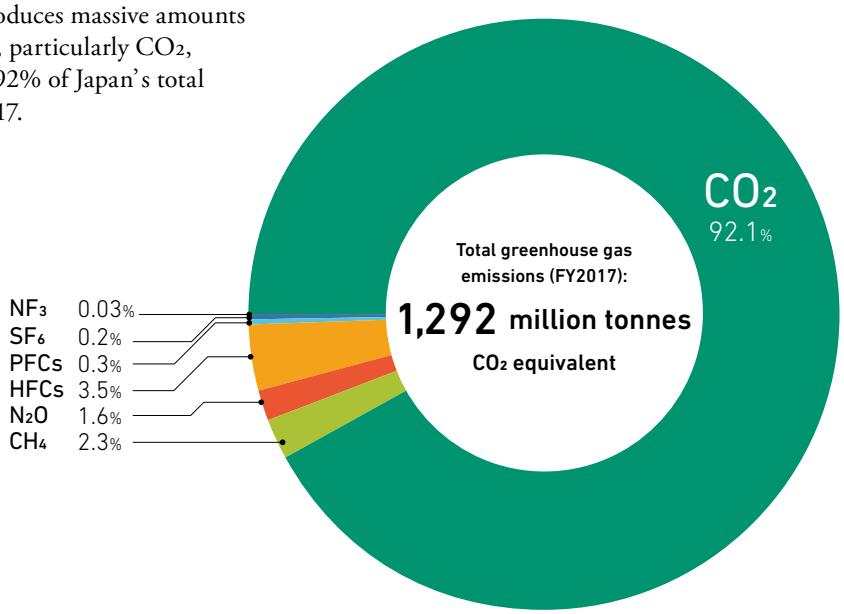
ADDITIONAL MATERIALS FROM THE 2019 ANNUAL REPORT ON THE ENVIRONMENT

Breakdown of Greenhouse Gas Emissions in Japan (FY2017)

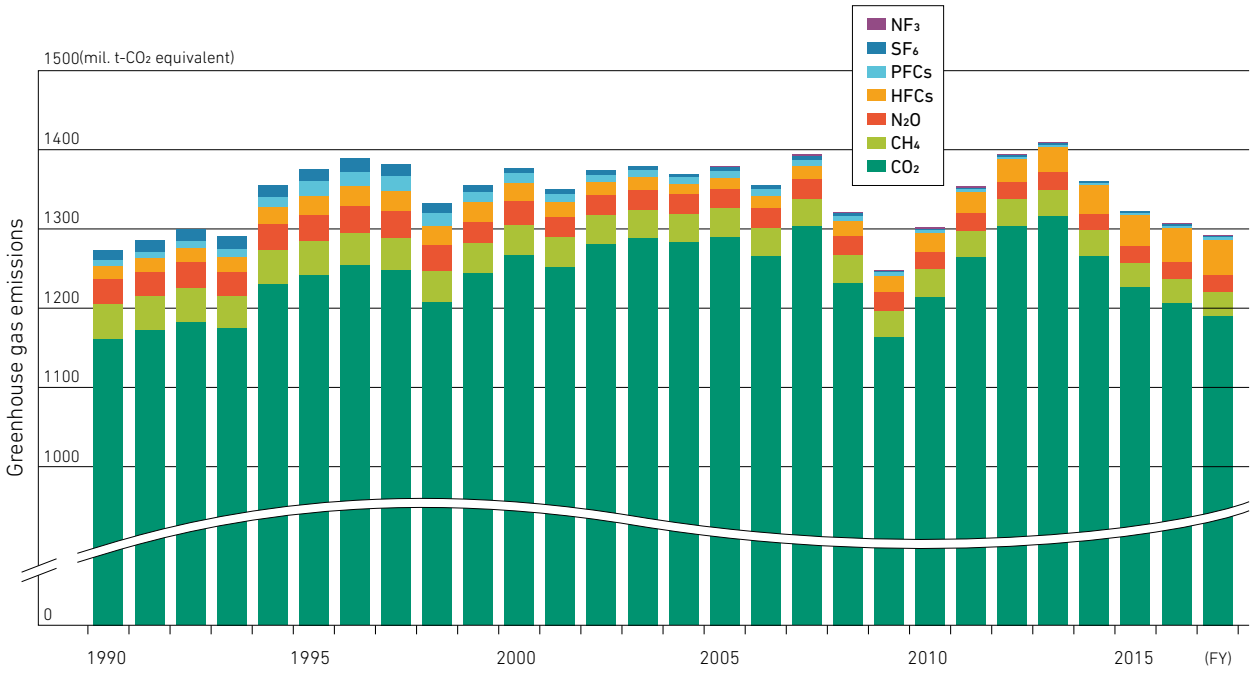
Globally, fossil fuel combustion produces massive amounts of anthropogenic greenhouse gases, particularly CO_2, which accounts for approximately 92% of Japan's total greenhouse gas emissions in FY 2017.



Source: Ministry of the Environment

Greenhouse Gas Emissions in Japan

Japan's total greenhouse gas emissions in FY 2017 were equivalent to approximately 1,292 million tonnes of CO_2, a 1.2% drop from the previous year. This was due to the decrease in energy consumption through energy conservation, and the increase in the share of non-fossil fuels within the domestic energy supply.



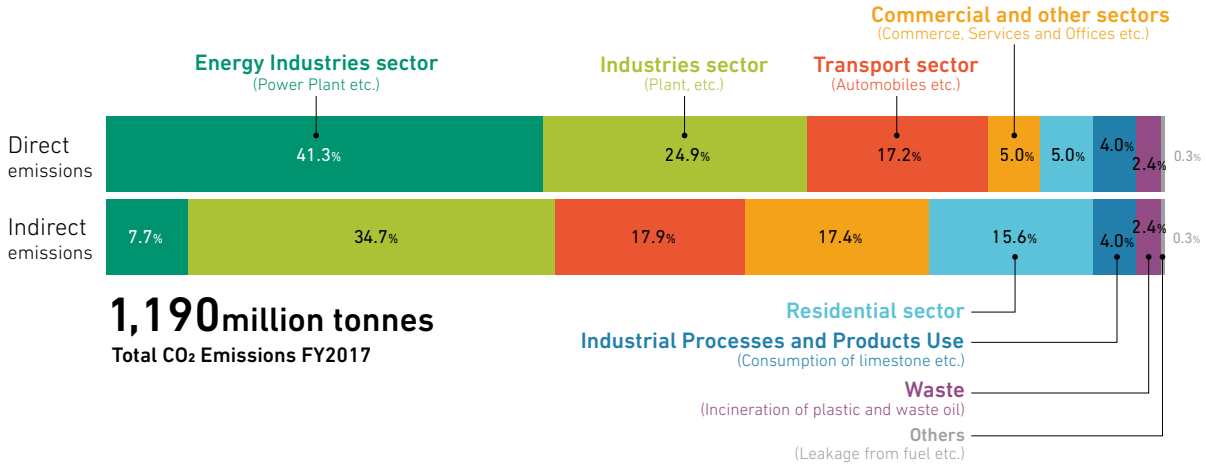
Source: Ministry of the Environment

Decarbonized society

Additional materials provide more details about the global warming issue.

Breakdown of CO_2 Emissions by Sector

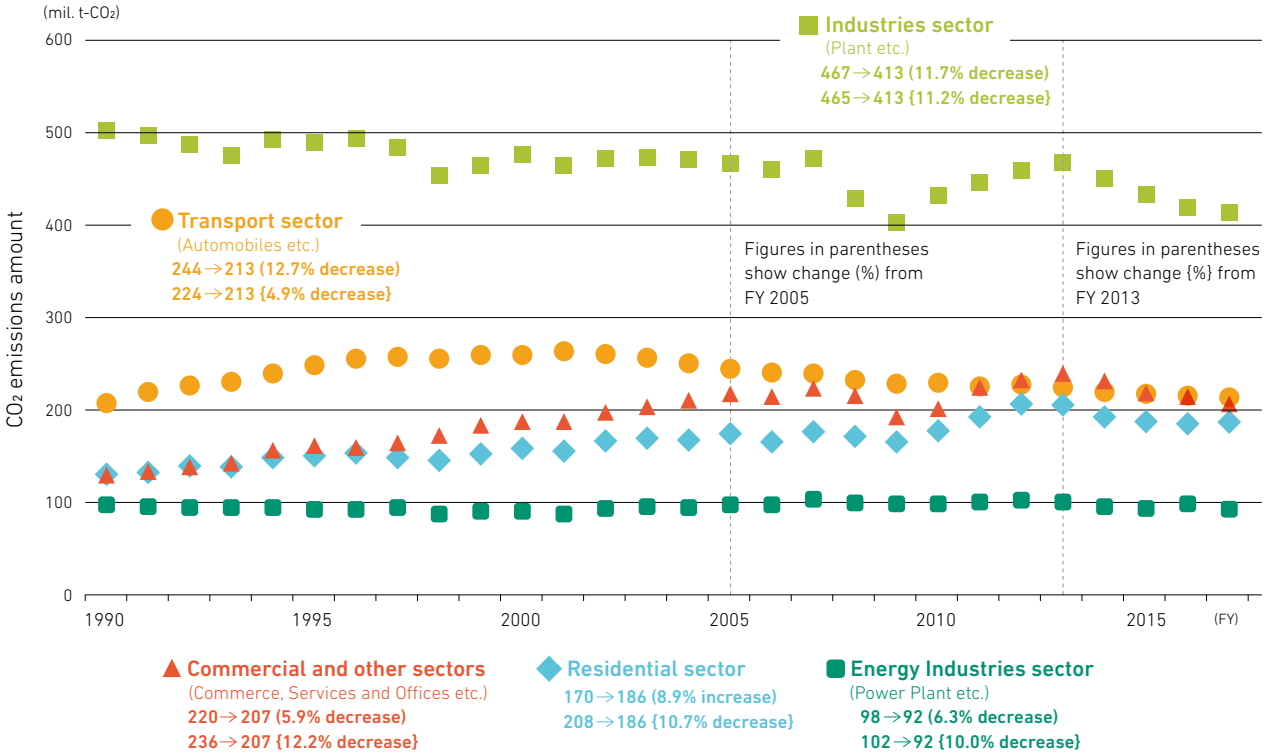
The sector with the largest CO_2 emissions in indirect emissions in FY 2017 was industries sector, accounting for approximately 34.7% of Japan's total.



Source: Ministry of the Environment

Energy originated CO_2 Emissions by Sector (Indirect Emissions)

Plotting energy originated CO_2 emissions by sector reveals that emissions in every sector decreased from FY 2013.



Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2019 ANNUAL REPORT ON THE ENVIRONMENT

Threatened Species in Japan

With an increasing number of species being put on the Red List, which publicizes threatened species, it is clear that the circumstances of wild fauna and flora in Japan continue to be severe.

(Reported in Jun 2019)

	Taxon	Species Targeted for Evaluation	Extinct	Extinct in the Wild	Threatened Species			Near Threatened	Data Deficient	Total of listed species	Endangered Local Population
					Endangered Class I		Endangered Class II				
					Class IA	Class IB					
			EX	EW	CR	EN	VU	NT	DD		LP
Fauna	Mammals	160 (160)	7 (7)	0 (0)	**33(33)**		9(9)	18 (18)	5 (5)	63 (63)	23 (23)
					24(24)						
					12(12)	12(12)					
	Birds	Approx. 700 (Approx. 700)	15 (15)	0 (1)	**98(97)**		43(43)	21 (21)	17 (17)	151 (151)	2 (2)
					55(54)						
					24(23)	31(31)					
	Reptiles	100 (100)	0 (0)	0 (0)	**37(37)**		23(23)	17 (17)	4 (4)	58 (58)	5 (5)
					14(14)						
					5(5)	9(9)					
	Amphibians	76 (76)	0 (0)	0 (0)	**29(29)**		12(12)	22 (22)	1 (1)	52 (52)	0 (0)
					17(17)						
					4(4)	13(13)					
	Brackish water and freshwater fish	Approx. 400 (Approx. 400)	3 (3)	1 (1)	**169(169)**		44(44)	35 (35)	37 (37)	245 (245)	15 (15)
					125(125)						
					71(71)	54(54)					
	Insects	Approx. 32,000 (Approx. 32,000)	4 (4)	0 (0)	**363(363)**		186(186)	350 (350)	153 (153)	870 (870)	2 (2)
					177(177)						
					71(71)	106(106)					
	Shellfish	Approx. 3,200 (Approx. 3,200)	19 (19)	0 (0)	**616(616)**		328(328)	445 (445)	89 (89)	1169 (1169)	13 (13)
					288(288)						
					33(33)	16(16)					
	Other invertebrates	Approx. 5,300 (Approx. 5,300)	0 (0)	0 (1)	**65(65)**		43(43)	42 (42)	44 (43)	151 (151)	0 (0)
					22(22)						
					0(0)	2(2)					
	Subtotal of Fauna		48 (48)	1 (3)	**1410(1409)**		688(688)	950 (950)	350 (349)	2759 (2759)	60 (60)
					722(721)						
Flora	Vascular plants	Approx. 7,000 (Approx. 7,000)	28 (28)	11 (11)	**1786(1786)**		741(741)	297 (297)	37 (37)	2159 (2159)	0 (0)
					1045(1045)						
					525(525)	520(520)					
	Bryophytes	Approx. 1,800 (Approx. 1,800)	0 (0)	0 (0)	**241(241)**		103(103)	21 (21)	21 (21)	283 (283)	0 (0)
					138(138)						
	Algae	Approx. 3,000 (Approx. 3,000)	4 (4)	1 (1)	**116(116)**		21(21)	41 (41)	40 (40)	202 (202)	0 (0)
					95(95)						
	Lichens	Approx. 1,600 (Approx. 1,600)	4 (4)	0 (0)	**61(61)**		20(20)	41 (41)	46 (46)	152 (152)	0 (0)
					41(41)						
	Fungi	Approx. 3,000 (Approx. 3,000)	26 (26)	1 (1)	**62(62)**		23(23)	21 (21)	50 (50)	160 (160)	0 (0)
					39(39)						
	Subtotal of Flora		62 (62)	13 (13)	**2266(2266)**		908(908)	421 (421)	194 (194)	2956 (2956)	0 (0)
					1358(1358)						
	Total of thirteen taxonomic groups		110 (110)	14 (16)	**3676(3675)**		1596(1596)	1371 (1371)	544 (543)	5715 (5715)	60 (60)
					2080(2079)						

* Numerals within parentheses indicate the respective numbers of species (including subspecies, variety (only for flora) and form (only for algae and fungi)) from the Red List 2018. The numbers in the LP column are the numbers of local population. ** The number of species excluding those that cannot be evaluated by the naked eye.

The categories are considered as follows:

Extinct [EX]: Species that are likely to already be extinct / Extinct in the Wild [EW]: Species that exist only in captivity or as a naturalized population outside its natural habitat / Endangered Class I (Critically Endangered + Endangered) [CR+EN]: Species that are threatened to extinction / Endangered Class I A (Critically Endangered) [CR]: Species that are facing an extremely high risk of extinction in the wild in the near future / Endangered Class I B (Endangered) [EN]: Species that are facing a high risk of extinction in the wild in the near future / Endangered Class II (Vulnerable) [VU]: Species with and increasing risk of extinction / Near Threatened [NT]: Species that are not currently endangered, but may possibly qualify for "endangered" status with changes in their habitat conditions / Data Deficient [DD]: Species with data insufficient for adequate evaluation / Endangered Local Population [LP]: Species with a population isolated regionally, and face a high risk of extinction

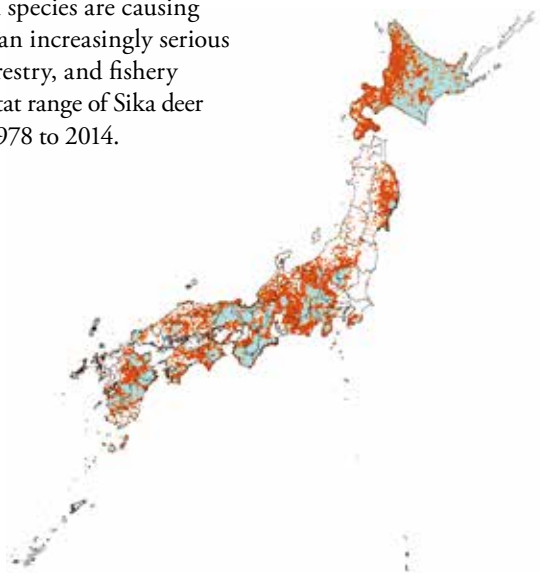
Source: Red List 2019 by the Ministry of the Environment

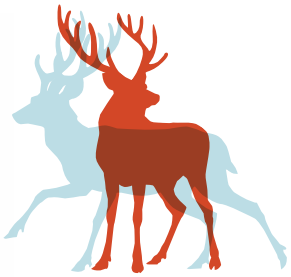
Biodiversity

Additional materials provide more details about biodiversity in Japan.

Growing Range of Sika Deer

While certain flora and fauna are endangered, there are also issues with other species, such as Sika deer and wild boar, that are rapidly expanding their range of habitat and growing their populations. Such species are causing increasing damage, resulting in an increasingly serious situation for the agricultural, forestry, and fishery industries. For example, the habitat range of Sika deer expanded approx. 2.5 fold from 1978 to 2014.





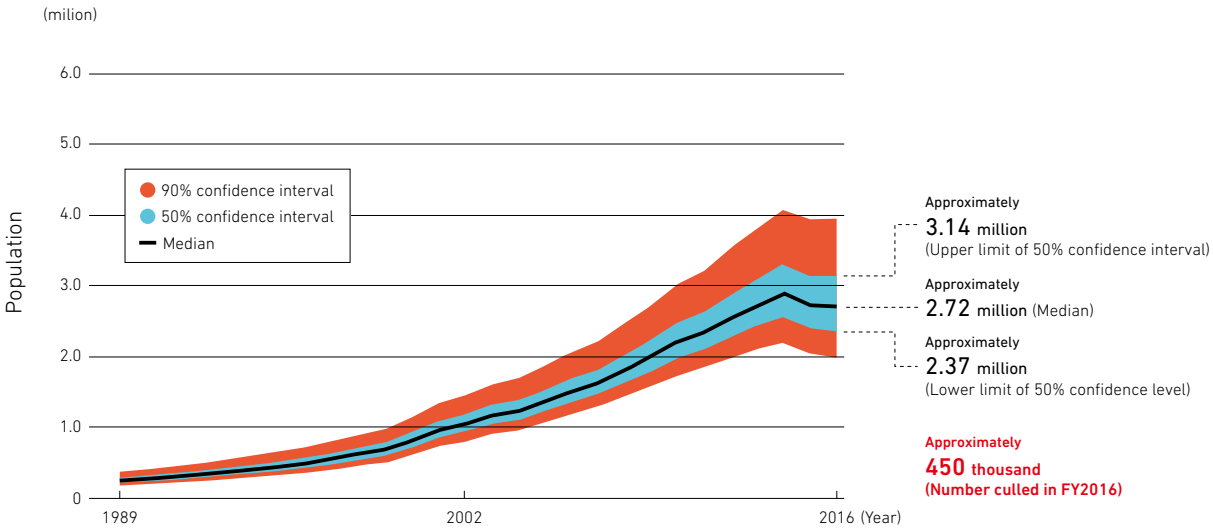
Range of distribution of Sika deer

- Range of distribution in 1978
- Expanded range of distribution by 2014

Source: Ministry of the Environment

Estimated Number of Sika Deer in Japan (excluding Hokkaido prefecture*)

By implementation of various approaches, the number of capturing of sika deer increases, and the estimated number of individuals tends to decrease.



*: In FY 2016, estimated number in Hokkaido was approx. 450,000, and number culled was approx. 120,000 (Hokkaido data).

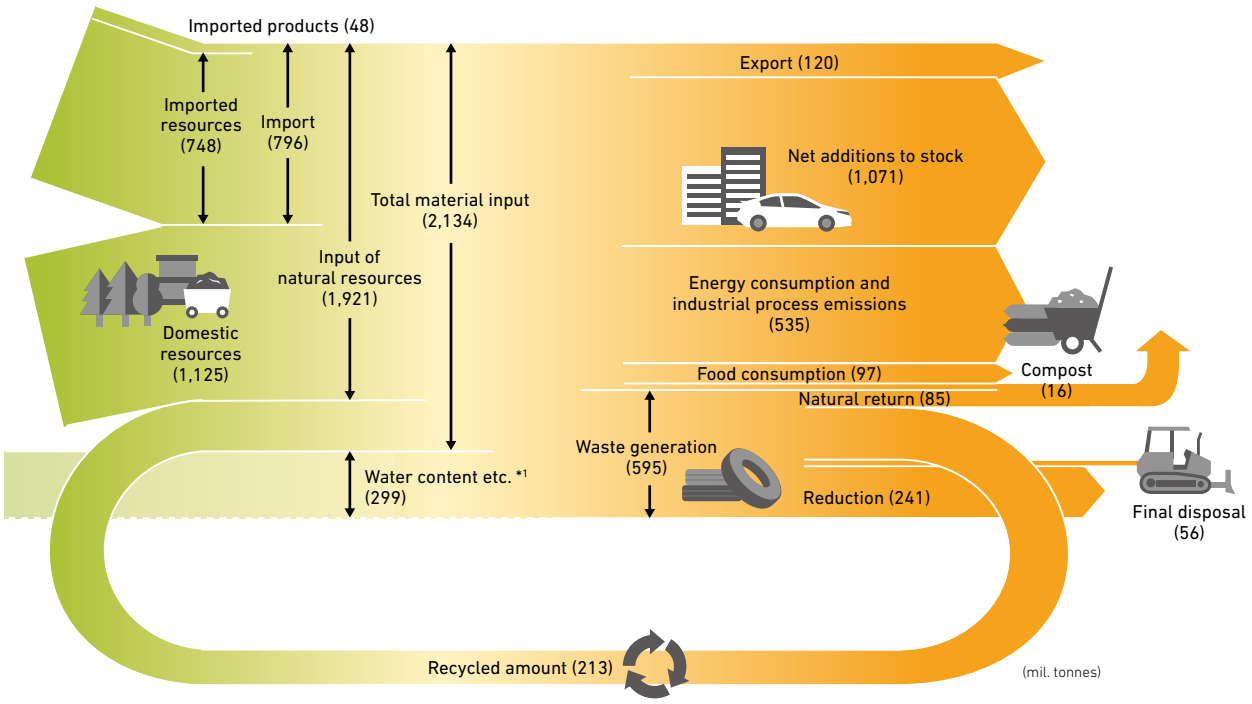
Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2019 ANNUAL REPORT ON THE ENVIRONMENT

Material Flow in Japan

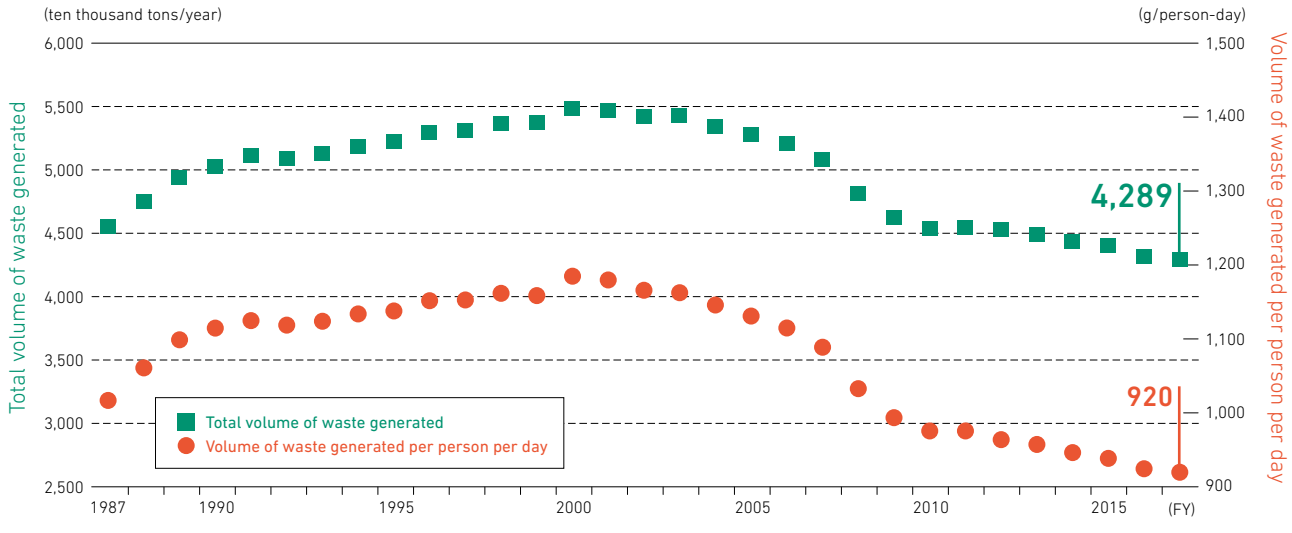
In order to establish a sound material-cycle society, it is necessary to comprehend material flows (or substance flows) to understand the extent of material extraction, consumption, and disposal in Japan. Japan uses material flows to determine targets for the four indicators of resource productivity, cyclical use rate(resource base), cyclical use rate (waste base), and final disposal amount.

FY2000 (for reference)



Total Volume of Waste Generation and Waste Volume Per Person Per Day

Total generated waste and waste generated per person per day are declining year by year.



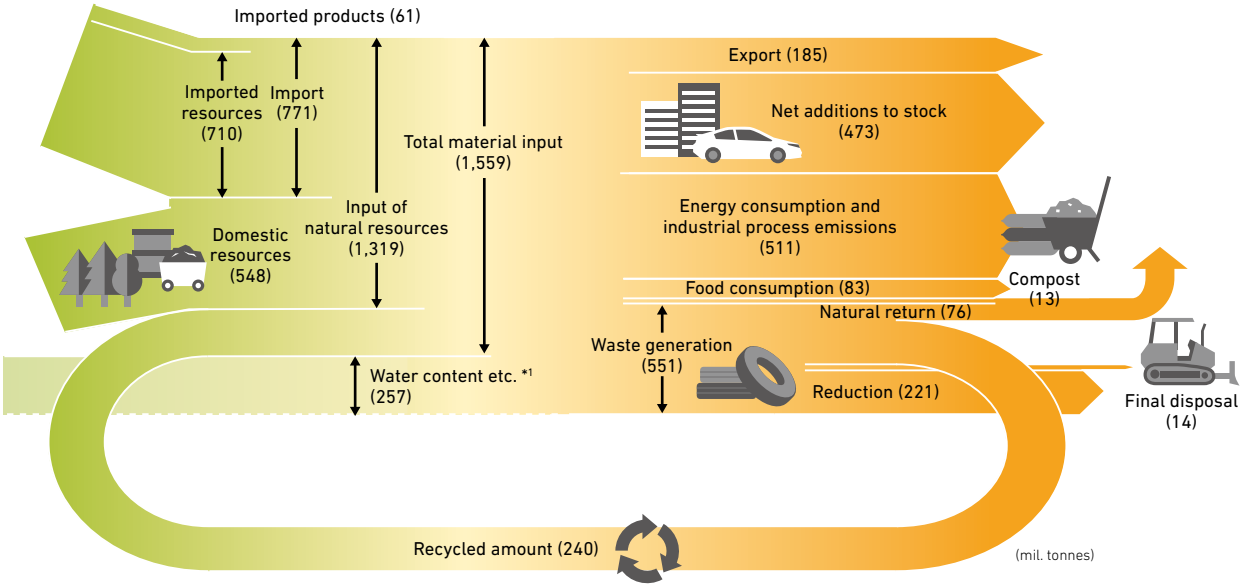
Source: Ministry of the Environment

Sound material-cycle society

Additional materials provide more information about current efforts to form a sound material-cycle society.

*1 Water content: water contents of wastes (sludge, livestock waste, night soil, waste acid, waste alkali) and sediments dumped in association with the process of economic activities (sludge in mining, construction and in waterworks as well as slag)

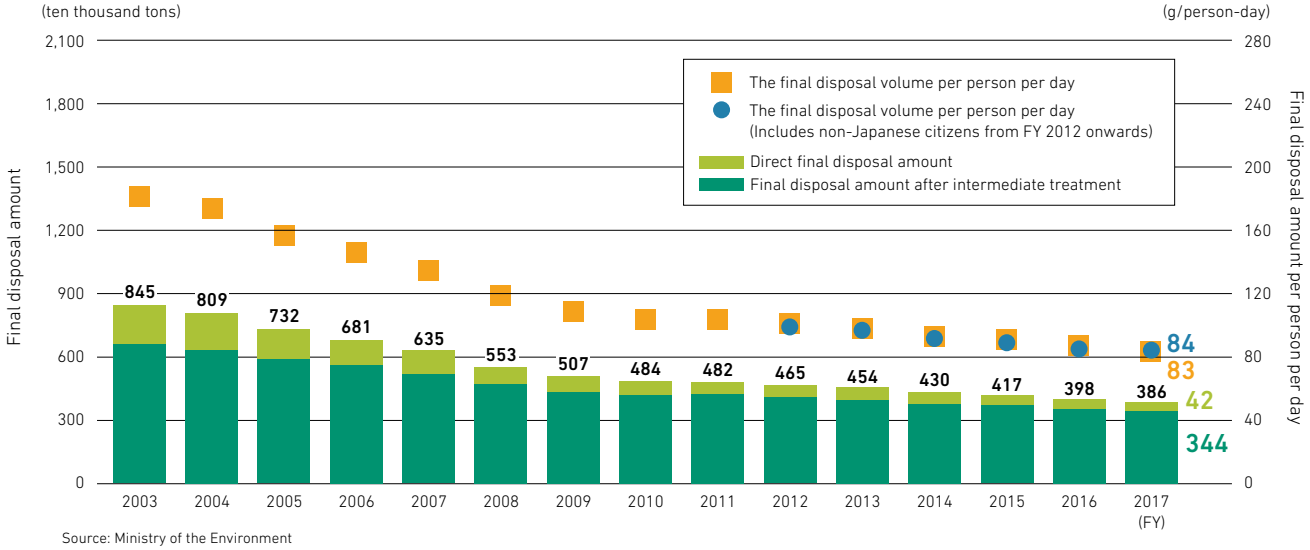
FY2016



Source: Ministry of the Environment

Final Disposal Amount and Final Disposal Amount Per Person

Final disposal amount of waste and final disposal amount per person per day are trending downwards.



Source: Ministry of the Environment

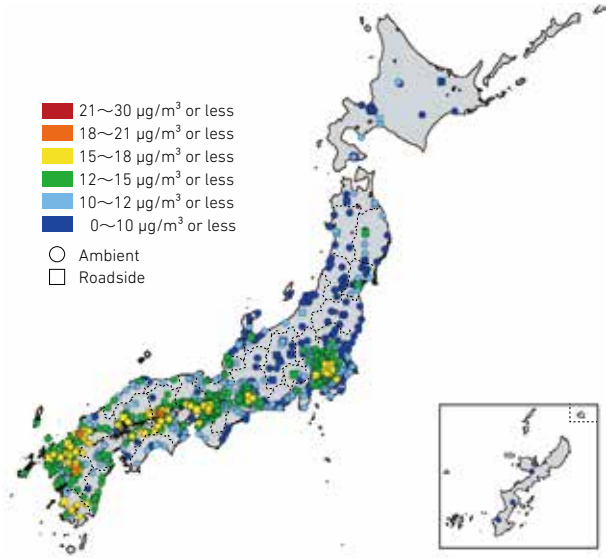
ADDITIONAL MATERIALS FROM THE 2019 ANNUAL REPORT ON THE ENVIRONMENT

Fine particulate matter

In FY2017, the rate of compliance with ambient air quality standards for fine particulate matter (PM 2.5) was 89.9% for ambient air pollution monitoring stations and 86.2% for roadside air pollution monitoring stations throughout Japan. The annual average was 11.6 μg/m³ for ambient air pollution monitoring stations and 12.5 μg/m³ for roadside air pollution monitoring stations. By region, the rate of compliance with environmental standards remains lower in mainly urban areas of the Kanto and Kansai regions, in parts of the Chugoku and Shikoku regions that face the Inland Sea, and in Kyushu.

Fiscal year		2012	2013	2014	2015	2016	2017
No. of vaild stations							
	Ambient	312	492	672	765	785	814
	Roadside	123	181	198	219	223	224
No. of vaild stations compliant with ambient air quality standards							
	Ambient	135	79	254	570	696	732
		43.3%	16.1%	37.8%	74.5%	88.7%	89.9%
	Roadside	41	24	51	128	197	193
		33.3%	13.3%	25.8%	58.4%	88.3%	86.2%

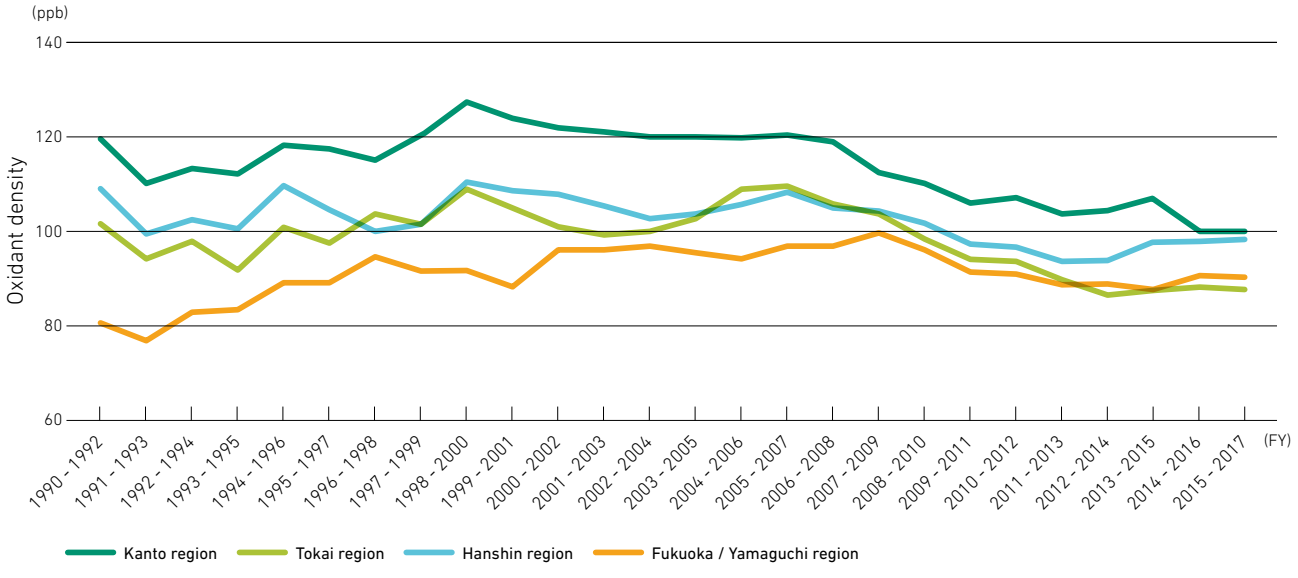
Source: Ministry of the Environment



Source: Ministry of the Environment

Photochemical oxidants

Photochemical oxidant densities (the highest value within a region of the 3-year average of the 99th percentile values of highest 8-hour daily values) had been tending to decline since around FY2006 to FY2008, but in recent years they have tended to be almost flat.



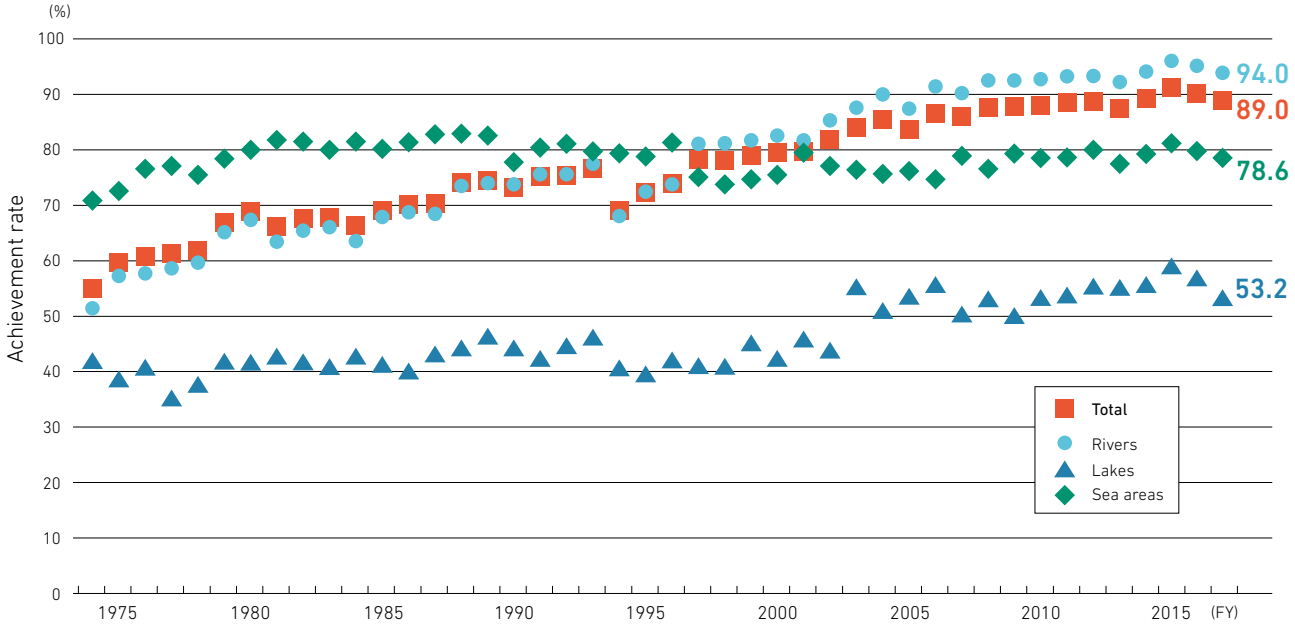
Source: Ministry of the Environment

Atmospheric and water environments

Additional materials provide more information about atmospheric and water environments.

Achievement of Environmental Standards (BOD or COD)

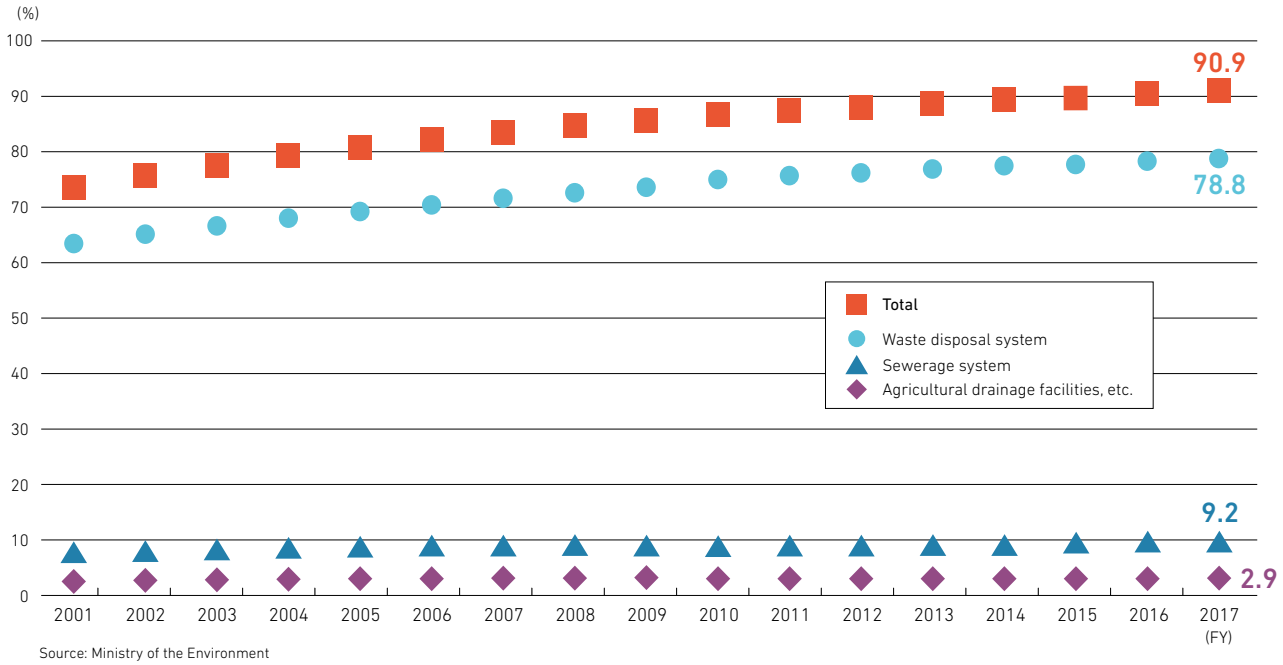
An overall level of 89% has been achieved for the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) environmental standards relating to the maintenance of living environments. BOD and COD are leading indicators of water quality in respect of organic pollution.



Source: Ministry of the Environment

Coverage of Population Served by Waste Disposal System

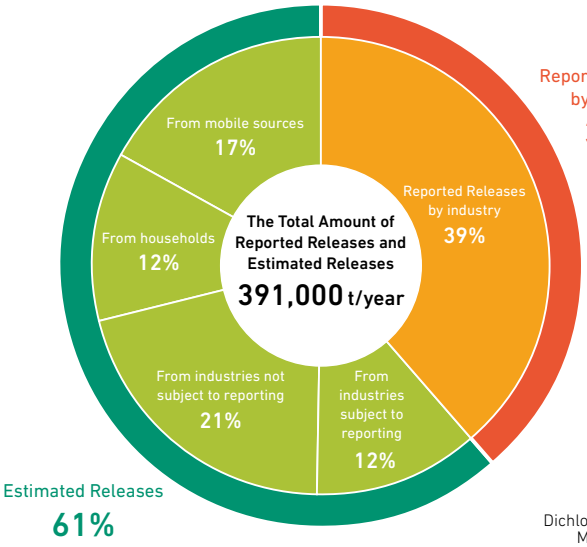
The population coverage of wastewater treatment systems in Japan is 90.9%. Wastewater treatment facilities are being installed to cover the population not yet served by the wastewater treatment systems.



Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2019 ANNUAL REPORT ON THE ENVIRONMENT

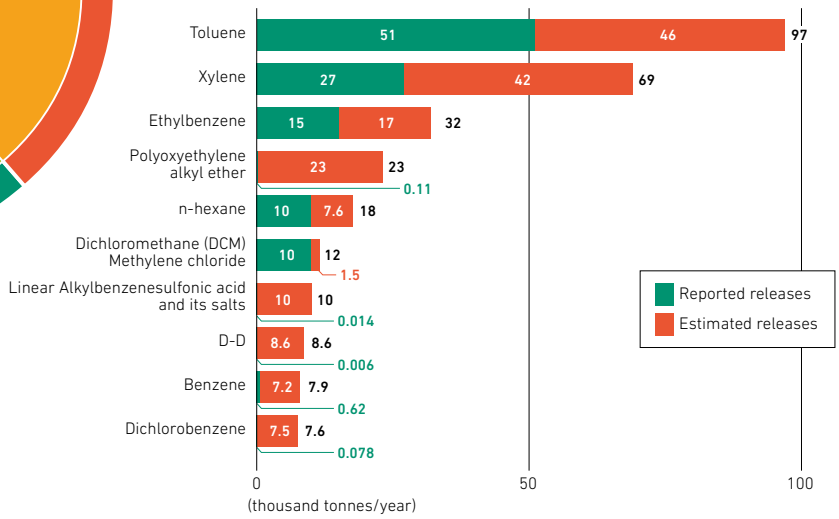
Breakdown of Reported Releases by Industry and Estimated Releases of Chemical Substances in FY 2017



Notes: The reported releases are from the business entities categorized as subjected to reporting. Releases are estimated for businesses that do not meet the reporting requirements, such as number of employees, annual handling quantity, etc., and are exempted from reporting.

Source: Ministry of Economy, Trade and Industry and Ministry of the Environment

Top 10 Chemicals with High-volume of Reported Releases and Estimated Releases (FY 2017)



Source: Ministry of Economy, Trade and Industry and Ministry of the Environment

In March 2019, the government compiled data reported from businesses concerned on release and transfer of chemical substances complying with the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law). Releases that were not subject to reporting were estimated.

Cover: Setonaikai National Park

Setonaikai National Park is one of the three oldest national parks in Japan. It was designated in 1934, along with the Unzen and Kirishima National Parks. Its outstanding attraction is the landscape, made up of a multitude of islands large and small. This area, also known as the Inland Sea, has been a cradle of culture since ancient times. The terraced fields on the slopes of the islands and the picturesque port towns where people wait for the tides to change are reminders of life in tune with nature.

Oyster farming in Mushiage Bay in the city of Setouchi, Okayama Prefecture, is a local industry that shows how people and nature can thrive by living in harmony.

Alveopora japonica

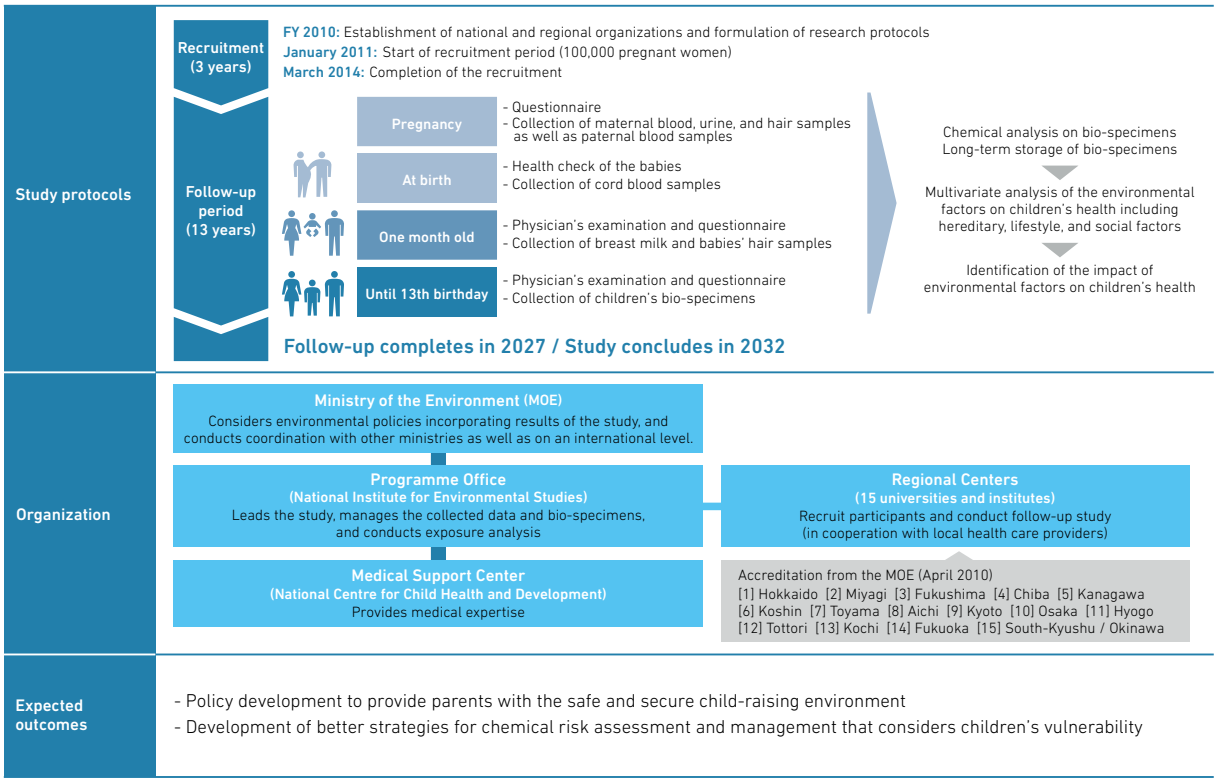
Environmental risks of chemical substances

The following data provides information on action regarding chemical substance emissions into the environment and initiatives for children's environmental health.

The Japan Environment and Children's Study (JECS)

The Japan Environment and Children's Study (JECS), a large-scale, long-term national birth cohort study involving 100,000 mother-child pairs, was launched in FY 2010. The Sub-cohort study, which includes home visits for environmental measurements, medical examinations and children's bio-specimen collection, began in November 2015, involving 5,000 participants selected from the Main Study.

JECS is a large-scale, long-term prospective cohort study to examine the impact of the exposure to chemical substances during pregnancy and childhood on children's health.



Source: Ministry of the Environment

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