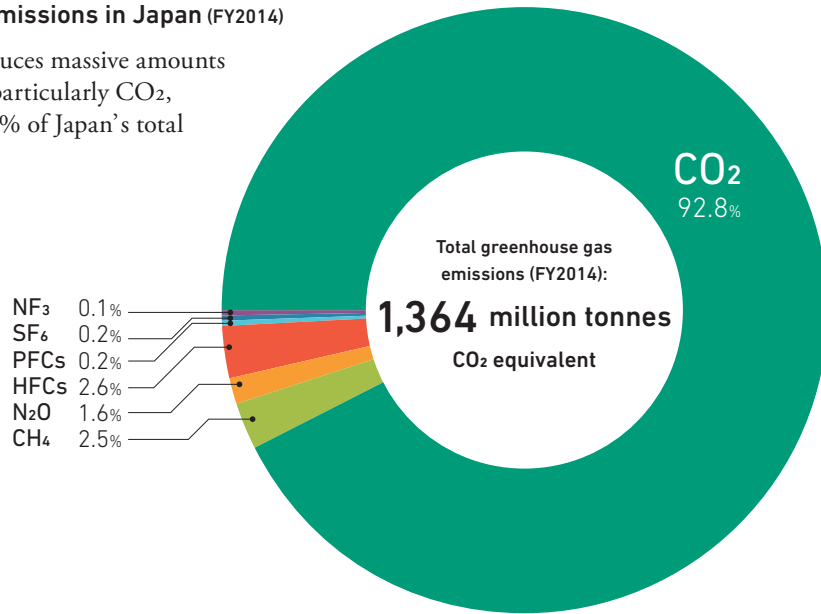


# ADDITIONAL MATERIALS FROM THE 2016 ANNUAL REPORT ON THE ENVIRONMENT

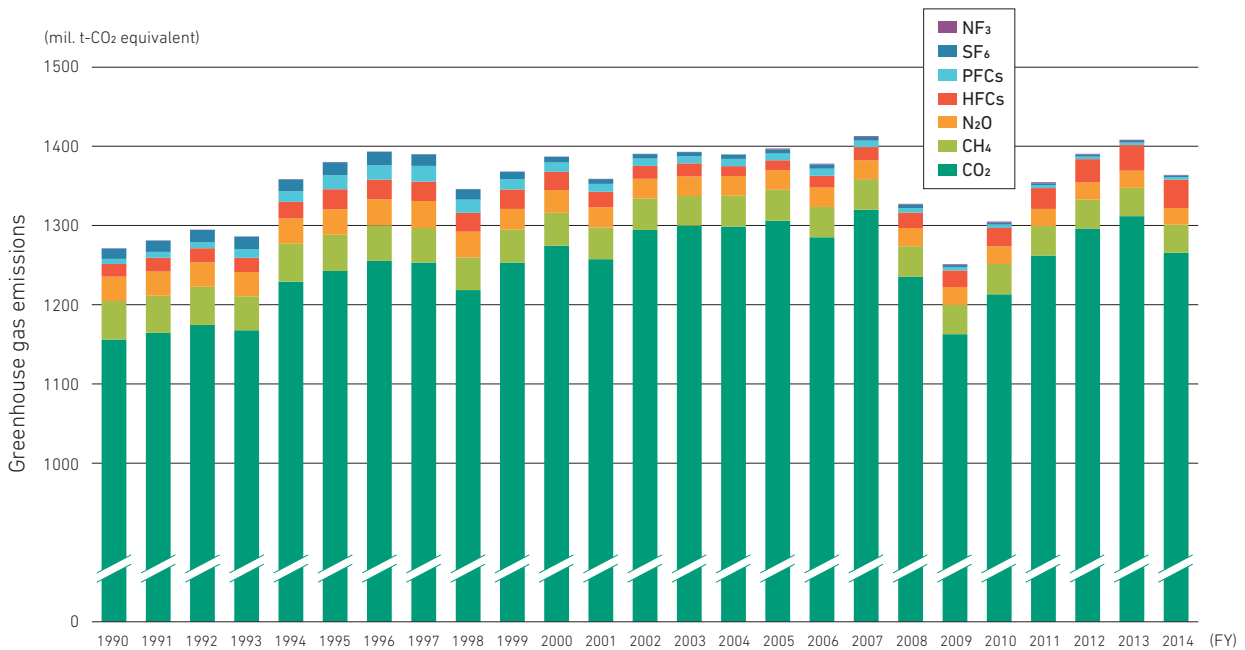
## Breakdown of Greenhouse Gas Emissions in Japan (FY2014)

Globally, fossil fuel combustion produces massive amounts of anthropogenic greenhouse gases, particularly CO<sub>2</sub>, which accounts for approximately 93% of Japan's total greenhouse gas emissions.



## Greenhouse Gas Emissions in Japan

Japan's total greenhouse gas emissions in FY 2014 were equivalent to approximately 1,364 million tonnes of CO<sub>2</sub>, a 3.1% drop from the previous year. This was due to energy originated CO<sub>2</sub> emissions decreasing as lower electricity consumption and the improvement of carbon intensity in power generation resulted in less CO<sub>2</sub> production from power generation.



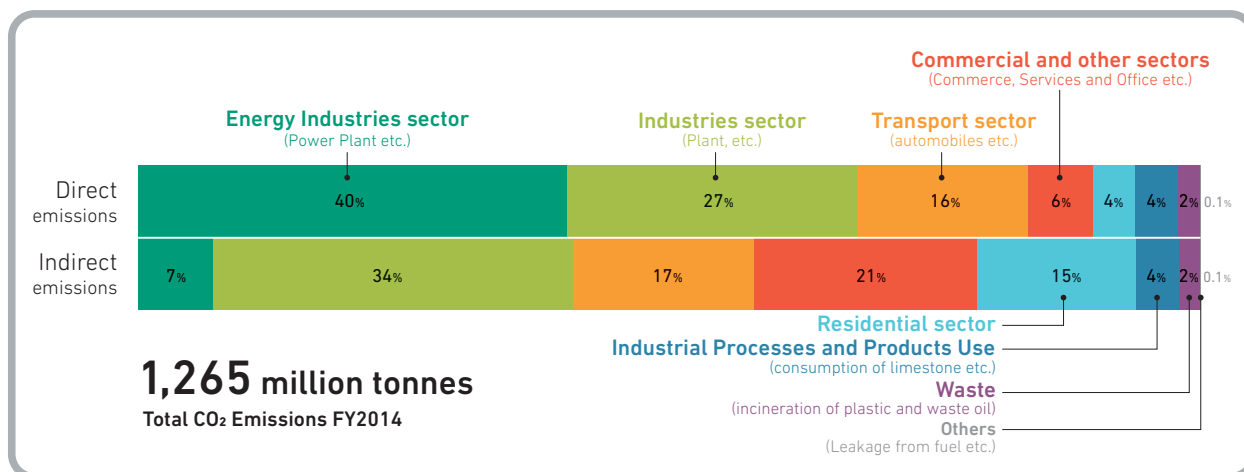
Note: Emissions data is subject to change due to corrections or recalculations of statistical data in annual reports.

# Low-carbon society

Additional materials provide more details about the global warming issue.

## Breakdown of CO<sub>2</sub> Emissions by Sector

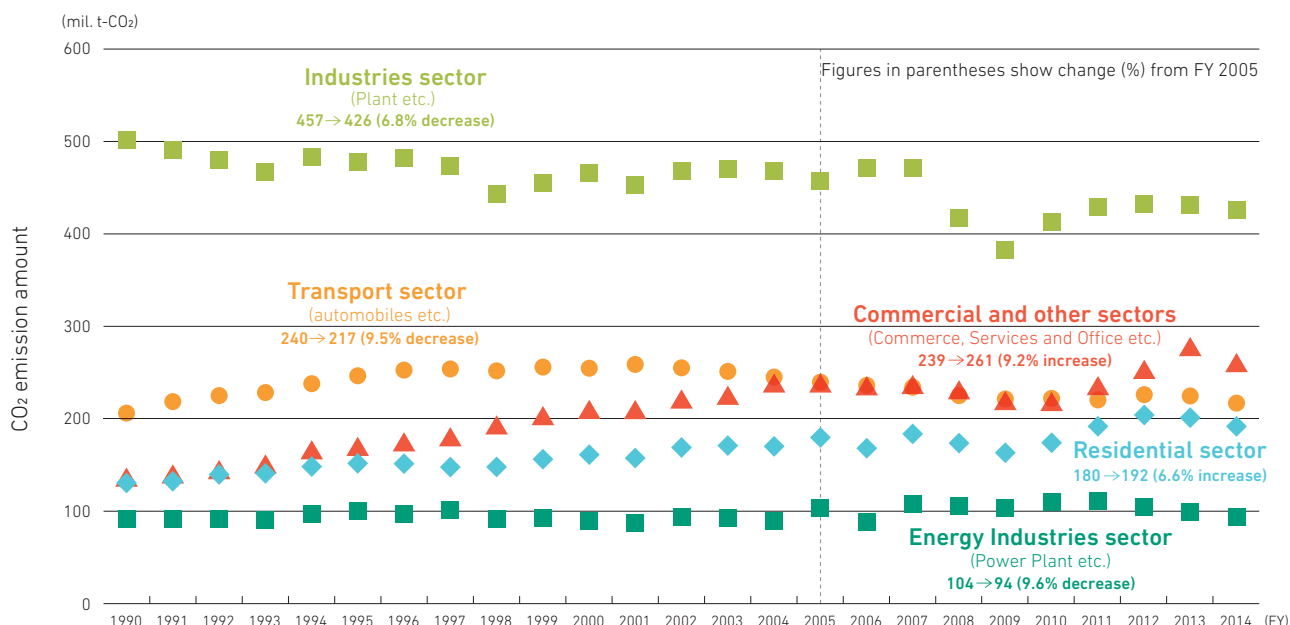
Industries was the sector with the largest CO<sub>2</sub> emissions in FY 2014, accounting for approximately 34% of Japan's total.



Notes: The upper bar represents the share of direct emissions from each sector.  
The lower bar represents the share of each final demand sector, correcting emissions from power generation by the electric utility companies and emissions from heat generation by heat supply operators to final demand sectors in proportion to their electricity and heat consumption level.  
Due to statistical errors and rounding, the sum of percentages of emissions does not always add up to 100%.

## Energy originated CO<sub>2</sub> Emissions by Sector

Plotting energy originated CO<sub>2</sub> emissions by sector reveals that emissions in most sectors are currently on a downward trend.



# ADDITIONAL MATERIALS FROM THE 2016 ANNUAL REPORT ON THE ENVIRONMENT

## Threatened Wildlife Species in Japan

With an increasing number of species being put on the Red List, which publicizes threatened wildlife species, it is clear that the circumstances of wildlife in Japan continue to be grave.

(Reported in September 2015)

Taxonomical group	Species for the survey (a)	Extinct	Extinct in the wild	Threatened (b)			Near threatened	Data Deficient	Total number of Red-listed	Threatened local population (b/a)	
				Category I (critically endangered + endangered)		Category II (vulnerable)					
				IA (Critically endangered)	IB (endangered)						
EX	EW	CR	EN	VU	NT	DD					
Animals	Mammals	160 (160)	7 (7)	0 (0)	33(34)		9(10)	5 (5)	63 (63)	23 (22)	
				24(24)	12(12)	12(12)					
	Birds	approx. 700 (approx. 700)	14 (14)	1 (1)	97(97)		43(43)	17 (17)	150 (150)	2 (2)	
				54(54)	23(23)	31(31)					
	Reptiles	98 (98)	0 (0)	0 (0)	36(36)		23(23)	3 (3)	56 (56)	5 (5)	
				13(13)	4(4)	9(9)					
	Amphibians	66 (66)	0 (0)	0 (0)	22(22)		11(11)	1 (1)	43 (43)	0 (0)	
				11(11)	1(1)	10(10)					
	Brackish water and freshwater fish	approx. 400 (approx. 400)	3 (3)	1 (1)	167(167)		44(44)	33 (33)	238 (238)	15 (15)	
				123(123)	69(69)	54(54)					
Insects	approx. 32,000 (approx. 32,000)	4 (4)	0 (0)	358(358)		187(187)	153 (153)	868 (868)	2 (2)		
			171(171)	65(65)	106(106)						
Molluscs	approx. 3,200 (approx. 3,200)	19 (19)	0 (0)	563(563)		319(319)	93 (93)	1126 (1126)	13 (13)		
			244(244)								
Other invertebrate	approx. 5,300 (approx. 5,300)	0 (0)	1 (1)	61(61)		41(41)	42 (42)	146 (146)	0 (0)		
			20(20)								
Animals subtotal		47 (47)	3 (3)	1337(1338)		677(678)	347 (347)	2690 (2690)	60 (59)		
Plants, etc.	Plants etc. I	approx. 7,000 (approx. 7,000)	32 (32)	10 (10)	1779(1779)		741(741)	37 (37)	2155 (2155)	0 (0)	
	Tracheophyte				1038(1038)	519(519)					519(519)
	Plants etc. II	Bryophyte	approx. 1,800 (approx. 1,800)	0 (0)	0 (0)	241(241)		103(103)	21 (21)	283 (283)	0 (0)
		Algae	approx. 3,000 <sup>Note 1</sup> (approx. 3,000)	4 (4)	0 (0)	138(138)	116(116)				
		Lichen	approx. 1,600 (approx. 1,600)	4 (4)	1 (1)	61(61)		20(20)	46 (46)	153 (153)	0 (0)
		Fungi	approx. 3,000 <sup>Note 1</sup> (approx. 3,000)	26 (26)	0 (0)	41(41)	62(62)				
	Plants etc. Subtotal		66 (66)	12 (12)	2259(2259)		908(908)	194 (194)	2953 (2953)	0 (0)	
Total of the 10 taxonomical groups		113 (113)	15 (15)	3596(3597)		1585(1586)	541 (541)	5643 (5643)	60 (59)		

\* Figures in parentheses indicate the species (including subspecies, and, in the case of Plants, etc., variants (in part varieties)) for the 4th Red List, reported in 2012 and 2013. LP shows the number of local populations surveyed.

Note 1: Numbers of species exclude species that cannot be identified visually.  
 Note 2: Data on the assessed animal species (including subspecies) were derived from the Environment Agency's Checklist of Japanese Species of Wildlife (1993, 1995, and 1998).  
 Note 3: Among "Plants, etc.," data on species (including subspecies) of tracheophytes were derived from data aggregated by the Japanese Society for Plant Systematics.  
 Note 4: Among "Plants, etc.," data on species (including subspecies) of non-tracheophytes (bryophytes, algae, lichen, and fungi) were derived from Ministry of the Environment surveys.

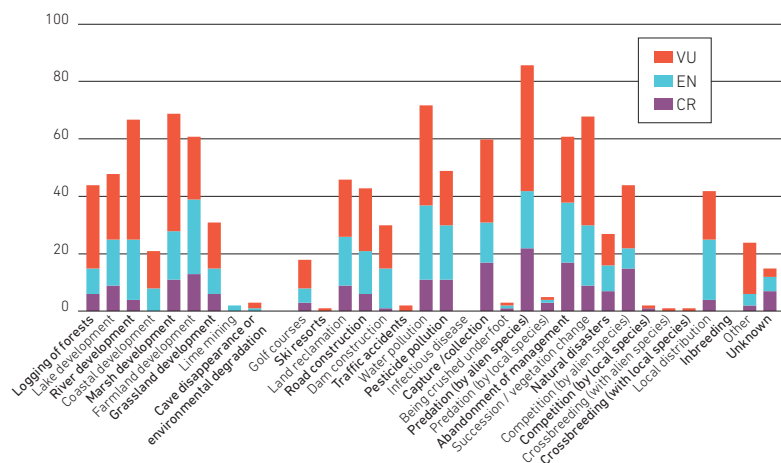
The categories are considered as follows:

Extinct: Species thought to already be extinct in Japan / Extinct in the Wild: Species surviving in cultivation, in captivity, or as a naturalized population well outside its historic range / Critically Endangered + Endangered: Species in danger of extinction / Vulnerable: Species facing increasing danger of extinction / Near Threatened: Species with weak foundation for survival / Data Deficient: Species with insufficient data to make an assessment

Source: Table of species listed in Red List by the Ministry of the Environment

## Drivers of Loss of Endangered Species (insects)

There are various drivers of loss of endangered species, but typical drivers include development, capture/collec-tion, abandonment of management or succession, overuse, water pollution, and alien species.



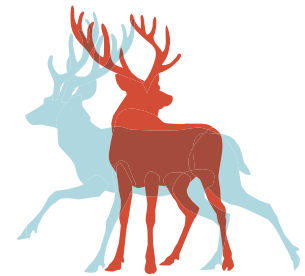
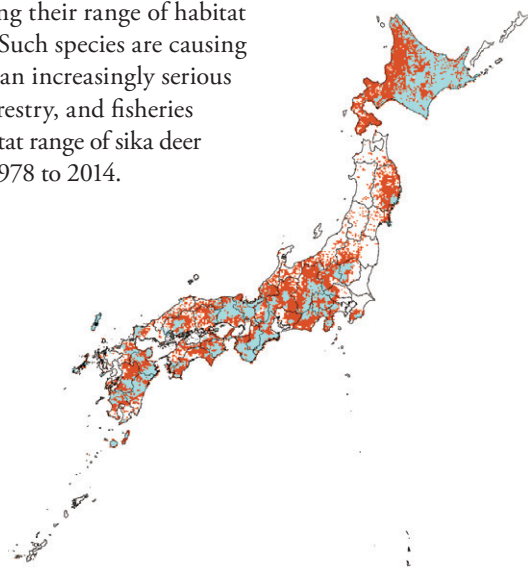
Note 1: Horizontal axis represents number of species.  
 There are some species for which multiple drivers of loss apply.  
 Note 2: CR: Category IA. EN: Category IB. VU: Category II.

# Biodiversity

Additional materials provide more details about biodiversity in Japan.

## Growing Range of Sika Deer

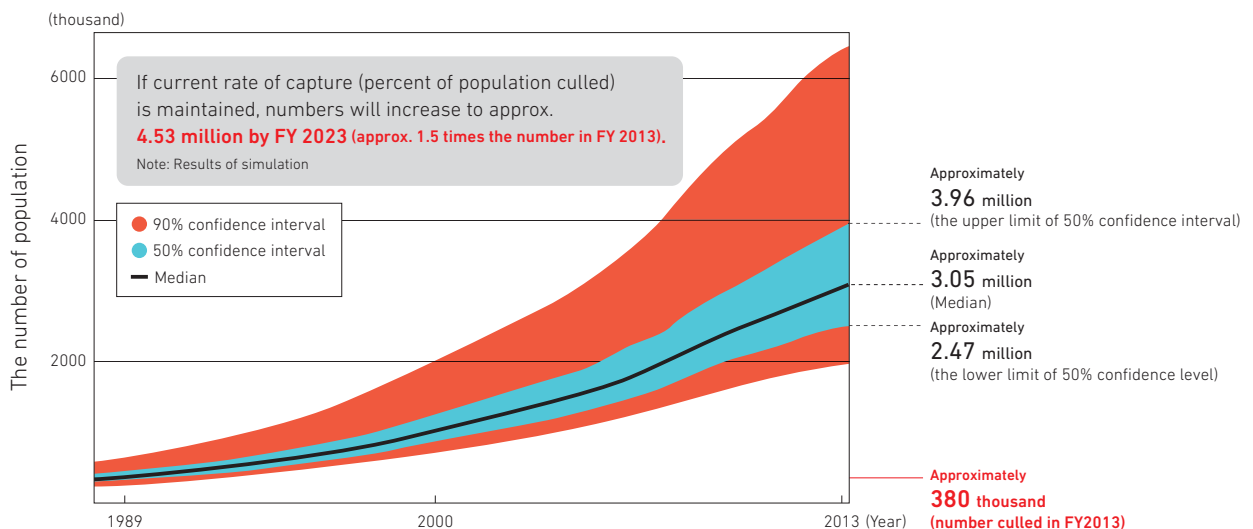
While certain flora and fauna are endangered, there are also issues with other species, such as sika deer and wild boar, that are suddenly expanding their range of habitat and growing their populations. Such species are causing increasing damage, resulting in an increasingly serious situation for the agricultural, forestry, and fisheries 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

## Estimated Number of Deer in Japan (excluding Hokkaido\*)

Furthermore, the number of sika deer on the main Japanese island of Honshu and further south is forecast to increase to 1.7 times its 2011 level by 2023.

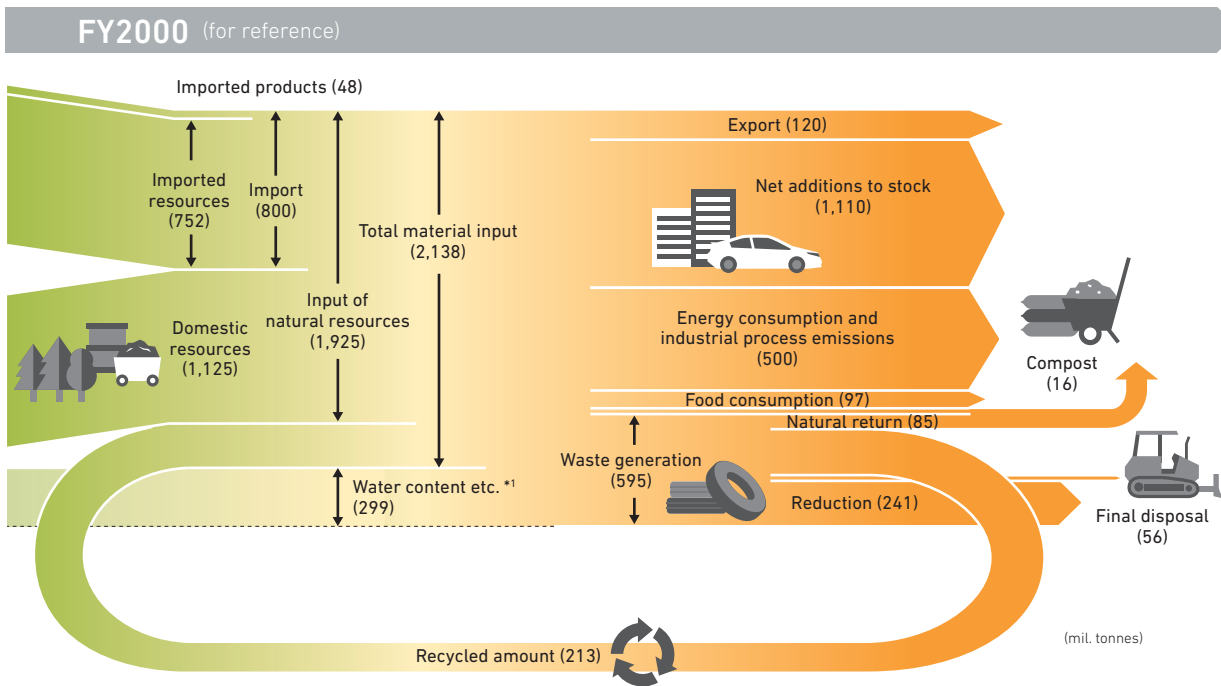


\*: In FY 2013, estimated number in Hokkaido was approx. 540,000, and number culled was approx. 130,000 (Hokkaido data).

# ADDITIONAL MATERIALS FROM THE 2016 ANNUAL REPORT ON THE ENVIRONMENT

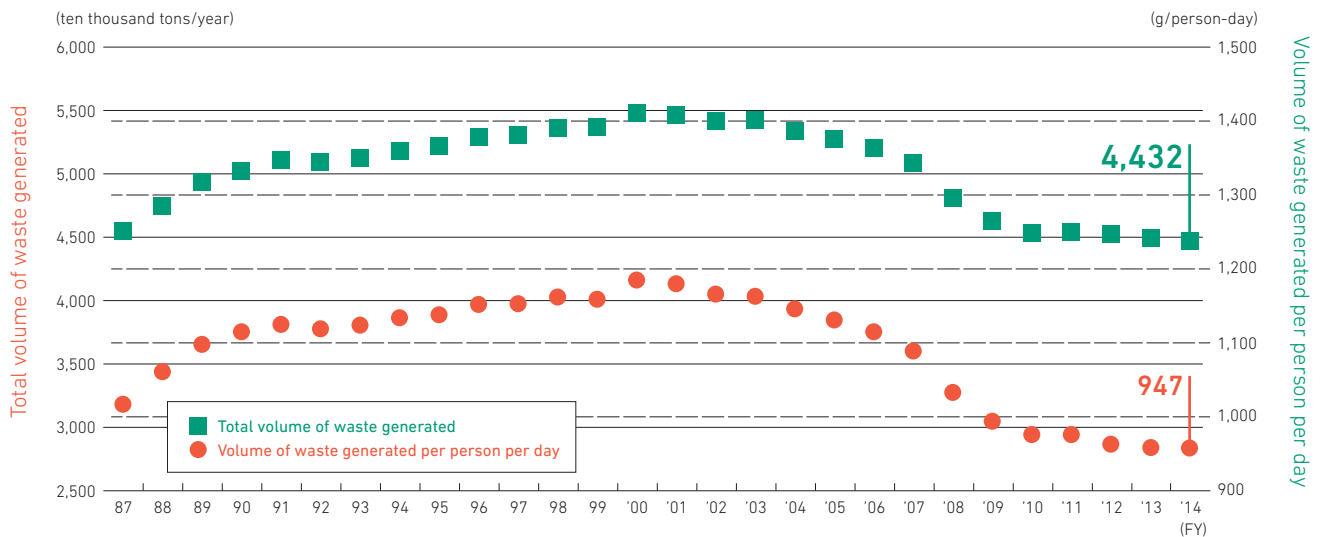
## Material Flow in Japan

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 three indicators of resource productivity, cyclical use rate, and final disposal amount.



## 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.



Note 1: In the figures for FY 2005 onwards, total generated waste is considered the same as the total volume of municipal solid waste, defined as "volume of waste collected by local governments + waste directly brought into waste treatment facilities + group collection of recyclable waste" in the Basic Guidelines for the Comprehensive and Systematic Promotion of Waste Reduction Measures and Other Appropriate Treatments, developed based on the Waste Disposal and Public Cleansing Act.

Note 2: Waste generated per person per day calculated by dividing total generated waste by total population x 365 days, or 366 days.

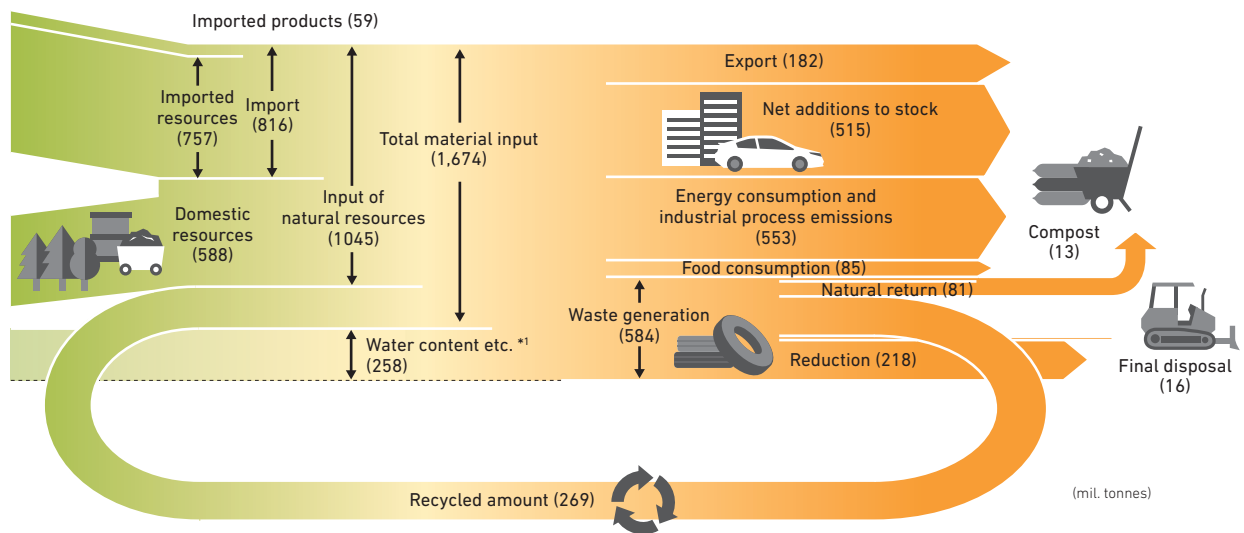
Note 3: From FY 2012 onwards, total population includes population of non-Japanese residents.

# Sound material-cycle society

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

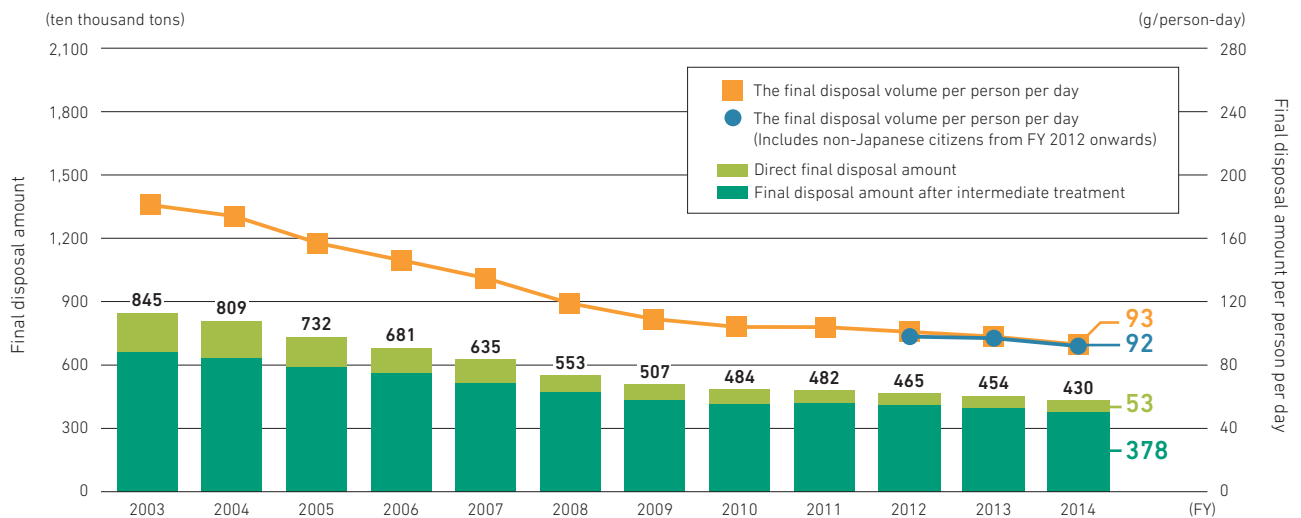
\*1 Water content: water contents of wastes (sludge, livestock waste, night soil, waste acid, waste alkali) and sediments dumped in association with the process of economic activities (sludge in mining, construction and in waterworks as well as slag)

FY2013



## Final Disposal Amount and Final Disposal Amount Per Person

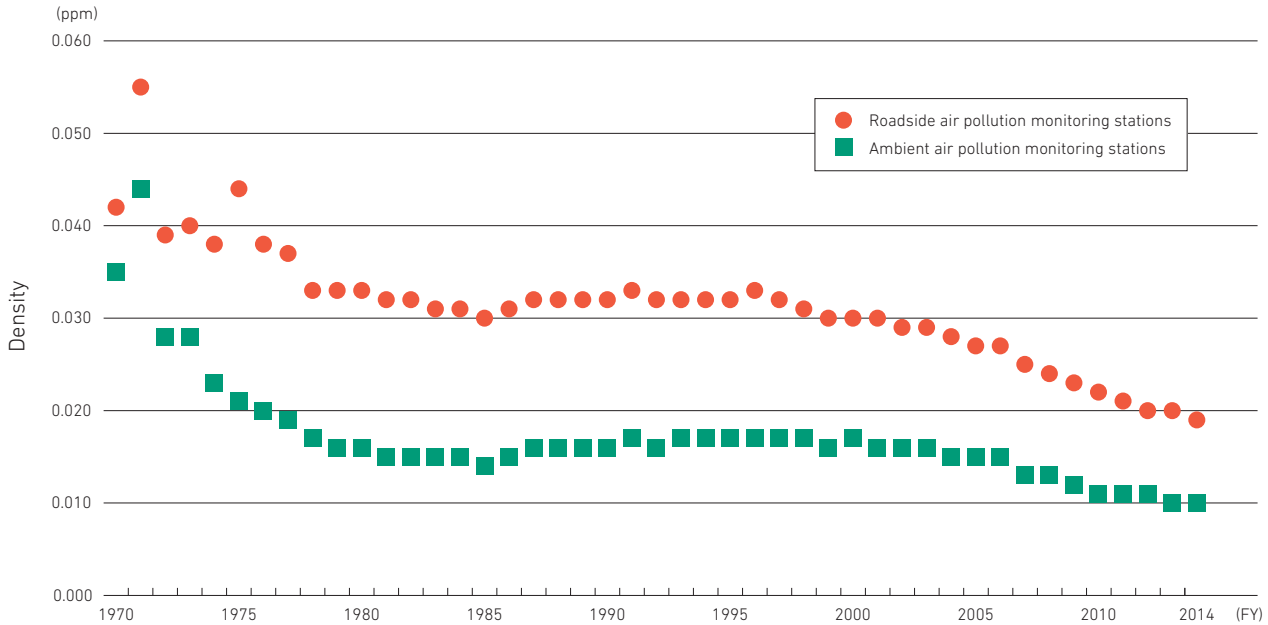
Final disposal amount of waste and final disposal amount per person per day are trending downwards.



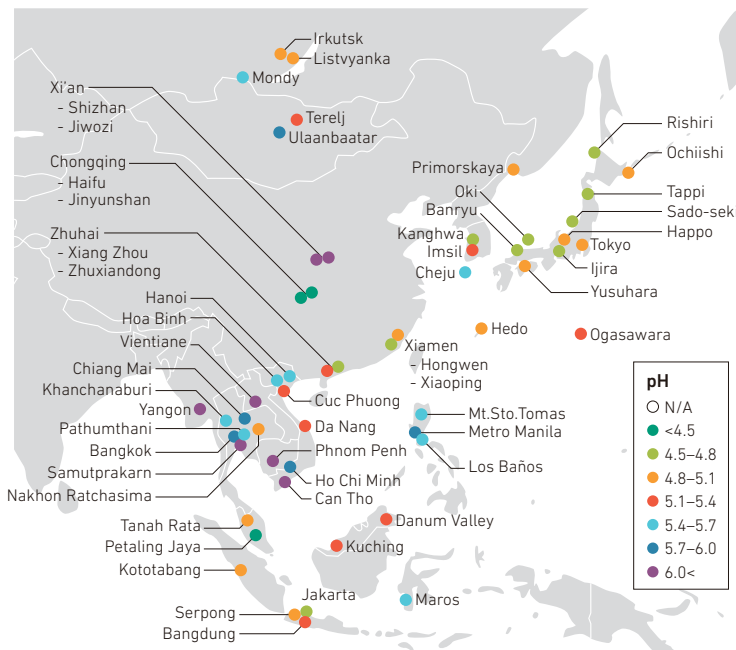
# ADDITIONAL MATERIALS FROM THE 2016 ANNUAL REPORT ON THE ENVIRONMENT

## Annual Average Density of NO<sub>2</sub> (from FY1970 to FY2014)

A gradual fall in mean nitrogen dioxide levels can be seen recently at both ambient air pollution monitoring stations and roadside air pollution monitoring stations.



Source: "Air Pollutions in FY2014 (for press release)" by Ministry of the Environment



## pH in Precipitation in EANET Region (Average pH 2011 - 2014)

The Acid Deposition Monitoring Network in East Asia (EANET) was established through a Japanese initiative with the aim of establishing a regional cooperative framework regarding acid rain, and of making clear the state of the acid deposition issue and its impact in the East Asian region. Currently thirteen East Asia nations participate, collecting reliable data through acid deposition monitoring using the same methodology. The network will expand its range of operations to include PM<sub>2.5</sub> and ozone monitoring.

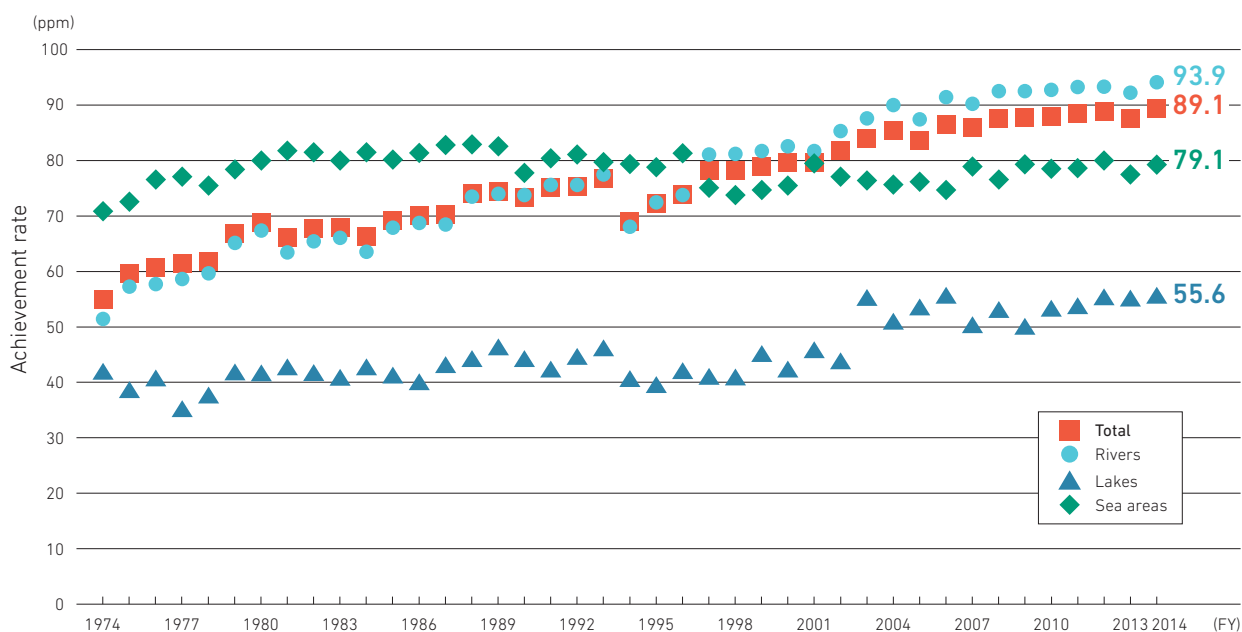
Source: EANET "Data Report on the Acid Deposition in the East Asian Region 2013"

# Atmospheric and water environments

Additional materials provide more information about atmospheric and water environments.

## Achievement of Environmental Standards (BOD or COD)

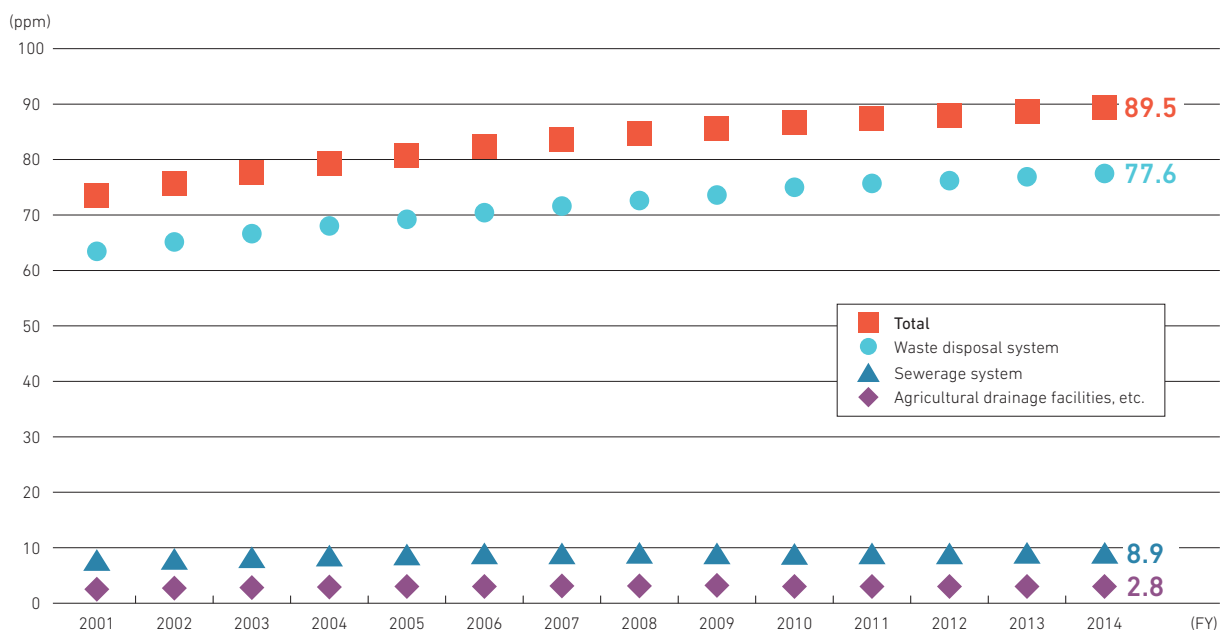
An overall level of 89.1% has been achieved for the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) environmental standards relating to the maintenance of living environments. BOD and COD are leading indicators of water quality in respect of organic pollution.



Source: "Measurement Results of Water Quality in Public Waters FY 2014" Ministry of the Environment

## Coverage of Population Served by Waste Disposal System

The population coverage of wastewater treatment systems in Japan is 89.5%. Wastewater treatment facilities are being installed to cover the population not yet served by the wastewater treatment systems.

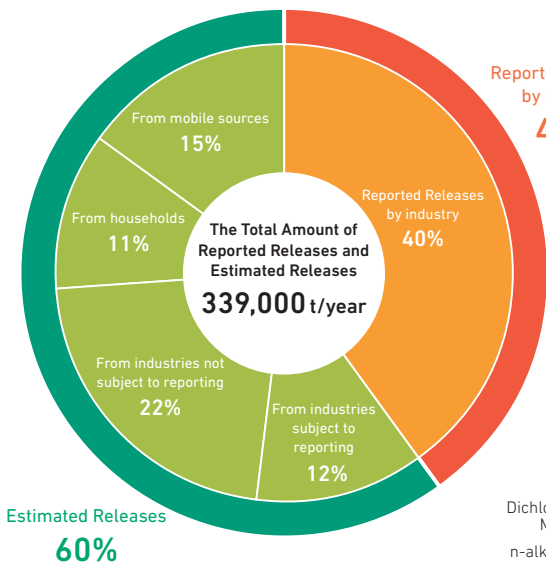


Source: press release of "Coverage rate of population served by waste disposal system (September, 2015)," Ministry of the Environment



# ADDITIONAL MATERIALS FROM THE 2016 ANNUAL REPORT ON THE ENVIRONMENT

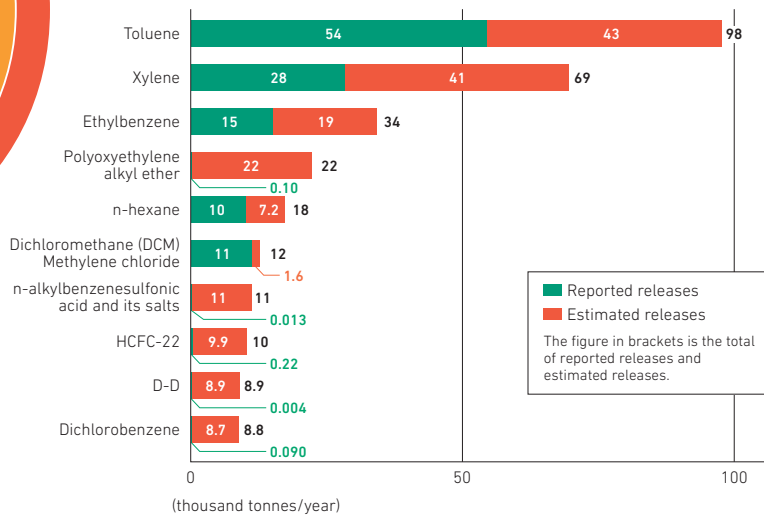
## Breakdown of Reported Releases by industry and Estimated Releases of chemical substances in FY 2014



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. Figures in parentheses are the totals of reported and estimated releases.

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 2014)



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

In March 2016, 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: Drift Ice on Shiretoko

Shiretoko, a national park in Hokkaido, was registered as a World Heritage Site in 2005. The peninsula, untouched and abundant with wildlife, is an excellent example of the interrelationship of marine and terrestrial biodiversity thanks to rich nutrition brought by drift ice. It provides a breeding and wintering area for endangered species such as marine mammals and raptors. Global warming may decrease drift ice in Hokkaido, the southernmost coast that drift ice reaches in the northern hemisphere.



Shiretoko World Heritage Site

# 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 January 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.



Background	The effects of chemical substances in the environment on children's health have not been well documented. That leads to growing concern among parents. ▶ Large-scale epidemiological studies are warranted in order to identify these effects.	
Study protocols	<p><b>Recruitment (3 years)</b></p> <p>FY 2010: Establishment of national and regional organizations and formulation of research protocols                  January 2011: Start of recruitment period (100,000 pregnant women)                  March 2014: Completion of the recruitment</p> <p><b>Follow-up period (13 years)</b></p> <ul style="list-style-type: none"> <li><b>Pregnancy</b> <ul style="list-style-type: none"> <li>- Questionnaire</li> <li>- Collection of maternal blood, urine, and hair samples as well as paternal blood samples</li> </ul> </li> <li><b>At birth</b> <ul style="list-style-type: none"> <li>- Health check of the babies</li> <li>- Collection of cord blood samples</li> </ul> </li> <li><b>One month old</b> <ul style="list-style-type: none"> <li>- Physician's examination and questionnaire</li> <li>- Collection of breast milk and babies' hair samples</li> </ul> </li> <li><b>Until 13th birthday</b> <ul style="list-style-type: none"> <li>- Physician's examination and questionnaire</li> <li>- Collection of children's bio-specimens</li> </ul> </li> </ul> <p><b>Follow-up completes in 2027 / Study concludes in 2032</b></p>	<p>Chemical analysis on bio-specimens                  Long-term storage of bio-specimens</p> <p>↓</p> <p>Multivariate analysis of the environmental factors on children's health including hereditary, lifestyle, and social factors</p> <p>↓</p> <p>Identification of the impact of environmental factors on children's health</p>
Organization	<p><b>Ministry of the Environment (MOE)</b>                  Considers environmental policies incorporating results of the study, and conducts coordination with other ministries as well as on an international level.</p> <p><b>Programme Office (National Institute for Environmental Studies)</b>                  Leads the study, manages the collected data and bio-specimens, and conducts exposure analysis</p> <p><b>Medical Support Center (National Centre for Child Health and Development)</b>                  Provides medical expertise</p> <p><b>Regional Centers (15 universities and institutes)</b>                  Recruit participants and conduct follow-up study (in cooperation with local health care providers)</p> <p>Accreditation from the MOE (April 2011)                  [1] Hokkaido [2] Miyagi [3] Fukushima [4] Chiba [5] Kanagawa [6] Koushin [7] Toyama [8] Aichi [9] Kyoto [10] Osaka [11] Hyogo [12] Tottori [13] Kochi [14] Fukuoka [15] South-Kyushu / Okinawa</p>	
Expected outcomes	<ul style="list-style-type: none"> <li>- Policy development to provide parents with the safe and secure child-raising environment</li> <li>- Development of better strategies for chemical risk assessment and management that considers children's vulnerability</li> </ul>	

## Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2016

Published by Ministry of the Environment  
 Environmental Strategy Division  
 Environmental Policy Bureau

[hakusho@env.go.jp](mailto:hakusho@env.go.jp)  
[www.env.go.jp/en/](http://www.env.go.jp/en/)

Published in September 2016  
 Cover Photo©GYRO PHOTOGRAPHY/a.collectionRF/amanaimages  
 Copyright©2016 Ministry of the Environment, Japan. All rights reserved.