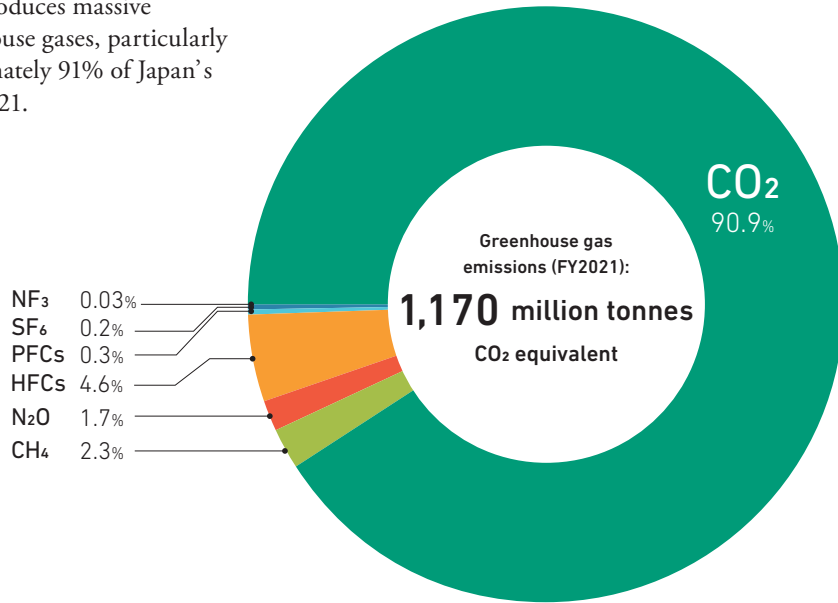


ADDITIONAL MATERIALS FROM THE ANNUAL REPORT ON THE ENVIRONMENT IN JAPAN 2023

Breakdown of Japan's Greenhouse Gas Emissions (FY2021)

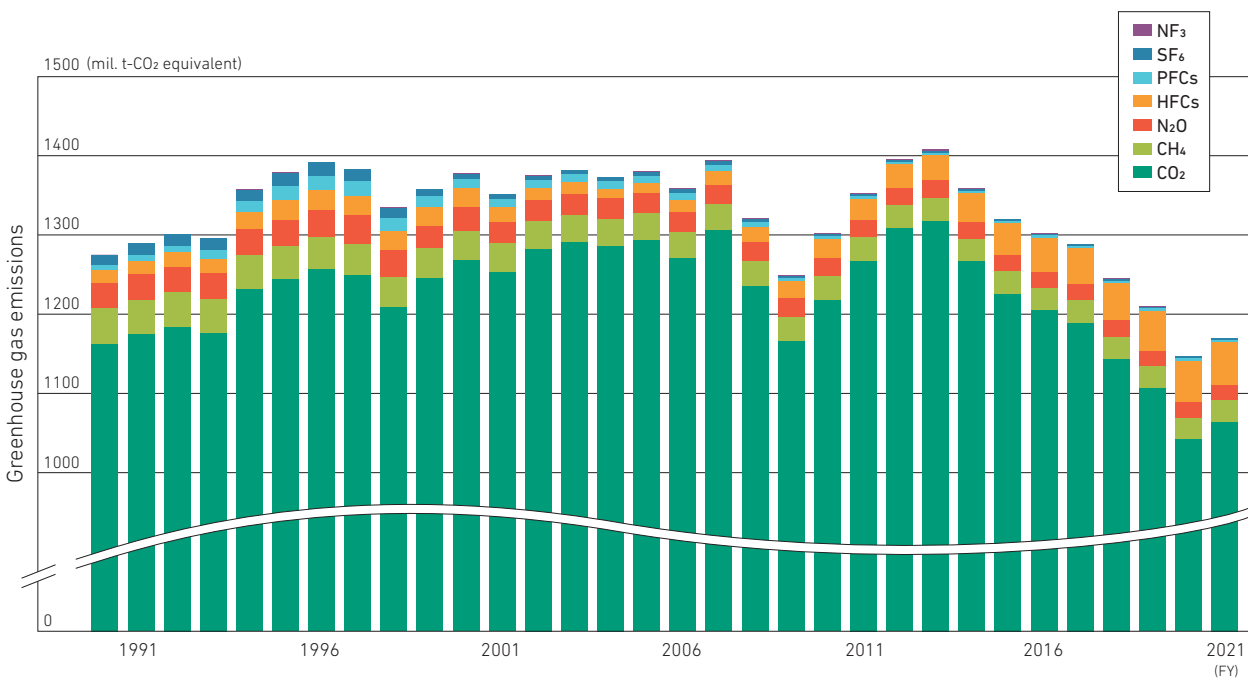
Globally, fossil fuel combustion produces massive amounts of anthropogenic greenhouse gases, particularly CO₂, which accounts for approximately 91% of Japan's greenhouse gas emissions in FY 2021.



Source: Ministry of the Environment

Japan's Greenhouse Gas Emissions

In Japan, the greenhouse gas emissions in FY2021 were equivalent to 1,170 million tonnes of CO₂. Economic recovery from the slowdown caused by COVID-19, including increased manufacturing and energy consumption due to an increase in cargo transport, contributed to a 2.0% increase over the previous fiscal year.



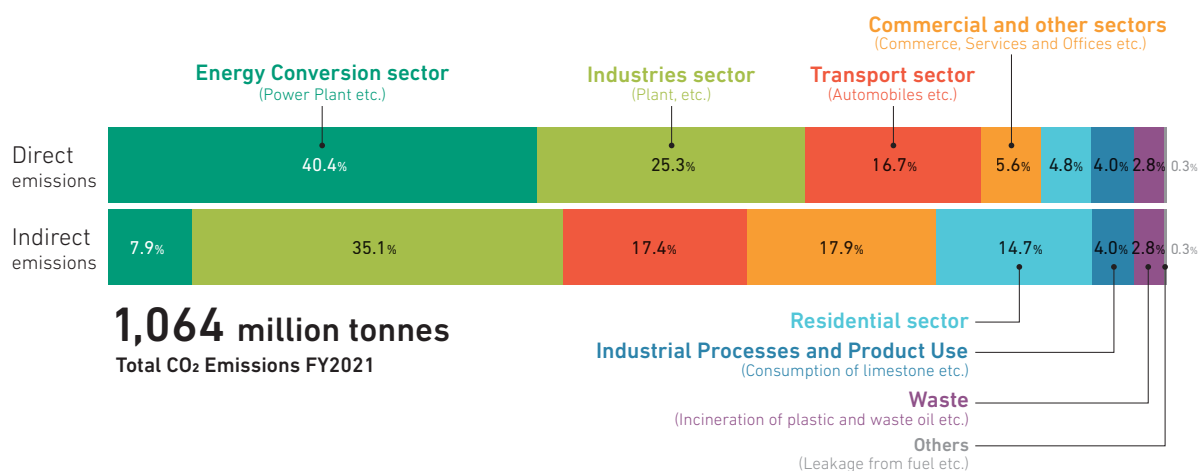
Source: Ministry of the Environment

Japan's GHG Emissions

Additional materials provide more details about the Japan's GHG Emissions

Breakdown of CO₂ Emissions by Sector

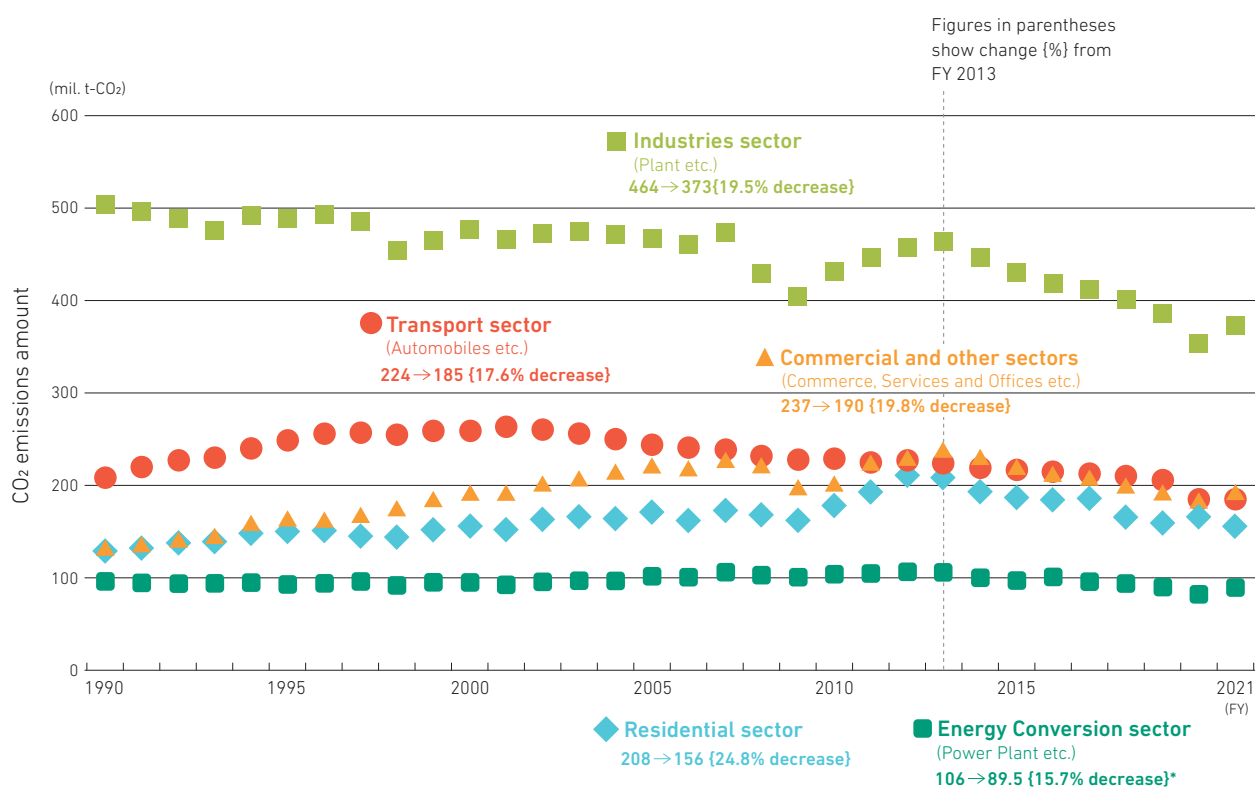
The sector with the largest CO₂ emissions in indirect emissions in FY 2021 was industries sector, accounting for approximately 35.1% of Japan's total.



Source: Ministry of the Environment

Energy-related CO₂ Emissions by Sector (Indirect Emissions)

Plotting energy-related CO₂ emissions by sector reveals that emissions in every sector decreased from FY 2013.



* Excluding statistical discrepancy from power and heat allocation.

Source: Ministry of the Environment

ADDITIONAL MATERIALS

FROM THE ANNUAL REPORT ON THE ENVIRONMENT IN JAPAN 2023

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 March 2020)

Taxon	Species Targeted for Evaluation	Extinct EX	Extinct in the Wild EW	Threatened Species			Near Threatened NT	Data Deficient DD	Total of listed species	Endangered Local Population LP	
				Endangered Class I		Endangered Class II VU					
				Class IA CR	Class IB EN						
Fauna	Mammals	160 (160)	7 (7)	0 (0)	34(33)			17 (18)	5 (5)	63 (63)	26 (23)
					25(24)		9(9)				
					12(12)	13(12)					
	Birds	Approx. 700 (Approx. 700)	15 (15)	0 (0)	98(98)			22 (21)	17 (17)	152 (151)	2 (2)
					55(55)		43(43)				
					24(24)	31(31)					
	Reptiles	100 (100)	0 (0)	0 (0)	37(37)			17 (17)	3 (4)	57 (58)	5 (5)
					14(14)		23(23)				
					5(5)	9(9)					
Amphibians	91 (76)	0 (0)	0 (0)	47(29)			19 (22)	1 (1)	67 (52)	0 (0)	
				25(17)		22(12)					
				5(4)	20(13)						
Brackish water and freshwater fish	Approx. 400 (Approx. 400)	3 (3)	1 (1)	169(169)			35 (35)	37 (37)	245 (245)	15 (15)	
				125(125)		44(44)					
				71(71)	54(54)						
Insects	Approx. 32,000 (Approx. 32,000)	4 (4)	0 (0)	367(363)			351 (350)	153 (153)	875 (870)	2 (2)	
				182(177)		185(186)					
				75(71)	107(106)						
Shellfish	Approx. 3,200 (Approx. 3,200)	19 (19)	0 (0)	629(616)			440 (445)	89 (89)	1177 (1169)	13 (13)	
				301(288)		328(328)					
				39(33)	28(16)						
Other invertebrates	Approx. 5,300 (Approx. 5,300)	1 (0)	0 (0)	65(65)			42 (42)	44 (44)	152 (151)	0 (0)	
				22(22)		43(43)					
				0(0)	2(2)						
Subtotal of Fauna		49 (48)	1 (1)	1446(1410)			943 (950)	349 (350)	2787 (2759)	63 (60)	
				749(722)		697(688)					
Flora	Vascular plants	Approx. 7,000 (Approx. 7,000)	28 (28)	11 (11)	1790(1786)			297 (297)	37 (37)	2163 (2159)	0 (0)
					1049(1045)		741(741)				
					529(525)	520(520)					
	Bryophytes	Approx. 1,800 (Approx. 1,800)	0 (0)	0 (0)	240(241)			21 (21)	21 (21)	282 (283)	0 (0)
					137(138)		103(103)				
Algae	Approx. 3,000 (Approx. 3,000)	4 (4)	1 (1)	116(116)			41 (41)	40 (40)	202 (202)	0 (0)	
				95(95)		21(21)					
Lichens	Approx. 1,600 (Approx. 1,600)	4 (4)	0 (0)	63(61)			41 (41)	46 (46)	154 (152)	0 (0)	
				43(41)		20(20)					
Fungi	Approx. 3,000 (Approx. 3,000)	25 (26)	1 (1)	61(62)			21 (21)	51 (50)	159 (160)	0 (0)	
				37(39)		24(23)					
Subtotal of Flora		61 (62)	13 (13)	2270(2266)			421 (421)	195 (194)	2961 (2956)	0 (0)	
				1361(1358)		909(908)					
Total of thirteen taxonomic groups		110 (110)	14 (14)	3716(3676)			1364 (1371)	544 (544)	5748 (5715)	63 (60)	
				2110(2080)		1606(1596)					

* 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 2019. 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:

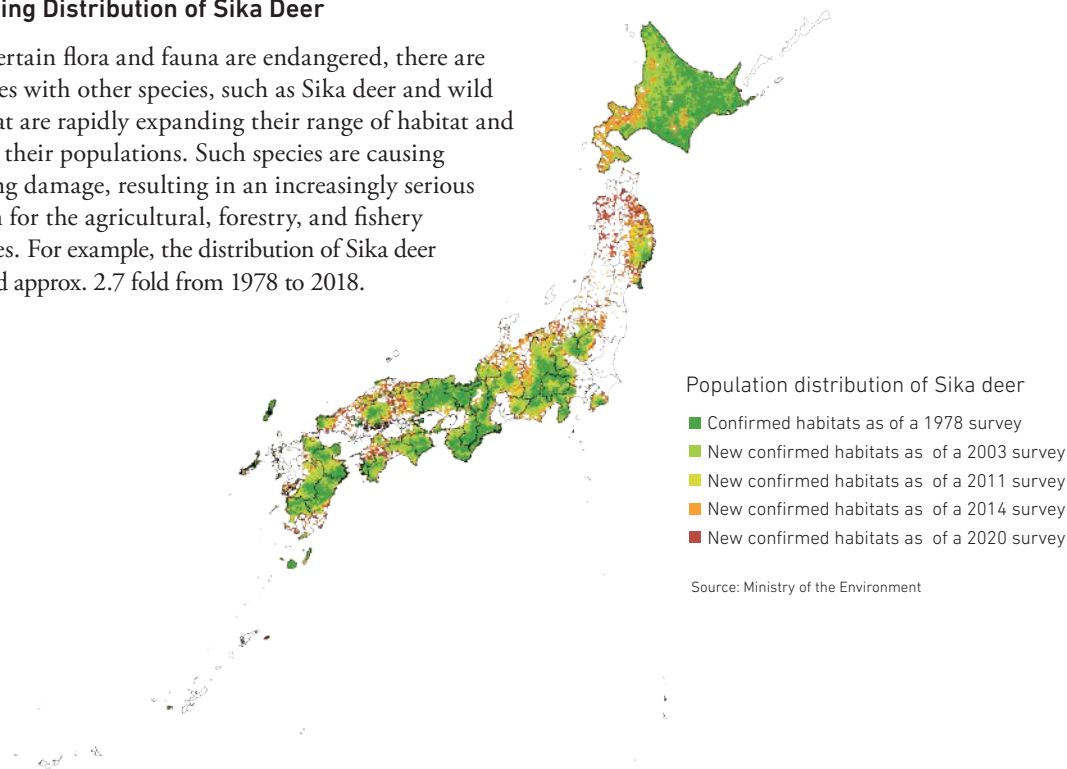
Extinct [EX]: Species that are likely to already be extinct / Extinct in the Wild [EW]: Species that exist only in captivity or as a naturalized population outside its natural habitat / Endangered Class I (Critically Endangered + Endangered) [CR+EN]: Species that are threatened to extinction / Endangered 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

Biodiversity

Additional materials provide more details about biodiversity in Japan.

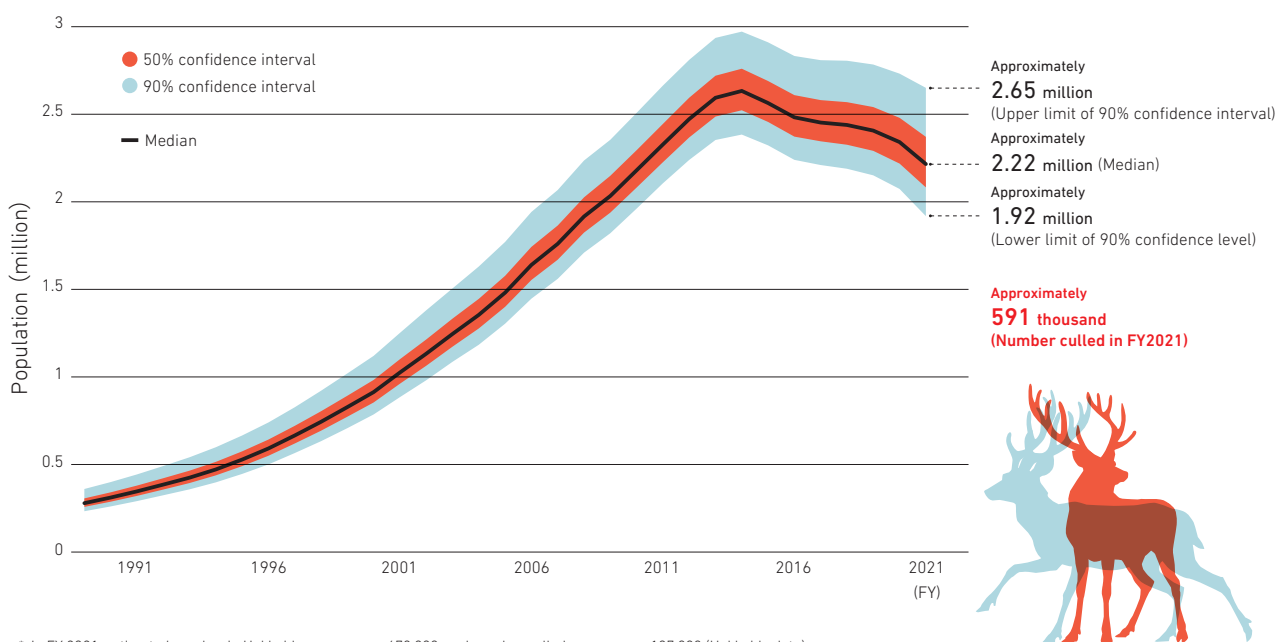
Expanding Distribution of Sika Deer

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 distribution of Sika deer expanded approx. 2.7 fold from 1978 to 2018.



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 2021, estimated number in Hokkaido was approx. 670,000, and number culled was approx. 107,000 (Hokkaido data).

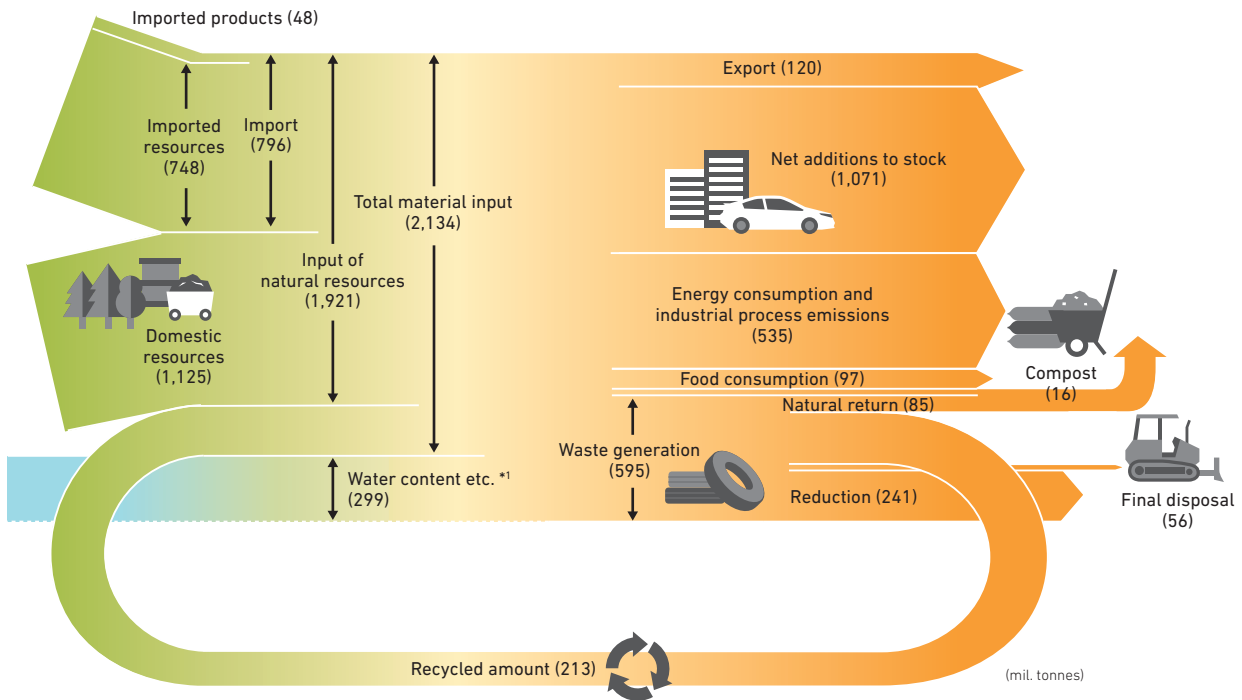
Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE ANNUAL REPORT ON THE ENVIRONMENT IN JAPAN 2023

Material Flow in Japan

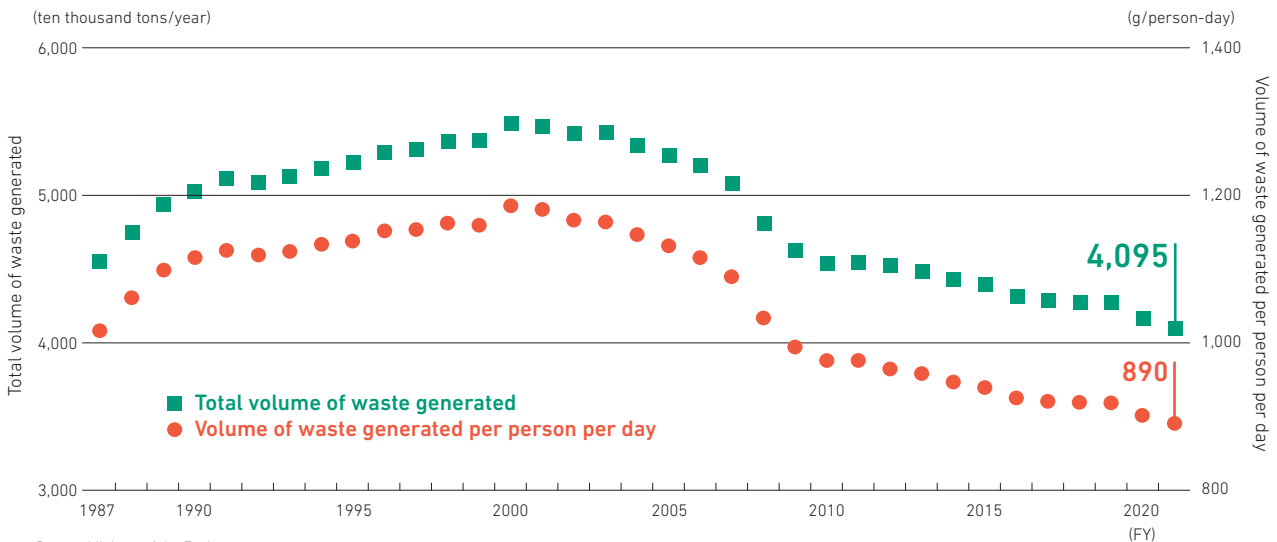
In order to establish a sound material-cycle society, it is necessary to comprehend material flows (or substance flows) to understand the extent of material extraction, consumption, and disposal in Japan. Japan uses material flows to determine targets for the four indicators of resource productivity,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

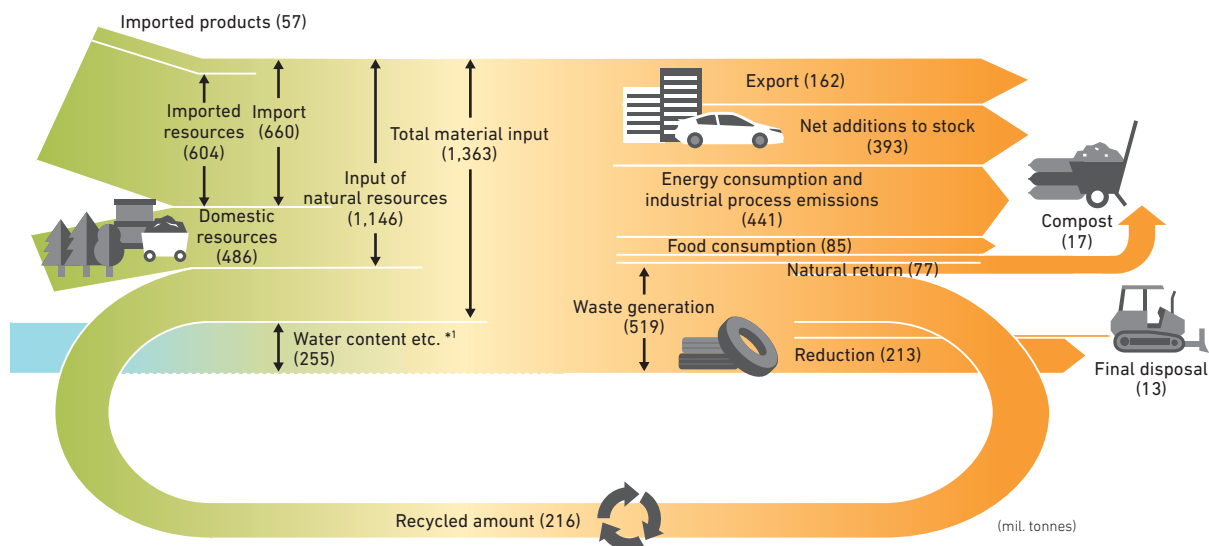


Sound material-cycle society

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)

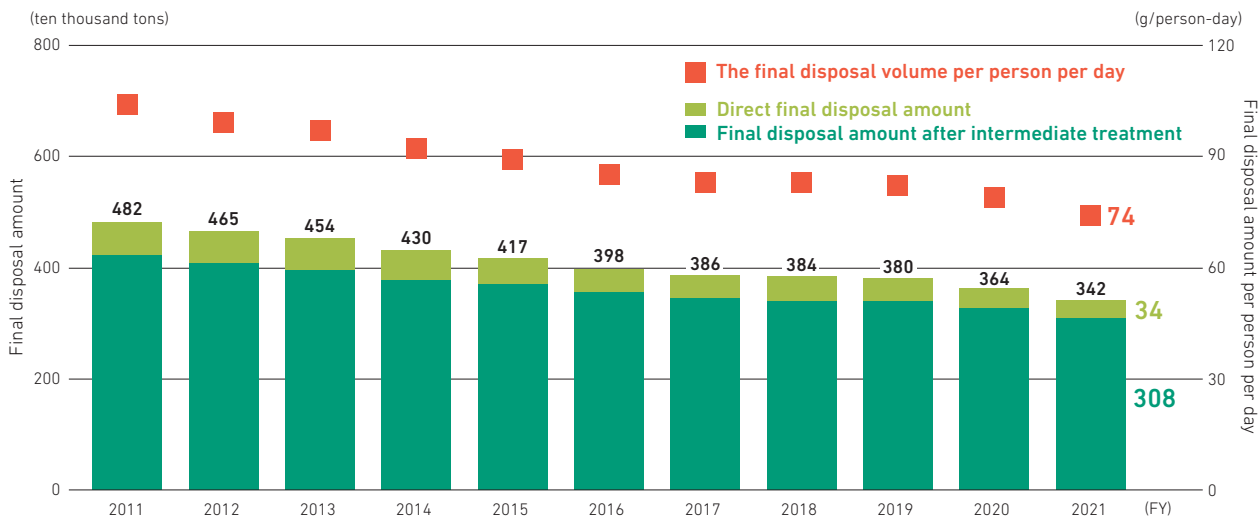
FY2020



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

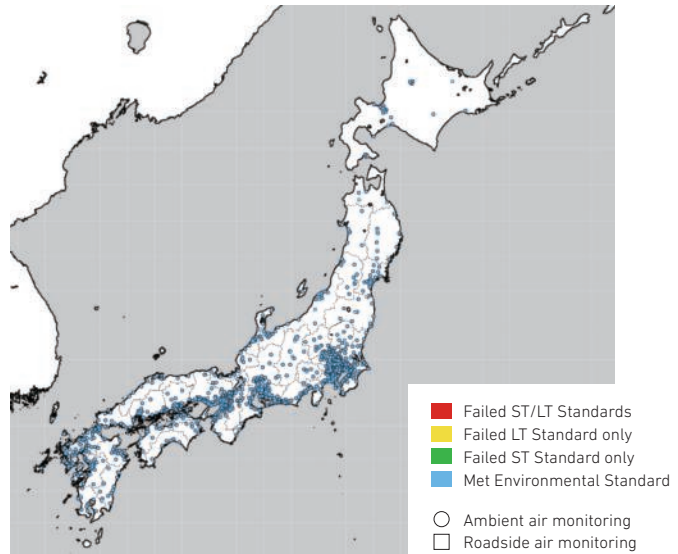
ADDITIONAL MATERIALS FROM THE ANNUAL REPORT ON THE ENVIRONMENT IN JAPAN 2023

Fine particulate matter (PM2.5)

In FY2021, the rate of compliance with ambient air quality standards for fine particulate matter (PM2.5) was 100% for ambient air pollution monitoring stations and 100% for roadside air pollution monitoring stations throughout Japan. The annual average was 8.3 $\mu\text{g}/\text{m}^3$ for ambient air pollution monitoring stations and 8.8 $\mu\text{g}/\text{m}^3$ for roadside air pollution monitoring stations.

Fiscal year	2016	2017	2018	2019	2020	2021
No. of vaild stations						
Ambient	785	814	818	835	844	858
Roadside	223	224	232	238	237	240
No. of vaild stations compliant with ambient air quality standards						
Ambient	696	732	765	824	830	858
	88.7%	89.9%	93.5%	98.7%	98.3%	100%
Roadside	197	193	216	234	233	240
	88.3%	86.2%	93.1%	98.3%	98.3%	100%

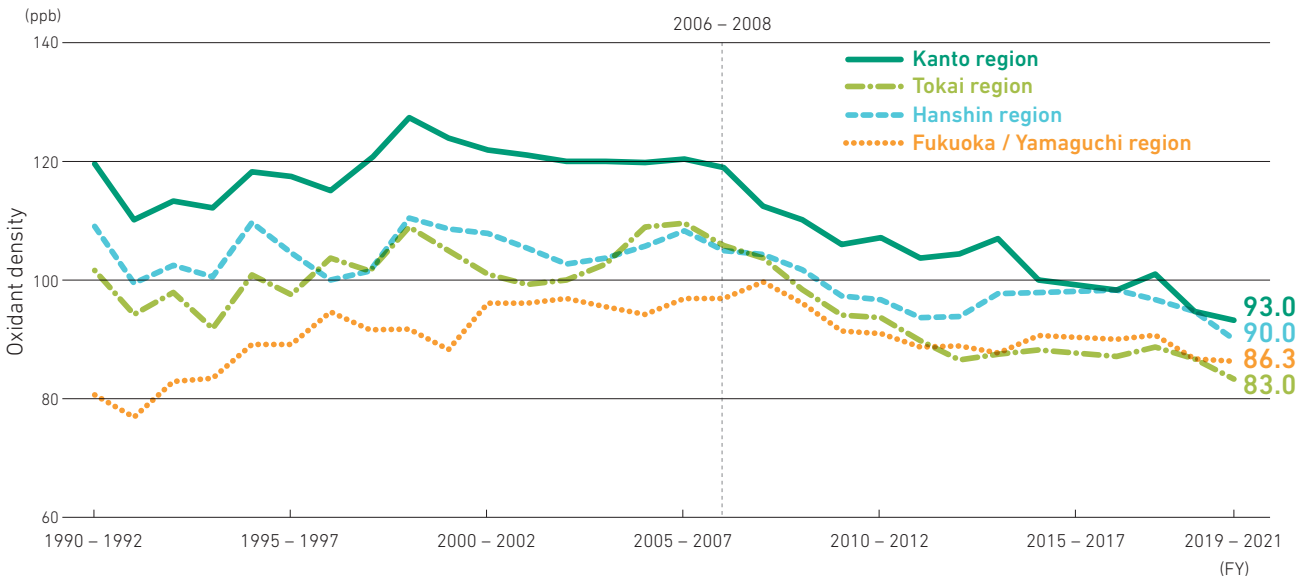
Source: Ministry of the Environment



Source: Ministry of the Environment

Photochemical oxidants

Photochemical oxidant concentrations (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.



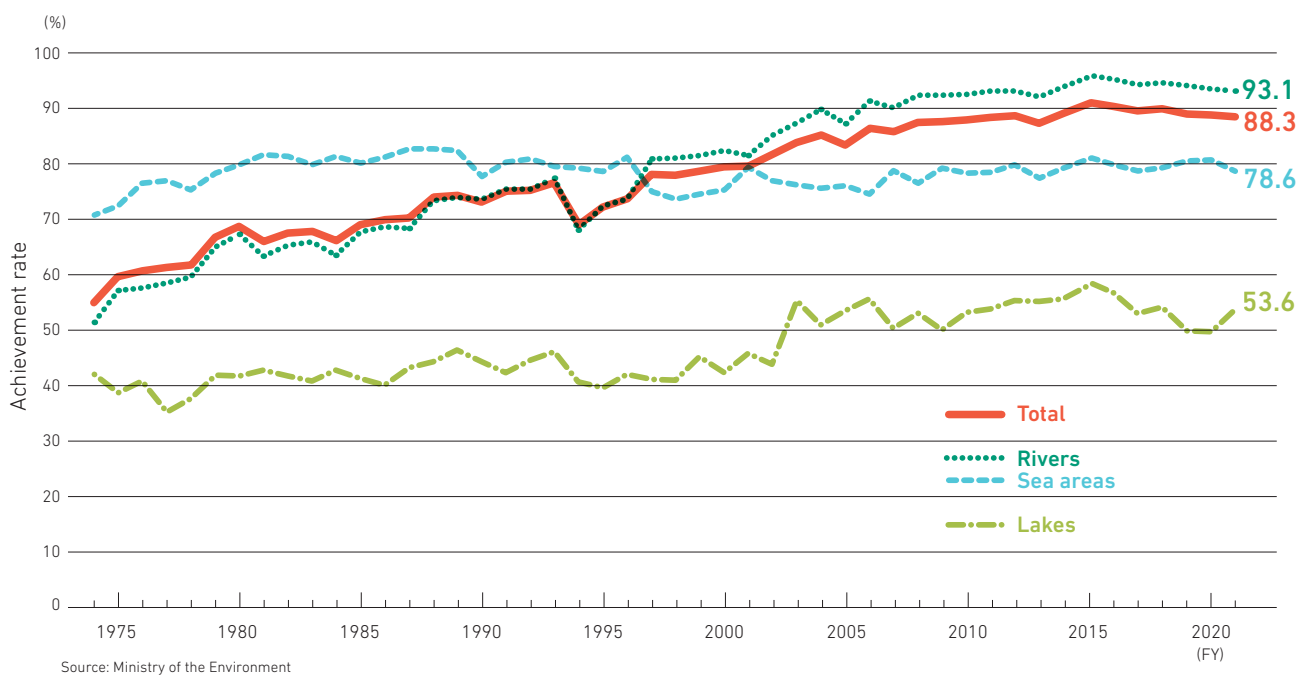
Source: Ministry of the Environment

Atmospheric and water environments

Additional materials provide more details about biodiversity in Japan.

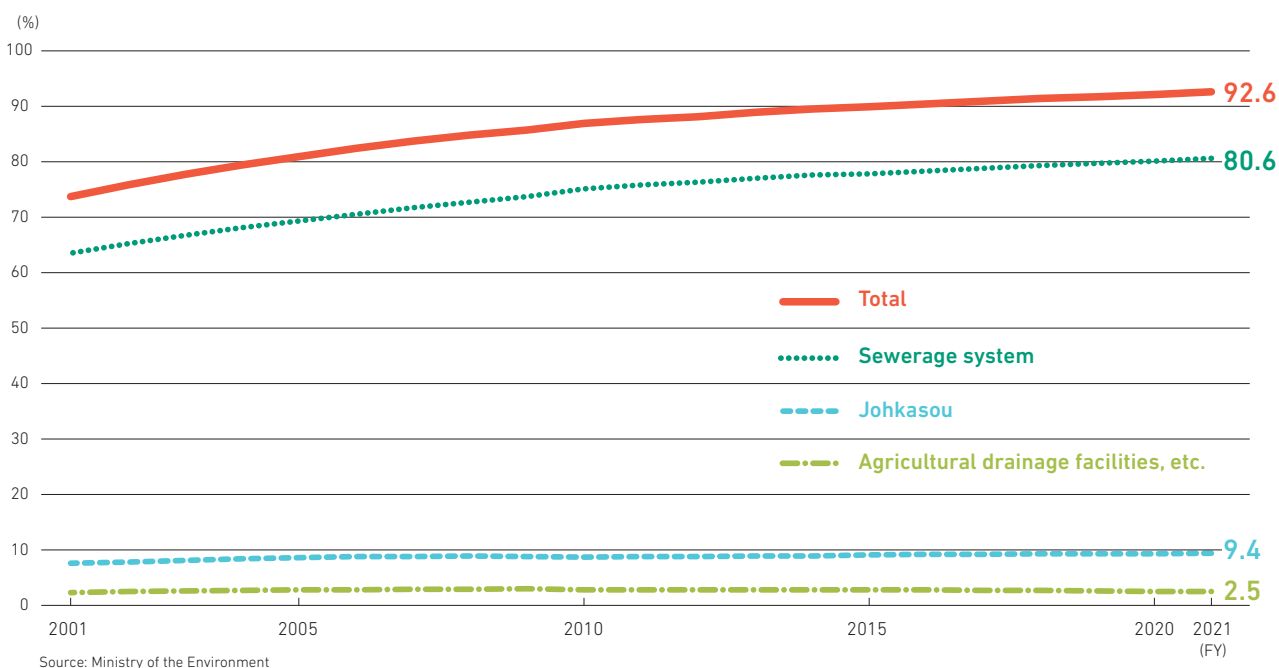
Achievement of Environmental Standards (BOD or COD)

An overall level of 88.3% 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.



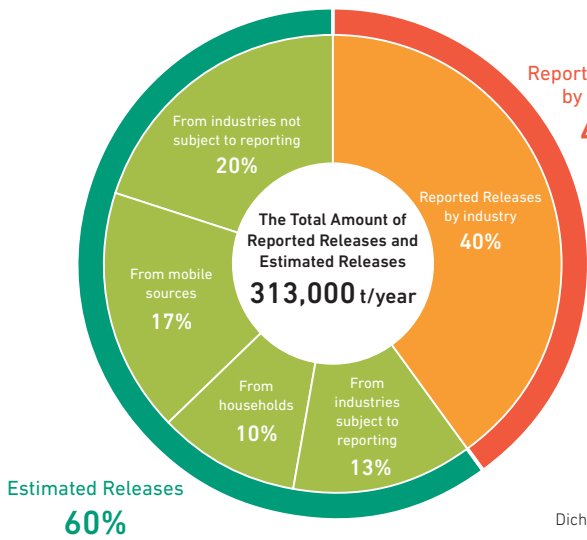
Coverage of Population Served by Wastewater Treatment System

The population coverage of wastewater treatment systems in Japan is 92.6%. Wastewater treatment facilities are being installed to cover the population not yet served by the wastewater treatment systems.



ADDITIONAL MATERIALS FROM THE ANNUAL REPORT ON THE ENVIRONMENT IN JAPAN 2023

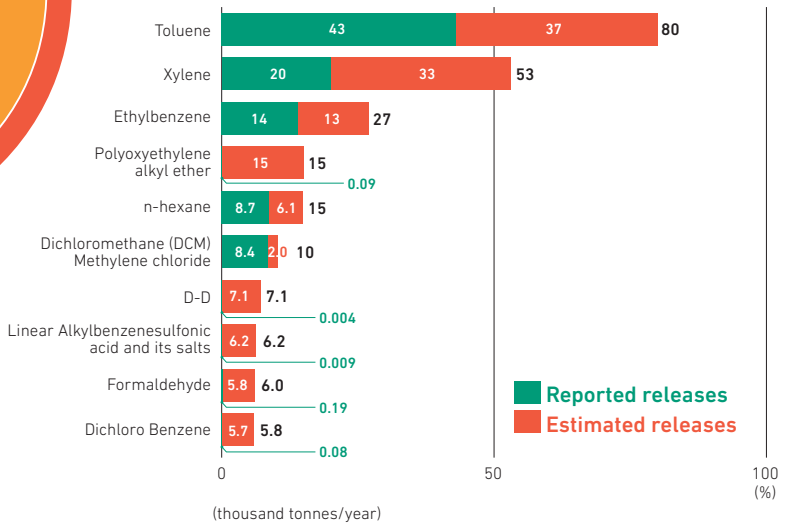
Breakdown of Reported Releases by Industry and Estimated Releases of Chemical Substances in FY 2021



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.

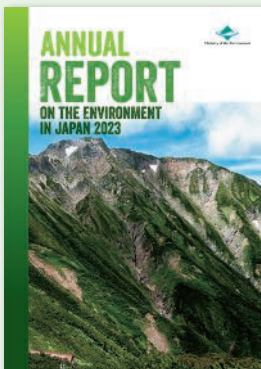
Source: Ministry of Economy, Trade and Industry and Ministry of the Environment

Top 10 Chemicals with High-volume of Reported Releases and Estimated Releases (FY 2021)



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

In March 2023, 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.



Chubusangaku National Park

Established in 1934 as one of the first national parks, Chubusangaku National Park is a mountainous park that represents the nation with a string of mountains dominating the entire Northern Alps. The park consists of some of Japan's most famous mountains rising 3,000 m above sea level from north to south, including the Ushiro-Tateyama Mountain Range with Mt. Shiroumadake as the highest peak, the Tateyama Mountain Range with Mt. Tsurugidake and Mt. Tateyama, the Hotaka Mountain Range with Mt. Yarigatake, and Mt. Norikuradake located at the south end of the park.

In terms of landscape, steep rock cliffs, deep and precipitous valleys, alpine belts, rock ptarmigans, a blanket of snow over the valleys that lingers till summer months, glacier-eroded U-shaped valleys, and lakes and lava plateaus formed by volcanoes all create a richly diverse mountain landscape that captivates many climbers and visitors.

This photo of Mt. Goryudake was taken from Mt. Shiratake in August. In the afternoons, mountain fogs rise to accentuate the ridge line.

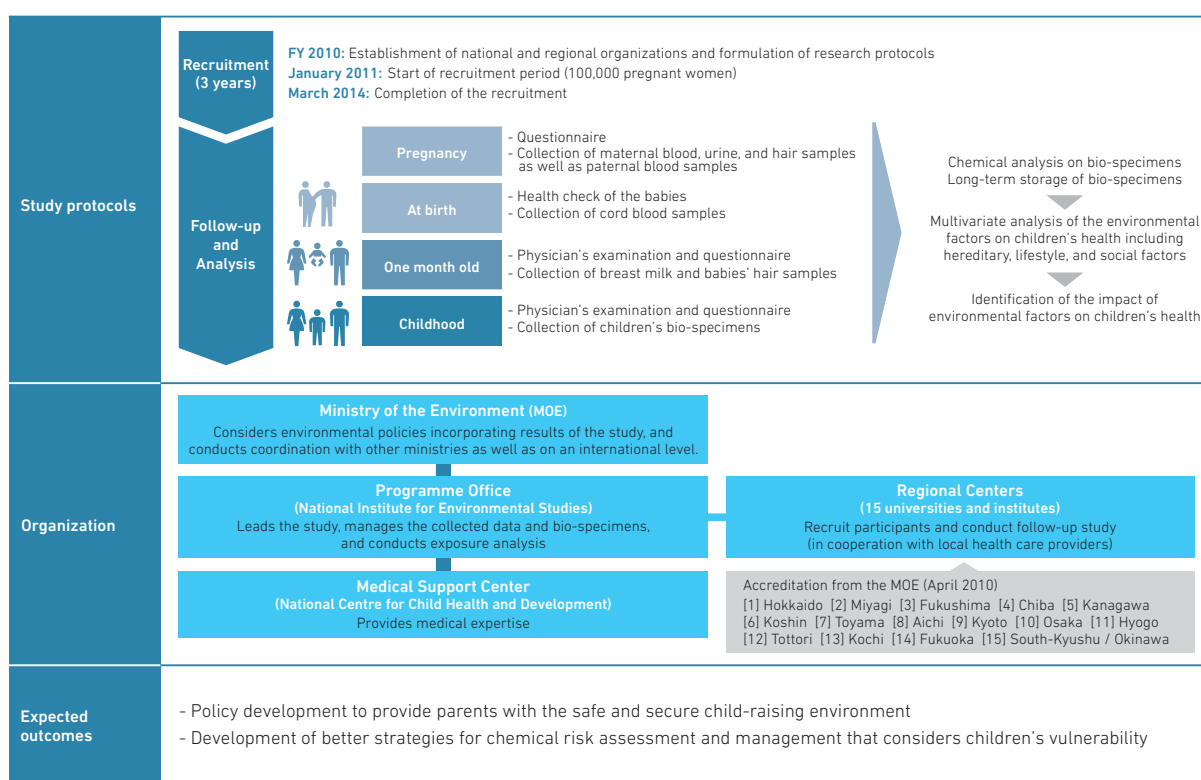
Environmental risks of chemicals

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 2014, involving 5,000 participants selected from the Main Study. In FY2022, a conceptual plan was formulated to conduct the follow-up study on the participants of ages 13 and higher in FY2024.

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



Source: Ministry of the Environment



Rock Ptarmigan

Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2023

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