

Kao's approach

Water is essential to Kao's business activities. In manufacturing, water is used not only as a raw material in liquid cleaning products but also for heating, cooling and cleaning purposes. Consumers also need to use water when using our products. Kao has continued to propose products which reduce the amount of water needed for their production and when they are used by consumers. In addition, the water that is used in plants and homes is returned to river and ocean environments as wastewater after receiving wastewater treatment. We are therefore also taking steps including management the water quality of wastewater at our plants, and developing products whose wastewater has less impact on the environment.

Kao's creating value to address social issues

Social issues we are aware of

Water is necessary to life for all plants and animals on Planet. All humans also need access to sustainable sources of sanitary water in order to maintain the whole hearted satisfaction and enrichment. Drought and conflicts over water are already becoming problems in some regions and are predicted to become increasingly severe due to future population growth and global warming.

Kao's creating value

To substantially improve water usage efficiency throughout all stages of product lifecycles, at our plants we set targets and continue to aim for water use reduction. We are also developing water-saving products, which we are rolling out globally, to reduce water consumption during product use.

In addition, we offer additives for concrete and cement enabling construction without harming the environment, particularly as regards construction near water, such as along rivers or coastal areas, in relation to construction of a more resilient infrastructure.

To minimize release of chemical substances into the natural environment, we manage wastewater treatment facilities at our plants using stricter limits than mandated for wastewater quality management. For wastewater after product use, we conduct voluntary risk assessments of chemical substances and use only chemical substances with acceptable risk.

Contributions to the SDGs



Risks and opportunities related to realization of our vision by 2030

Items		Content
Risks	Transitional risk	<p>Enactment of water-related policies and regulatory regimes has the potential to increase our supervisory costs in this area. Investing in better facilities and developing of new technologies to comply with policies and regulations will mean higher equipment and operating costs, which could negatively impact our profitability.</p> <p>In addition, national or regional policies to limit water intake depending on plant locations or increased risk of water sources drying up could cause unscheduled production stoppages and result in lower sales.</p> <p>Examples of possible policy or regulatory restrictions</p> <ul style="list-style-type: none"> • Plant wastewater regulation. • Regulation of use of chemical substances in products. • Product labeling programs for environmental performance or chemical substance content. • Water intake restrictions.
		<p>Risk of profit reduction due to higher operating costs entailed by higher R&D costs for developing water-saving and other products for dealing with water risks.</p> <p>Risk of failing to increase sales if technologies developed do not work out.</p>
		<p>If drought persists at the national or local level, limits on water consumption during product use may be imposed. While this creates opportunities in the form of stronger demand for water-saving products, we face the risk that sales of non-water-saving products may fall.</p> <p>Risk of lower sales if water-saving product technology levels fail to match levels demanded by the market.</p>
		<p>Risk of reputational harm due to insufficient measures or inadequate disclosure for dealing with the above risks.</p>
	Physical risk	<p>Risk that short droughts or flooding due to localized downpours may stop plant operations and make production impossible. Similar conditions at suppliers' plants could make it impossible for us to procure raw materials, with the risk that we could not continue manufacturing products. There is also the risk that supply chains, from suppliers to our plants, and from our plants to our customers, could be interrupted. These risks, meaning that we could no longer supply our products to the market, would negatively impact sales, and if such risks actually materialized, would require special measures at additional cost, thus reducing our profits. In addition, damage to infrastructure due to widespread flooding would severely affect consumers' lives and reduce consumption activity, which carries the risk of lower sales for us.</p>
		<p>In the case of our plants or suppliers located in areas where severe drought may occur, there is a risk that we may not be able to increase production necessary for future growth. There is also the risk that sales of water-using products may decline in these areas.</p>
Opportunities	Resource efficiency	Continuing to reduce water use at our plants reduces operating costs for manufacturing products and is an opportunity to increase profits.
	Products, services	Our product development system centers on interface control technology. Interface control literally means controlling how substances mix with each other. This technology enables us to continue developing water-related products, for example, detergents that rinse readily or cement that does not readily mix with water, thus enabling us to respond appropriately to market changes.
	Markets	<p>If restrictions on water use materialize after a disaster due to flooding or downpours, the spotlight will be on water-saving products, presenting an opportunity to increase sales.</p> <p>Construction of a more resilient infrastructure is also an opportunity to boost demand for concrete and cement additives essential for construction work.</p>
	Resilience	<p>Continuing to reduce water use at our plants and require suppliers to implement water risk surveys help improve our resilience with regard to water issues in manufacturing our products.</p> <p>We have been offering advice to consumers for over 60 years, and thanks to a database built up over 40-plus years, we can forecast consumer trends and propose new products, an activity necessary for improving the resilience of our business.</p>

Policies

We at Kao are working together with our business partners and consumers to introduce and develop technologies to conserve water and water quality at each stage of the product lifecycle.

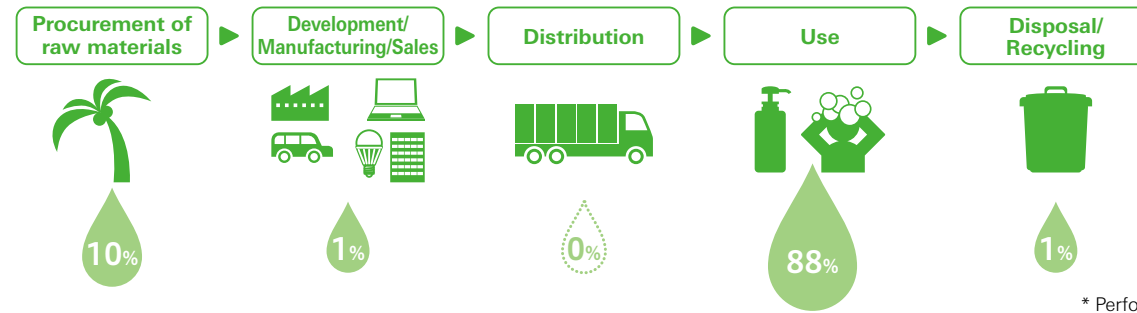
In the product lifecycle, the usage stage accounts for the largest ratio of water consumption at 88%. As with CO₂ emissions, in 2009 we announced in the Kao Environmental Statement our commitment to contribute to environmental conservation at all stages of the product lifecycle.

Water used at the raw materials procurement stage, which accounts for 10% of total lifecycle water consumption, represents water used at suppliers' plants. For this reason, making efforts together with our suppliers is vital.

The ratio of water used in the development, manufacturing and sales stages is small at 1%, but our plants still have some impact on the communities in which they are located. Each of our plants currently sets water conservation targets and conducts activities accordingly. We also set stricter limits than mandated for wastewater quality management.

We offer products whose wastewater from product use has small impact at the disposal stage to reduce the environmental impact of household wastewater and help prevent water quality contamination.

Ratio of water consumed at each stage of Kao Products' lifecycle



* Performance in 2018

Efforts with suppliers

Among our principal suppliers with high water risks, we conduct surveys and evaluate suppliers' water use and water management activities through our CDP Supply Chain Program. These surveys also represent an opportunity to promote suppliers' water management. We also assess these suppliers' plant water risks using tools such as Aqueduct from the WRI* and endeavor to get an idea of future risks.

* WRI

World Resources Institute.

A U.S.-based policy center that researches problems related to natural resources and the environment and conducts activities together with government and private groups and environmental experts.

Efforts at plants

At our plants, we use water as a product ingredient as well as to clean and cool equipment. We set targets to reduce water consumption at each plant and are working to reduce consumption and increase recycling based on the 3R's (reduce, reuse and recycling).

We are also installing wastewater treatment technologies. Our Wakayama Plant in Japan has conducted a demonstration experiment of industrial wastewater treatment technology, that uses tubifex worms developed by the Industrial Technology Center of Wakayama Prefecture. It was verified that the technology can reduce pollutants emitted from a treatment center by as much as 80%. We also seek out external technologies to introduce in our plants and are working to reduce waste materials and cut costs.

Survey of water risks

We regularly conduct water risk assessments at plants using the WRI's Aqueduct tool and internal information. When opening new plants, we also examine the long-term feasibility of using the water resources and the wastewater impacts.

Initiatives to prevent water pollution

We have installed and conduct high-level maintenance and management of wastewater treatment facilities at many plants. After properly treating plant wastewater, it is discharged outside the plant. We monitor the quality of the discharged water based on laws and regulations as well as agreements with nearby local governments.

Surveys of ground and soil contamination

In light of our past history of chemical substance use, every year we voluntarily measure the levels of substances regulated by environmental standards in the groundwater within plant premises.

Compliance with environmental legislation

We manage facilities and operate pollution prevention control systems to comply with various environmental laws and regulations, including for plant wastewater and waste. We conduct high-level maintenance and management to comply with regulations that are becoming more rigorous year after year.

Efforts in products

We are actively working to develop easily rinsed products that reduce the amount of water needed during product use.

We are working to develop products whose wastewater after product use has small impact on water environments. In addition, we are conducting surveys and research on river contamination in cooperation with experts and industry associations.

Framework

Risk management is carried out by the Internal Control Committee and opportunity management is carried out by the ESG Committee, under the supervision of the Board of Directors. These committees are headed by the President and CEO.

The Responsible Care Promotion Committee, which manages policy/regulatory regime and technology risks, and the Risk and Crisis Management Committee, which manages market, reputational and acute risks, are under the Internal Control Committee. These committees are headed by the executive officer in charge of the Corporate Strategy.

The Responsible Care Promotion Committee of Corporate Strategy Division acts as the Responsible Care Promotion Committee Secretariat while the Crisis Management Department of Corporate Strategy Division acts as the Risk and Crisis Management Committee Secretariat.

The Responsible Care Promotion Committee meets twice a year to report on and discuss compliance with laws and regulations, status of water use reduction and other matters. It also sets targets for the following year. The Responsible Care Promotion Committee conducts monthly checks on compliance with laws and regulations, monitors water use, mainly at plants which have a large impact on water issues, and keeps abreast of the amount of chemical substances in wastewater, reporting on these and other matters to the head of the committee, committee members, members of the Internal Control Committee, auditors and others. The Risk and Crisis Management Committee which manages natural

disaster and reputational risks, meets four times a year.

The Internal Control Committee meets one or more times a year, receiving activity reports from the Responsible Care Promotion Committee and the Risk and Crisis Management Committee which it oversees and auditing the activities of the two committees.

Opportunity management relating to water issues is handled by the ESG Committee, which meets four times a year. Committee members are the persons in charge of the business, sales, R&D, SCM and other divisions, an arrangement which connects divisions horizontally. The Internal Control Committee, and the ESG Committee which it supervises, discuss water and environmental issues as well as social and governance issues. The committee reports on its activities to the Board of Directors one or more times a year and is audited by the Board of Directors.

The risk and opportunity management system for water resources is the same as the management system for climate change.



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Collaboration with stakeholders

- We participate in the Water Project sponsored by Japan's Ministry of the Environment, to help the public understand the importance of water and water conservation and develop ideas for how individuals can help save water.
- The water conservation campaign that we continue to conduct in cooperation with the Chinese government was held for the seventh consecutive year in 2018. We expanded the areas of activity and conducted awareness-raising for water conservation at 64 universities in China's northwestern region in this year's campaign.
- We participate in the CDP Supply Chain Program and work together with CDP to survey and gather information about water consumption and management conditions at suppliers with high water risks.



Speech at the China water conservation campaign

Mid- to long-term targets and performance

2020 mid-term target

We set the 2020 reduction targets for water consumption for all Kao Group sites in 2013 and have aimed to achieve a 1% reduction each year.

We set the 2020 reduction targets for water consumption during the product use stage for the Kao Group in Japan in 2009.

Targets for water consumption

Index	Scope	2018 targets	2019 targets	2020 targets
Water consumption	All Kao Group sites	39% reduction	39% reduction	40% reduction
	During consumer product use for the Kao Group in Japan	—	—	30% reduction

Anticipated benefits from achieving Mid- to long-term targets

Cost reductions or profit increase

Achieving water consumption targets for all Kao Group sites will contribute to lowering operational costs and to improving earnings. For achieving water consumption targets during product use, we must increase sales of water-saving products, and reaching this target can help increase sales.

Effects on society

Achieving the above targets will contribute to sustainable availability or supply of fresh water in areas where our sites are located and can have a positive effect on conserving water-related ecosystems.

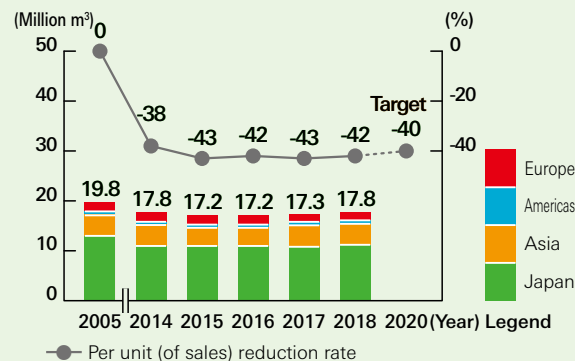
2030 long-term target

Item	Scope	2030 targets
Water consumption (per unit of sales)	All Kao Group sites	Reduce by 45% (2005 baseline)
	Overall Kao Group product lifecycles	Reduce by 10% (2017 baseline)
	Overall Kao Group product lifecycles in drought areas	Reduce by 40% (2017 baseline)

Performance in 2018

Performance*

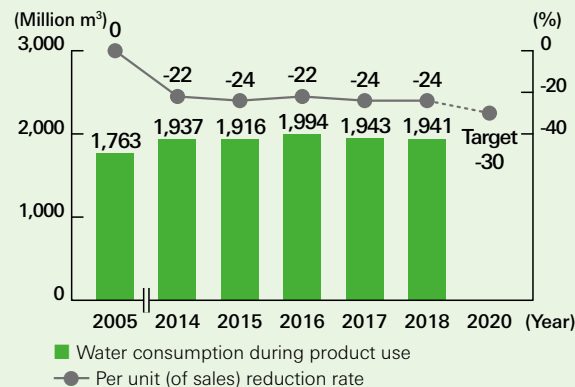
Water consumption (withdrawal) (all sites)



* Boundary: Through 2014, all Kao Group production sites as well as non-production sites within Japan. For 2015, includes some non-production sites outside Japan, and from 2016 onwards, includes all non-production sites outside Japan.

* Assurance provided for water consumption (withdrawal).

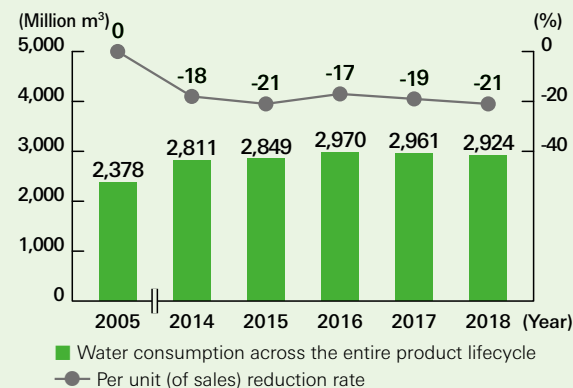
Water consumption during product use (Kao Group in Japan)



* Water consumption during product use is calculated by multiplying the water consumption per unit of a product, mainly for consumer products in Japan, by the annual sales quantity of the product, and then adding all the results for these products together.

* Assurance provided for water consumption and per unit (of sales) reduction rates.

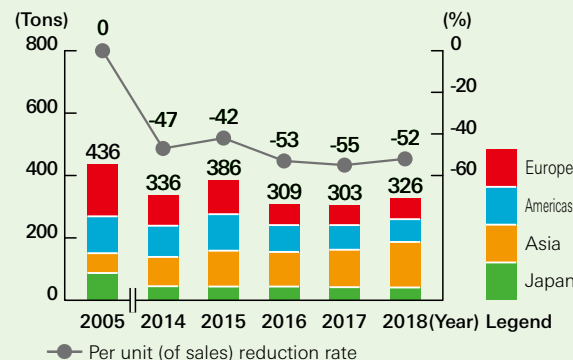
Water consumption across the entire product lifecycle (Kao Group)



* "Water consumption across the entire product lifecycle" is calculated as the combined total for the amount of lifecycle water consumption of individual products sold within and outside Japan, multiplied by their annual sales quantity. Among the lifecycle, the estimated water consumption during the manufacturing and distribution processes is substituted by the actual use during these processes. This amount includes water used for procurement in regard to chemical products but does not include water used in the use and disposal of such products.

* Assurance provided for water consumption and per unit (of sales) reduction rates.

COD pollution load (all production sites)



* The amount of COD pollution load for wastewater entering sewer systems takes into account the removal rate from sewer systems.

* Assurance provided for COD pollution load.

* Per unit of sales is calculated based on Japanese standards up to fiscal 2015, and on International Financial Reporting Standards (IFRS) from fiscal 2016.

Water withdrawal amount by source (Million m³)*

	2016	2017	2018
Surface water	0	0	0
Brackish water/seawater	0	0	0
Rainwater	0	0	0
Groundwater (renewable)	4.9	5.1	5.3
Groundwater (not renewable)	0	0	0
Oil-contaminated water/process water	0	0	0
City water	12.3	12.2	12.5
Wastewater from other organizations	0.1	0.03	0.02

Wastewater discharge by destination (Million m³)*

	2016	2017	2018
Rivers/lakes	2.1	2.3	2.4
Brackish water/seawater	6.0	5.8	6.4
Groundwater	0	0	0
Sewage system	2.7	2.8	2.8
Wastewater to other organizations	0	0	0
Total	10.8	10.9	11.5

* Boundary: All Kao Group sites

Reviews of performance

Our water consumption (all sites) came to 17.8 million m³, deteriorated by one point from the per unit of sales-based reduction rate over the previous year to 42%. We achieved our 2019 and 2020 targets, continuing from the previous year. Water consumption at manufacturing sites with water intake risks came to 3.1 million m³. Our water consumption across the entire product lifecycle (Kao Group) decreased by 37 million m³, which contributed to the improvement of the per unit reduction rate (sales-base) by two points to 21% reduction. Water consumption during product use also decreased by one million m³, while the per unit reduction rate stayed at the same level as the previous year at 24% reduction. Our COD pollution load increased by 23 tons over the previous year, deteriorated by three points in the per unit of sales-based reduction rate.

The challenge is to reduce water consumption during the use stage. We are working to further expand our water-saving products.

Our initiatives

Efforts in raw materials procurement

We participate in the CDP Supply Chain Program in 2015 and encourage suppliers in high water risk sectors to work on improving their water management standards. For example, we ask suppliers to cooperate in surveying and confirming their water consumption and water management conditions. Since 2017 we have been assessing water management conditions based on suppliers' responses and providing them with feedback about the results.

Efforts in development, manufacturing and sales

We use water as a product ingredient as well as to clean and cool equipment at our plants. We set targets to reduce water consumption at each plant and are working to reduce consumption and increase recycling based on the 3Rs (reduce, reuse and recycling).

Reduce

Multiple plants including Kao Chemicals GmbH in Germany conduct efforts to increase the number of times that water is reused for boilers and for cooling to reduce their water consumption.

Reuse

Rainwater is collected and used to water green spaces at the Sumida Office, Kao Chemical Corporation Shanghai and Fatty Chemical (Malaysia).

Recycle

Active recycling efforts, such as recovering steam and treating and reusing water that has been used in production processes, are being carried out at many plants.

Examples of 3R activities

Company name	Description of activity
Kao Chemical Corporation Shanghai	Reduces its water consumption for the manufacturing of some products by reusing water from reaction processes of other products.
Kao Vietnam	Introduced a spray technique for washing and sanitizing tanks, resulting in reducing its use of water and steam.
Kao Industrial (Thailand)	Returns cooling water overflow to a cooling water pool to help eliminate unnecessary water consumption.
Quimi-kao S.A. de C.V. (Mexico)	Concluded an agreement with the local community to receive treated water from the community's wastewater treatment plant. Reverse osmosis is employed to use sewerage effectively, and Quimikao further purifies the treated water it has purchased and releases water left over from production into a river through the community's facility, thus contributing to local water recycling.

Surveys of groundwater and soil contamination

The Wakayama Plant, Sumida Office, Sakata Plant, Kawasaki Plant, Tochigi Plant and Odawara Office have independently conducted groundwater and soil contamination surveys and confirmed that all measurement indicators are below the quantifiable lower limit.

Compliance with environmental legislation

In 2018, there were four incidents of violations of environmental laws and regulations, resulting in fines of 644,000 yen. At the Kashima plant, there was one incident of rainwater discharge exceeding COD limits while at Kao Specialties Americas, there were two incidents of wastewater discharge into sewage system exceeding BOD limits and one incident of ethyl methyl ketone discharge, none of which resulted in fines. Kao Corporation (Spain) paid a fine of 5,001 euros for a violation of storage standards for hazardous waste materials in 2016.

Compliance status with environmental laws and regulations

Category	Unit	2016	2017	2018
Number of violations*1	incidents	3	11	4
Of which, number of leaks	incidents	0	0	1
Total fines*2	1,000 yen	2,590	699	644
Of which, number of leaks	1,000 yen	0	0	0

*1 All incidents detected by authorities during the reporting period.

*2 Fines paid during the reporting period.

Efforts during use

Efforts in the Consumer Products Business

We are conducting a wide range of efforts, as water consumption in the use stage accounts for almost all water consumption across the entire lifecycle. Our leading efforts are offering water-saving products and communicating how to use them.

Since launching *Attack Neo* laundry detergent, which requires only one rinse cycle, in Japan in 2009, we have expanded the supply areas. Currently we provide such water-saving laundry detergent in Taiwan, Singapore and Australia.

We offer *Merit Shampoo*, which since 2010 has been able to reduce the amount of water required for rinsing by 20% over the existing product, *CuCute* dishwashing detergent, which since 2014 has been able to reduce the amount of water required for rinsing by 20%, and *Bath Magiclean* bathroom cleaning liquid, which since 2015 has been able to reduce the amount of water required for rinsing by 10%.

We also communicate ways to save water to consumers using a variety of approaches. For example, we have developed eco shampoo techniques to use less water when shampooing hair, and we communicate these to consumers. Communicating ways to conserve water while offering water-saving products truly embodies “eco together,” the slogan of the Kao Environmental Statement.



Eco shampoo techniques to use less water when shampooing hair.

Efforts in the Chemicals Business

Visco Top is a cement additive in the Chemical Business that can prevent cement from dispersing into surrounding rivers, seas and other water sources when used in construction projects taking place near water. *Visco Top* is also being used in work to remove contaminated water at the Fukushima Daiichi Nuclear Power Plant.



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Efforts for wastewater after product use

In product development, we incorporate considerations for impacts on the water environments of discharged water after product use. More specifically, we have investigated the biodegradability of raw materials that may be discharged into the environment and their impacts on common aquatic organisms using river water and activated sludge used at wastewater treatment plants. Through this investigation, we are actively promoting the development and use of raw materials with reduced environmental impact. We also plan to use AI and other technologies to investigate chemical substances with high environmental compatibility.

In addition, we are focusing on understanding the situation of water environments after product use and we are conducting our own field surveys on an ongoing basis, such as environmental monitoring of river water to get an idea of the bio risks of chemical substances. To respond to globalization, we are conducting monitoring and working with experts to develop mathematical models that predict the concentration of chemical substances in rivers, aiming to conduct business with consideration for the local environment in countries outside Japan.

Furthermore, cooperating with the Japan Soap and Detergent Association (JSDA), we have conducted environmental monitoring of four major surfactants in urban river systems (7 sites from 4 rivers, 4 measurements/year) for the past 20 years in order to assess environmental risk on aquatic ecosystems. In the surveys conducted so far, the results show that these surfactants have consistently low risks to aquatic organisms.