



Water resources



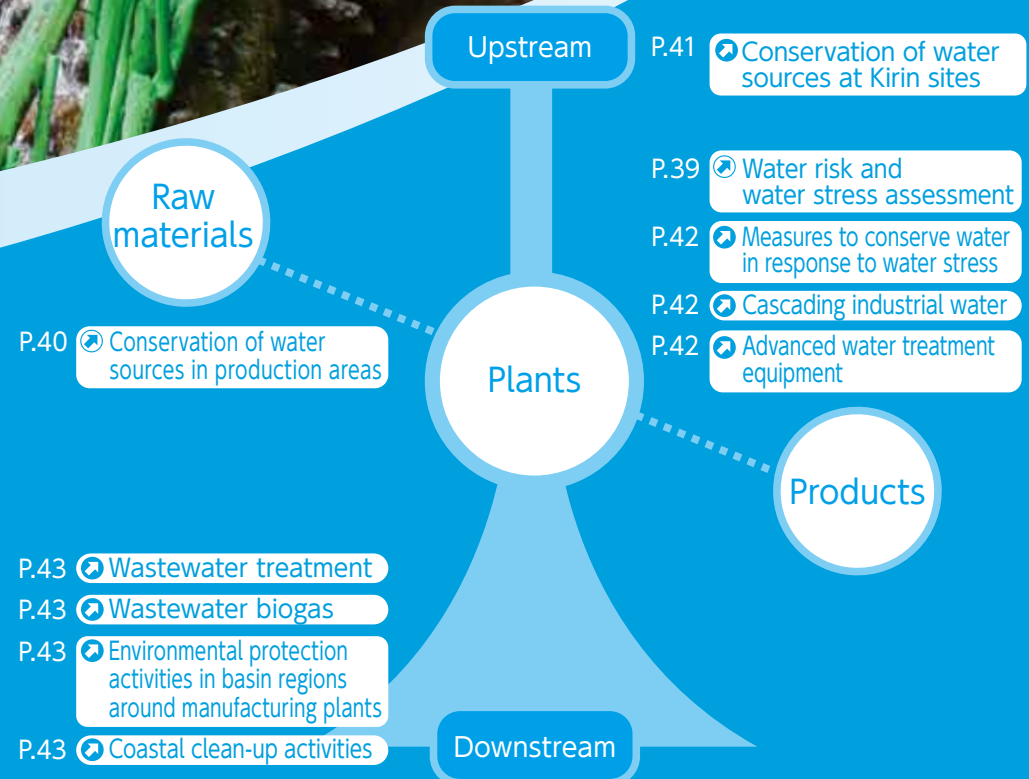
Background to Initiatives

Water is not only a basic raw material for the Kirin Group, but is also an indispensable resource for cleaning our production facilities, etc. It is also an essential resource for the growth of agricultural products that are our ingredients. On the other hand, the Kirin Group, which has large businesses in both Japan, where water stress is low, and Australia, which has experienced severe water shortages many times in the past, has been empirically aware from early on that water risks and water stress vary greatly between countries and regions. As early as 2014, we began conducting water risk surveys at our business sites and areas where we source our agricultural raw materials. Since then, we have been conducting such surveys on a regular basis. Scenario analysis conducted based on the TCFD recommendations further clarifies the seriousness of the impact of climate change on water. Against this backdrop, the Kirin Group will take appropriate measures tailored to the circumstances of each region.

We will create together

A society that values sustainable water resources

- Bring water, used as a raw material, to a sustainable state
- Solve issues with water in a way that suits the characteristics of basin regions where our business bases are located



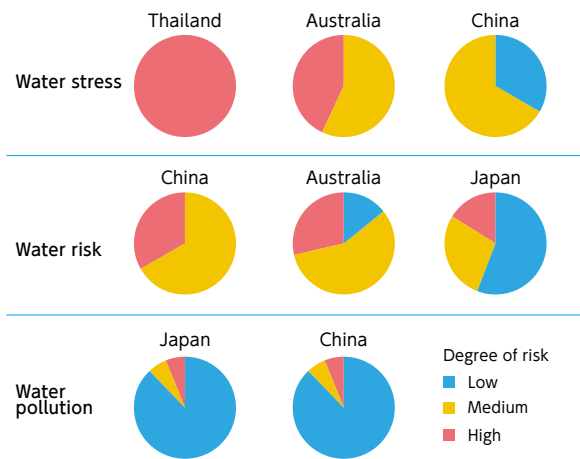
Points

- Among Sri Lanka's tea farms, we have conserved water sources at 13 locations, far exceeding our target of 5 by the end of 2020.
- We participated in the Corporate Engagement Program sponsored by the Science Based Targets Network to develop scientific approaches and rules for setting targets related to water resources.
- In our third group-wide water risk survey, we reaffirmed that water stress is high in Australia and Thailand, and that water risk is high in Australia.

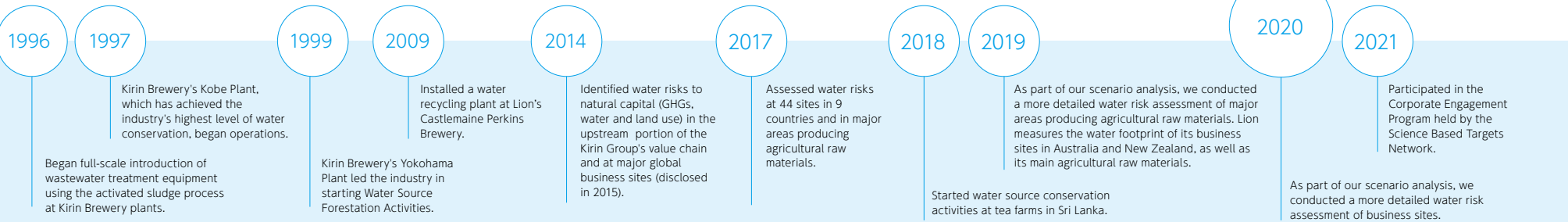
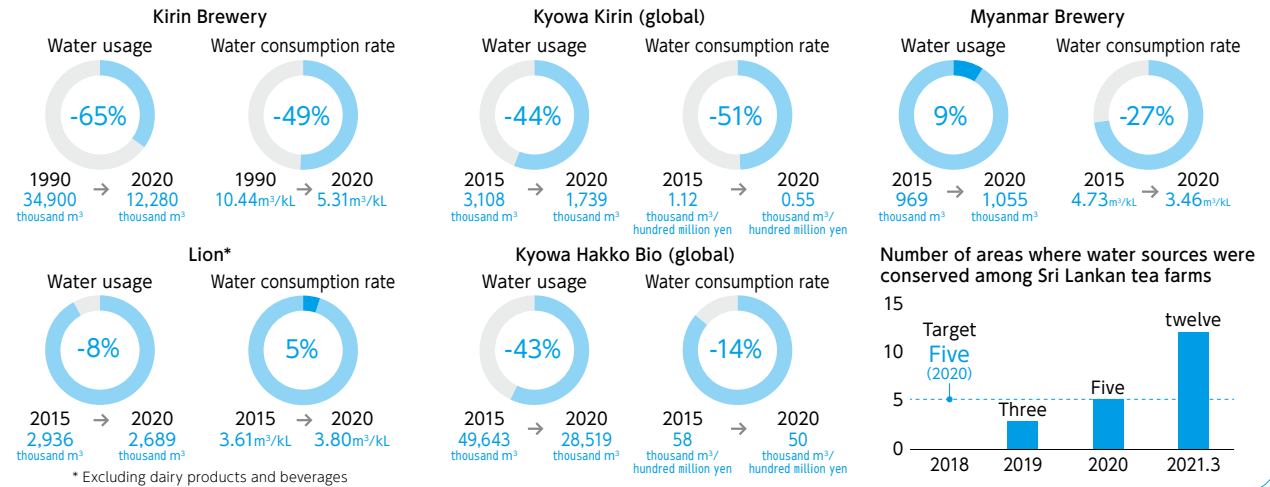
Overview of initiatives

Initiative	Issue	Progress
Initiatives to achieve our vision	Risk assessment	We conducted our third group-wide water risk survey from 2020 to 2021. Lion has also identified its water footprint.
	Rulemaking	Participated in the Corporate Engagement Program held by the Science Based Targets Network.
Bring water, used as a raw material, to a sustainable state	Kirin Brewery	Compared with 1990, we had reduced our unit water consumption by 49% and water use by 65% in 2020.
	Lion	Compared with 2015, Lion had increased its unit water consumption by 5% and reduced its water use by 8% in 2020.
	Myanmar Brewery	Compared with 2015, Myanmar Brewery had reduced its unit water consumption by 27% and increased its water use by 9% in 2020.
	Kyowa Kirin (global)	Compared with 2015, Kyowa Kirin had reduced its unit water consumption by 51% and water use by 44% in 2020.
	Kyowa Hako Bio (global)	Compared with 2015, Kyowa Hako Bio had reduced its unit water consumption by 14% and water use by 43% in 2020.
Solve issues with water in a way that suits the characteristics of basin regions where our business bases are located	Domestic water source forestation	In 2020, we suspended our activities as a result of the spread of COVID-19. In 2019, 1,192 people participated at 12 locations nationwide.
	Value chain upstream	We had engaged in water source conservation activities at Sri Lankan tea farms in 13 locations through the end of 2020, since commencing these activities in 2018. We will continue these activities after 2021.
	Response to torrential rain	In response to disruptions to logistics networks caused by the 2018 West Japan Torrential Rain Disaster, we prepared a manual for responding to similar disasters. In 2019, we successfully minimized the impact of Typhoon Faxai and Typhoon Hagibis.

Risk assessment of water resources



Progress





Water risk and water stress assessment

Results of water risk and water stress surveys

In 2020, we conducted water risk and water stress surveys, and found that business sites in Australia and Thailand have low water use, but use water from areas with a high risk of drought. We also found that in Japan, water use is high, but we use water from basins with a relatively low risk of drought. In terms of flood risk, we found that although production volume is smaller than in Japan, there is a high possibility that Australia will suffer from flood damage, which could significantly affect production. Based on these assessments, we are promoting water-saving activities in response to water stress, the development of BCPs tailored to water risks, etc.

Different water risks and stresses in different countries and regions

The Kirin Group has experienced large-scale droughts many times in Australia, an important business region, and has been empirically aware from many years ago that water issues vary greatly between countries and regions, and that action must be tailored to each situation.

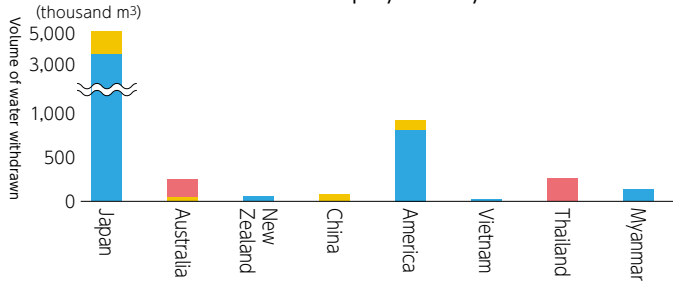
To confirm this, in 2014 the Kirin Group surveyed water risks and water stress at a total of 35 sites in six countries. We scientifically confirmed that water stress was high in Australia. We have since conducted water stress and water risk surveys every few years, including expanding the scope of the survey to nine countries and a total of 44 business sites in 2017. In surveys in 2014 and 2017, we estimated the water use of agricultural raw materials in the upstream of our value chain.

In 2020, we surveyed and assessed 45 production sites in Japan, Australia, New Zealand, China, the United States, Vietnam, Thailand, and Myanmar. In the survey, after we used WRI Aqueduct to simplify the survey, we made assessments based on factors such as hazard maps and other information published by administrations, as necessary, as well as interviews with all operating companies.

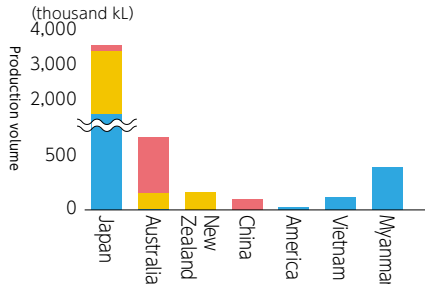
Graph 1 shows the total amount of water used at Kirin Group business sites by country. We divide the amount of water used into three colors according to the level of water stress. Graph 2 shows the Kirin Group's total production volume in the alcoholic and non-alcoholic beverages businesses, and Graph 3 shows the total production volume in businesses other than alcoholic and non-alcoholic beverages by country. We use different colors to show the production volume in three stages according to the level of water risks. Graph 4 shows the overall results of the water risk survey.

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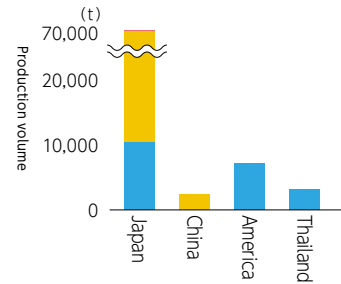
1 Water withdrawn of entire Group by country and water stress



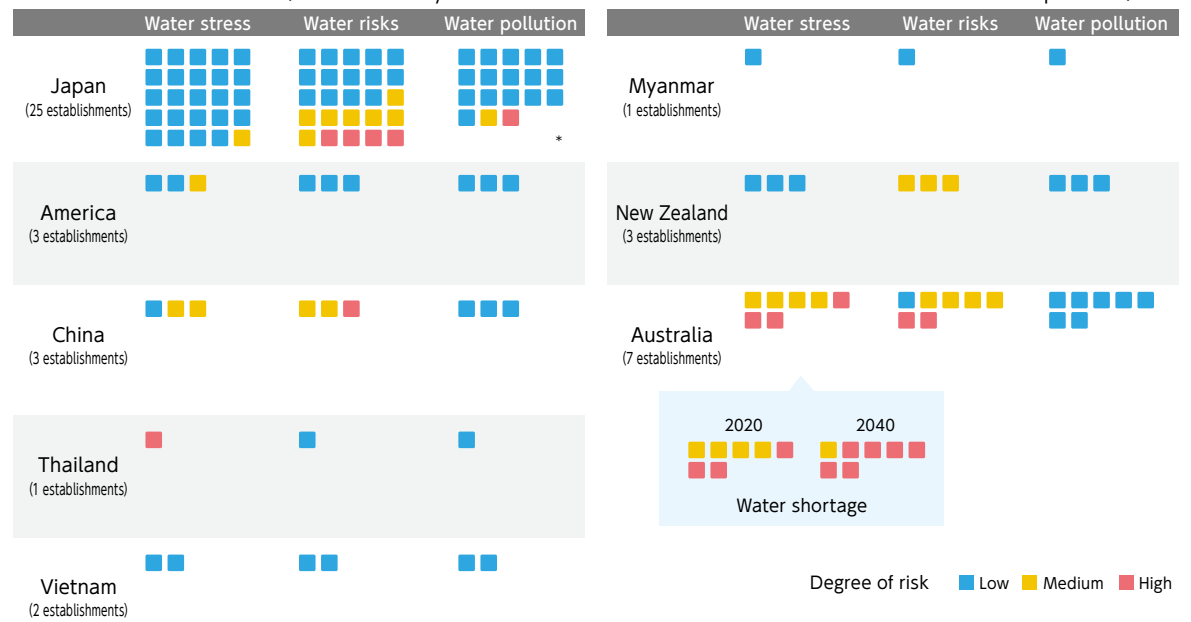
2 Production volume and water risks in alcoholic and non-alcoholic beverages businesses by country



3 Production volume and water risks in businesses other than the alcoholic and non-alcoholic beverages businesses by country



4 Site water risk assessment (results of surveys from 2020 for water stress and water risks and 2017 for water pollution)



* The results of the water pollution survey are from 2017, and the number of business sites differs from the present.



Conservation of water sources in production areas

Solving water resource issues in the upstream of the value chain

As a first step in solving water issues in areas where we source our agricultural products in the upstream of our value chain, the Kirin Group began water source conservation activities at Sri Lankan tea farms in 2018, and by the end of 2020, we had conserved water sources in 13 locations, far exceeding our target of 5. We have provided group training to 1,750 people living near water sources in order to support understanding of the necessity of conserving water sources. In addition, we have distributed pamphlets on water conservation and basin protection to 15,000 residents as part of measures to raise awareness.

Conservation activities for water sources on tea farms

In a 2017 assessment of water risks in the value chain and scenario analysis in 2019, it was evident that climate change will cause water stress and flood risks to increase in areas producing agricultural raw materials in the future. It is not easy to respond to water resource issues in the upstream of the value chain. Therefore, the Kirin Group decided to start addressing this issue with Sri Lanka, where we have been providing assistance for obtaining sustainable tea farm certification, and where we have developed strong partnerships with local tea farms and NGOs. As such, we are working to accumulate knowledge in this area.

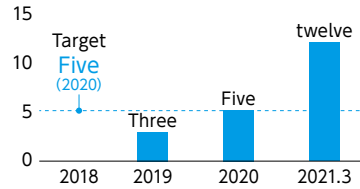
At the tea farms in the Sri Lankan highlands, there are many areas with tea trees on steep slopes.



Tea bushes planted on steep slopes

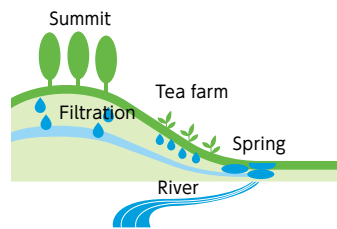
In such places, it is said that the level of water recharge is not high because even if it rains, the rainwater flows down the slope. In places with good conditions such as strata, however, there are places where rainwater penetrates into the ground and gushes out as many springs in certain places in tea farms. These places are known as micro watersheds. Micro watersheds on tea farms can be found in the highlands of central Sri Lanka, and, in almost all cases, they are headstreams of rivers flowing through coastal cities. For this reason, while they occupy only a tiny area, they are very

Number of areas where water sources were conserved among Sri Lankan tea farms



A stream in a tea farm

Mechanism of micro watersheds



A fenced off micro watershed

precious water sources.

As part of its yearly efforts to engage with local farms managers, the Sri Lankan government went as far as mapping micro watersheds in order to support understanding of their importance and make them easier to conserve and manage. We learned that these efforts were held up owing to a lack of funds. Therefore, in order to further enhance the sustainability of tea farms whose acquisition of certification we supported and the surrounding areas, we began activities to conserve water sources at farms in 2018.

These activities involve fencing off micro watersheds so that they are not used for other purposes, and planting unique regional native species around them. This provides a diversity of vegetation at tea farms, which have a single crop, and prevents soil from flowing down the mountain slope into water sources as a result of torrential rain, etc.

Education programs to teach the value of water

Owing to the history of large Sri Lankan tea farms, going back to when the plantations were first established under British colonial rule, many people still live on the vast tea farms who make a

living by doing work that has nothing do with the tea farms themselves. These residents have been generally allowed to use empty plots that are not being used to grow tea for their living. For this reason, there have been cases in which these residents, not recognizing the micro watersheds as water sources, have converted those areas to vegetable patches or grazing pasture, or have cut down the trees around the watersheds for firewood. In order to protect the water sources, instead of merely fencing off the micro watersheds to keep the tea farms' residents away, there is a need to educate them that those areas are water sources that we should protect.

In this initiative, we are conducting an education program to teach residents living near target water sources about such matters as the importance of water and the functions of micro watersheds. At some farms, we are also working to incorporate our educational programs as part of the curriculums of day care centers and elementary schools attended by the children of tea pickers, etc.



Flyer for water education

Target number of residents to educate about the importance of water



15,000 (2020)

Contribution to water-efficient agriculture

The bag-type culture technology that Kirin has developed for the practical application of mass plant propagation technology is expected to be used in water-efficient agriculture. With the resin film-based bag-type culture vessel system, we allow plants to grow by aerating a solution containing nutrients necessary for plant growth inside a small bag, making it easier to use water more effectively than in soil cultivation. This system may have applications in cultivation in dry areas, for example.

[More information on mass plant propagation technology→P.34](#)

Conservation of Kirin water sources

Activities to protect the blessings of water

Our Water Source Forestation Activities, which we started as an activity to protect the water sources of our production plants, began in the forest of the Tanzawa district of Kanagawa Prefecture, which is the water source for Kirin Brewery's Yokohama Plant in 1999. We have since adopted this initiative, which was a pioneering initiative in the industry, in 11 locations across Japan. Under medium and long-term agreements with the local governments and other relevant parties that manage the water source forests, the program includes tree planting, undergrowth cutting, pruning, and thinning. Today, many of the forests are bright, luxuriant forests. In some locations, some of our customers have volunteered to take part in the activities. In 2019, 1,192 people participated in a total of 15 activities, but starting in 2020, we ceased our activities in most locations in response to the COVID-19 pandemic.

In the "Aso Area Grassland Regeneration Project Aimed at 'World Cultural Heritage' Status," we are providing "support for the resumption of open burning" to preserve the grassland landscape of Aso. These activities are part of the support that we provide based on the comprehensive tri-party support agreement related to the *Kirin KIZUNA Relief-Support Project* concluded between Kumamoto Prefecture, the Nippon Foundation, and the Kirin Group in 2018, with the aim of achieving a creative recovery from the 2016 Kumamoto Earthquake. Preserving the vast grasslands of Aso, which recharge large amounts of groundwater, will help protect the water that we use as a raw material at our Yatsushiro Plant. In 2019, 12 people from Mercian's Yatsushiro Plant participated in this activity.



Kirin Kiso-river water source forest



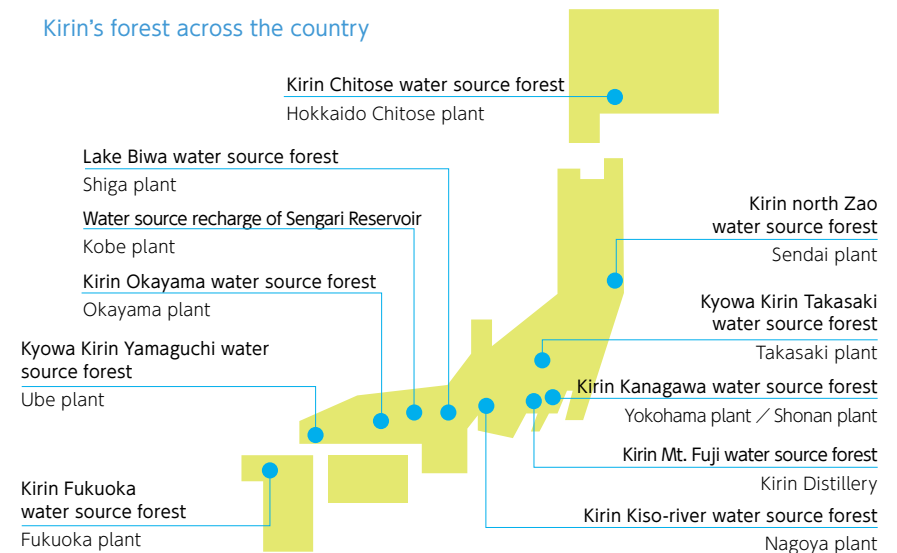
Support for the resumption of open burning

Voice of Stakeholder

Forest creation consists of planting, protection and nurturing, and taking advantage of resources. Teaching people who live in cities about forests through cutting work, and giving them hands-on experiences of making things from the thinned wood - all of these things lead to forest creation. We work with the Kirin Group on the Water and Forests Classroom, a reader-participation activity sponsored by Randonnée magazine, and other activities. With the aim of forest creation that anyone can participate in, we will continue to cooperate with the Kirin Group in the pursuit of our activities.

Tsuchi ni Kaeru Ki Forestation Society (NPO)

Kirin's forest across the country



Water Source Forestation Activities actual results* (2019)

Number of implementations	Number of participants	Locations
15	1,192	11

* In response to the COVID-19 pandemic, we suspended activities in all locations in 2020, and therefore the results for 2019 are shown here.

Production

Measures to conserve water in response to water stress

Reducing the amount of water we use in our plants is a major issue. The Kirin Group has pursued water conservation through recycling and other means, in addition to initiatives based on using water only when and as much as needed.

Focusing on water stress in the basin regions around our plants, we are installing and operating water-saving equipment according to the level of water stress.



CIP equipment



External washer

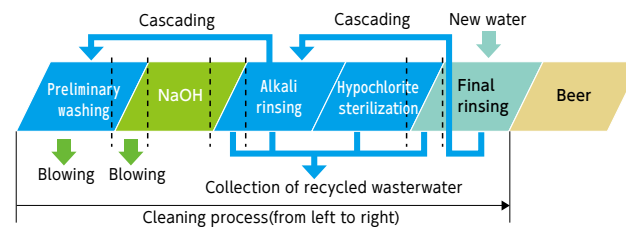
Cascading industrial water

In plants, much of our water usage is for washing and sterilizing processes for equipment and pipes. In addition to establishing frameworks and mechanisms to confirm and assure the washing, from a quality perspective, we also strictly control water flow rate and velocity to ensure that we do not waste water. We also actively pursue the re-use of water, depending on the purpose.

For example, the rinsing water that we use in the final step of the pipe and equipment washing process is still relatively clear, so we can use it again for the initial process of pipe washing. In this way, we have implemented a cascading system of water use in which we repeatedly use water that we have previously used in washing, according to the quality of the water. In actuality, considerable knowledge on how to use equipments is necessary to guarantee that we are properly washing the equipment and pipes, such as achieving the right balance of the amount of water we can recover and the amount of water we can use, as well as the timing of recovery and use.

The Kirin Group is achieving a high level of water conservation by sharing and accumulating various different types of expertise.

Cascading rinse water for washing tanks



Advanced water treatment equipment

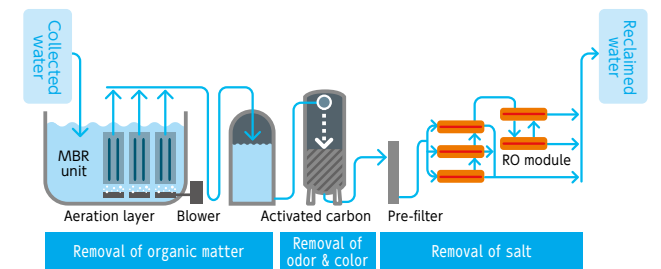
Lion is committed to exploring innovative ways to improve water management within the communities it operates.

In 2009, Lion commissioned a water recycling plant for its Castlemaine Perkins Brewery – setting out to halve the water used in brewing their classic brand, XXXX Gold.

The two main uses for water in brewing are water used in making the beer itself – plus water used in the brewing process, which is used in non-product related processes, such as cleaning, cooling, and pasteurizing. In 2009, Lion partnered with the Queensland Government to install a reverse osmosis plant, to recover waste water and minimize our reliance on mains-fed town water. In 2019, the plant generated more than 240 million liters, the equivalent of 96 Olympic-sized swimming pools. On average the brewery recycled approximately 4.7 million liters of water per week in 2019. Vivality, the plant enables Lion to produce XXXX Gold at a ratio of 2.5 liters of water for every liter of beer produced – which is approaching world class levels of water efficiency.

Lion is sharing this technology within the Kirin Group, and we are now using it at Kirin Brewery's Kobe Plant.

Flow of sophisticated water processing facility at the Kobe Plant



Wastewater

Wastewater treatment

It is our obligation as a company that uses water as a raw material to ensure that we return our wastewater to nature in pristine condition. In the Kirin Group, we purify the water that we have finished using to voluntary standards that are stricter than those required by law, before we release it into rivers and sewers.

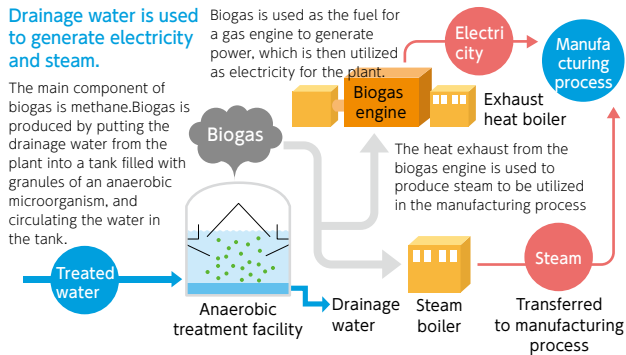
[More information on wastewater volume→P.98](#)

[More information on wastewater quality→P.105](#)

Wastewater biogas

In our breweries, we have introduced anaerobic treatment facilities to purify the wastewater generated by the production process. Unlike conventional aerobic treatment, anaerobic treatment does not require electricity for aeration. Also, the anaerobic microorganisms generate biogas as a by-product of the treatment process. This biogas, the main component of which is methane, can be utilized in biogas boilers and cogeneration systems. Derived from plant-based raw materials such as malt, biogas is a renewable energy and a CO₂-free fuel.

Anaerobic treatment mechanism



Environmental protection activities in basin regions around production plants

At the various production plants of the Kirin Group, we are conducting a range of environmental protection activities, particularly riverside clean-up activities in cooperation with local governments and NGOs. The Kirin Brewery's Yokohama Plant, in cooperation with an NPO, Tsurumi River Basin Networking, continues to conduct beautification campaigns at nearby Tsurumi River, Living Species Observation Events, and other events.

Kirin Brewery, Kirin Beverage, Mercian, Kyowa Kirin, and Koivai Dairy Products are also engaged in local environmental beautification and environmental protection activities, focusing on the rivers they draw water from and other nearby rivers.

In response to the COVID-19 pandemic, a considerable number of our plants canceled river and beach clean-up activities in 2020. In July, however, our Toride Plant took part in coastal cleaning activities along the Kinu and Kokai Rivers, and our Shiga Plant did the same along the Seri River in Taga.

At the Four Roses Distillery in the United States, we participate in neighborhood Salt River cleanup activities.



Environmental protection activity in Tsurumi River basin regions

Coastal clean-up activities

A group of 36 people, consisting of employees of Mercian's Fujisawa Plant and their families, participated in the 43rd Zero Trash Clean Campaign - Beach Clean Up Kanagawa 2019, a clean-up activity on the Katase Coast in Fujisawa hosted by the Fujisawa City and the Kanagawa Coastal Environmental Foundation on May 26, 2019. The Plant supports the goals of this initiative, namely to "conduct a clean campaign to protect the beautiful natural surrounds of the Katase Coast, so that the beaches can be widely loved as a place of rest and relaxation for all," and participates in the campaign every year. In 2020, however, these activities were cancelled as a result of the COVID-19 pandemic.

We will continue to widen the circle of volunteers and call on everyone to participate in the beautification of the environment on the Katase Coast.

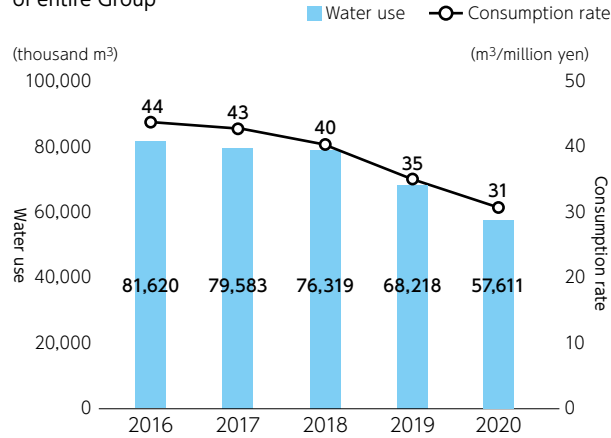


Clean-up activity on Katase Coast in Fujisawa

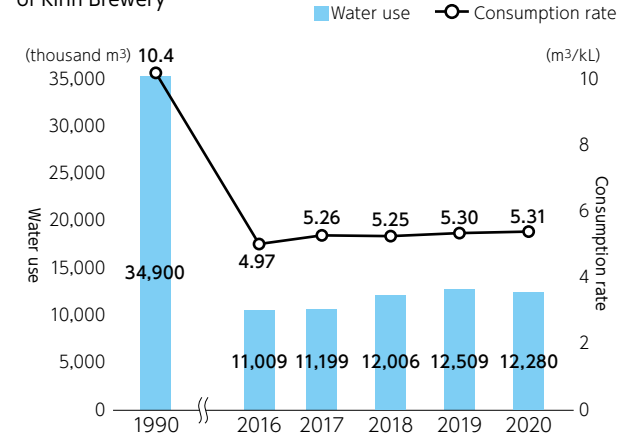
Water Graphs

Related Information→P.97~P.98

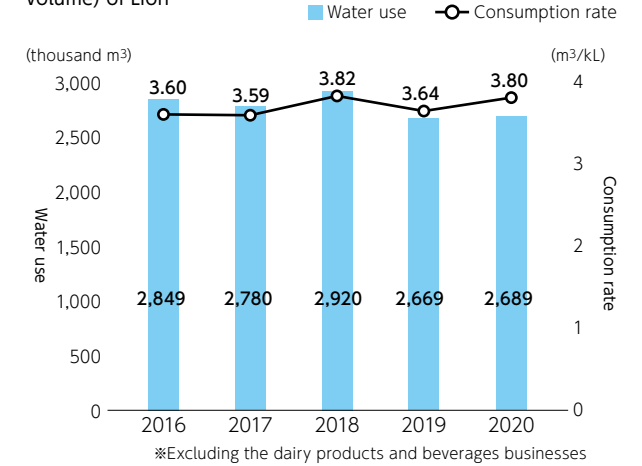
Water use and consumption rate (water use/sales revenue) of entire Group



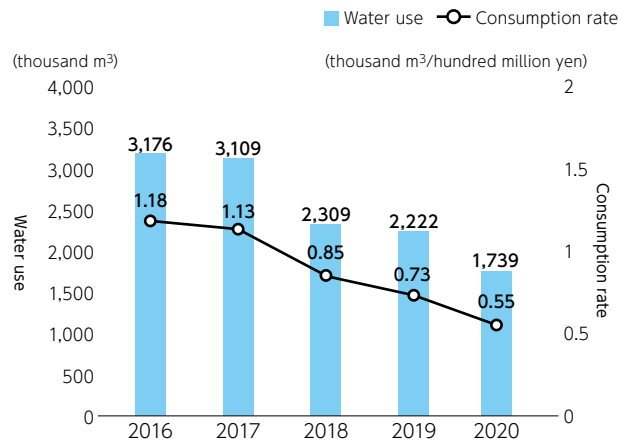
Water use and consumption rate (water use/production volume) of Kirin Brewery



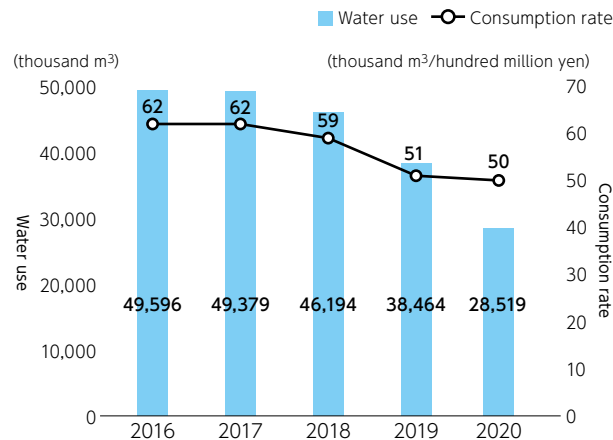
Water use and consumption rate (water use/production volume) of Lion



Kyowa Kirin (Global) water use and basic unit (water use / sales revenue)



Kyowa Hakko Bio(Global) water use and basic unit (water use / sales revenue)



Cyclical water use and cyclical use ratio (cyclical use/ (tap water use + cyclical use)) of entire Group

