The White Paper indicates the necessity for two healthy cycles, a socio economic system and a natural environment, and the necessity for achievement of high environmental efficiency that exceeds the economic growth. It also introduces various measures that are currently being made actively by the citizens and enterprises and new strategies by the Government. Considering future environmental constraint and the possibility of further environmental measures, the paper also clarifies the necessity for urgent measures including the review of the current mass-production, mass-consumption, and mass-waste producing socio economic system, and that such measures will bring positive outcomes to the economy in the long run and also can contribute to the international standing of Japan.

We will be very pleased if this booklet is useful for the enhancement of each reader's awareness regarding environmental problems and can provide guidelines for actual activities for an actively sustainable society.

The cover illustration is a work by Homare Nagano, a third grade student at Wadamisaki Elementary School in Kobe City, Hyogo Prefecture. Homare won the Minister of the Environment Award (Elementary and Junior High School Division) in the "Year 2002 White Paper on the Environment Cover Page Illustration Contest" organized by Ministry of the Environment and Japan Environmental Association.

Commenting on this work, Homare said, "I drew this picture, hoping that I could play on a clean beach forever with my family."

The illustration on the back cover is a work by Aya Itami, a second grade student at Takamatsu Industrial Arts High School, Kagawa Prefecture. Aya won the President of the Japan Environment Association Award (General Division) in the "Year 2002 White Paper on the Environment Cover Page Illustration Contest."

Aya described her work by saying, "I arranged a good environment on the left-hand side and a bad environment on the right-hand side of the screen, I expressed good and bad using colors and postures for the person on the center. By separating the scene into three parts of sky, land, and ocean, I tried to present various environmental issues."

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Chapter 1

Association Between a Socio Economic System and Environmental Problems

<Summary of Chapter 1>

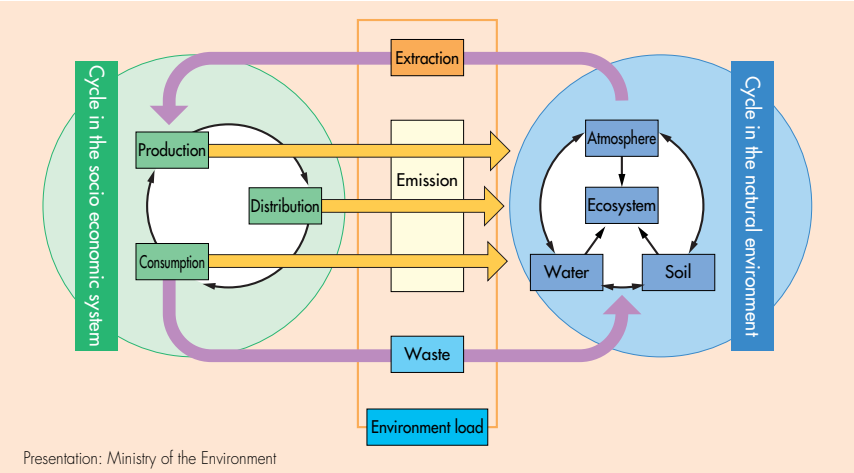
Today's social economic system is maintained by using the benefits from nature and discharging unnecessary materials into the natural environment. Expansion of economic activities in the socio economic system of mass production, mass consumption, and mass waste generation has caused a rapid increase of environment load, and has started to disturb the balance of the natural environment, which is the foundation of survival of the human race. These problems started to appear as various environmental problems on a global scale.

This chapter examines the association between a socio economic system and environmental problems and clarifies the importance of improvements of environmental efficiency to realize a sustainable society.

1. Development of Social Economy and Transition of Environmental Problems

1) Cycles in the socio economic system and natural environment

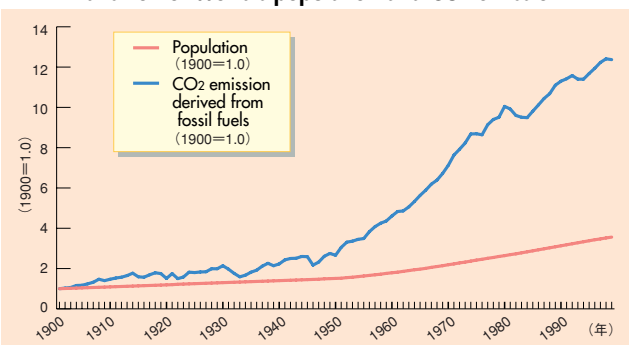
Cycle in the socio economic system and cycle in the natural environment



Presentation: Ministry of the Environment

The natural environment of the Earth can exist only while materials circulate between the atmosphere, the hydrosphere, the soil system, and the overall ecosystem maintains this delicate balance. At the same time, the socio economic system of mass production, mass consumption, and mass waste generation imposes an impact on the natural environment through collection of resources and energy and discharge of unnecessary materials. The natural environment is essential for survival of human beings such as purification of water, soil formation and maintenance, and temperature adjustment and also accommodates resources of various living organisms. The natural environment also has a function for absorbing and reducing the impact that is generated in the socio economic system within its own cycle, in addition to providing various benefits to the human race such as a valuable source for recreation and tourism. However, the capacity is limited and the functions are compromised by destruction of the natural environment and the deterioration of nature due to an increase of forestry mismanagement. As a result, the total environment load that is generated by socio economic activities exceeds the limit of the absorption and reduction functions through the cycle of the natural environment, causing various environmental problems including pollution and the destruction of nature.

Transition of World's population and CO_2 emission



Source: (Population) For the data of 1950 and earlier: United Nations, "The Determinants and Consequences of Population Trends" Vol. 1, 1973
For the data of 1950 and after:United Nations, "World Population Prospects:1998"
Presentation: (CO_2) Carbon Dioxide Information Analysis Center (CDIAC)

With regard to global warming, a large volume of fossil fuels such as oil and coal has been consumed since the Industrial Revolution. The emissions of carbon dioxide, which is the primary cause of global warming, has increased by about 12 times over the last 100 years and the density of carbon dioxide in the atmosphere has increased by 30% compared to that before the Industrial Revolution. As a result, the surface air temperature has increased by 0.6±0.2℃ globally and by 1.0℃ in Japan. IPCC (Inter-government Panel on Climate Changes) predicts that the average temperature of the ground surface will increase by 1.4℃ to 5.8℃ and the sea level will rise by 9cm to 88cm by the end of the 21st Century.

The decrease and the deterioration of forests are becoming problems due to bush fires and illegal deforestation in addition to untraditional slash-and-burn methods and inappropriate commercial deforestation. During the period from 1990 to 2000, the forest area on the global scale decreased by 94,000,000 ha. Each year, 14,200,000 ha of natural forests, which is equivalent to about the two third of Honshu in Japan, is disappearing from the tropical zone. Excessive grazing and excessive logging for making of firewood and charcoal are causing desertification and about 3,600 million ha of the land area, which is equivalent to about one fourth of the total land area of the Earth, is subject to desertification. The amount of yield from crops that are collected from the natural environment through agriculture has increased by about 2.7 times during the period from 1950 to 1995.

For diversification of organisms also, there are currently 5,435 types of animals and 5,611 types of plants that are exposed to the danger of extinction.

The impact on the natural environment is also caused by discharge of unnecessary materials. Urban wastes in the major countries in the world are increasing and in terms of the material balance in Japan, only about 10% of the total amount of wastes is recycled. Each household uses 130kg of resources per day, of which about 50kg are discharged as unnecessary materials.

With regard to resources, during the period from 1950 to 1995, the production of oil has increased by about 6.3 times and the production of iron and steal have increased by about 6.5 times. The acid rain that is caused by sulfur oxides and nitrogen oxides that are discharged into the atmosphere as a result of burning of oil and coal causes serious damage such as acidification of lakes and swamps and degradation of forests.

Condition of species that may become extinct

(Endangered animal species, 2000)

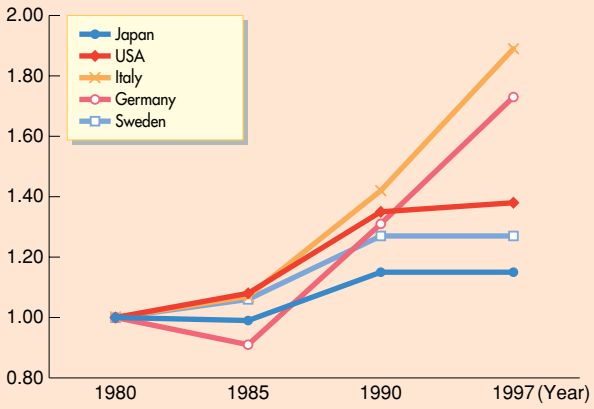
Species / Condition	Mammal	Fowls	Reptiles	Amphibia	Others	Total
Extinct	83	128	21	5	456	693
Extinct in the wild	4	3	1	0	25	33
Threatened	1,130	1,183	296	146	2,680	5,435
Endangered Ⅰ	520	503	135	63	1,057	2,278
Endangered Ⅱ (Vulnerable)	610	680	161	83	1,623	3,157
Near threatened	676	730	77	27	504	2,014

(Endangered plant species, 2000)

Species / Condition	Total number (species)
Extinct	73
Extinct in the wild	17
Threatened	5,611
Endangered Ⅰ	2,280
Endangered Ⅱ (Vulnerable)	3,331
Near threatened	951

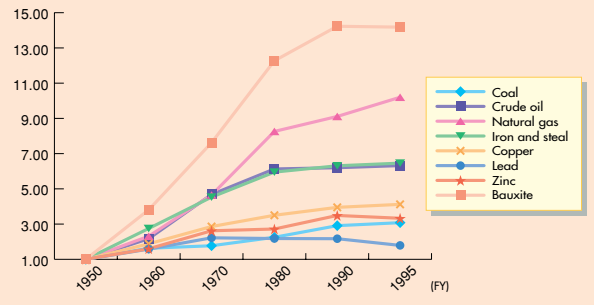
Note: Extinct in the Wild refers to the condition where the species exist under breeding or cultivation only.
Source: "The 2000 IUCN Red List of Threatened Species" IUCN

Transition of amount of wastes discharged from metropolitan areas



Note: Based on the value in 1980 as 1.
Presentation: Prepared by Ministry of the Environment based on "Environmental Data 1995," "Environmental Data 1997,"OECD

World mineral production

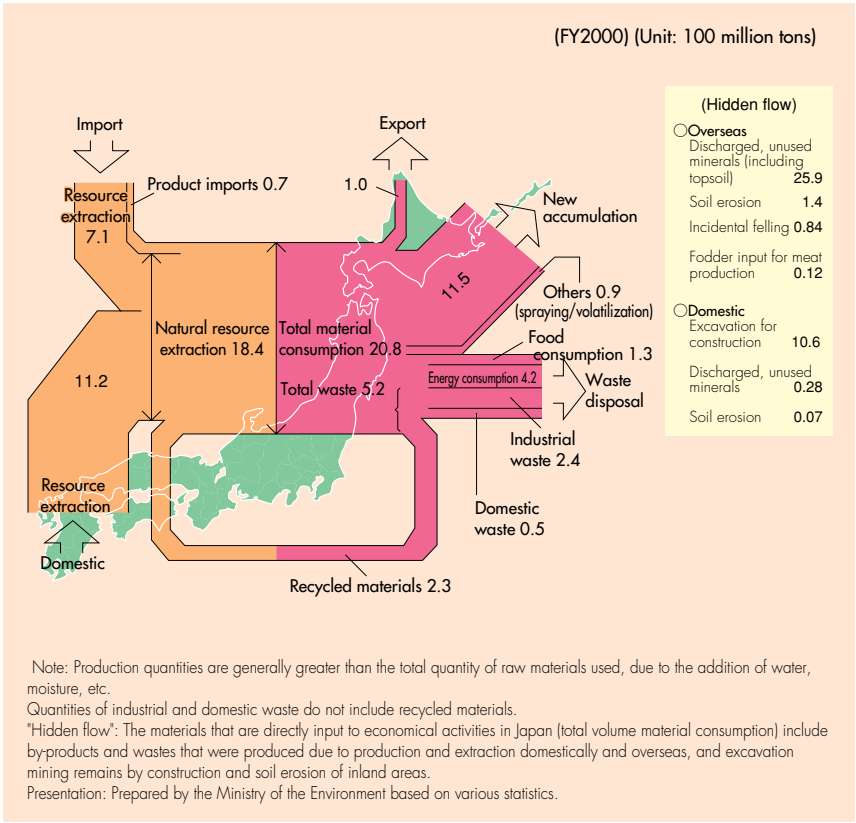


Note: Based on the value in 1950 as 1
Presentation: Created by the Ministry of the Environment based on the "Energy Production, Supply and Demand Statistics Yearbook" and "Annual resource statistics report" by the Ministry of Economy, Trade, and Industry

Ozone layer depletion is a problem caused by the emissions of CFCs that are chemically stable and non-toxic to humans and are used in many industries. An "Ozone hole" which appears when the total amount of ozone is extremely low was observed above Antarctic around 1985 and the size has expanded to 26,470,000 km^2 by 2001.

Environmental pollution problems are also caused by harmful chemical substances. Currently, about 100,000 types of chemical substances distributed globally. Many chemical substances that are considered to be harmful are detected within various environments. For instance, PCBs that was banned 30 years ago was detected in seals from the North Pole. The causes of the increase in use of the natural environment for resources and the increase of discharge of wastes include expansion of economic activities and the increase of population, which is the premise of the expansion of economic activities. During the period from 1950 to 1995, the world's GNP increased about 5.5 times and during the period from 1950 to 2000, the world's population increased to about 6000 million, which is 2.5 times over that period.

Flow of materials



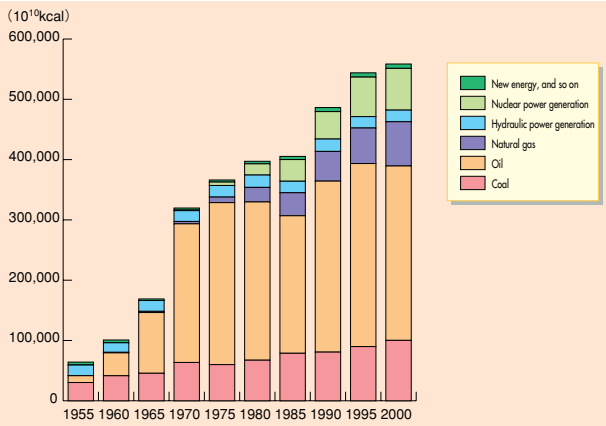
Note: Production quantities are generally greater than the total quantity of raw materials used, due to the addition of water, moisture, etc.
Quantities of industrial and domestic waste do not include recycled materials.
"Hidden flow": The materials that are directly input to economical activities in Japan (total volume material consumption) include by-products and wastes that were produced due to production and extraction domestically and overseas, and excavation mining remains by construction and soil erosion of inland areas.
Presentation: Prepared by the Ministry of the Environment based on various statistics.

In this way, the current socio economic system is continuously imposing considerable impact on the natural environment, disturbing the balance between the socio economic system and the natural environment. As a result, deterioration of the quality of the natural environment is progressing in every situation.

2. Transition of environmental problems in Japan

This section discusses the relationship between the socio economic system and the natural environment, tracing the history back to the postwar era in Japan.

Energy supply of Japan



Presentation: Prepared by the Ministry of the Environment based on the "Comprehensive Energy Statistics" of the Resource Energy Agency

During the period of rapid economic growth (first period) from mid-1950's to mid-1960's where post war economic recovery was the first priority, the energy consumption increased sharply and the rapid progress of the heavy and chemical industries that generate a large amount of pollutants per unit production value degraded the environment rapidly. Those days which the worst air pollution, the visibility dropped to 30 to 50m and some areas were filled with the penetrating odor of sulphur oxides. Red tide that is caused by explosive reproduction of plankton near the surface of water, has damaged fishery products throughout the Seto Inland Sea in 1970. Serious air pollution and water pollution evolved into major social problems, such as causing four major pollution-related diseases (Minamata disease, Niigata Minamata disease, Itai-itai disease, and Yokkaichi asthma).

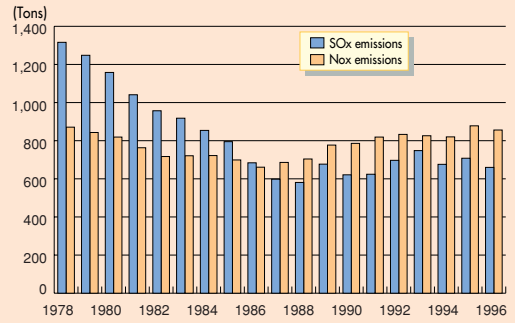
Transition of environmental problems of Japan

	Year	Social economy and science and technology	Environment status and international movement	Environmental measures of Japan
High-growth period when industrial pollution was generated (1st stage, around 1960's to 1972)	1955	- The "Economic White Paper" declared "it is no longer a post-war" material (1956) - Joined the United Nations. (1956) - Opening of metropolitan expressway (1959) Jimmu economy November 1954 to June 1957	- Itai Itai disease was detected (Jinzu River basin). (1955) - Minamata disease was detected. (1956) - Protest against factory effluent by the Tokyo Bay fishermen. (1958)	- Memorandum was exchanged with the local factory (Shimane Prefecture) * First Pollution Control Agreement by the local public bodies (1952) - Smoke Control ordinance was established (Tokyo) (1955) - Natural Parks Law was established. (1957) - Law regarding water quality conservation of public basins and law regarding factory effluent were established. (1958) - Factory Location Law was established. (1959)
	1960	- The Japan - U.S. Security Treaty was signed. (1960) - National income doubling plan (1960) - National total development plan (1962) - Joined OECD (1964) - Opening of Tokaido Shinkansen (1964) - Host the Tokyo Olympics. (1964) Iwato economy June 1958 to December 1961 Olympic economy October 1962 to October 1964	- Slime accumulation in Tagonoura, Shizuoka Prefecture (1960) Yokkaichi pollution became serious (asthma, etc.) - Smog was generated over one week. (Tokyo) (1962) - Rachel Carson, "Silent Spring" (1962) - The construction project of Mishima/Numazu industrial complex was canceled due to protest from the residents. (1964) - The second Minamata Disease was detected (Agano River basin). (1965)	- Law regarding smoke and soot emission control was established. (1962)
	1965	- The population in Japan exceeded 100 million. (1966) - European Community (EC) was established. (1967) - Japan's GNP ranked the 2nd in the world. (1968) - The first human landed on the moon. (1969) Izanagi economy October 1965 to July 1970	Expansion of Red Tide - Niigata Minamata Disease lawsuit and Yokkaichi pollution lawsuit(1967)	- Basic Law for Environmental Pollution Control was established. (1967) - Air Pollution Control Law and Noise Regulation Law were established. (1968)
	1970	- Osaka EXPO was held. (1970) - Number of passenger vehicles owned exceeded 10 million. (1971) - The Okinawa Return Agreement was signed. (1972) - The "Plan for Remodeling the Japanese Archipelago" was announced. (1972) - Club of Roma "Limits to Growth" (1972) Remodeling the Japanese Archipelago December 1971 to November 1973	- Photochemical smog damage frequently occurred in Tokyo. (1970) Serious air pollution by smoke, soot, and SOx occurred. Environmental pollution problem caused by PCB - The policy of imposing the responsibility on those who caused pollution was accepted by OECD. (1972) - Declaration on the Human Environment was accepted by the United Nations Conference on the Human Environment. (1972) - The World Environment Day (June 5) was decided by the UN General Meeting. (1972) - The UN Environment Plan (UNEP) was established. (1972)	- Fourteen pollution related measures were established in the 64th Diet session. (1970) (Marine Pollution Prevention Law, Waste Management and Public Cleansing Law,Water Pollution Control Law, Law concerning Entrepreneurs' Bearing of the Cost of Public Pollution Control Works were established.) (1970) - The Environment Agency was established. (1971) - Construction of Oze automobile road was cancelled. (1971) - Nature Conservation Law was established. (1972)
Stable-growth period when urban type pollution become noticeable (2nd stage, 1973 to middle of 1980's)	1973	- Changed to the floating exchange rate system. (1973) - 1st oil crisis caused by the 4th Middle East wars (1973) - 2nd oil crisis occurred (1979) - Three-Mile Island nuclear power plant accident occurred (USA) (1979)	- Washington Convention was accepted (UN). (1973) - The possibility of ozone depletion by CFCs was indicated. (1974) - London Convention became effective. (1975) - Serious Red Tide occurred in Seto Inland Sea. (1976)	– Law Concerning Special Measures for Conservation of the Environment of the Seto Inland Sea was established. (1973) - Chemical Substances Control Law was established. (1973) - Pollution-related Health Damage Compensation Law was established. (1973) - Notice of Japanese Version of Muskie Act (1974) - SOx emission control system was introduced. (1974) - Law Concerning the Rational Use of Energy was established. (1979) - Total pollutant load control of COD. (1979)
	1980	– Number of Japan's automobile production reached No.1 in the world. (1980) - Iran-Iraq War (1980) - The USA launched the first space shuttle. (1980)	- SOx environmental quality standard was almost accomplished. (1980) The occurrence of photochemical oxidants was decreasing. Ground subsidence expanded nationwide.	- NOx emission control system was introduced. (1981) - Law Concerning Special Measures for the Preservation of Lake Water Quality was established. (1984)
Period when global environmental problems were beginning to be recognized (3rd stage, from middle of 1980's)	1985	- Tsukuba Science EXPO was held. (1985) - Chernobyl nuclear power generation plant accident occurred. (1986) - The National Railways was divided and privatization was implemented. (1987) - World's share market collapsed (Black Monday). (1987) - The Seikan tunnel was opened and Seto Bridge was completed. (1988) Bubble Economy November 1986 to February 1991	- An ozone hole was discovered above Antarctic. (1985) - Vienna Convention for the Protection of the Ozone Layer was accepted. (1985) Continuously decrease in automobile traffic noise environmental quality standards accomplishment rate. Ground water pollution by trichloroethylene and so on spread more widely. The NO_2 environmental quality standard accomplishment rate (general bureau) deteriorated. - "Our Common Future" was announced (WCED). (1987) - The Montreal Protocol was accepted. (1987) - An Intergovernmental Panel on Climate Change (IPCC) was established. (1988) The household wastewater pollution problem became serious in the enclosed basins.	- Ozone Layer Protection Law was established. (1988)
	1989	- Tokyo Stock exchange price average reached the highest in its history (38,915 yen) (1989) - Consumption tax (3%) was introduced. (1989) - The Berlin Wall collapsed. (Integration of East Germany and West Germany) (1989) - Gulf War (1991) - Soviet Union collapsed and CIS was established. (1991) - The five-day working week system became stable and schools started to introduce the system. (1992)	- Valdez oil leakage accident (1989) The agricultural chemical problem of golf courses became evident. Automobile air pollution in metropolitan areas became serious. The dioxin problem became evident. - Basel Convention was implemented. (1992) - United Nations Framework Convention on Climate Change was accepted. (1992) - Acceptance of Biodiversity Convention (1992) - A Global Summit was held in Rio de Janeiro. (1992)	- Water Pollution Control Law was revised (prevention of groundwater pollution was regulated) (1989) - The global warming prevention activity plan was decided by the Cabinet. (enacted in1990) - Law for the Promotion of Utilisation of Recyclable Resources. (enacted in1991) - Automobile NOx Law was established. (1992) - Law for the Conservation of Endangered Species of Wild Fauna and Flora was established. (1992) - The Government development aid principle was decided by the Cabinet. - "Environmental conservation" as the basic principle. (1992)
	1993	- WTO was established. (1994) - The Product Liability Law (PL Law) was established. (1995) - Great Hanshin Earthquake (January), Underground Sarin incident (March) (1995) - The exchange rage of Japanese yen reached 1 dollar = 79 yen 75 sen (highest in the postwar history). (1995) - The consumption tax was increased to 5%. (1997) - Hong Kong was returned to China. (1997)	Pressure in the final landfill site - "Global Warming has already started" IPCC Secondary assessment report (1995) - Convention on Prevention of Desertification was accepted. (1996) - Nakhodka Oil Spill accident (1997) - Kyoto Protocol was accepted (COP3) and an emissions reduction commitment was set. (1997)	- Basic Environment Law was established. (1993) - The environment basic plan was decided by the Cabinet. (1994) - Law for Promotion of Sorted Collection and Recycling of Containers and Packaging. (enacted in 1995) - Keidanren Environment Appeal - declaration of Voluntary Action of business community (1996) - Environmental Impact Assessment Law was established. (1997)
	1998	- Single currency "Euro" was launched. (1999) - Number of people who are without jobs reached 3 million. (1999) - Reorganization of the central government ministries (2001) - Simultaneous terrorism occurred in the USA. (2001)	- Rotterdam Convention on PIC was adopted. (1998) - Tokorozawa Dioxin vegetable problem (1999) - "Climate change 2001" IPCC 3rd Assessment Report (2001) - Stockholm Convention on POPs was adopted. (2001) - COP7 (Marrakesh Agreement) (2001)	- Law for Recycling of Specified Kinds of Home Appliances was established. (1998) - Global Warming Measure Promotion Law was established. (1998) - Law Concerning the Rational Use of Energy was revised (introduction of top runner method, and so on). (1998) - Law Concerning Reporting,etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management was established (PRTR Law). (1999) - Law Concerning Special Measures for Dioxins was established. (1999) - Law on Promoting Green Purchasing was established. (2000) - Basic Law for Establishing the Recycling-Based Society.(enacted in 2000) - Food Recycling Law. (enacted in 2000) - Construction Materials Recycling Act (enacted in 2000) - New environment basic plan was decided by the Cabinet. (2000) - Fluorocarbons Recovery and Destruction Law was established (2001) - Law Concerning Special Measure against PCB waste(enacted in 2001) - Automobile NOx Law was revised (PM was added). (2001)

Presentation: Prepared by the Ministry of the Environment

From the mid-1970's to mid-1980's, the economy shifted from rapid growth to stable growth due to the oil crisis (2nd period) that hit twice and in the industrial sector, energy conservation has progressed, although the energy consumption increased in the household sector and the transportation sector. Pollution problems caused by industrial activities started to converge as a result of pollution prevention agreements made by municipalities and effects of rules and regulations of the country, and measures taken by enterprises. For instance, sulfur oxide measures regarding air pollution showed their distinguished effects. However, during this period, urban life type pollutions associated with daily living and normal business activities have become problems due to concentration of population in metropolitan areas, air pollution caused by automobile exhaust as a result of the circulation of automobiles caused by increase of income, and water pollution caused by sewage.

Emissions of sulfur oxides and nitrogen oxides (fixed source)



Presentation: Prepared by the Ministry of the Environment

In and after the middle of 1980's (3rd period), imports of not only raw materials but all the products increased and at the same time, production of high energy consumption type industries such as chemicals and pulp increased due to the price drop of crude oil. In Japan, population concentration in Tokyo accelerated and consumer spending increased due to the bubble economy. However, after the bursting of the bubble economy, Japan faced a long-term economic recession and consumption stagnation. Since the framework of environmental measures had already been constructed during the expansion period of rapid economic growth, industrial pollutions were not repeated. However, urban life type pollutions started to prevail, causing new environmental problems such as waste and recycling problems. During this period, problems of endocrine disrupters (so-called environmental hormone) were detected, many of whose scientific characteristics including toxicity are still unknown.

3. Lessons from the past examples

Turning our attention to the world's situation, in regions with the most fragile environment in the world there are some cases where destruction of the ecosystem is imposing serious influences on the social economy. Among them are examples of Aral Sea, whose size was reduced to one third and India and China, whose underground water levels are dropping sharply. Examples of the Sumer Civilization and Easter Island Civilization indicate that a civilization is ruined when the environment is degraded to an unrecoverable state. The natural environment exists in a delicate balance and we must examine the significance of the influence on the environment by continuation of such economic activities, considering these examples.

2. Socio Economic System and Environmental Efficiency

1. Sustainability and eco-efficiency

Various ideas were submitted regarding the ideal relationship between the socio economic system and the natural environment while our socio economic activities are consuming resources of the Earth gradually, and environmental pollution exceeding the self-purification capability of Nature is becoming more eminent. Of all the ideas, the idea called "sustainable development" has influenced many countries so that the idea was taken up as the main theme of the global summit held in 1992. The idea indicates the development that satisfies the desires of the current generation while satisfying the desires of the next generation. In the "Basic Environment Plan" that was revised in 2000, Japan summarized and introduced the "sustainable society" as the society that maintains the healthy relationship with various systems that are formed by the mutual relationship among the air, water, soil, and organisms that form the environment. These components carry out activities within the range that allows maintenance of self-purification capability of the environment and functions of the ecosystem, without reducing the resources, in order to avoid any adverse influence on the systems.

By linking the current economical activities and the environmental load, concepts such as "factor 10" and "factor 4" were submitted by various organizations regarding the measures to be taken by the society in order to realize a sustainable society. The common suggestion of these ideas is the necessity for reduction of environmental load per unit economical activity by improving the efficiency of the use of resources and energies as much as possible. This concept can be expressed as "eco-efficiency." Adopting the idea of eco-efficiency, this document examines particularly what roles the technology has played and how Japan's eco-efficiency has changed.

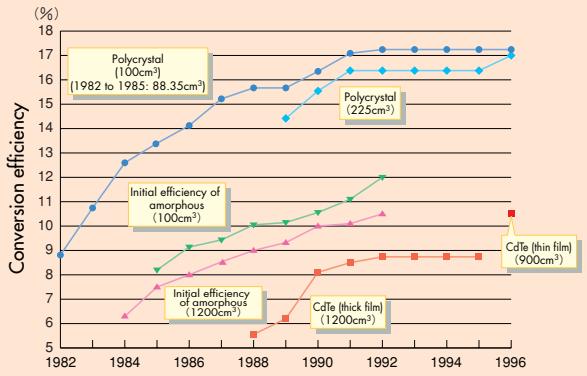
2. Improvement of eco-efficiency and progress of environmental technology

Japan has almost completely overcome serious problems created during the rapid growth period. The primary factors of this background are establishment and implementation of various regulations and the introduction of pollution control facilities by many enterprises. Constant improvement of the performance control facilities and progress in the development of engines for reduction of automobile exhaust are also to be noted. After the oil crisis, Japan has rapidly improved the energy efficiency of production facilities, transportation facilities, and electrical appliances.

Steady reduction of environment load, that is improvement of eco-efficiency, can be traced in the process of economical growth, with background development of various environmental technologies such as pollution reduction technology and energy conservation technology. It is possible to discover that, in many cases, introduction of new regulations and promotion measures in terms of policies are extremely effective.

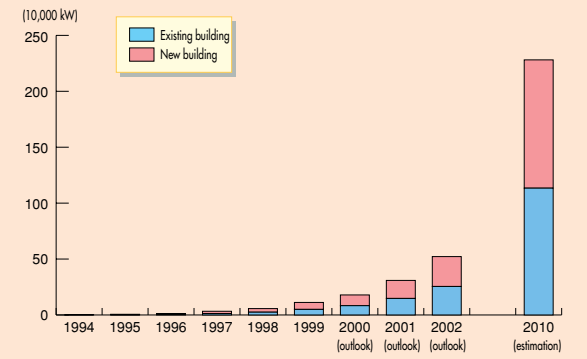
For instance, the strict exhaust gas regulation that was introduced in Japan for the first time in 1978 was one factor of the onslaught of the Japanese automobile industry on the world market. Active development of low pollution vehicles brought Japan into a superior position in the world's low pollution vehicle market, and the active development promotion policy for solar power generation resulted in rapid improvement of power generation efficiency and rapid propagation into general households. In order to realize and propagate fuel cell batteries, and to lead the world in this regard, Japan is constantly progressing with the promotion of technology development and active introduction of fuel cell batteries in public organizations including Governments.

Transition of solar battery conversion efficiency in the New Sunshine plan (cell based)



Note: CdTe: Cadmium tellurium
Source: Presentation submitted by the Comprehensive Resource Energy Research Association, New Energy Section

Result and outlook of introduction of residential solar power generation



Source: New Energy Foundation

Plan for introduction of low-emission vehicles as general public vehicles of Japan

Year	Up to 2000	Up to 2001	Up to 2002	Up to 2003	Up to 2004	Total
Number of vehicles introduced	316	1,013	1,860	1,931	1,901	7,021
Electric-powered vehicles	8	0	0	0	0	8
Natural gas vehicles	57	26	59	58	52	252
Methanol vehicles	0	0	0	0	0	0
Hybrid vehicles	251	689	1,039	1,101	1,100	4,180
High fuel efficiency/superior emissions vehicles	0	298	762	772	749	2,581

Number of ownerships	316	1,329	3,189	5,120	7,021
Introduction rate %	4	19	45	73	100

Includes the Parliament and Courts in addition to Agencies and Ministries. The number of vehicles in 2001 is an expected value and may be changed. In this case also, the installation is 100%.
Presentation: Ministry of the Environment

Conversion processes and efficiencies of various power generation methods

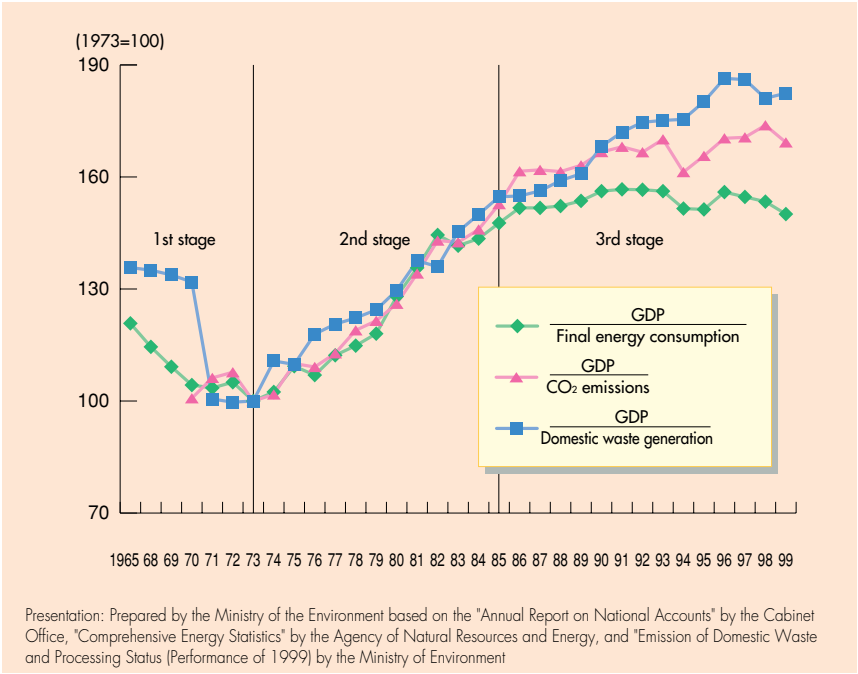
Power generation method	Conversion process	Efficiency %
Fuel cell battery	Chemical→electricity	40～60
Steam gas turbine power generation	Heat→ machine→electricity	30～42
Diesel power generation	Heat→machine→electricity	25～35
Thermoelectric converter	Heat→electricity	8～15
Thermal converter	Heat→electricity	6～10
Solar battery	Light→electricity	10～20

Note: The efficiency indicates the percentage of electric energy converted from the energy source that is indicated on the left-hand side of the conversion process.
Source: Prepared by the Ministry of the Environment based on "Story of Battery" by Hironosuke Ikewa and "Resource Energy Yearbook" by the Data Examination Association of the Ministry of International Trade and Industry

3. For improvement of eco-efficiency

This section reviews the history of Japan in terms of eco-efficiency, based on the classification by period. In this review, we took up five items as typical environmental indexes, namely, energy that is inevitable to economical activities, carbon dioxide, a contributor to global warming, nitrogen dioxide and sulfur dioxide that are air pollutants, and domestic waste that is discharged from daily life. We also took up the typical GDP as the economic index and examined the transition of eco-efficiency that is calculated by dividing an economic index by each environmental index.

Transition of eco-efficiency (final energy consumption, CO_2 emissions, an domestic waste generation)

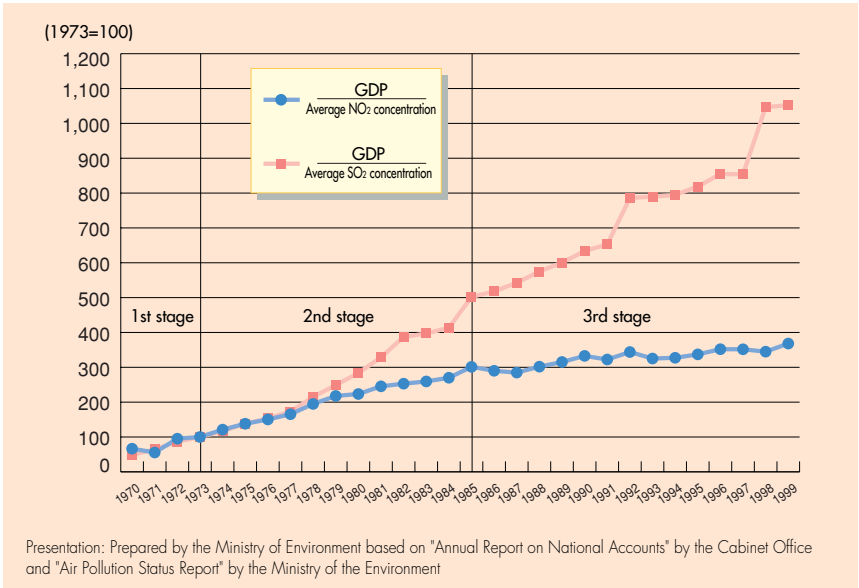


Presentation: Prepared by the Ministry of the Environment based on the "Annual Report on National Accounts" by the Cabinet Office, "Comprehensive Energy Statistics" by the Agency of Natural Resources and Energy, and "Emission of Domestic Waste and Processing Status (Performance of 1999) by the Ministry of Environment

Initially, during the period up to 1973, which is up to the occurrence of the first oil crisis (1st period), the eco-efficiency deteriorated gradually, regarding energy and domestic waste. This is because Japan was in the rapid growth era and priority was given to economic growth, instead of giving adequate consideration to environmental conservation and as a result the environment load increased at a rate exceeding the economic growth rate. The eco-efficiency of nitrogen dioxide and sulfur dioxide is improving as a result of improvement of various regulations.

During the 2nd period (from early 1970's to 1985) when the Japanese economy shifted from the rapid economic growth to a stable economic growth, the eco-efficiency improved in all the environmental indexes. The eco-efficiencies of energy, carbon dioxide and general waste improved at the same speed. This was due to the thorough application of energy conservation and resource conversation in the national level, which was triggered by the oil crisis. In particular, within the energy field, the eco-efficiency in the industrial sector improved constantly, while the eco-efficiency of the residential sector of the consumer sector has leveled off. The reason is that although there were factors for improving the eco-efficiency by energy conservation of various appliances, the spread of household electrical appliances to each household prevented improvement of the eco-efficiency. In the transportation sector, the eco-efficiency of the passenger sector leveled off or slightly deteriorated. One of the causes that can be considered is that automobile ownership increased at a rate exceeding the economic growth rate.

Transition of eco-efficiency (average NO_2 concentration and average SO_2 concentration)

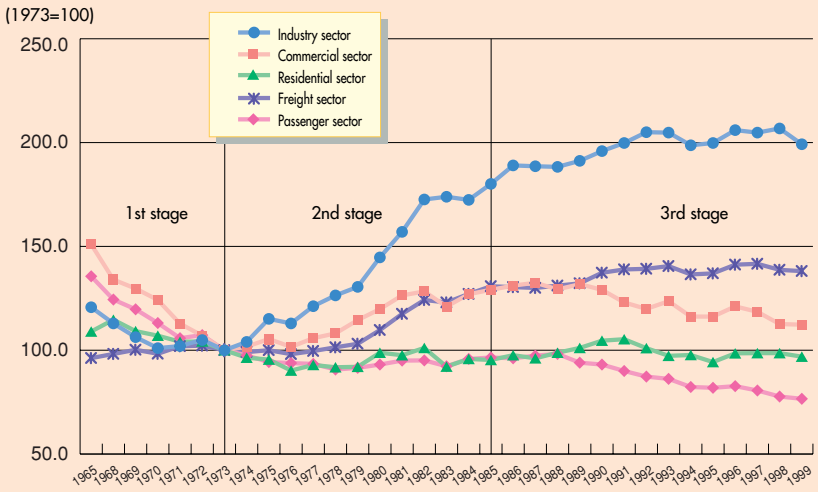


Presentation: Prepared by the Ministry of Environment based on "Annual Report on National Accounts" by the Cabinet Office and "Air Pollution Status Report" by the Ministry of the Environment

Finally, for the period from 1985 (3d period), when global environmental problems started to be recognized as serious issues, the eco-efficiencies of nitrogen dioxide and sulfur dioxide, and domestic waste have improved smoothly, however, the eco-efficiencies of energy and carbon dioxide remained on the same level although slight improvements were made.

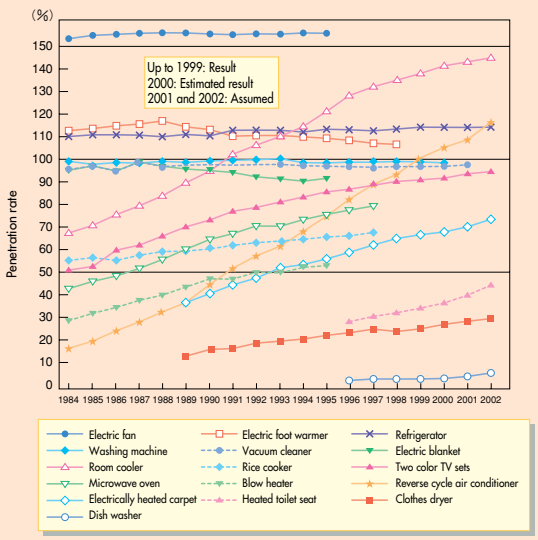
Regarding the energy eco-efficiency by sector, initially some business types of the industrial sector made gradual improvements. However, the eco-efficiencies have deteriorated in most business types since 1992 and 1993 under the background of stability of the price of crude oil at a low level from 1985 and restraining of investment to expensive energy conservation facilities. The eco-efficiency of the residential sector remained the same, while the eco-efficiency of the commercial sector deteriorated due to the increase of office areas and introduction of personal computers. In the transportation sector, increase of shipment of small items such as door-to-door deliveries hindered improvement of eco-efficiency in the freight sector and at same time, the eco-efficiency of the passenger sector showed continuous deterioration due to the increased popularity of large passenger vehicles.

Transition of energy eco-efficiency in each sector



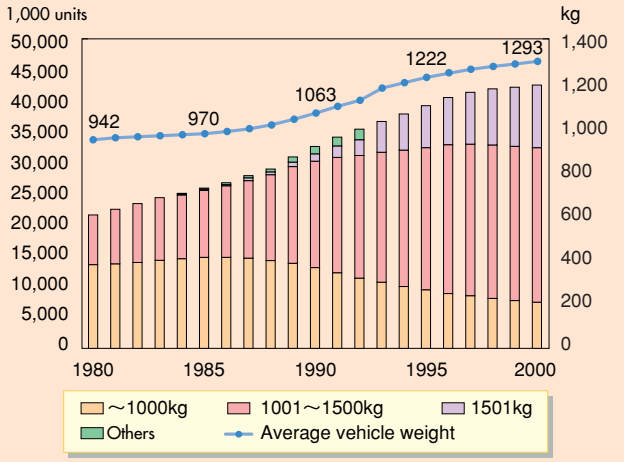
Presentation: Prepared by the Ministry of the Environment based on the "Annual Report on National Accounts" by the Cabinet Office, "Comprehensive Energy Statistics" by the Agency of Natural Resources and Energy,

Home electrical appliances penetration rate



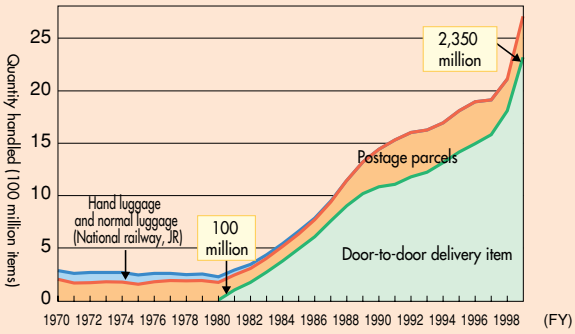
Note: The penetration rate of color TV sets refers to the second and subsequent TV sets.
Source: Japan Power Investigation Committee

Transition of automobile ownership and average body weight by vehicle type



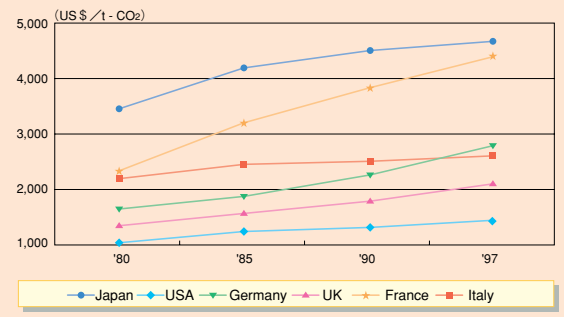
Note: In 1992 or earlier, mini-van and one-box cars of 1501kg or more were classified as "Others", however, from 1993, they were classified by weight.
Presentation: Number of vehicle ownerships by type: Prepared by the Ministry of Land, Infrastructure, and Transport based on the "Automobile Inspection & Registration Association."

Transition of small item transportation amount



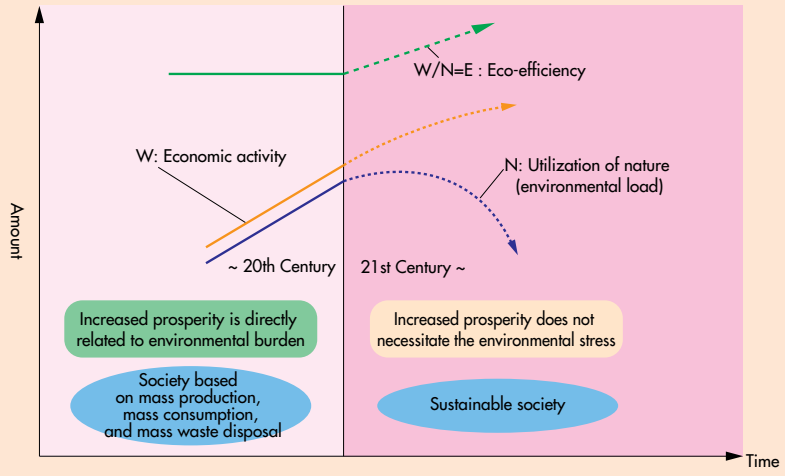
Source: "Summary of Transportation Economic Statistics" by the Ministry of Land, Infrastructure, and Transport

International comparison of transition of eco-efficiency associated with carbon dioxide



Presentation: Prepared by the Ministry of the Environment based on OECD "Environmental Date 1999" and EDMC" Summary of Economy of Energy Statistics"

Move toward a sustainable society



Presentation: Prepared by the Ministry of the Environment based on the data of EEA (European Environment Agency)

The eco-efficiency in Japan is progressing as described above. In comparison with other countries using carbon dioxide as an example, the eco-efficiency of Japan is extremely high although other countries have shown improvements in eco-efficiency.

However, such eco-efficiency in each country is still not adequate.

As discussed in Section 1, the impact on the global environment is still increasing and the balance between human activities and the eco-system such as environmental purification is quite unstable. To improve this situation, reduction of the environmental load as a whole is imperative and to realize this objective, the eco-efficiency must be improved to a level exceeding the economic growth.

Japan once steadily increased the eco-efficiency during the stable economic growth period. Therefore, it is possible to improve the eco-efficiency while achieving economic growth. In particular, Japan holds the 2nd position in the world on the economic scale and emits about 5% of world's carbon dioxide, which ranks it in the 4th position in the world. Thus, under the circumstances where Japan is imposing a serious environmental load on the Earth and reduction of the environmental load is a serious issue on the global scale, Japan must make greater efforts in improvements of eco-efficiency by utilizing its experiences.

Chapter 2

Activities by Each Entity Towards Construction of a Socio Economic System with Minimum Environment Load

<Summary of Chapter 2>

Many of today's environmental problems are caused by the daily life of citizens and business activities, and thus the problems are caused by many and unspecified entities. To realize a sustainable society, each entities unit such as citizens, enterprises, and the government must take active measures towards a reduction of the environment load voluntarily in all the aspects of the society.

This chapter examines the background and the awareness regarding the various new activities that are being started by each entity such as citizens, enterprises, and the government.

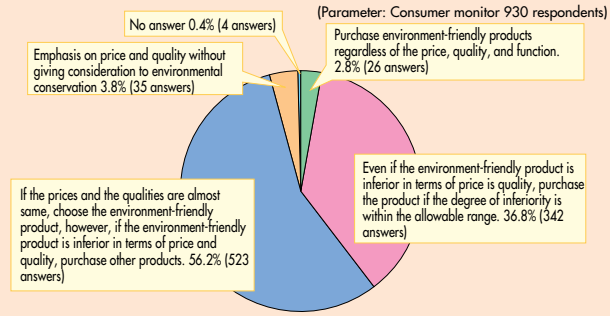
1. Change of Activities by Citizens

1) Change of awareness and behavior

Recently, a new factor called consideration of the environment has been added to the decision-making factors of consumers at the purchase point of goods. For instance, according to the replies of the survey, about 95% of consumers consider environmental conservation when purchasing goods. About 70% of consumers indicated that they would purchase environmentally concerned goods even if they are more expensive than other goods. With a change of awareness such as this, measures for providing environmental information of goods has provided support for the green purchase movement that gives higher priority to products and services of low environment load at the time of purchasing. Such a change is influencing the market and, for fifteen product fields that are the major targets of green purchase, the sales volume of the environmentally concerned products account for 30% of the total sales volume.

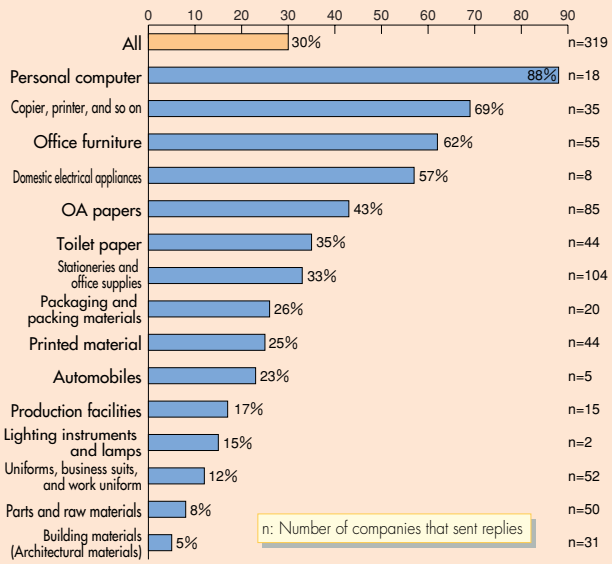
Such a change of awareness and behavior towards purchase by consumers has changed the role of enterprises in the society in response to request by the citizens, and some survey results shows that about 70% of those replied indicated environmental protection as the efforts to be made by enterprises to gain social credibility. With a such level of concern by the citizens as the background, there have been some external movements to assess which enterprises are giving considerations to environmental issues and to what extent, such as rewarding the measures taken by enterprises for environmental conservation and establishment of a ranking of environmental management.

To what extent is consideration given to environment-friendly products at the time of purchasing of goods?



Source: "Report on the investigations of actual conditions regarding advertisement considering environmental consideration" by Bureau of Fair Trade Commission (March 2001)

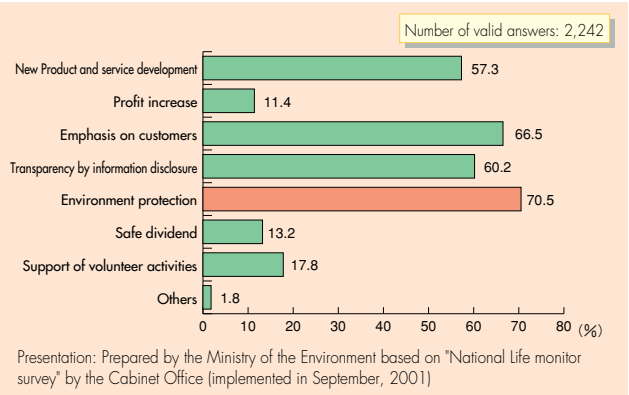
Ratio of environment-friendly products to the total sales volume



Note: Result of the questionnaires sent to the manufacturers and distributors of environment-friendly products of 15 main product fields that are targeted by Law on Promotion of Green Purchasing regarding the ratio of the sales volume of the environment-friendly products to the total sale sales volume

Source: "The 6th Green Purchase Questionnaire Survey Result Report" by the Green Purchase Network (Survey period: October and November 2001)

Items that should be targeted by enterprises in the future to obtain social credence



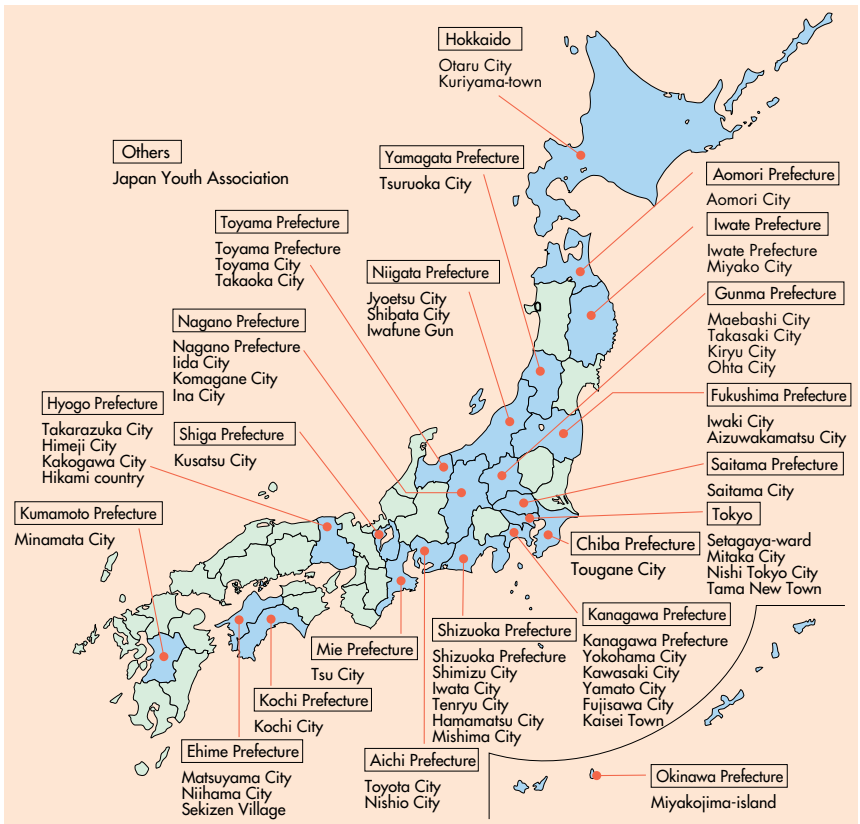
Presentation: Prepared by the Ministry of the Environment based on "National Life monitor survey" by the Cabinet Office (implemented in September, 2001)

In this way, the increase of the interest of citizens towards the environment not only changes goods purchasing activities but also becomes the background of behavioral change of enterprises, thereby changing the market by increasing the range of the type of goods that are environmentally friendly.

2) Possibility of further reduction of environment load by citizens

The changes of the awareness of citizens are represented by various measures that are taken for environmental conservation and are demonstrated in various areas nationwide. There are many unique examples for promoting the "environmentally concerned life style." Various activities that are taken nationwide such as the example from Kawaguchi City that has nominated one day a year as the "Eco-life day for the City" to enable participation by anyone; the example of Hamatonbetsu in Hokkaido a wind power station was constructed as the citizens joint development, and the example of Kuriyama-town of Hokkaido where a local currency (eco-money) is issued to activate exchange of services that cannot create market values easily, such as environmental conservation through the initiative of local residents.

Map of the major regions that are going to promote eco-money (as of March 2002)



Presentation: Prepared by the Ministry of the Environment based on the Eco-Money Network Data

In spite of such measures, the energy consumption in the household sector is increasing as indicated in Chapter 1. This is because the nation's awareness towards various measure for reduction of environment load (such as energy conservation) is still insufficient to control the increase of the environment load by each household, such as the spread of household electrical appliances and the tendency towards larger capacities.

In this modern age where the actions taken by each citizen are critical, it has become necessary to realize the "eco-living", which reforms the modern life style that causes environmental problems to a more environmentally concerned and more humanistic and rich life style for everybody. From such a standpoint, Conference on "Wa-no-Kuni-Kurashi" (http://www.wanokurashi.ne.jp) was established for the participation of opinion leaders of each industry, particularly regarding global warming problems.

Global warming countermeasures by individual actions

The following measures taken at home can reduce greenhouse gas emission by 2.8% in Japan (1990)

(CO_2 conversion)

	Example of measures	Annual CO_2 reduction per household	Reduction ratio to annual emission per household (%)	Annual conservation effect per household	Remarks
1	Set a cooler temperature 1oC higher and a heater temperature 1oC lower.	About 31kg/year	0.5%	About 2,000 yen/year	By adjusting sunlight using curtains and clothes, the use of a cooler and a heater can be reduced in day-to-day living. Delay the starting time of a cooler and a heater.
2	Refrain from driving a car for a return trip of a distance of 8km twice a week.	About 185kg/year	3.1%	About 8,000 yen/year	Use buses, railways, and bicycles for commuting and shopping. Walking and bicycling are also good for the health.
3	Idling Stop for 5 minutes a day.	About 39kg/year	0.7%	About 2,000 yen/year	Turn off the engine while parking or stopping a vehicle for a long time. This also contributes to a reduction of air pollutants.
4	Reduce standby power by 90%.	About 87kg/year	1.5%	About 6,000 yen/year	Turn off the main power supply. When not using power for a long time, pull out the cable from the outlet. When replacing electrical appliances, choose products of low standby power.
5	The showering period is reduced by one minute per day by each member of the family.	About 65kg/year	1.1%	About 4,000 yen/year	Be careful not to leave hot water running while washing your body.
6	Utilize bath water for washing clothes.	About 17kg/year	0.3%	About 5,000 yen/year	Some utilize used bath water for washing clothes, watering plants, and flushing toilets. Commercially available pumps are useful for recycling used hot water.
7	Turn off the simmering function of cooking pots.	About 31kg/year	0.5%	About 2,000 yen/year	Simmering of the contents in a pot or a jar consumes a lot of electricity for extended use. Re-heat rice with a microwave oven to reduce power consumption.
8	All the family members stay in one room to reduce the heating and lighting energy by 20%.	About 240kg/year	4.1%	About 11,000 yen/year	Each member of the family requires extra heating and lighting energy if they are in different rooms.
9	Carry a shopping bag and choose items with less packaging (vegetables, and so on).	About 58kg/year	1.0%		Trays and wrapping materials become waste products at home. By carrying a shopping bag, consumption of plastic bags can be reduced.
10	Reduce the TV watching period by one hour.	About 13kg/year	0.2%	About 1,000 yen/year	Choose only the TV programs that you wish to watch.
	Total	About 766kg/year	13.0%	About 41,000 yen/year	
	Total effects in Japan	About 34.7 million tons/year	Reducing greenhouse gas emission of Japan by 2.8% (1990)		

Notes:
1. Annual CO_2 emission per household in Japan: About 5,900kg, Number of households in Japan: 47,420,000 (1999), Number of passenger vehicles in Japan: 40 million
2. Method of calculating the total effects in Japan: reduction by the measures in vehicles (2, 3) x 40 million units + other measures x 47,420,000 (households) = 34.7 million tons
3. Greenhouse gas emission of Japan in the Kyoto Protocol standard year: 1,223.8 million tons

Source: "Familiar global warming countermeasures - 10 measures that can be made at home" by the Ministry of the Environment

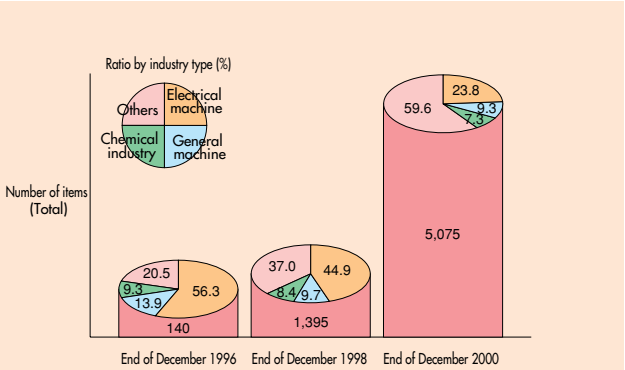
2. Change of Activities by Enterprises

1) Change of enterprises and the background

Recently, the concept of measures towards environmental conservation by enterprises has been changing to a more positive direction, from one of just social contribution to one of the most important business strategies.

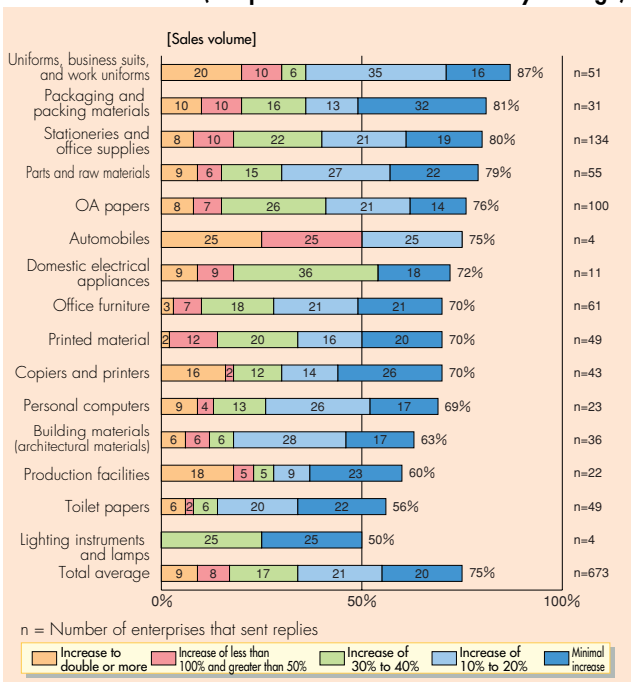
As the background of such a concept for enterprises, there are the expansion of ISO14001 certification acquisition, progress of green purchase, and the spread of environmental reporting and environmental accounting. ISO14001, which is an international standard of the environmental management system, provides managers of enterprises with opportunities for examining measures on environmental conservation and for progressing with the

Transition of ISO14001 examination and registration items



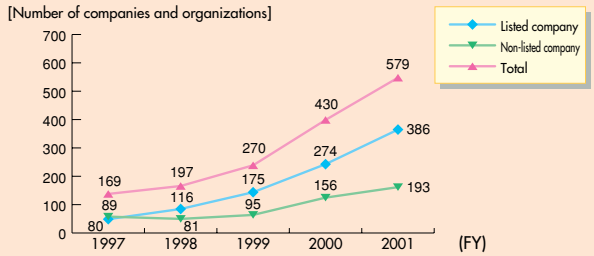
Presentation: Prepared by the Ministry of the Environment based on the data of Japanese Standerds Association and ISOWORLD.

Status of increase of sales volume of the products that were stored in the environment (compared to that of one or two years ago)



Note: Targets the enterprises that manufacture and distribute environment-friendly products in the 15 product fields that are the major targets of green purchase, regarding sale and commercialization of environment-friendly products
Source: "The 6th Green Purchase Questionnaire Survey Result Report" by the Green Purchase Network Bureau (Period of survey: October and November 2001)

Transition of the number of enterprises and organizations that issued environmental reporting



Source: "Survey of Environmentally Friendly Corporate Activities" by the Ministry of the Environment

reformation of the top-down concept. The number of certifications that were acquired in Japan reached about 8,000 as of the end of 2001. With the increase of the number of organizations that implement green purchase and sales of environment friendly products, some enterprises, which are suppliers of products and services, have started to implement green procurement and at the same time, such movements have become highly valued by the market in terms of environmental conservation. Corresponding to such a trend, enterprises have started to recognize the importance of environmental communication and more and more enterprises prepare environmental reporting each year.

The appearance of green consumers who choose environment-friendly products and shops and of green investors who take account of enterprises' environmental considerations for investments also promote positive measures of environmental conservation by enterprises. The Environmental Conservation Law that was recently enhanced includes many mechanisms for promoting voluntary environmental conservation by enterprises and some businesses tackle environment control.

In this way, various factors involving enterprises such as the markets, citizens and change of awareness, and measures taken by the Government are becoming more closely related to environmental conservation, having a profound impact on the concepts and actual measures taken by enterprises.

Recent laws and regulations regarding environment and examples of eco-business

Year	Laws and regulations regarding the environment	Main movements such as eco-business
1992	Revision of Montreal Protocol (advancing CFC reduction) Establishment of Automobile NOx Law	Technical development of CFC avoidance advanced such as ozone depletion coefficient "zero" refrigerator Spread of development of lean-burn engine that satisfied both low fuel cost and low NOx emission and three-way catalyst
1994	Effectuation of the United Nations Framework Convention on Climate Change Ideal of zero emission by the United Nations University	Acceleration of development of energy conservation technology such as for electrical appliance manufacturers and automobile manufacturers Zero emission measures started in automobile, electrical appliances, and beer manufacturers.
1996	ISO14001 certification system	The ISO14001 certification acquisition support service, LCA support business, and environmental report creation support business were started.
1997	Revision of Waste Management and Public Cleansing Law (Review of the Manifest system)	Recycling and waste disposal support businesses are accelerated.
1998	Announcement of bioremediation environment influence assessment guideline	Promotion of bioremediation technology development
1999	Revision of Law Concerning the Rational Use of Energy and execution of Bill for the Promotion of Measures to Tackle Global Warming Announcement of Law Concerning Reporting, etc, of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management	Progress of technology development related to solar batteries and fuel cell batteries Development of chemical control systems such as for manufacturers of electrical appliances
2000	Execution of Law Concerning Special Measures for Dioxins Execution of Law for Promotion of Sorted Collection and Recycling of Containers and Packaging Announcement of Law on Promoting of Green Purchasing Announcement of Construction Materials Recycling Act Announcement of Food Recycling Law Held the 6th session of the Conference of the Parties (COP6) to the UNFCCC	Progress of modification (and new installation) of dioxin countermeasure waste incineration facility Development of business supporting Container and Packaging Recycling Law Acceleration of spread of environment-friendly products to the market Effort for zero-emission was started mainly by major general contractors. Raw garbage processing business accelerated. Trading business started to attract attention.
2001	Execution of Law for Recycling of Specified Kinds of Home Appliances	Consultancy business related to waste processing and recycling flourished.

Presentation: Ministry of the Environment

2) Positive activities incorporating environment awareness in enterprise management

With the change of the business concept of enterprises that has been discussed above, most enterprises not only proceed with environment management by observing laws and regulations regarding environment law but also are moving towards positive introduction of the concept of environmental conservation into business management.

As an example of the new business, ESCO (Energy Service Company) comprehensively provides the technology, facilities, human resources, and funds that are required for energy conservation of buildings and factories and household electrical product rental business that focuses on the requirements for the services provided by products, not ownership of products. New products that were developed include eco-cement that is manufactured by using sewerage sludge and ashes from waste incineration as the raw materials and eco-fund, which is an environment-friendly investment trust that makes investments by taking the measures for environmental problems by enterprises into consideration. In addition, examples of measures for reducing the environmental load of existing products include the soap industry, which is actively promoting the refilling of containers, and the copier industry where related enterprises cooperate with recovery of other products.

PSS (product and service system) classification (P=Product S=Service SC=System Change)

(Ps) Product with service attached

- A service is provided at product delivery.
- A service is provided when the use of a product is determined or the life cycle reached.
- Forecast and recovery service

(Sp) Service with product attached

- Product that is provided by the service provider such as free mobile phone

(PS) The product and the service are equally important to satisfy certain requirements.

- A product, an auxiliary facility, contents, and a service are provided to fully satisfy the requirements of the client.
- Sharing the use of a product part-time, part-time ownership, or a sharing a product
- Using and not owning the functions of a product

(SC) System change

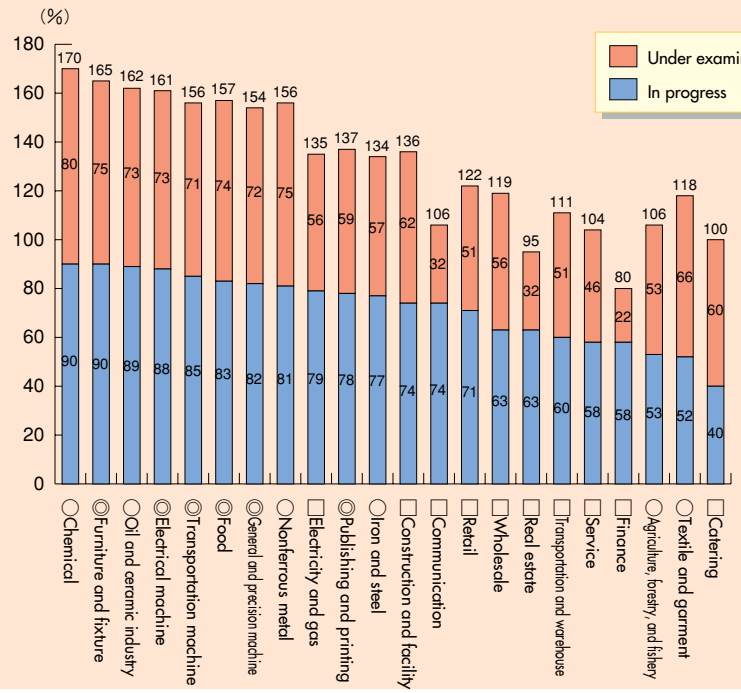
- From coin to electronic wallet
- From sale of agricultural chemicals to guarantee of freedom from pests

Presentation: Prepared by the Ministry of the Environment based on the "Sustainable Company" by Ryoichi Yamamoto

3)Differences of contents and reasons of activities taken for solving environmental problems by industry type

As discussed above, each company is making various measures for environmental conservation, however, the mechanisms of the measures vary according to the situation of the industry type to which the company belongs.

Rate of measures taken for environmental conservation by industry type

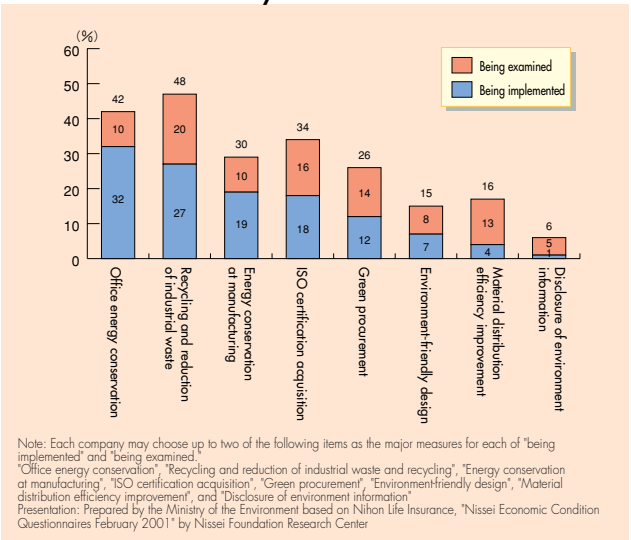


Note 1: ○ Material type manufacturing industry,
◎ Processing and assembly type manufacturing industry,
□ Non-manufacturing industry
2. "Rate of Measures" indicates a ratio of companies that are taking some measures for environmental conservation and a complement of a non-answer rate of questionnaires. The value indicates the value produced by subtracting the rate of the non-reply companies from 100% when the major two items can be selected for "measures that are being implemented" from the eight choices of "Rate of measures being implemented", "office energy conservation", "industrial waste reduction/recycling", "energy conservation at manufacturing", "ISO certification acquisition", "green procurement", "environment-friendly design", and "material efficiency improvement." The "rate of measures currently being examined" refers to the value calculated regarding "measures that are currently being examined."
(Sample structure by company scale: total number of samples 3,764 companies)
Large companies (employees exceeding 1,000): 6.9%
Medium companies (employees 300 to 1,000 or less): 26.0%
Medium to small companies (employees 300 or less): 66.8%
Presentation: Prepared by Ministry of the Environment based on Nihon Life Insurance, "Nissei Economic Condition Questionnaires February 2001" by Nissei Foundation Research Center

All the activities regarding environmental conservation were summarized and the rate of activities was checked by industry type. The result shows that some industry types consume a large amount of energy at the manufacturing stage and manufacturers of final finished products for consumers show high rates. Processing type manufacturing industries are relatively enthusiastic towards green procurement and environment-friendly design and non-manufacturing industries concentrate on office energy conservation.

We studied the proportion of activities that are being implemented and the proportion of activities that are being examined according to the contents. The result shows that the measures leading to cost reduction such as energy conservation at the manufacturing stage and reduction of industrial waste are implemented as the first stage in addition to the environmental effects. Then, the measures are spread to green procurement and environment-friendly design.

Contents of environmental conservation measures taken by all the industries



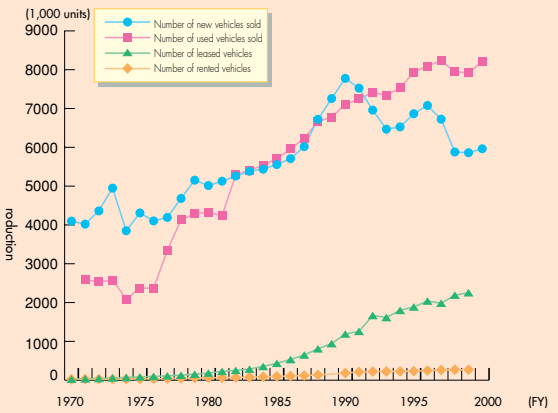
Note: Each company may choose up to two of the following items as the major measures for each of "being implemented" and "being examined."
"Office energy conservation", "Recycling and reduction of industrial waste and recycling", "Energy conservation at manufacturing", "ISO certification acquisition", "Green procurement", "Environment-friendly design", "Material distribution efficiency improvement", and "Disclosure of environment information"
Presentation: Prepared by the Ministry of the Environment based on Nihon Life Insurance, "Nissei Economic Condition Questionnaires February 2001" by Nissei Foundation Research Center

The contents of the activities taken by each industry and the difference of degree receive serious influence from the requirements of the prospective customers, such as business associates as customers and consumers and the condition of each industry. This indicates the possibility that the implementation status of activities taken by the downstream industries gradually influences the upstream industries within the complicated socio economic system, and the intentions and behaviors of the final consumers may change the actions taken by enterprises.

4) Conformity with revenue improvement measures of enterprises

Under the current difficult economic conditions, Japanese enterprises are working hard to improve their performance. Among the activities that are being taken, active improvement of management efficiency such as introduction of IT led to a reduction of environmental load and shift of the emphasis from sale of materials to sale of services, such as leasing contract of automobiles, various rental services, and sale of products integrating with repair reform service resulted in a reduction of environmental load. In this way, the direction of activities for performance improvement match that of measures for environmental conservation.

Transition of the number of domestic vehicle sales and leased or rented vehicles



Presentation: Prepared by Ministry of the Environment based on the "Automobile Statistics Yearbook" and "Japan's Automobile Industry" by the Japan Automobile Industry Association, "Land-borne Statistics Directory" by Ministry of Land, Infrastructure, and Transport, and "Lease Handbook" by Lease Industry Association.

As discussed above, the situations surrounding enterprises further emphasize the relationship with the environment and environmental countermeasures are being recognized as business opportunities also, as well as mere constraints of activities.

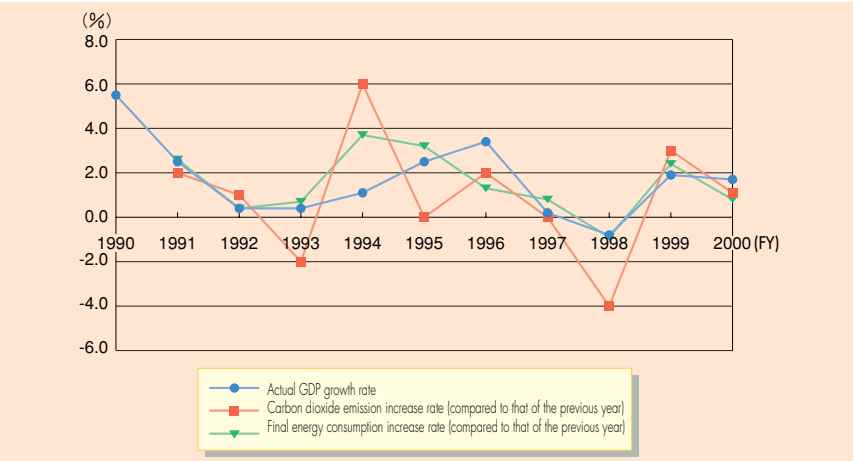
3. Change of Government Policies

1) Actual policies in each field

Today's environmental problems including global environmental problems are closely related to and cannot be separated from socio economic activities. To solve such new environmental problems, the Government is required to take a different approach from that for handling conventional industrial pollution, while considering the influence on socio economic activities.

Regarding the global warming problem, as indicated in chapter 1,carbon dioxide emission that accounts for 90% of greenhouse gases, and economic growth are interrelated. Therefore, the Government has taken countermeasures that also achieve substantial results in aspects other than global warming prevention effects, and can be beneficial even if global warming does not occur. However, since the influence of global warming was found to be definite, further measures are necessary.

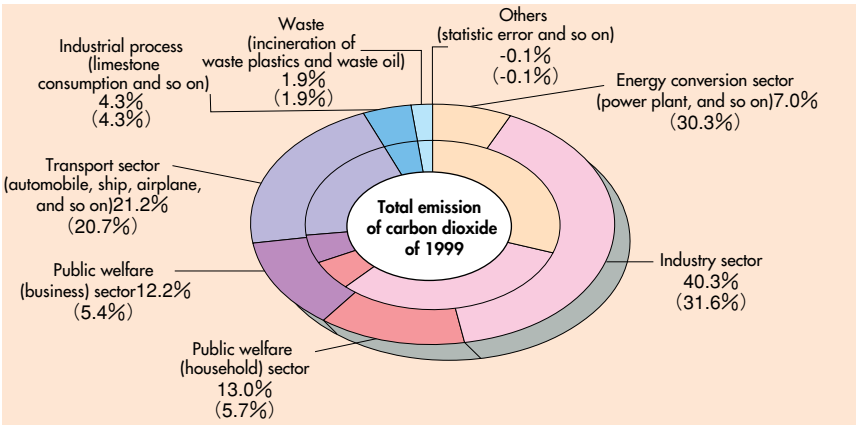
Relationship between GDP growth rate, carbon dioxide emission increase rate, and energy consumption increase rate



Source: "Comprehensive energy statistics (2000 version)" by Research and Institute of International Trade and Industry
"Energy Demand and Supply Result (Quick Report) of 2000" by Agency of Natural Resources and Energy
"1995 Calendar Year Standard GDE (GDP) Time Series Table 2000 Definite Report by Demand Item" by the Cabinet
Inventory by convention bureau country (1999 version)

The "Outline for Promotion of Efforts to Prevent Global Warming" that was defined in March 2002 indicates implementation of each measure for achieving the 6% reduction as promised by transforming the situation to the reduction mode as quickly as possible by immediately implementing the measure that can be implemented at the current stage, then trying to achieve further reductions, and leading to further continuous emission reduction in the long term. The basic concepts of these measures that were presented include "co-existence of environment and economy", "step-by-step approach", "promotion of measures by integrating all the industries and levels", and "securing international linkage of global warming measures."

Breakdown of carbon dioxide emission by sector

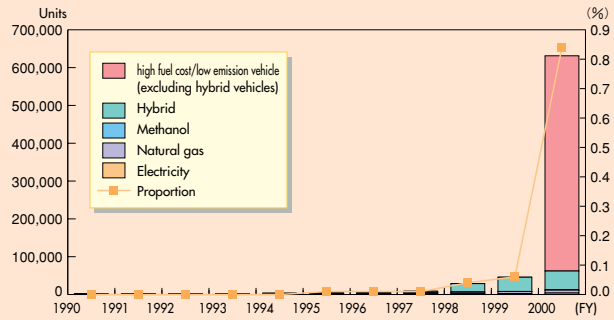


Note 1: The inner circle indicates the proportion (number in the lower parentheses) of direct total emission of each sector and the outer circle indicates the proportion (number in the upper level) after distribution of the emission associated with power generation of the electricity company to the final demand sector according to the power consumption
Note 2: Statistical error: The total of emission proportions does not necessarily become 100% since the value is rounded up.
"Others" include the statistical error and the portion associated with consumption of lubricating oil
Presentation: Ministry of the Environment

To achieve effective and efficient greenhouse gas emission reduction, it is important to use the concept of policy mix that combines various policy techniques organically. Above all, as one of the techniques for achieving high cost effective reduction, the economic technique of taxes and surcharges that persuade each subject to behave according to the economic rationality by granting economic incentives will be examined comprehensively, while giving consideration to the influence on the national economy and association with other countries, based on the market mechanism as the precondition.

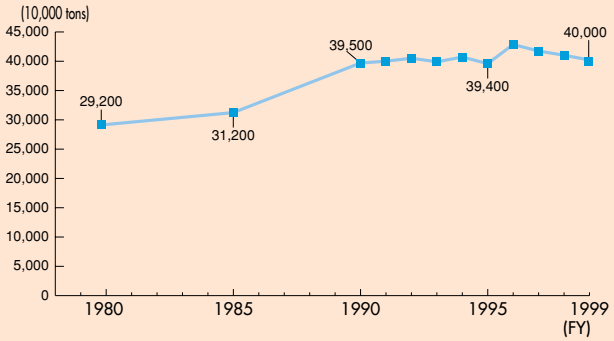
For waste management and recycling problems, because there is a concern that the pressure of landfill sites and resource exhaustion may constrain economic activities, it is necessary to control the amount of resources extracted and reduce environmental load by promoting a recycling-based society.
To achieve this objective, it is necessary to: -introduce and enhance the concept of "Extended Producer Responsibility" that producers take certain responsibility for appropriate recycling or disposal of their products of post-consumer stage, -increase the purchase of recycled products by the National government and other entities based on Green Purchase Law to secure sufficient demand for them, -consider the use of economic instruments such as unit-based pricing,tax and charge, and deposit-refund.
For the economic instruments, local governments are considering taxes regarding waste as local discretionary earmarked taxes that were created in 2000FY.

Transition and penetration rate of the number of low-emission vehicle ownership rate



Presentation: Automobile Inspection and Registration Association, Japan Motor Vehicle Association, Japan Gas Association, Traffic Low-Emission Vehicle Promotion Organization, Oil Industry Activation Center, Ministry of Land, Infrastructure, and Transport, and Ministry of the Environment

Transition of industrial waste emission



Presentation: Ministry of the Environment

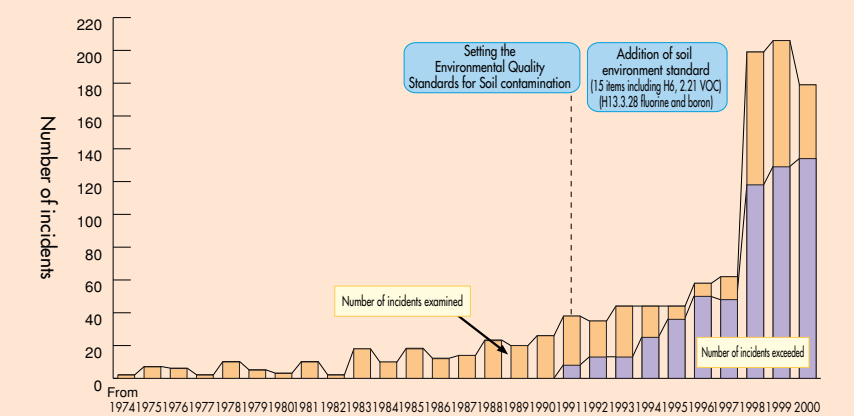
Examination status of tax system regarding wastes in local Governments

	Tohoku North 3 prefectures (Aomori, Akita, Iwate)		Mie Prefecture	Tottori Prefecture	Fukuoka Prefecture	Kitakyushu City
Type	Industrial waste tax	Industrial waste delivery charge	Industrial waste tax	Industrial waste tax	Industrial waste tax	Industrial waste tax
Status	Prepare the draft during 2002 and regulated in 2003.		Enforced in April 2002	Under examination	Under examination	Under examination
Tax payer	Draft A: Emission enterprise Draft B: Emission enterprise and intermediate processing enterprise	Industrial waste delivery agent from outside of the Prefecture	Emission enterprise (within and outside of the Prefecture)	Emission enterprise and intermediate processing enterprise (within and outside of the Prefecture)	Emission enterprise (within and outside of the Prefecture)	Final waste disposal enterprises and companies that treat wastes internally
Charge target	Draft A: Delivery to the intermediate processing facility and landfill site Draft B: Delivery to the landfill site	Delivery of industrial wastes to the Prefecture	Delivery to the intermediate processing facility and landfill site The recycling facility is exempted from the tax.	Delivery to the intermediate processing facility and landfill site within the Prefecture	Delivering to the intermediate facility and landfill site The tax is exempted from the delivering to the intermediate waste processing site for recycling purpose	The amount of waste in the landfill site within the city
Tax payment method	—		Payment by self-assessment	Collected by the intermediate processing enterprise and final waste disposal enterprise in conjunction with the disposal fee	Self-assesment	Self-assessment
Tax rate	—		1,000 yen/t However, for intermediate processing, multiply a coefficient considering emission reduction.	Intermediate processing About 100 yen/t Final waste disposal About 1,000 yen/t	1,000 yen/t	1,000 yen/t
Expected tax revenue	—		About 400 million yen	About 67 million yen	About 1,700 million yen	About 2000 million yen
Main use of tax revenue	Making prior consultation obligatory and responsibility of the party	Source fund for appropriate processing promotion policy of industrial waste and the fund required for recovery to the original condition	Support of environmental industry and countermeasures for environmental load by industrial wastes	Cost of the industrial waste appropriate processing business and policies of the Prefecture	Support of development promotion such as technology and industrial activities, measures for urgent issues, and support of municipalities	Support of technology development and establishment of town that enable coexistence of waste processing and the environment and creation of a new environment industry
Others	duty-izing of prior consultaion and responsibility to participant of pollution		Review about five years after enforcement of the regulation	Review five years after enforcement of the regulations		

Note: Being examined by 34 local government among 98 prefectures and cities with Health Centers (as of January 2002)
Presentation: Ministry of the Environment

For soil contamination problems, with the recent increase of enterprises that are engaged in contamination examination at redevelopment and sale such as factories to be redeveloped and expansion and enhancement of constant monitoring of groundwater by local Governments, soil contamination by heavy metals and volatile organic compounds that have surfaced and the number of incidents of contamination is dramatically increasing. Immediate actions for soil contamination will reduce the cost for future countermeasures and activate the economy associated with land irrigation, as well as achieve environmental conservation effects, although it imposes some economic burden to the implementers such as elimination of contamination. In addition, expansion of new businesses associated with soil contamination countermeasures is expected and deliberation is currently in progress with the submission of the "Bill for soil contamination countermeasures."

Number of soil contamination incidents that were detected each year



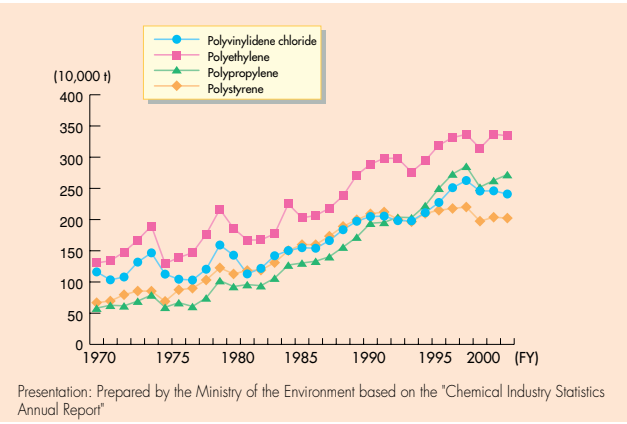
Number of incidents exceeded	2	7	6	2	10	5	3	10	2	18	10	18	12	14	23	20	26	38	35	44	44	44	58	62	199	206	179
Number of incidents exceeded	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	13	13	25	36	50	48	118	129	134

Presentation: Ministry of the Environment

For the conservation of nature, the conventional discussions tend to revolve around the choice between protection or development. However, recently there have been many cases where the conservation of nature and regional revitalization can be integrated such as protection of Japanese crested ibis of Sado Island and designation of Yakushima as the world heritage site and other cases where environmental conservation measures and employment measures are integrated such as "Green employment business" of Wakayama Prefecture and "Shinshu Kikori Lecture" of Nagano Prefecture. Attempts for nature regeneration business have started through active recovery of the natural resources that were lost.

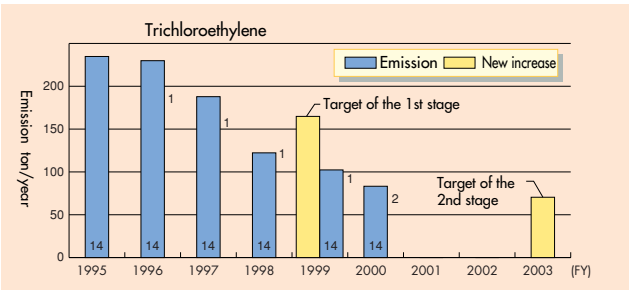
Concerning the problems arising from chemical substances, it is important to note how effectively and economically the environmental load caused by chemical substances even can be reduced taking into account that sufficient scientific explanation of the influence is not necessarity available. Initially, it is necessary to quantitatively assess the environmental risk, which is the risk of adverse influence of chemical substances on human health and the eco-system, to introduce the concept of reduction of environmental risk as a whole, and to take precautionary approaches to prevent the occurrence of irreversible changes, assuming the existence of some degree of uncertainty.
In addition, enterprises have started to take voluntary management such as Responsible Care activities without being restricted by legal regulations. Furthermore PRTR (Pollutant Release and Transfer Registers) was introduced whereby enterprises themselves check the emission and clarify the conditions such as emission of chemical substances to the environment, which is a fundamentally different method from the conventional regulatory method, such as promotion of further measures by enterprises.

Transition of production of four major resins



Presentation: Prepared by the Ministry of the Environment based on the "Chemical Industry Statistics Annual Report"

Example of activities taken by reducing harmful air contaminants in the Japan Responsible Care Council



The emission indicates the increase from the base figure, which is the emission of 1995, by stacking the increase in the graph as "new increase".
* The figures in the bar graph indicate the number of companies that submitted the data.
* The figures above the bar graph indicate the number of the companies whose emission increased from that of

Note: Indicates the substance reduction effects among the 12 substances that are targeted for voluntary control
Source: "Responsible Care Report 2001" by the Japan Responsible Care Council

2) Concept in proceeding with environmental countermeasures

As discussed above, various key concepts can be found in determining the basic skeleton of measures in each field of environmental problems. These concepts can be applied over a wide range more generally, not only to specific environmental problems. To handle current environmental problems, accurate measures are necessary by using these various concepts.

Chapter 3

Aiming at a Socio Economic System for Sustainable Development

<Summary of Chapter 3>

Based on the world's economic growth and population increase, we can predict further increase of environmental load on the global scale so that the current socio economic system faces environmental constraints.

This Chapter clarifies the necessity for active immediate environmental measures to avoid such environmental constraints. The Chapter also clarifies that the efforts for environmental measures bring various economical benefits and international contribution by Japan is important to secure sustainability on the global scale under the current situation in the lead-up to the Johannesburg Summit. It also examines the process towards structuring of a sustainable society in Japan.

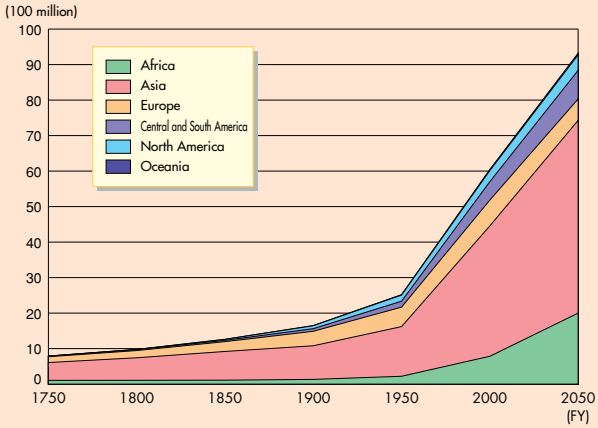
1. Actualization of Environmental Constraints and Possibility of New Measures

1) Necessity for handling environmental constraints

In spite of annual fluctuations, the world economy is consistently growing over the long term and the world population is expected to reach 9.3billion by 2050, which is an increase of 50% from 2001. Such future economic development and population growth lead to an increase of various environmental loads and increases the possibility for the current socio economic system to face some environmental constraints. For resources, the major mineral resources are expected to last for the next 30 to 40 years only; oil and natural gases are expected to be exhausted in the next 40 years and 60 years respectively. Thus, a definite reduction of the absolute amount for global resources is concerned.

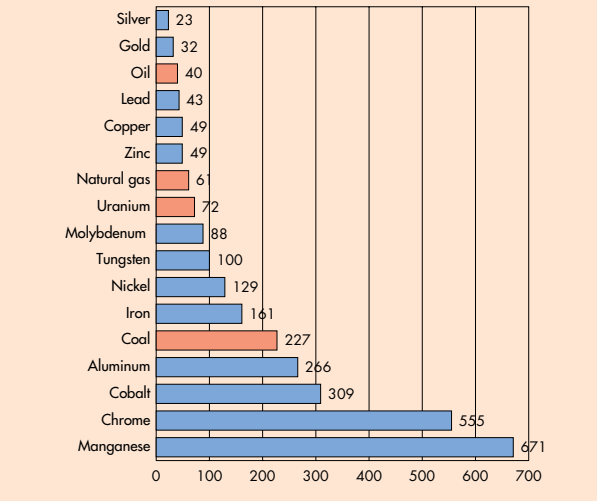
Regarding the influence on the environment, for global warming, the average temperature of the entire Earth is expected to rise by 1.4℃ to 5.8℃ during the period from 1990 to 2100 and the sea level is expected to rise for 9cm to 88cm. It is feared that such changes impose serous influences on people's livelihood and production foundations including increase of drought and flood, unstable grain production, and various influences on health and related issues in Japan are expected. For water resources, due to an increase of population and the amount of water extracted, the population of about 5billion is expected to suffer water restriction by 2025. For food production, it is expected that the increase of demand for meat in developing countries will cause a dramatic production increase; the demand for grains for livestock feed is expected to be doubled during the period from 1995 to 2020. Expansion to the lands unsuitable for cultivation may cause deterioration of soil and water quality, particularly in developing countries. For biological diversity, 60,000 species of plants, which account for one quarter of all the species in the world are assumed to become extinct by 2025.

Transition of world population



Source: "Revisions of the World Population Estimates and Projections" (1998) by United Nations

Number of years available in terms of reserves of major energy resources and mineral resources

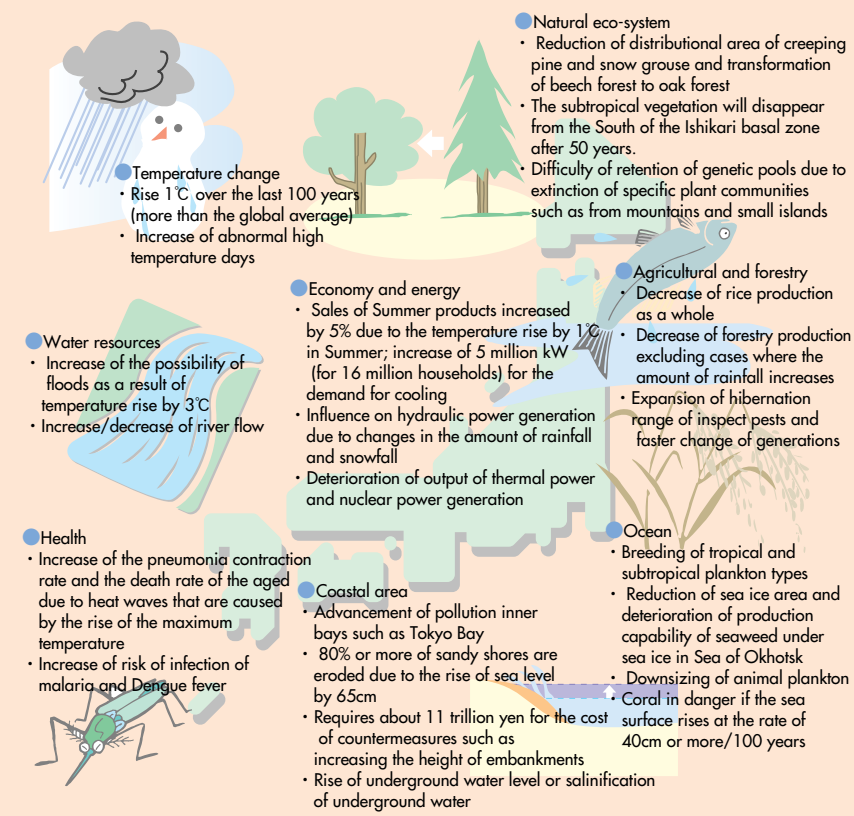


As of 2000 (however, 1997 for Uranium and 1999 for aluminum)
Number of years available = Amount of reserve/production amount
Presentation: Prepared by the Ministry of the Environment based on "Statistical Review of World Energy 2001" by BP Amoco and "Mineral Commodity Summaries 2001 (partly 2000)", and "World Metal Statistics 2001" by OECD/NEA-IAEA.

The result of calculations, called as ecological footprint regarding the degree of load imposed on the environment by the socio economic activities such as supply of food and timbers, and energy consumption indicates that the socio economic activities of the entire world including Japan had already exceeded the global environmental capacity, that is the sustainable level, in 1970.

The future environmental problems in the OECD countries in 2020 that were forecast by the OECD indicate stagnation or further deterioration in many areas such as use of water resources, emission of harmful wastes, agricultural pollution, and emission of greenhouse gases. Thus, the OECD countries commonly recognize the urgency of environmental constraints.

Influence of global warming that is predicted in Japan



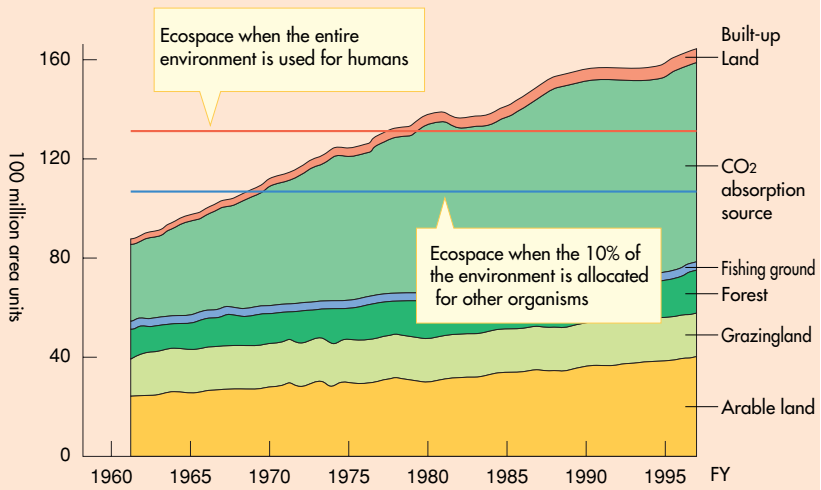
Presentation: "Influence of Global Warming in Japan 2001" by Ministry of the Environment (2001)

2) Avoiding environmental constraints

To avoid such situations, further efforts for environmental measures are inevitable.

As discussed in Chapter 1, through the severe pollution experiences and two oil crises, Japan has rapidly enhanced energy productivity and resource productivity and enhanced eco-efficiency. It is possible to promote environmental measures further.

Transition of world ecological footprint



Ecological footprint: The following items are converted to the common unit called "area unit"; area unit indicates how much load the socio economic activities impose on the global environment and the total area unit has increased by about 50% (about 1.5% annually) since 1970, reaching 16,4 billion area units in 1996. (1) Cropland required for food production(2) GrazingLand required for production of meat and diary products(3) Forest required for manufacturing of paper and timbers(4) Fishing ground required for marine products(5) Forests required for absorption of carbon dioxide that is emitted as a result of energy consumption(6) Land required for housing and infrastructure
The global ecospace in 1996 accounts for 12,600 million area units (ecospace accounts for 11,3 billion area units when 10% of the environment is allocated for other organisms). The world ecological footprint exceeded the ecospace in the 1970's and currently exceeds it by about 30% (about 45%).
Source: "Living Planet Report 2000" (2000) by WWF

Regarding reduction of emission of carbon dioxide, new energies such as solar power generation, wind power generation, and biomass account for only 1% of the total supply of primary energy and the proportion of the number of low-emission vehicles such as hybrid vehicles to the total number of vehicles is still low (about 1%). For these reasons, various additional measures are expected to be introduced.

For resource utilization, consumption control of natural resources and reduction of environmental load require efforts for reduction, reusing, recycling, heat recovery, and proper treatment in that order. For recycling, the amount of material produced by subtracting the amount recycled from the emission amount for each resource or container package shows further implementation possibility of resource recycling.

Amount produced by subtracting the recycled amount from the emission amount among the main nonferrous metals

(1997)

	Emission amount (ton) (A)	Recycling rate (%) (B)	A×(1−B/100) (ton)
Aluminum	1,662,000	54	766,000
Copper	598,000	66	202,000
Zinc	364,000	20	291,000
Lead	277,000	66	93,000
Cadmium	1,080	28	780

Source: Prepared by Ministry of the Environment based on the "Examination and research relating to 'Recycling economy system in nonferrous metal materials (March 1999)" by Clean Japan Center

Amount produced by subtracting the recycled amount from the emission amount among major container packages

(2000)

	Emission amount (ton) *1 (A)	Recycling rate (%) *2 (B)	A×(1−B/100) (ton) *1
Steel can	1,215,357	84.2	192,026
Aluminum can	167.5	80.6	32
PET bottle	362,000	34.5	237,110

*1 100 million cans for aluminum cans only
*2: Recovery rate for PET bottles
Source: Prepared by Ministry of the Environment based on the data provided by the Clean Japan Center

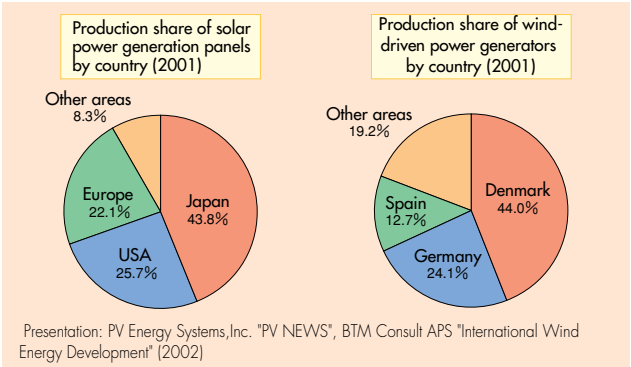
2. Economical Effects Achieved by Environmental Measures

1) Environmental measures and technical innovation

To avoid environmental constraints discussed in Section 1, it is necessary and vital to start the new measures in such an economic recession age as this for planning of sufficient handing before the occurrence of any adverse influence of the environment. Such measures can give a positive effect to the economy when taken property through various effects such as avoidance of future damage in addition to technical innovation, employment creation, and ripple effects.

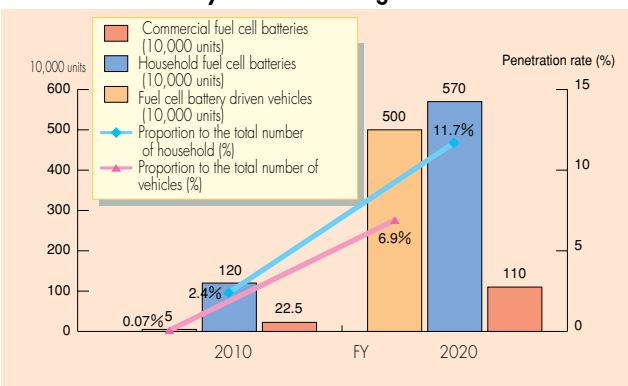
For technical innovation, proper measures of automobile and solar energy generation as discussed in Section 2 Chapter 1 have stimulated domestic technology development, and Japanese enterprises are now proud of their top-level technical power in the world, while Denmark has started development and sales of wind-driven power generation to be first in the world and currently holds 40% share of the world market. Fuel cell batteries are also one of the major projects that are to be tackled by the giant world enterprises as a joint development and in Japan also, a trillion-yen market is expected to be born in 2010.

Production share of solar power generation panels and wind-driven power generators by country



Presentation: PV Energy Systems,Inc. "PV NEWS", BTM Consult APS "International Wind Energy Development" (2002)

Fuel cell battery introduction target and market scale



	2010	2020
Market scale	1 trillion yen	8 trillion yen

(Reference)		1995
Market scale	Agriculture	8.4 trillion yen
	Beverage	8.5 trillion yen
	Petrochemical product	7.5 trillion yen
	Railway transport	6 trillion yen
	Accommodation	7 trillion yen

Presentation: Prepared by Ministry of the Environment based on the data supplied by Ministry of Economy, Trade, and Industry:research comniffee for fuel cell battery practical use in the strategy (2001) and inter-industry relstions table (1995).

Current situation of eco-business market scales of Japan and future forecast

Eco-business	Market scale (100 million yen)		Employment scale (persons)	
	1997	2010	1997	2010
A. Environment pollution control	142,140	188,430	311,258	340,350
Manufacturing of devices and pollution prevention materials	13,475	17,860	22,346	21,893
1. Air pollution prevention	3,052	3,660	4,826	4,286
2. Waste water treatment	9,824	10,828	15,550	12,593
3. Waste processing	89	387	201	611
4. Soil and water purification (including underground water)	15	2,408	24	2,962
5. Noise and vibration prevention	142	104	254	145
6. Environment measurement, analysis, and assessment	352	473	1,491	1,295
7. Others	—	—	—	—
Providing services	86,098	103,607	246,005	256,139
8. Air pollution prevention	—	—	—	—
9. Waste water treatment	9,569	12,111	8,575	7,991
10. Waste processing	73,904	85,202	226,174	231,496
11. Soil and water purification (including underground water)	356	3,225	1,290	5,223
12. Noise and vibration prevention	—	—	—	—
13. Research and development regarding environment	—	—	—	—
14. Engineering regarding environment	—	—	—	—
15. Analysis, data collection, measurement, and assessment	2,197	2,186	9,517	9,469
16. Education, training, and information distribution	21	348	133	806
17. Others	51	534	316	1,154
Construction and equipment installation	42,567	66,964	42,906	62,318
18. Air pollution prevention	0	59	0	72
19. Waste water treatment	33,942	57,884	30,515	52,040
20. Waste processing	7,196	6,421	11,107	7,868
21. Soil and water purification (including underground water)	—	—	—	—
22. Noise and vibration prevention	1,429	2,599	1,285	2,337
23. Environment measurement, analysis, and assessment	—	—	—	—
24. Others	—	—	—	—
B. Environmental load reduction technology and products (Manufacturing devices and providing technology, materials, and services)	2,256	5,464	3,516	8,774
1. Environment load reduction and energy conservation technology, and associated processes	0	2,500	0	5,747
2. Environment load reduction and resource conservation products	2,256	2,964	3,516	3,027
C. Effective use of resources (Manufacturing devices, providing technology, materials and services, construction and installation of equipment)	103,031	207,049	380,371	517,883
1. Prevention of indoor air pollution	—	—	—	—
2. Water supply	288	1,051	337	1,710
3. Renewable material	37,451	88,506	87,081	169,119
4. Recyclable energy facility	1,690	7,109	6,302	11,946
5. Energy conservation and energy control	7,560	24,949	12,619	25,777
6. Sustainable agriculture and fisheries	—	—	—	—
7. Sustainable forestry	—	—	—	—
8. Natural disaster prevention	—	—	—	—
9. Eco-tourism	—	—	—	—
10. Others (nature protection, eco-environment, bio diversity, etc.)	56,041	85,434	274,032	309,330
Grand total	247,426	400,943	695,145	867,007

While market globalization is progressing, the technologies that were developed by advanced enterprises are acquiring large market shares throughout the world. Since environmental problems are common world issues, the superiority of Japanese technology can also be developed further in the market relating to environmental measures, which is expected to expand further in the future.

Notes:
1. Column A contains the items that are difficult to assume by distinguishing "manufacturing of devices and pollution prevention materials" and "construction and equipment installation." Therefore, those that are assumed to be ordered as individual devices only were classified as "manufacturing of devices and pollution prevention materials" and those that are assumed to be ordered as plants were classified as "construction and equipment installation."
2. Some items are marked as " - " due to unavailability of data.
3. Data of 1996 is used for some of the market scale of 1997.

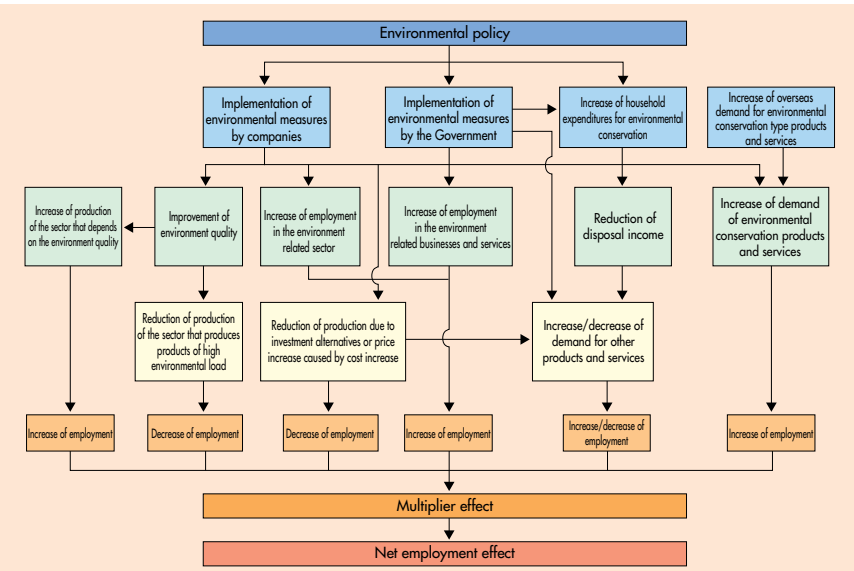
Presentation: Ministry of the Environment

2) Environmental measures and employment

The report regarding "environmental policies and employment" that was announced by the OECD in 1997 indicates a slight positive effect of the influence of environmental measures on employment as a whole, although it is very small.

Regarding the employment creation condition in the environment field in each country, Germany provided employment for about 1.3 million in the environment field, which exceeds that of the machine manufacturing industry or the food related industry. In the USA also, the recycle and reuse industries created about 1.12 million jobs, which is equivalent to the automobile manufacturing industry.

Latent influence of environmental policies on employment



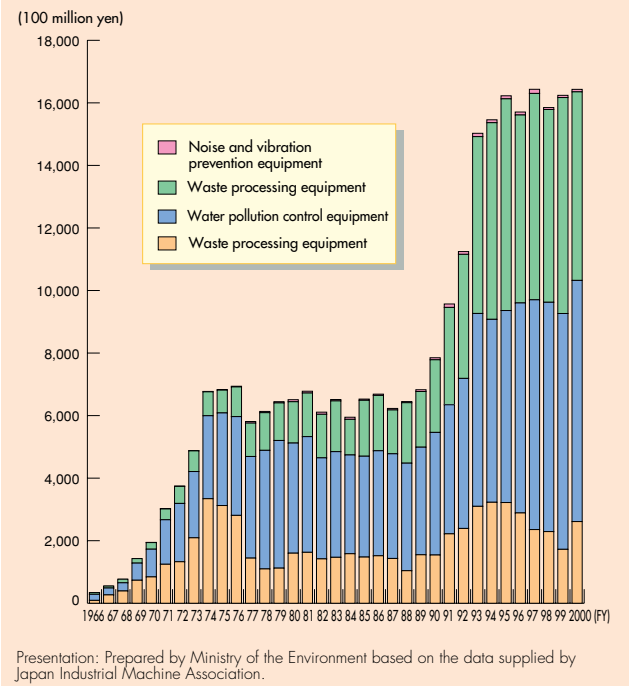
Sources: Prepared based on the "Environmental Protection and Employment" (1998) (modelled on OECD "Environmental Policies and Employment" (1997) by Ministry of the Environment in Germany

In Japan also, the employment scale in the environment field as of 1997 reached about 700,000 and the number is estimated to reach about 870,000 in 2010. For the employment measures that are taken by Prefectures, the result of urgent regional employment special grants shows that the environment and recycling fields account for about 30%, which is the highest proportion.

3) Ripple economical effects by environmental measures

Environmental measures are considered to be expenditures for enterprises, however, for enterprises that manufacture facilities required for implementation of environmental measures, environmental measures are sales. The environment related market is expanding; the environment-related equipment production performance has increased from about 34.1 billion yen in 1966 to 1,643.2 billion yen in 2000. The result of the analysis of the production induction effects and employment creation effects through investments in the environment field estimated by using an inter-industry relations table indicates that environment-related businesses have approximately the same production ripple effects as those of the construction sector industry.

Transition of production of environment-related equipment in value



Presentation: Prepared by Ministry of the Environment based on the data supplied by Japan Industrial Machine Association.

4) Avoidance of future damage

We tend to become hesitant over the implementation of measures under the current difficult economic situation. For environmental measures, the effects appear in the future while the cost occurs immediately and the benefit spread to the entire society, not to the individual enterprise. Therefore, since the cost bearer does not necessarily gain the benefit associated with the cost, the burden is sometimes avoided or delayed. However, we have already experienced bitter lessons in recent history; when people's health is damaged by environmental pollution, the damage cannot be reversed, the environment is difficult to recover or recovery of the environment is extremely expensive once it is lost.

Cost of damage in pollution-related experiences in Japan and estimated cost for countermeasures

	Annual cost of damage	Annual cost for measures
Air pollution in Yokkaichi	21,007 million yen	14,795 million yen
Minamata disease	12,631 million yen	123 million yen
Itai Itai disease	2,518 million yen	602 million yen

Presentation: Prepared by Ministry of the Environment based on "Pollution Experiences of Japan" by Global Environment and Economy Research Institute

For the problems on the global scale, the amount of damage becomes vast and UNEP estimates the total amount of damage will reach 304.2 billion dollars over the entire world when the density of carbon dioxide in the atmosphere reaches twice that of the pre-industrial revolution level in 2050.

As discussed adobe, the effects of environmental measures on the economy have various facets. When taken properly, these environmental measures result in economical benefits such as technical innovation, securing of employment and ripple effects. In addition In the sense of avoiding future damage, environmental measures may give positive effects to the economy.

3. New Measures by International Society and Japan's Contribution

1) Factors of instability of the international society caused by deterioration of the natural environment

The current background of frequent regional disputes has produced a vast number of refugees worldwide. In addition, "environmental refugees" who were forced to leave their residences due to destruction of the environment are estimated to reach 25 million. Thus, environmental problems have become serious problems.

Population shifts caused by the environmental problems and cross-border environmental problems such as acid rain, and pollution of international rivers have become the factors of instability in the international society.

2) Securing stability of environment, society, and economy

With these conditions forming the background, recently the environment and security issues are often associated in discussions. For example, the subject of "Environment and Security" was included in the final communique of the G8 Environment Minister's Meeting held in 1999. Under the recent climate where mutual dependency beyond borders has become increasingly stronger worldwide due to globalization of the world economy, recent apprehension regarding spread of instability of some regions in the world due to environment destruction is increasing. To secure sustainability on the global scale, the approach from each facet of the environment, society, and economy is necessary. For Japan, which largely depends for its resources, energy, and food on overseas countries, active contribution is important to secure sustainability on the global scale, considering the size of the environmental load.

Dependency of Japan on imports for its major resources

	1980			2000 (*1)		
	Production amount	Import amount	Overseas dependency (%)	Production amount	Import amount	Overseas dependency (%)
Timber <raw material> (1,000 m³)	34,051	43,892	56.3	17,987	19,511	52.0
Grains <including feeds> (1,000 tons)	10,750	26,120	70.8	10,450	26,810	72.0
Coal (1,000 tons)	18,095	72,711	80.1	3,126	145,278	97.9
Crude oil (1,000 kl)	503	256,833	99.8	740	249,814	99.7
Natural gas (million m³)	2,197	22,854	91.2	2,431	103,225	97.7
Iron ore (1,000 tons) (*2)	477	133,721	99.6	4	131,733	100.0
Copper (1,000 tons)	53	867	94.2	1	4,469	100.0
Bauxite (1,000 tons)	0	5,708	100.0	0	2,096	100.0

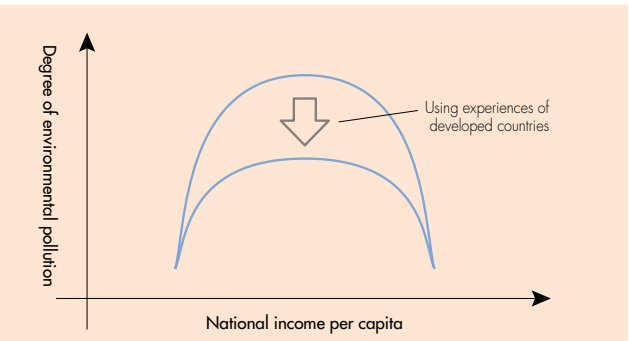
Source: "Raw materials demand and supply statistics", "Food demand and supply table" by the Ministry of Agriculture, Forestry, and Fisheries of Japan, and "Trend of Mineral Industry of Japan" and "Trade White Paper" by the Ministry of Economy, Trade, and Transport
Notes
1. The data of timber and grains is that of 2000
2. The values of 2000 were estimated using the average grade of iron ore as 38.9% based on the statistics survey of the amount of mineral reserves.

3) Significance of "World Summit On Sustainable Development"

From the end of August, 2002, the "World Summit On Sustainable Development" will be held in Johannesburg (South Africa). For the significance of the meeting, the following items are expected :
<1> Political decisions made by the world leaders indicate the guideline of international efforts associated with sustainable development in the 21st Century.
<2> New challenges and opportunities that the international society is facing are verified and international agreements are made regarding the future practical measures.
<3> Participation of various concerned stakefolder over a wide range, as well as the Governments, further promotes the realization of sustainable development.

Constructive discussions by world leaders in one place regarding actualization of sustainable development, in particular, environmental prosection and poverty eradication in developing countries are extremely meaningful in securing worldwide sustainability. For Japan, which depends significantly on overseas countries, this is a good opportunity to make active contributions.

Environment Kuznets curve



Presentation: Prepared by Ministry of Environment

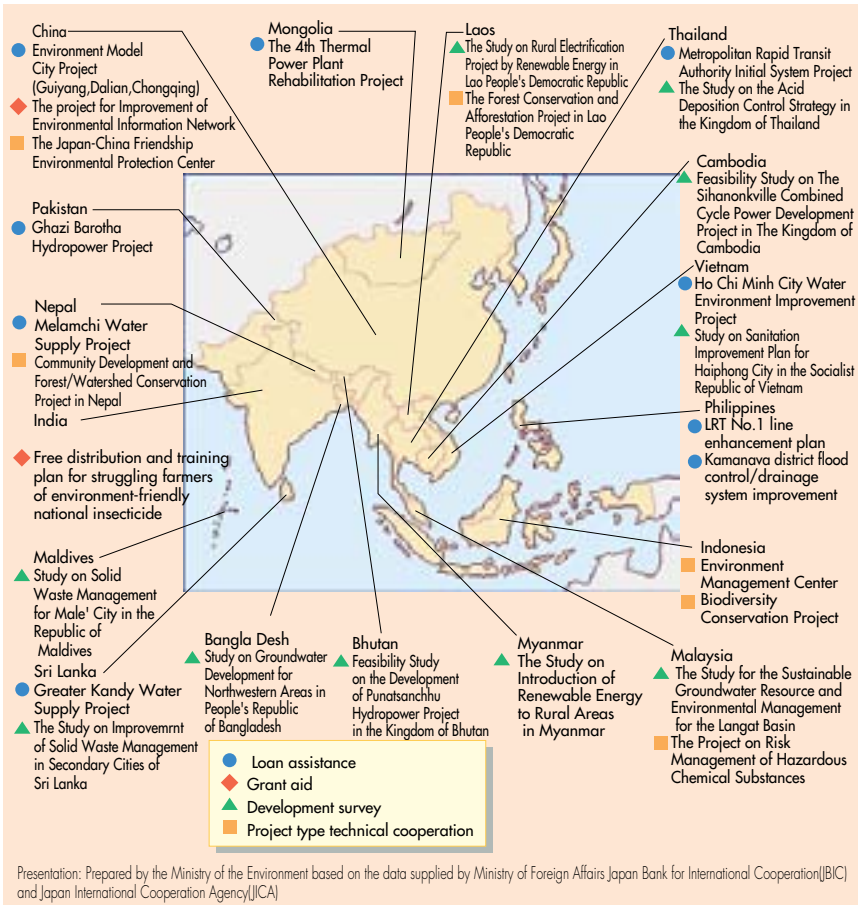
4) International contribution in the environmental field

According to the analysis result of the relationship between

economic growth and environmental load, the environmental load is low at the initial stage of economic growth and increases as the economic growth progresses, and after the economic growth reaches a certain stage, the environmental load decreases due to the development of environmental measures. Such a reverse U curve is called an environmental Kuznets curve. To achieve sustainable development, it is extremely effective for developing countries to reduce the degree of the reverse U curvature, instead of following the same development path as developed countries. For this reason, it is important for developing countries to actively tackle environmental measures and at the same time to gain the cooperation of developed countries that have the knowledge of such measures.

In particular, in the Asian region, future rapid population increase and economical development are expected, resulting in increase of environmental load causing instability of the regional society. The Japanese government, which is closely related to the Asian region in terms of the society, economy as well as environment ,must make efforts for securing environmental, social and economical stability in the Asian region by allocating 30% of its official development assistance (ODA) to environmental proposals.

Actual examples of the Official Development Assistance (ODA) in the Asian region by the Japanese Government



Presentation: Prepared by the Ministry of the Environment based on the data supplied by Ministry of Foreign Affairs Japan Bank for International Cooperation(JBIC) and Japan International Cooperation Agency(JICA)

4. Movement towards Construction of Sustainable Society

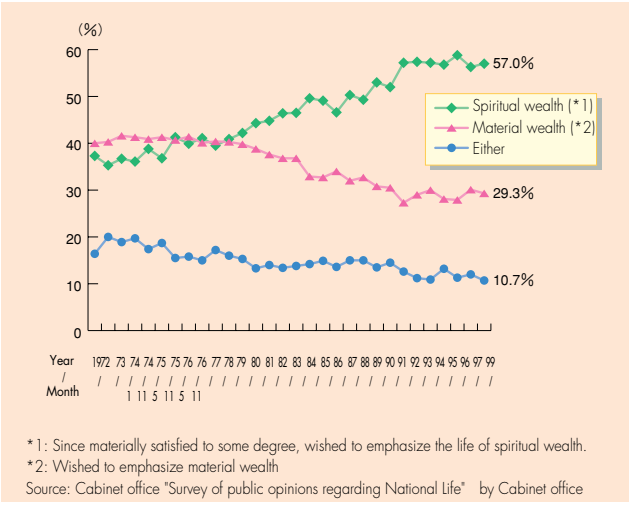
As discussed above, we are required to take further measures for reducing the environmental load. In the measures based on the current mass production, mass consumption, and mass waste producing socio economic system, the effects are limited. To build a sustainable society within the limited ecospace, it is necessary to review the current socio economic system itself.

Based on this concept, the Government established a "Harmonious Coexistence Conference" hosted by the Prime Minister in order to transform the society to the "sustainable simple society that emphasizes quality" and examined the measures for realization of Japan as the country of harmonious coexistence with the earth. In the discussions held in the conference, various suggestions were submitted under the recognition that "harmonious coexistence" is to reform the current socio economic structure, our livelihood, and our sense of value based on the environment viewpoint. The discussions suggested that the conventional socio economic system is to be changed to minimize the use of resources by economic activities, recycle the resources, and shift the contents of economic development from quantitative expansion to qualitative improvement.

As for the actual image of the new socio economic system, all the entities such as citizens, enterprises, and governments are to collectively make efforts and examine in reduction of the environmental load so that such a system is created.But some of the measures taken by the entities may lead to review of the current socio economic system.

For instance, the recent trend shows that consumers started to move away from the adherence to new items, to extended use of consumer durable goods and sharp increase of the used item retail industry, increase of consumers desiring "spiritual wealth" rather than "material wealth" and valuing having sufficient time for oneself. Thus, the sense of value towards the richness of society is changing. As discussed in Section 2 Chapter 2, a transformation may occur from utilization of materials to utilization of services that is de-materialization across the entire society, as seen in the increase of lease and rental services in many enterprises. This may produce the result that cannot be achieved by efficiency improvements of individual products. Vitalization of regions through improvement of voluntary measures relating to environment in regions indicates a direction different from the socio economic system based on the existing overconcentration on mass production.

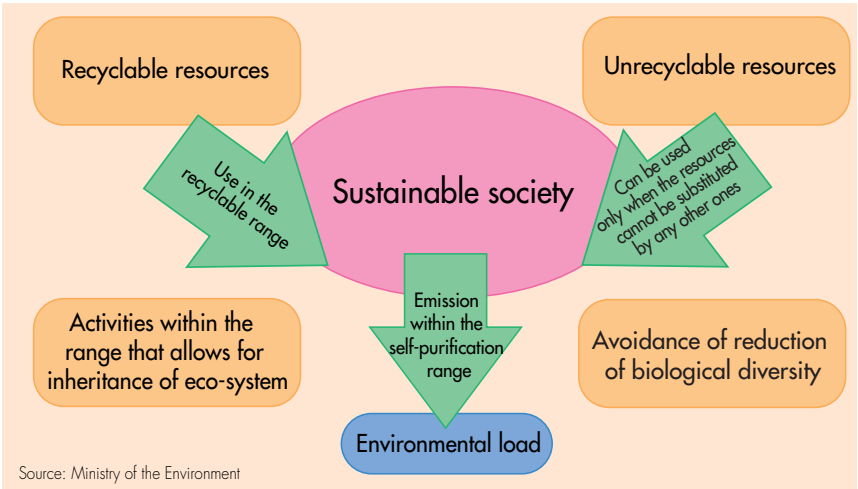
Material wealth or spiritual wealth



*1: Since materially satisfied to some degree, wished to emphasize the life of spiritual wealth.
*2: Wished to emphasize material wealth
Source: Cabinet office "Survey of public opinions regarding National Life" by Cabinet office

As discussed adobe, the environment as the foundation of the world socio economic system is in a serious condition in many fields. In fact, measures by enterprises and citizens have gradually started to penetrate and attempts are being made to improve eco-efficiency so that reduction of environmental load exceeds economic growth. However, to restrict the total environmental load to a certain range, it is necessary to fundamentally review the socio economic system based on the current concept of mass production, mass consumption, and mass waste production and aim for transformation to a society of a new stage independent of resources and energy mass consumption with the maturing of the economy.

Definition of "Sustainable Society" in the Environmental Basic Plan



Source: Ministry of the Environment

In this year as the 10th year from the Earth Summit, the Johannesburg Summit will be held and the meaning of sustainable development will be discussed again. In this opportunity, we must contemplate what choice is to be made to start the first step for construction of a sustainable society and proceed with structural reform of the society based on the viewpoint of the environment for the future.

Part 2 : Current Environmental Issues and Environmental Conservation Measures by Government

This part reports the current conditions of environmental problems and the environmental conservation measures that were implemented in 2001 based on the Basic Environment Plan under the Chapters indicated below. The following Chapters clarify the current conditions of environmental problems and issues in the major fields.

Chapter 1 Creating a Socio Economic System Based on Sound Material Cycles with Minimal Environmental Burden
Chapter 2 Basis of Measures, and Measures to Promote Participation of All Segments of Society
Chapter 3 Measures to Promote International Action
Chapter 4 Effective Implementation of the Basic Environment Plan

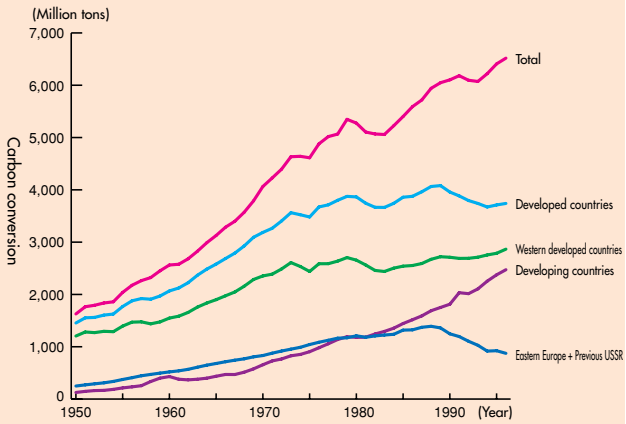
1) Global Scale Conservation of Air Environment

(1) Global warming

With the recent expansion of human activities, a large amount of greenhouse gases such as carbon dioxide and methane gas is emitted into the air, enhancing greenhouse effects and increasing the possibility of global warming.

The 2001 report of the Intergovernmental Panel on Climate Change (IPCC) indicates a rise of the average global surface temperature by 0.6±0.2℃ since 1861 and forecasts a further rise by 1.4℃ to 5.8℃ until 2100 and a rise of the sea level of between 9cm and 88cm. The observation by Japan Meteorological Agency indicates a rise of the average annual temperature by about 1.0℃ over the last 100 years and the influence of global warming on the natural environment is already detected such as reduction of the sea ice area of Sea of Okhotsk and a shift of natural habitat areas of animals and plants.

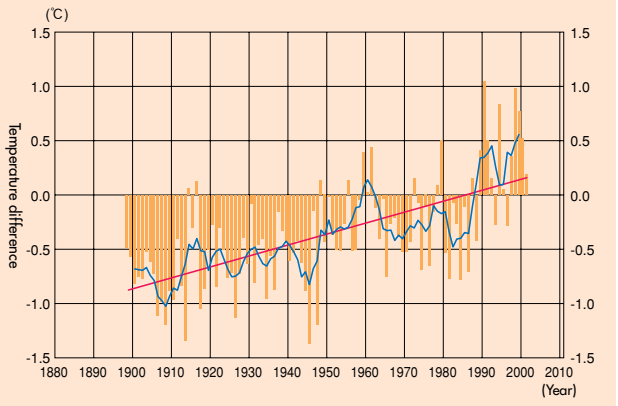
Transition of global CO_2 emission (1950-1996)



Presentation: Prepared by the Ministry of the Environment based on the data supplied by the Carbon Dioxide analysis Information Center of Oakridge National Institute (USA)

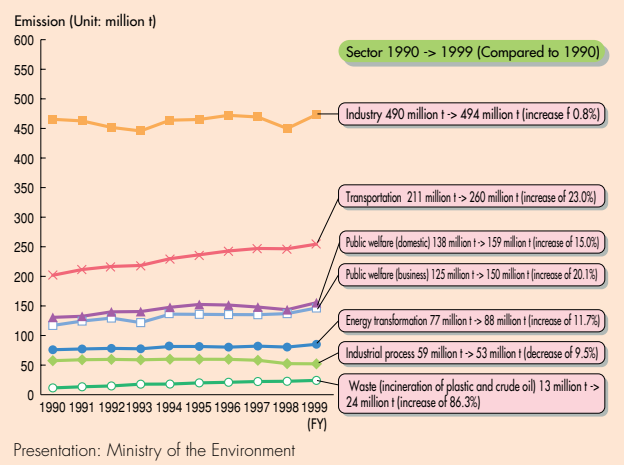
Among the greenhouse gases emitted in 1999 in Japan, the carbon dioxide emission accounts for 1,225 million tons and the emission per capita is 9.67 tons (both are based on carbon dioxide conversion). The emission per capita has increased by 6.3% since 1990 and the total emission shows an increase of 9.0%. The results by sector indicates an increase of 23.0% in the transportation sector, an increase of 20.1% in the public welfare (business) sector, and an increase of 15.0% in the public welfare (household) sector, while the result shows an increase of 0.8% in the industrial sector.

Chronological change of anomaly of average surface temperature in Japan in common year (1898 to 2001)



Note: The bar graph shows the value of each year. The blue line indicates the average shift change of the value in each year and the red line shows the long-term trend.
Presentation: Japan Metrological Agency

Condition of carbon dioxide emission by sector in Japan



Presentation: Ministry of the Environment

To solve global warming problems, the Japanese Government is to make its utmost efforts for approval of the conclusion of Kyoto Protocol in the 154th ordinary session of the Diet, and establishment of the domestic collateral law that is required for the approval regarding the greenhouse gas emission of developed countries in order to conclude in 2002 the Kyoto Protocol that sets constraints on emission values. In addition, the Government needs to enhance the measures in every site of the socio economical system and organically combine measures of each aspect. At the same time, a fundamental measure is necessary in the future for reviewing and changing the mass production, mass consumption, and mass waste producing modern socio economic system.

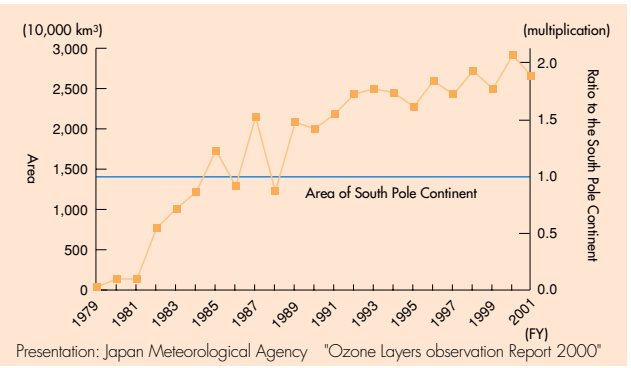
(2) Ozone layer depletion

It became clear that the ozone layer is being depleted by ozone layer depletion substances such as chlorofluorocarbon (CFC). When an ozone layer is depleted, harmful ultra violet rays reach the Earth's surface, causing health hazards such as skin cancer or cataracts.

Ozone layers being depleted globally except over tropical areas and the rate of depletion is higher in the highest latitude regions. In Japan also, a statistically significant trend has been verified in Sapporo, and in the South Pole, the largest ozone hole in history was observed in 2000. The ozone layers are in a fragile condition due to the emission of man-made chemicals.

The Japanese Government controlled production of CFC by establishing the Ozone Layer Protection Law in 1988 established the "Law Regarding Recovery and Destruction of Freon Associated with Specific Products" in June 2001. This law made obligatory the recovery and destruction of Freon in commercial freezer air conditioners and car air conditioners.

Transition of scale of ozone holes



Presentation: Japan Meteorological Agency "Ozone Layers observation Report 2000"

2) Conservation of Air Environment (Excluding the global scale air environment)Air Environment

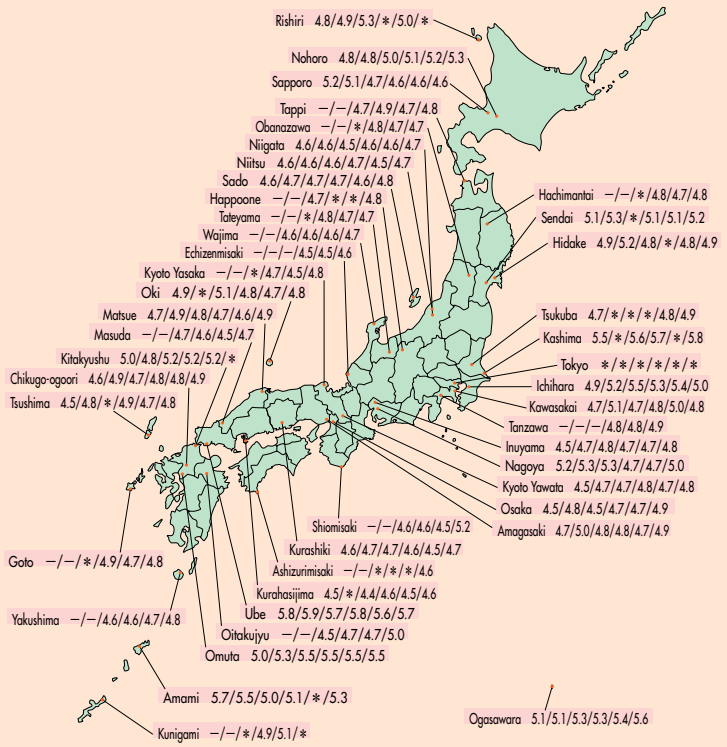
(1) Acid rain

Acid rain is a rain that shows strong acidity for dissolved sulfur oxides and nitrogen oxides that are generated from combustion of fossil fuels and so on. The impact of acid rain over a wide range Pisces for the acidification of inland water was such as lakes, swamps, and rivers, and forests by acidification of soils, and acceleration of deterioration or collapse of trees and cultural heritage buildings by acid deposition, is feared.

pH distribution chart in rainfall

Result of 2nd survey and 3rd survey

Average of 2nd survey(1)/1993/1994/1995/1996/1997



—: Not measured

*: Invalid data (discarded by the annual judgment criteria)

Notes: 1. Average value of the 2nd survey over 5 years (excluding missing measurement and the annual average values that were discarded)

2. In Tokyo, values are measured in different positions in the 2nd survey and the 3rd survey.

3. In Kurahashijima, values are measures in different positions in 1993 and 1994.

4. For Sapporo, Niitu, Hidake, and Tsukuba, the measurement frequencies are different in 1993 and from 1994 onwards.

5. Data of the winter closed points (Oze, Nikko, and Akagi) is excluded.

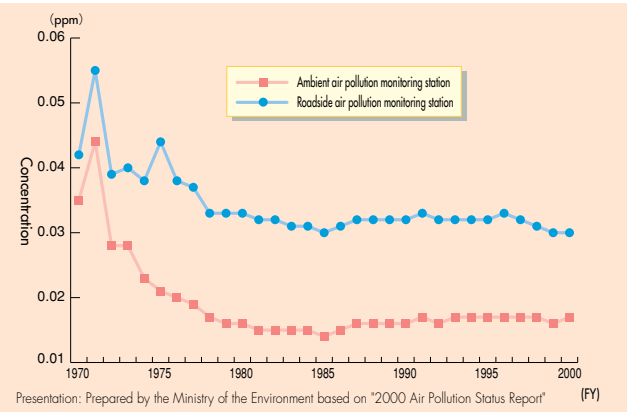
Source: "Summary of 3rd Acid Deposition Survey" by the Ministry of the Environment, Acid Deposition Countermeasure Review Meeting

In Japan, almost the same degree of acid rain impact is observed as in Europe and America from which damage has already been reported. However, the impact on the ecosystem has not been clarified yet. Since in general, the damage by acid rain surfaces after a long period of time, if acid rain continues at the present rate, the damage of acid rain may become actualized.

(2) Photochemical oxidants

Photochemical oxidants are generated as the secondary product of photochemical reactions when primary pollutants mainly consisting of nitrogen dioxides and hydrocarbons that are emitted from factories, offices, and automobiles receive irradiation from sunlight. Photochemical oxidants cause photochemical smog that irritates the eyes and throats or influences the respiratory organs, however, the level of photochemical oxidants still exceeds the environmental standard in almost all the areas nationwide.

Transition of annual average concentration levels of nitrogen dioxide



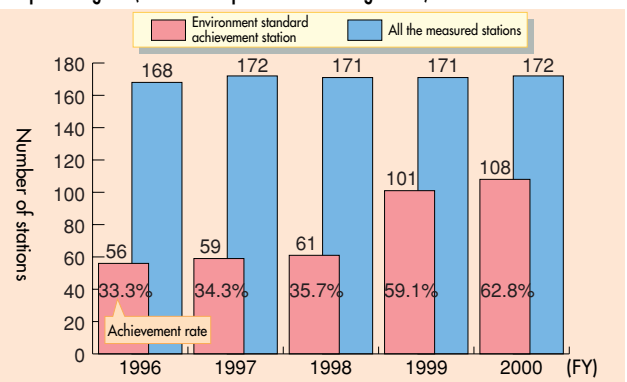
Presentation: Prepared by the Ministry of the Environment based on "2000 Air Pollution Status Report"

(3) Nitrogen oxides

Nitrogen oxides that adversely affect the respiratory organs at high concentration are generated mainly by material combustion. They are mainly generated from stationery sources such as factories and mobile sources such as automobiles.

The annual average concentration of nitrogen dioxide in 2000 was slightly higher than that of the previous year, however, the long-term view shows that the concentration remains almost at the same level. For the environmental standard achievement statuses for nitrogen dioxide in 2000, the Ambient Air Pollution Monitoring Station indicated 99.2% and the Automobile Exhaust Gas Monitoring Station indicated 80%. However, the standard has not been satisfied over a wide area surrounding the urban areas that are specified by Automobile NOx Control Law (Law Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides from Automobiles in Specified Areas) and the condition of air pollution is still unsatisfactory. Based on this reason, the implementation was enhanced by amending the Automobile NOx Law in 2001.

Transition of environment standard achievement status associated with nitrogen dioxide in specific regions (Roadside air pollution monitoring station)



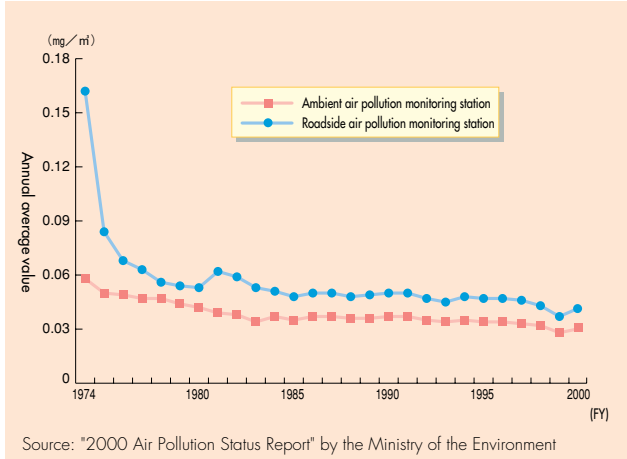
Notes: 1. Specific regions include some regions that are targeted for Automobile NOx Law in Saitama Prefecture, Chiba Prefecture, Tokyo, Kanagawa Prefecture, Osaka, and Hyogo Prefecture.
2. Air pollution by nitrogen dioxide based on the environmental standard is assessed as follows; among the daily average of nitrogen dioxides in each measurement station, the value is assessed from the lower value to that equivalent to 98%.

Presentation: Prepared by the Ministry of the Environment based on the "2000 Air Pollution Status Report"

(4) Suspended particulate matter

Suspended particulate matter is particles with diameter of 10 micro meters or less and float in the air. Suspended particulate matter consists of two categories:primary particles such as diesel exhaust particles that are emitted from diesel automobiles and flinged-up soils; and secondary particles that are produced by changing gaseous substances such as nitrogen oxides into particles in the air. Being extremely small, such matters stay in the air for a long time, are deposited in lungs and the trachea, harming the respiratory organs at high

Transition of annual average concentration level of suspended particulate matter

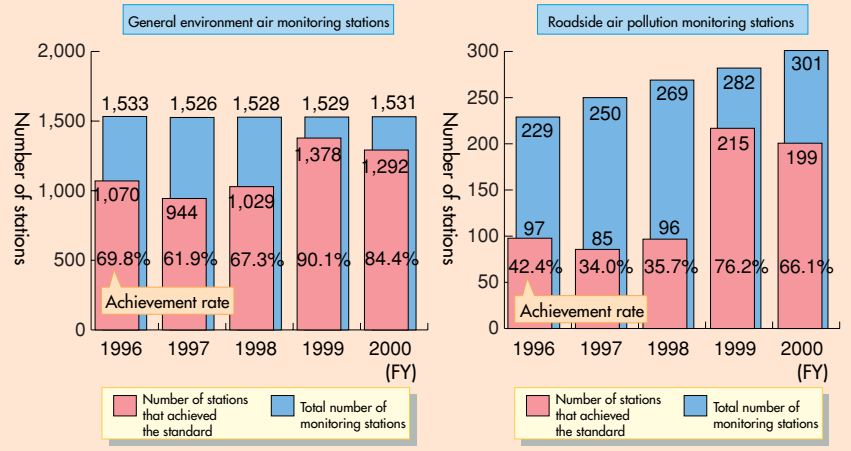


Source: "2000 Air Pollution Status Report" by the Ministry of the Environment

concentration.

The average density of suspended particular matter remains at almost the same level or is decreasing gradually. The conformity status of the environmental standard of suspended particulate matter based on the long-term assessment is decreasing slightly in comparison to that of the previous year. Therefore, as the measure for urban areas where the pollution conditions are quite serious, the Government amended Automobile NOx Control Low to add particulate matter to the regulated substance list in 2001. the Government also examining micro particulate matter with diameter 2.5 micro m or less and diesel exhaust particles since the relationship between these substances and health is of great concern.

Transition of environment standard achievement status of suspended particulate matter

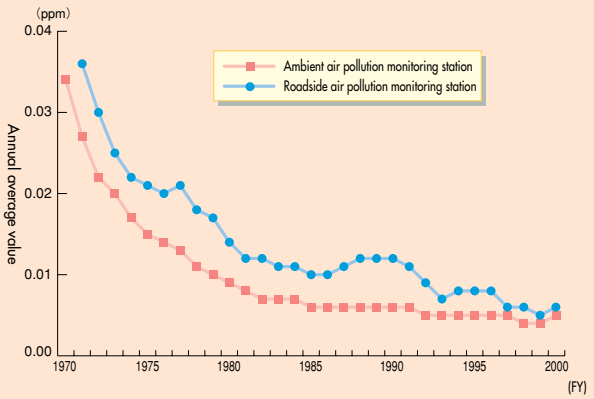


Source: "2000 Air Pollution Status Report" by the Ministry of the Environment

(5) Sulfur oxide

The average concentration of sulfur dioxide that is generated by burning oil and coal containing sulfur and causes pollution disease and acid rain remains at the same level or is decreasing. The recent environmental compliance status maintains a favorable condition although there were some influences from volcanic gas from Miyake Island.

Transition of average concentration level of sulfur dioxide



Source: "2000 Air Pollution Status Report" by the Ministry of the Environment

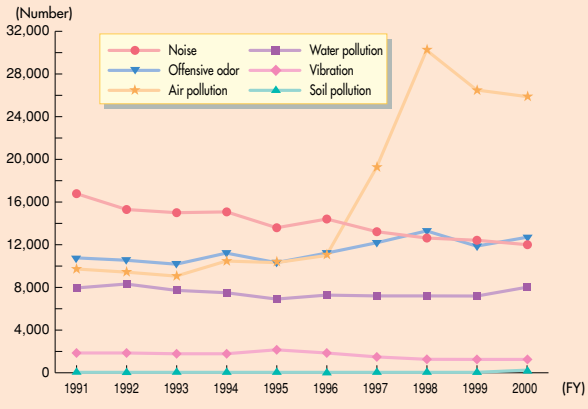
(6) Hazardous air pollutants

Full-scale monitoring was started for hazardous air pollutants in local Governments based on the revised Air Pollution Control law that was implemented in 1997. The levels of benzenes exceeded the environment standard value in 74 spots among 364 spots in 2000, and enhancement of emission reduction by voluntary measures is planned from 2001.

(7) Noise, vibration, and offensive odor

In addition to air pollution, there are also noise, vibration, and offensive odors, which are mainly related to human senses and are now regarded as important issues in conservation of the living environment. Noise is a problem closely related to daily living among various types of pollution and the sources vary greatly. Annually, the number of complaints against noise forms the majority of pollution complaints. Although the number of complaints regarding noise has decreased over these past 10 years, the number increased in 2000. The number of complaints regarding vibration remains at the same level over these past 10 years. The number of complaints regarding offensive odors was dropping after reaching its peak in 1972, however, it has started to increase in these past several years.

Transition of the number of complaints regarding seven typical pollutants by type



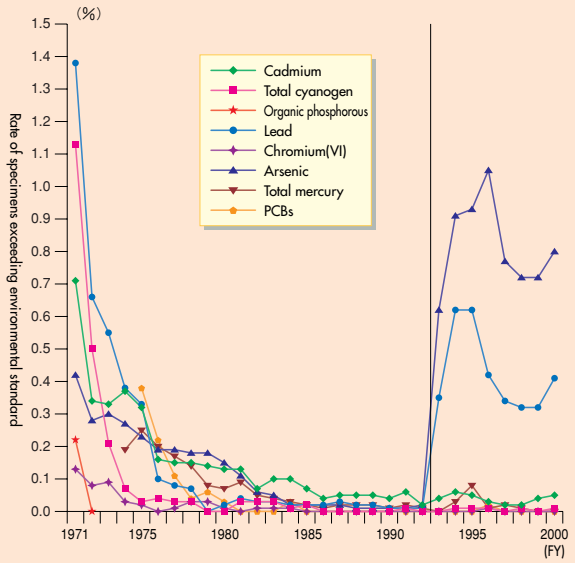
Note: The number of complaints regarding land subsidence was omitted since the presentation is difficult.
Presentation: Environmental Dispute Coordination Commission

3) Conservation of water, soil, and ground environment

(1) Water environment

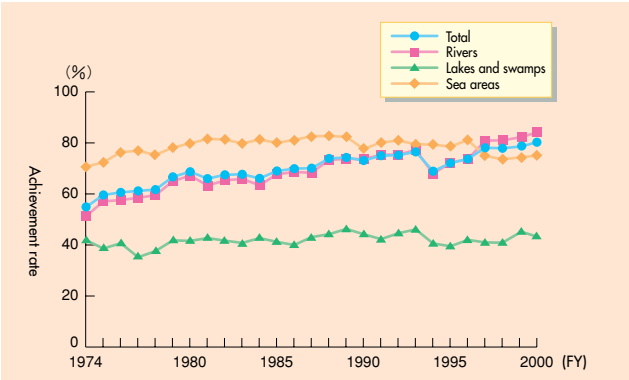
The result of national public water quality monitoring in 2000 indicates that the environment standard achievement rate regarding human health such as cadmium is 99.2%, however, the environmental standard achievement rate regarding conservation of living environment such as COD, which is a typical water quality index of organic pollution, is 79.4%. In particular, the achievement rates in the enclosed waters such as lakes, swamps, and bays are still low. The COD indexes, which are the typical indicators, indicate 63% for Tokyo Bay, 56% for Ise Bay, 76% for Seto Inland Sea, and 42.3% for lakes and swamps. To take the proper measures for such a condition, the Government decided to reduce COD indexes of Tokyo Bay, Ise Bay, and Seto Inland Sea further. The Government also decided to implement the 5th Areawide Total Pollutant Load Control targeting 2004 as the implementation year by adding nitrogen contents and phosphorus contents as the specification items as well as COD, in order to promote comprehensive reduction measures combining nitrogen and phosphorous, which are the causes of eutrophication.

Transition of rate of specimens exceeding environmental standard associated with health items (8th item)



Notes: 1. The rate of a specimen of alkyl mercury exceeding the environmental standard is 0% since 1971.
2. As a result of revision of the environmental standard made in March 1993, the environment standard value of Lead was revised from 0.1mg/l to 0.01mg/l, the standard value of arsenic was revised from 0.05mg/l to 0.01mg/l, and the standard value of organic phosphorus was deleted (not detected).
Presentation: Prepared by the Ministry of the Environment based on "National public water quality monitoring in 2000".

Transition of environmental standard (BOD or COD) achievement rate



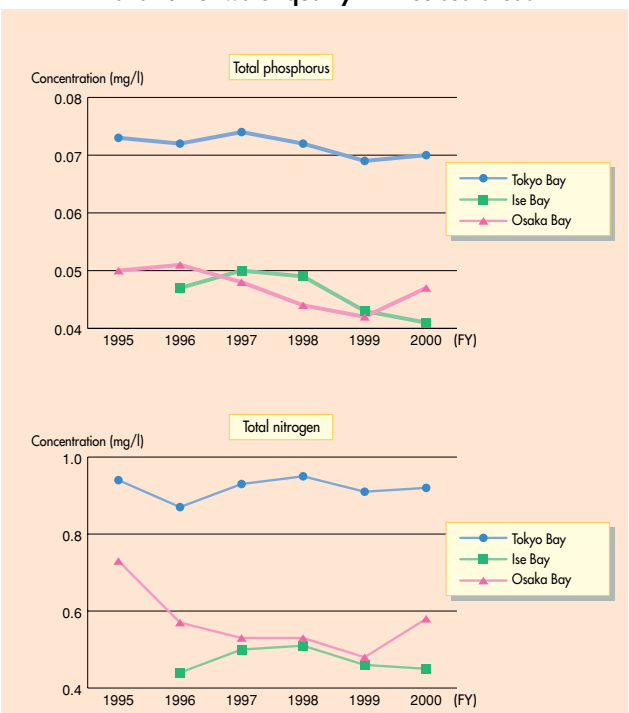
Remarks: 1. BOD for rivers and COD for lakes and swamps, and sea areas
2. Achievement rate (%) = (Number of water areas achieved/number of water areas applied) x 100
Presentation: Prepared by the Ministry of the Environment based on "National public water quality monitoring in 2000".

Groundwater quality monitoring result of 2000

Substance	Number of wells tested (wells)	Number of wells exceeded the standard (wells)	Excess rate %	Environmental standard
Cadmium	2,997	0	0.0	0.01mg/l or less
Total cyanogen	2,616	0	0.0	not detectable
Lead	3,360	10	0.3	0.01 mg/l or less
chromium(VI)	3,187	1	0.03	0.05 mg/l or less
Arsenic	3,386	65	1.9	0.01 mg/l or less
Total mercury	2,833	2	0.1	0.0005mg/l or less
Alkyl mercury	1,048	0	0.0	not detectable
PCBs	1,818	0	0.0	not detectable
Dichloromethane	3,534	0	0.0	0.02 mg/l or less
Carbon tetrachloride	3,675	2	0.1	0.002 mg/l or less
1, 2- dichloroethane	3,301	0	0.0	0.004 mg/l or less
1, 1- dichloroethylene	3,650	2	0.1	0.02 mg/l or less
cis-1, 2- dichloroethylene	3,657	12	0.3	0.04mg/l or less
1,1,1- trichloroethane	4,219	0	0.0	1 mg/l or less
1,1,2- trichloroethane	3,286	0	0.0	0.006 mg/l or less
Trichloroethylene	4,225	22	0.5	0.03 mg/l or less
Tetrachloroethylene	4,225	17	0.4	0.01 mg/l or less
1, 3- dichloropropene	3,039	0	0.0	0.002 mg/l or less
Thiuram	2,528	0	0.0	0.006 mg/l or less
Simazin	2,508	0	0.0	0.003 mg/l or less
Thiobencarb	2,453	0	0.0	0.02 mg/l or less
Benzene	3,436	0	0.0	0.01 mg/l or less
Selenium	2,634	0	0.0	0.01 mg/l or less
Nitrate nitrogen and nitrite nitrogen	4,167	253	6.1	10 mg/l or less
Fluoride	3,276	25	0.8	0.8 mg/l or less
Boron	3,210	16	0.5	1.0 mg/l or less
Total (Number of wells)	4,911	398	8.1	

Presentation: Ministry of the Environment "Groundwater Quality Monitoring Result in 2000"

Transition of water quality in three sea areas



Presentation: Prepared by the Ministry of the Environment based on "National public water quality monitoring during the period from 1995 to 2000".

For groundwater, the result of a survey conducted in 2000 shows that 8.1% of the wells that were examined exceeded the environmental standards. Regarding nitrate nitrogen and nitrite nitrogen, 6.1% of the wells exceeded the environmental standard. Under these circumstances, the countermeasures are regarded as urgent issues.

(2) Marine pollution

The number of confirmed marine pollutants in the Japanese sea areas in 2001 was 486, which is a reduction of 124 in comparison to that of 2000.

(3) Soil contamination

Soil contamination occurs due to direct infection such as leakage of raw materials due to inappropriate treatment or due to the secondary load generated through water pollution or air pollution caused by business activities. Once soil is contaminated, hazardous substances are deposited, causing a long-term contamination. Recently, soil contamination are being detected increasingly as a result of redevelopment of factory sites and research organization sites. In 2000, 134 soil contamination instances were detected. Therefore, to promote soil environment conservation measures in urban areas and so on, the Government submitted a bill for soil contamination countermeasures in February 2002.

(4) Ground Subsidence

Ground subsidence occurs due to contraction of a clay layer that is caused by a drop of the groundwater level that is caused by excessive extraction of groundwater. Once the ground has subsided, it will not be recovered to the original condition, causing damage to buildings and increase of submersion probability at flooding. By 2000, ground subsidence was noticed in 37 Prefectures and 61 regions.

Transition of number of confirmed marine pollutions by sea area

(Unit: Pollution)

Year	Type		Hokkaido coastal area	Honshu East Coast	Tokyo Bay	Ise Bay	Osaka Bay	Seto Inland Sea excluding Osaka Bay	Honshu South Coast	Kyushu coastal area	Japan Sea coastal area	South-West sea area	Total
1997		Oil	28	34	61	6	16	86	38	57	53	26	405
	Other than oil	Hazardous substance	0	9	1	0	1	3	75	1	0	0	90
		Waste	5	44	0	7	5	23	29	14	8	9	144
		Others	5	1	10	0	2	1	0	0	1	0	20
		Subtotal	10	54	11	7	8	27	104	15	9	9	254
		Red Tide	1	6	6	16	9	3	11	0	2	0	54
		Total	39	94	78	29	33	116	153	72	64	35	713
1998		Oil	32	24	73	12	16	67	52	47	33	32	388
	Other than oil	Hazardous substance	0	7	1	0	1	2	33	0	0	2	46
		Waste	8	6	2	13	37	60	33	39	13	0	211
		Others	2	0	9	1	1	11	1	1	0	0	26
		Subtotal	10	13	12	14	39	73	67	40	13	2	283
		Red Tide	0	1	2	6	1	8	5	0	3	0	26
		Total	42	38	87	32	56	148	124	87	49	34	697
1999		Oil	18	33	64	11	14	47	31	37	35	49	339
	Other than oil	Hazardous substance	0	2	2	0	0	1	13	2	0	0	20
		Waste	13	3	4	20	9	49	40	18	21	4	181
		Others	1	3	6	0	5	5	1	0	2	0	23
		Subtotal	14	8	12	20	14	55	54	20	23	4	224
		Red Tide	0	2	10	3	3	2	2	0	4	0	26
		Total	32	43	86	34	31	104	87	57	62	53	589
2000		Oil	13	23	78	17	16	44	45	31	13	27	307
	Other than oil	Hazardous substance	0	1	0	1	1	1	25	0	1	0	30
		Waste	10	9	2	45	3	43	10	39	64	1	226
		Others	1	1	4	0	1	3	5	1	0	0	16
		Subtotal	11	11	6	46	5	47	40	40	65	1	272
		Red Tide	0	0	15	5	1	1	6	2	1	0	31
		Total	24	34	99	68	22	92	91	73	79	28	610
2001		Oil	15	19	73	28	11	49	31	45	38	18	327
	Other than oil	Hazardous substance	0	2	1	1	2	1	0	1	0	0	8
		Waste	1	3	3	6	5	32	13	8	31	1	103
		Others	1	1	8	0	0	0	1	0	0	0	11
		Subtotal	2	6	12	7	7	33	14	9	31	1	122
		Red Tide	0	0	16	4	0	3	4	6	4	0	37
		Total	17	25	101	39	18	85	49	60	73	19	486

Notes: 1. "Hazardous substances" in the column "other than oil" refer to hazardous substances that are specified in the "Law Relating to Prevention of Marine Pollution and Maritime Disaster" and unexamined liquid substances.
2. "Others" in the column "other than oil" refer to factory waste water and Blue Tide.

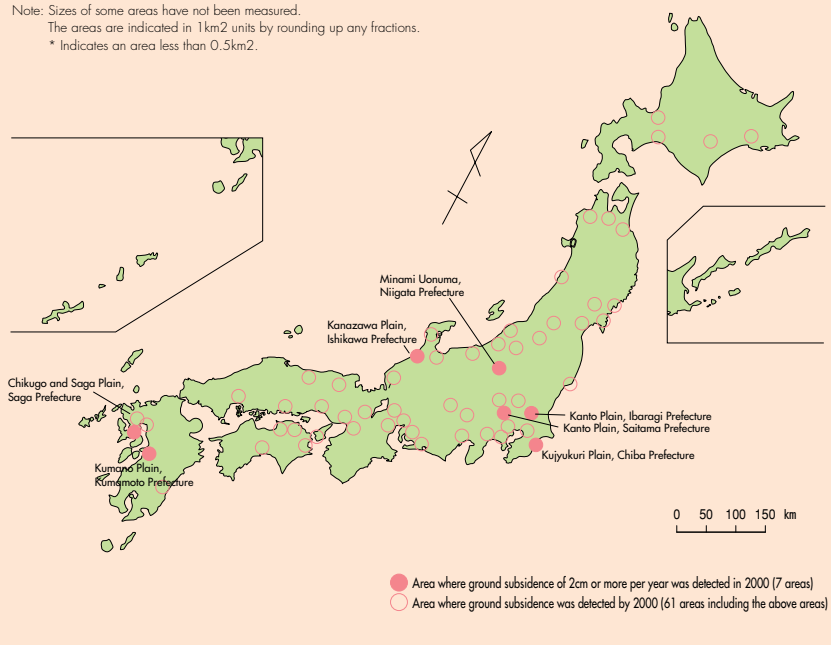
Presentation: Japan Coast Guard

Outline of ground subsidence areas nationwide

Upper column: Number of areas (Unit: Area)
Lower column: Area (Unit: km²)

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Ground subsidence by 2cm or more per year	28	25	23	23	22	22	31	19	18	12	17	16	18	17	19	11	21	14	13	9	9	9	7
	1,946	624	467	689	616	594	814	499	396	500	617	285	360	467	525	276	902	21	258	244	250	6	6
Ground subsidence by 4cm or more per year	13	9	8	8	8	6	12	7	6	7	5	4	5	4	6	1	6	2	4	0	0	0	0
	404	176	100	60	45	45	161	40	7	22	63	7	14	6	25	>	113	>	22	0	0	0	0

Note: Sizes of some areas have not been measured.
The areas are indicated in 1km2 units by rounding up any fractions.
* Indicates an area less than 0.5km2.



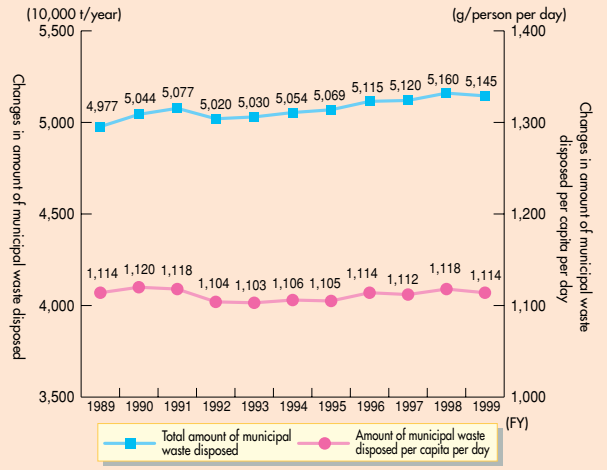
Presentation: Ministry of the Environment "General Condition of Ground Subsidence Areas Nationwide in 2000"

4) Measures for waste and recycling

In Japan, about 50 million tons of municipal wastes are disposed of annually since 1989 and the amount has remained at the same level for these past several years. Of the wastes, 78.1% is directly incinerated and 10.87 million tons are treated as final disposal. The average national capacity of municipal landfill sites is 12.3 years in 1999.

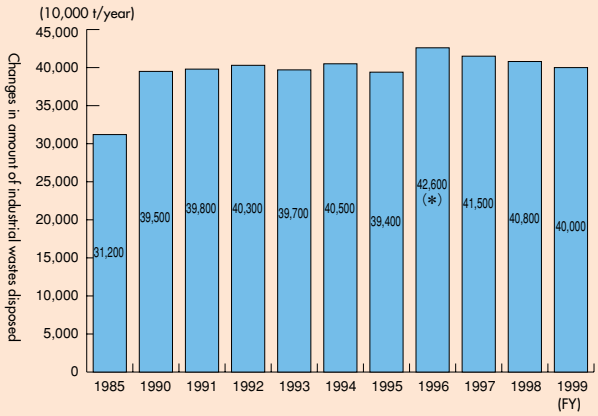
The total amount of industrial wastes disposed of remains at the same level in these past several years. In 1999, the amount decreased slightly from that of the previous year, resulting in about 400 million tons and the amount of final disposal was about 50 million tons, a decrease from the previous year's in terms of the proportion to the total disposal amount. The average national capacity of landfill sites was 3.7 years in 1999, presenting a more difficult situation than municipal wastes. In particular, the capacity in metropolitan areas is 1.2 years, which is a particularly difficult situation.

Changes in amount of municipal wastes disposed



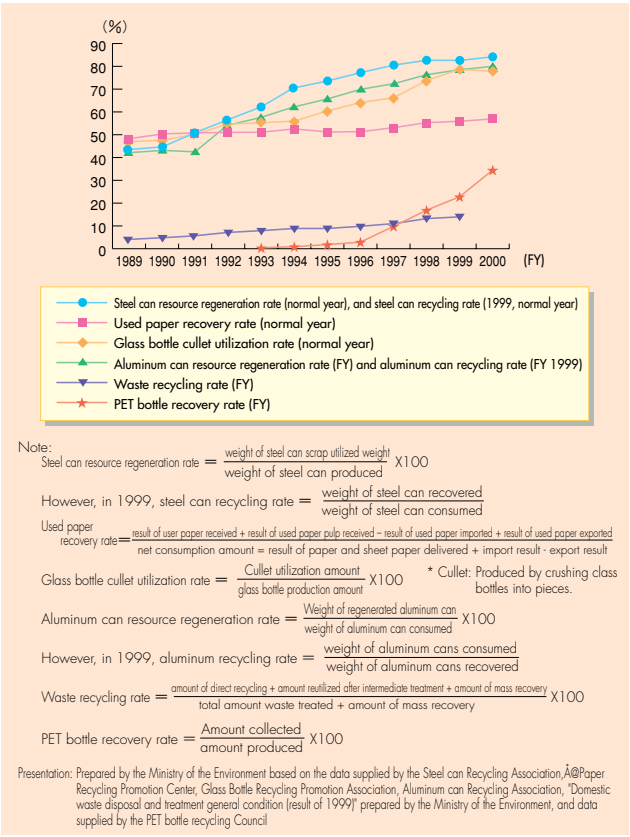
Presentation: Prepared by the Ministry of the Environment based on "Disposal and treatment of domestic wastes (implemented in 1999)"

Changes in amount of industrial wastes disposed



Note: The value marked by * indicates the amount disposed of in 1996 in the "target for reduction of the amount of wastes disposed " (determined by the Government on September 28, 1999) that was set by the Government, setting the target for 2010, based on the Basic Guidelines of Japan for the Promotion of Measures against Dioxins
The amount of wastes disposed of was calculated using the same calculation condition.
Presentation: Prepared by the Ministry of the Environment based on "Calculation of industrial wastes and treatment condition (implemented in 1999)"

Changes in recycling rate



Note:

$$\text{Steel can resource regeneration rate} = \frac{\text{weight of steel can scrap utilized weight}}{\text{weight of steel can produced}} \times 100$$

$$\text{However, in 1999, steel can recycling rate} = \frac{\text{weight of steel can recovered}}{\text{weight of steel can consumed}}$$

$$\text{Used paper recovery rate} = \frac{\text{result of user paper received + result of used paper pulp received − result of used paper imported + result of used paper exported}}{\text{net consumption amount = result of paper and sheet paper delivered + import result - export result}}$$

$$\text{Glass bottle cullet utilization rate} = \frac{\text{Cullet utilization amount}}{\text{glass bottle production amount}} \times 100$$

* Cullet: Produced by crushing class bottles into pieces.

$$\text{Aluminum can resource regeneration rate} = \frac{\text{Weight of regenerated aluminum can}}{\text{weight of aluminum can consumed}} \times 100$$

$$\text{However, in 1999, aluminum recycling rate} = \frac{\text{weight of aluminum cans consumed}}{\text{weight of aluminum cans recovered}}$$

$$\text{Waste recycling rate} = \frac{\text{amount of direct recycling + amount reutilized after intermediate treatment + amount of mass recovery}}{\text{total amount waste treated + amount of mass recovery}} \times 100$$

$$\text{PET bottle recovery rate} = \frac{\text{Amount collected}}{\text{amount produced}} \times 100$$

Presentation: Prepared by the Ministry of the Environment based on the data supplied by the Steel can Recycling Association,Â@Paper Recycling Promotion Center, Glass Bottle Recycling Promotion Association, Aluminum can Recycling Association, "Domestic waste disposal and treatment general condition (result of 1999)" prepared by the Ministry of the Environment, and data supplied by the PET bottle recycling Council

To solve these problems, waste and recycling measures must be implemented keeping in mind the following priority rule stipulated in the Basic Law for Establishing a Recycling-Based Society firstly reduction of waste generation, secondly reuse of used products and components, thirdly recycling as materials, fourthly energy recovery, and finally, proper disposal.

Regarding recovery and recycling status, the recycling rate combining resource regeneration implemented by municipalities and mass recovery by resident groups is only 13.1% in 1999. Although the rate is increasing each year, it is still at a low level. The individual recycling status in 2000 shows 84.2% for steel cans, 80.6% for aluminum cans, and 77.8% for glass bottle cullet (crushed used bottles) utilization rate. The rate of recycling used papers is slightly increasing, which is 57.0%. The recovery rate of PET bottles is also increasing each year and has reached 34.5% in 2000.
1,027 cases of illegal disposal of industrial waste were detected in FY 2000, and the tonnage dumped remained fairly stable at around 400,00 tonnes per year recently.

5) Measures for environmental risks of chemical substances

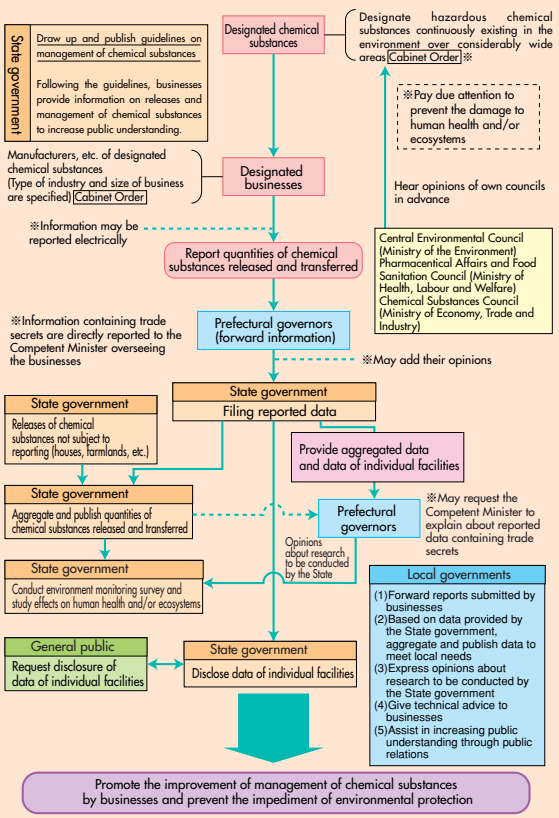
About 50,000 types or more of chemical substances that are currently distributed within Japan contain various toxicities including carcinogenicity and impacts on reproductive systems. These substances may give adverse effects on human health and the ecosystem via media such as air and water. The examination of chemical substances deposited in the environment has detected various chemical substances including those of high residual property, such as PCB and DDT. Some of these chemical substances are causing pollution on the global scale and, to tackle these problems internationally the Stockholm Convention on Persistant Organic Pollutants was adopted in 2001.

To prevent such impacts, it is necessary to take proper measures by assessing the concerns (environmental risks) caused by chemical substances.

Regarding dioxius, which is attracting public concerns its amount taken per person per day has been reducing steadily, and is less than the tolerable daily intake(TDI), whose amount is not harmful to human health even if it is taken continuously throughout the whole lifetime.

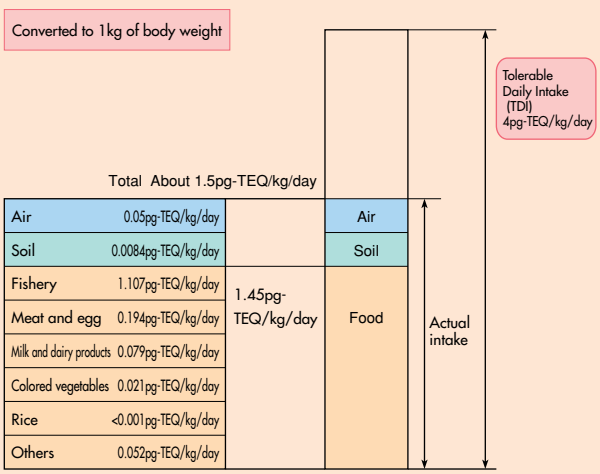
Concerning endocrine disrupters (so called environmental hormone) that might have an adverse influence on an endocrine system, since there are many unsolved issues, examination and research are being implemented to accumulate more scientific information.

Implementation Procedure of Reporting, etc. of Releases of Specific Chemical Substances(PRTR/Pollutant Release and Transfer Register)



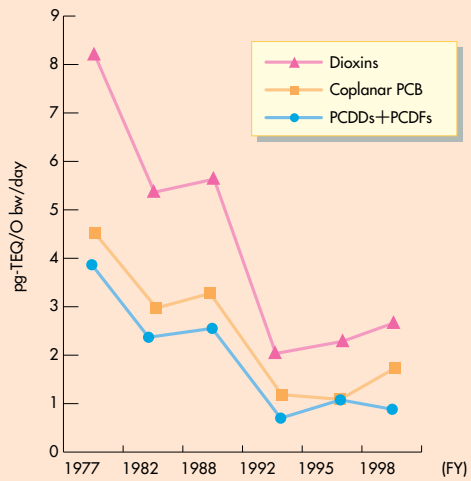
Presentation:Ministry of Economy, Trade and Industry; Ministry of the Environment

Intake of Dioxin per person per day in Japan



Presentation: Prepared by the Ministry of the Environment based on the data supplied by the Ministry of Health, Labour, and Welfare

Chronological change of daily intake of Dioxins



Source: 1998 Welfare and Science Research "Research in actual condition of dioxin contamination in food"

In addition, the PRTR system was introduced in Japan and the results will be announced after the end of 2002. The PRTR system is a mechanism for checking, aggregating, and announcing the amount of chemical substances harmful to human health or the ecosystem that is emitted to the environment or may be carried together with wastes. In the future, improvement of risk communication becomes more important to promote sharing of information and mutual understanding among citizens, industries, and governments regarding environmental risks caused by chemical substances.

6) Securing harmonious coexistence between human-kind and nature

The condition of the natural environment in Japan shows a decrease of natural forests and secondary forests and increase of plantations, urban areas, and reclaimed land areas, Tidal flat and algal areas and natural lakeshore areas and coastal areas are decreasing. Among the species found in Japan, a total of 57 species are specified as lean wild plant and animal species, including 2 types of Mammalia and 39 types of birds. The species whose existences are threatened in Japan include about 20% or more of Mammalia, Amphibia, and salt-water/fresh-water Pisces, about 20% or less of Reptilia and vascular bundle plants, and 10% or more of Aves.

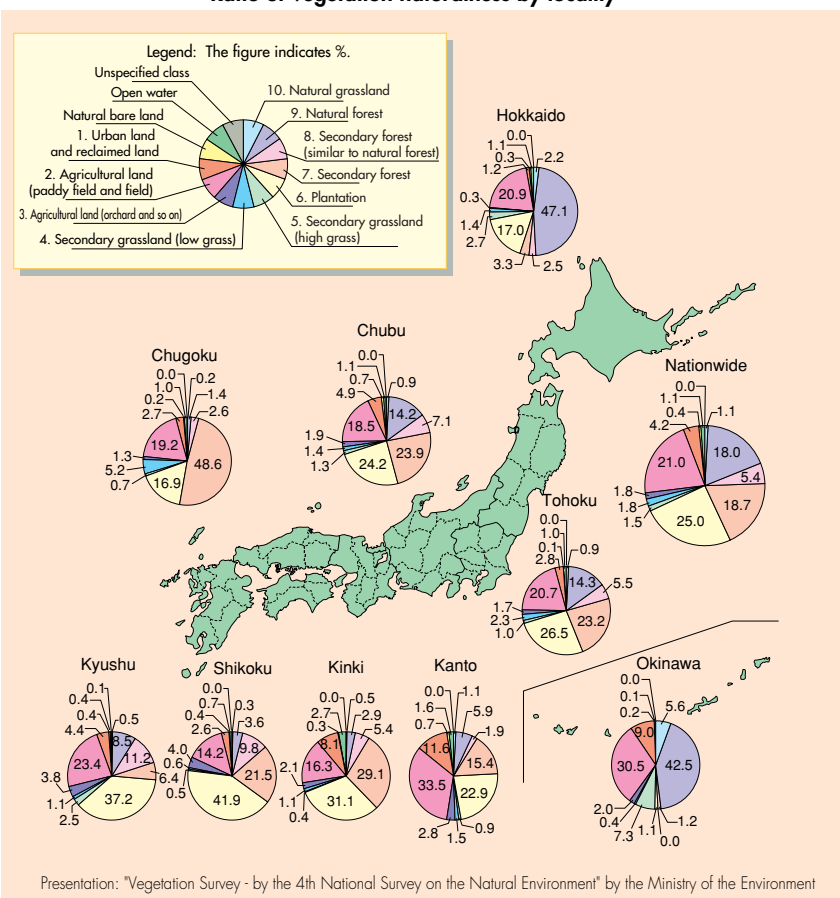
Based on these circumstances, the Government revised the National Strategy on Biological Diversity in March 2002.

Cycle in the socio economic system and cycle in the natural environment

Vegetation naturalness	Classification	3rd survey		4th survey		Increase/decrease	
		Number of meshes	Ratio	Number of meshes	Ratio	Number of meshes	Ratio
10	Natural grassland	4,038	1.1	4,011	1.1	−27	0.0
9	Natural forest	66,979	18.2	66,394	18.0	−585	−0.2
8	Secondary forest (similar to natural forest)	20,046	5.4	19,733	5.4	−313	−0.1
7	Secondary forest	70,484	19.1	69,030	18.7	−1,454	−0.4
6	Plantation	91,029	24.7	92,072	25.0	1,043	0.3
5	Secondary grassland (high grass)	5,737	1.6	5,626	1.5	−111	0.0
4	Secondary grassland (low grass)	5,939	1.6	6,498	1.8	559	0.2
3	Agricultural land (orchard)	6,798	1.8	6,817	1.8	19	0.0
2	Arable land (paddy fields and fields)	76,945	20.9	77,311	21.0	366	0.1
1	Urban land and reclaimed land	14,841	4.0	15,420	4.2	579	0.2
	Natural bare land	1,392	0.4	1,416	0.4	24	0.0
	Open water	4,170	1.1	4,211	1.1	41	0.0
	Unspecified class	72	0.0	71	0.0	−1	0.0
	Total	368,470	100.0	368,610	100.0	140	0.0

Presentation: "Vegetation Survey - by the 4th National Survey on the Natural Environment" by the Ministry of the Environment

Ratio of vegetation naturalness by locality



Presentation: "Vegetation Survey - by the 4th National Survey on the Natural Environment" by the Ministry of the Environment

In the new national strategy, the Government indicated the basic policies regarding the future biological diversity conservation measures with the following three major pillars based on the current condition of the crisis on biological diversity and maturity of awareness of the nation on these issues:

<1> "Enhancement of conservation" as the countermeasures for extinction of species, decrease of wetland, and problems of introduced species

<2> Suggestion of "Restoration of Nature" for actively regenerating and restoring the parts of Nature that were lost or damaged, in addition to the conversion of Nature

<3> "Sustainable use" in areas such as satoyama, community based traditional agriculture and forests, that is, promotion of regional conservation of biological diversity.

The conservation of areas with outstanding nature in Japan is also important issue. The Government is conserving the areas

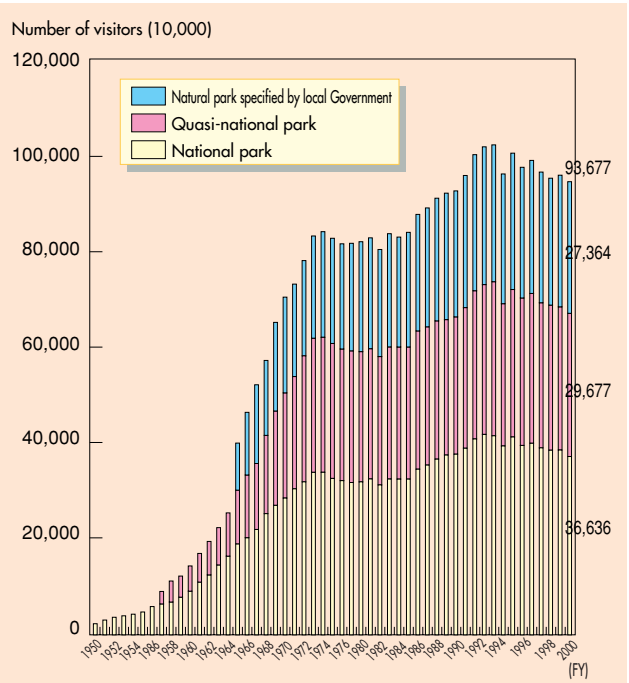
Endangered wildlife species in Japan
(Species table listed in the Red Data Book Red List) (As of January 2002)

	Taxonomic Group	Number of Species for Assessment	Extinct	Extinct in the Wild	Threatened: Endangered I (A Critically Endangered / B Endangered)	Endangered II (Vulnerable)	Near Threatened	Data Deficient	Endangered regional population	Number of endangered species
Fauna	Mammals	About 200	4	0	32 (12 / 20)	16	16	9	12	48
	Birds	About 700	13	1	42 (17 / 25)	48	16	15	2	90
	Reptiles	97	0	0	7 (2 / 5)	11	9	1	2	18
	Amphibians	64	0	0	5 (1 / 4)	9	5	0	4	14
	Brackish and Freshwater fish	About 300	3	0	58 (29 / 29)	18	12	5	14	76
	Insects	About 30,000	2	0	63	76	161	88	3	139
	Inland and Freshwater Shellfish	About 1,000	25	0	86	165	206	69	5	251
	Spiders and crustaceans	About 4,200	0	1	10	23	31	36	0	33
Sub-total for Fauna			47	2	303	366	456	223	42	669
Flora	Vascular Plants	About7,000	20	5	1,044 (564 / 480)	621	145	52	0	1,665
	Bryophytes	About1,800	0	0	110	70	4	54	0	180
	Algae	About5,500	5	1	35	6	24	0	0	41
	Lichens	About1,000	3	0	22	23	17	17	0	45
	Fungi	About16,500	27	1	53	10	0	0	0	63
Sub-total for Flora			55	7	1,264	730	190	123	0	1,994
total			102	9	1,567	1,096	646	346	42	2,663

(1) The number of animal species assessed (including endemic, and so on) is according to the "Japanese Wildlife Enumeration (Ministry of the Environment Section, 1993, 1995, and 1998).
(2) The number of vascular bundle plant species (including endemic, and so on) that are assessed is according to the summary of the Plant Taxonomy Association.
(3) The number of species that are assessed for mosses, algae, lichen, and fungus (including endemic, and so on) is based on the survey conducted by the Ministry of the Environment.
(4) The current condition of endangered species (including endemic, and so on) are based on "Revised version of endangered wildlife - Red Data Book - Amphibia, Reptilia, Plant I, Plant II (Ministry of the Environment Section 2000)" and "Red list Mammalia, Aves, Pisces, and Invertebrates (Prepared by the Ministry of the Environment, 1998, 1999, 2000)).
The categories are as follows:
Extinct: Species that are considered to be extinct in Japan
Extinct in the Wild: Species that exist under breeding or cultivation
Critically Endangered + Endangered): Species that are endangered for extinction
Vulnerable: Species that are increasingly endangered for extinction
Near Threatened: Species whose existence is precarious
Threatened Local Population: Regionally isolated population that are threatened for extinction

Presentation: Prepared by the Ministry of the Environment based on the "Red List"

Transition of the number of visitors to natural parks

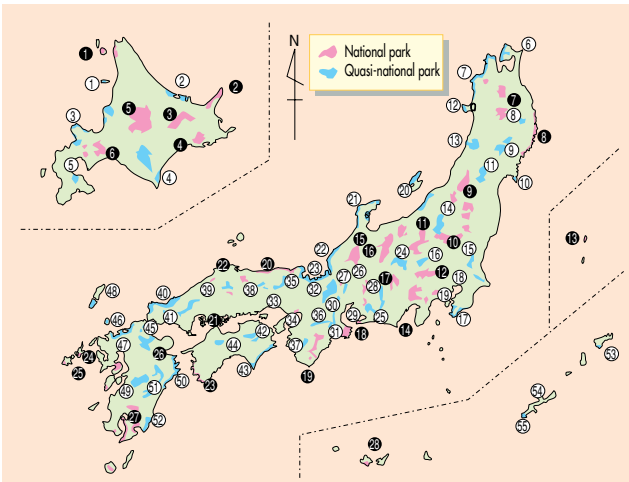


Note: Visitor statistical survey of quasi-national parks and national parks specified by local Government was started from 1957 and 1965, respectively.
Source: "Survey of Number of Visitors of Natural Parks" by the Ministry of the Environment

that maintain the native condition of the natural environment without being influenced by human activities by specifying them such as the Nature conservation Areas. Yakushima and Shirakami Sanchi are registered as World Natural Heritages. The Government is promoting conservation by specifying natural sights that can represent the country as natural parks such as national parks. Natural parks play important roles as the places for contact with nature such as experience in wild life, nature observation, and outdoor recreation, as well as conservation of natural environment. Corresponding to the increase of the nation's desire for enjoying nature, the number of visitors to natural parks exceeded 900 million.

In addition, the Government is implementing Rehabilitation of Natural Habitats and Maintenance of Viable Populations for endangered wild animals and plants such as Japanese crested ibis and Iriomote wild cat as a part of the wildlife protection management policies. The Government is also implementing businesses to improve various forests for installation of damage prevention facilities and coexistence of wild birds and animals, in response to aggravation of damage to agriculture, forestry, and Pisces and natural ecosystem by specific birds and animals such as deer and boars.

Map of national parks and quasi-national parks



National parks		Quasi-National parks		
❶Rishiri-Rebun-Sarobetsu	⓴San'in Kaigan	①Shokanbetsu-Teuri-Yagishiri	⑳Sado-yahiko-Yoneyama	㊴Nishi-Chugoku-Sanchi
❷Shiretoko	㉑Setonaikai	②Abashiri	㉑Noto Hanto	㊵Kita-Nagato Kaigan
❸Akan	㉒Daisen-Oki	③Niseko-Shakotan-Otaru Kaigan	㉒Echizen-Kaga Kaigan	㊶Akiyoshidai
❹Kushiro Shitsugen	㉓Ashizuri-Uwakai	④Hidaka Sanmyaku-Erimo	㉓Wakasa Wan	㊷Tsurugisan
❺Daisetsuzan	㉔Saikai	⑤Onuma	㉔Yatsugatake-Chushin Kogen	㊸Muroto-Anan Kaigan
❻Shikotsu-Toya	㉕Unzen-Amakusa	⑥Shimokita Hanto	㉕Tenryu-Okumikawa	㊹Ishizuchi
❼Towada-Hachimantai	㉖Aso-Kuju	⑦Tsugaru	㉖Ibi-Sekigahara-Yoro	㊺Kita Kyushu
❽Rikuchu Kaigan	㉗Kirishima-Yaku	⑧Hayachine	㉗Hida-Kiso Gawa	㊻Genkai
❾Bandai-Asahi	㉘Iriomote	⑨Kurikoma	㉘Aichi Kogen	㊼Yaba-Hita-Hikosan
❿Nikko		⑩Minamisanriku Kinkazan	㉙Mikawa Wan	㊽Iki-Tsushima
⓫Joshin'etsu Kogen		⑪Zao	㉚Suzuka	㊾Kyushu-Chuo Sanchi
⓬Chichibu-Tama-Kai		⑫Oga	㉛Muroo-Akame-Aoyama	㊿Nippo Kaigan
⓭Ogasawara		⑬Chokai	㉜Biwako	(51)Sobo-Katamuki
⓮Fuji-Hakone-Izu		⑭Echigo Sanzan-Tadami	㉝Meiji Memorial Forest Minoo	(52)Nichinan Kaigan
⓯Chubu Sangaku		⑮Suigo-Tsukuba	㉞Kongo-Ikoma-Kisen	(53)Amami Gunto
⓰Hakusan		⑯Myogi-Arafune-Saku Kogen	㉟Hyonosen-Ushiroyama-Nagisan	(54)Okinawa Kaigan
⓱Minami Alps		⑰Minami Boso	㊱Yamato-Aogaki	(55)Okinawa Senseki
⓲Ise-Shima		⑱Meiji Memorial Forest Takao	㊲Koya-Ryujin	
⓳Yoshino-kumano		⑲Tanzawa-Oyama	㊳Hiba-Dogo-Taishaku	

Presentation: Ministry of the Environment

7) Global environment conservation

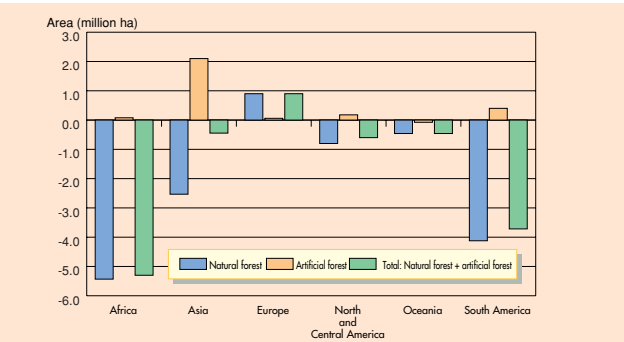
(1) Transboudary movements of hazardous wastes

In addition to global warming, ozone layer depletion, acid rain, and marine pollutions, there are various global environmental problems. During the period from 1970's to 1980's, many environmental problems occurred such as: hazardous wastes that were exported from developed countries and improperly or illegally disposed of in developing countries where the regulations are loose and the treating costs are low, causing environmental pollution, and transport ships with load, of hazardous wastes that were rejected for unloading and are wandering on the oceans with no set destinations. Therefore, the international society has commonly recognized that problems of transboundary movements of hazardous wastes must be handled on a global scale. In 1992, the Basel Convention was established and Japan joined in 1993.

(2) Decrease of forests

Forests have many functions such as supply of habitation and breeding of wildlife as well as absorption of carbon dioxide. Over the period from 1990 to 2000, about 94 million hectares of forests were lost worldwide. Consequently, the importance of conservation and sustainable management of forests including illegal logging problems was recognized and in 2000, "UN Forum on Forests (UNFF)" was established and many activity proposals that were suggested in the past are being implemented and promoted.

Chronological change of forest areas (1990 to 2000)

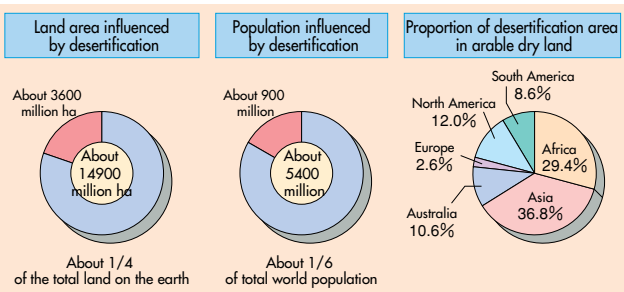


Presentation: Prepared by the Ministry of the Environment based on the "State of the World's Forests 2001" by the UN Food and Agriculture Organization

(3) Desertification

Serious global problems of desertification covers soil erosion, salinification, and reduction of natural vegetation species. The result of the survey conducted by UNEP indicates that the land area influenced by desertification accounts for about 1/4 of the total land, about 70% of the arable dry region and about 1/6 of the world population (about 900 million) is influenced by the desertification. Consequently, in 1996, the Convention to Combat Desertification took into effcted and Japan ratified the Convention. Currently, various measures are being examined for effective implementation of the Convention.

Current condition of desertification



Source: UNEP "Desertification Control Bulletin" 1991

Environmental Conservation Measures to be Implemented in FY2002

Environmental conservation measures to be implemented in FY2002 based on the Basic Environment Plan are reported in the following Chapters.

Chapter 1 Creating a Socio Economic System Based on Sound Material Cycles with Minimal Environmental Burden
Chapter 2 Basis of Measures, and Measures to Promote Participation of All Segments of Society
Chapter 3 Measures to Promote International Action
Chapter 4 Effective Implementation of the Basic Environment Plan

If you have any opinions or comments regarding this booklet, please contact:

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