Biological Resources

Basic Thinking

Biological resources, particularly agricultural products, are the most important and fundamental raw materials of the Kirin Group. However, inconsiderate agricultural practices will have a major impact on local ecosystems and communities in the regions where these raw materials are produced. Climate change also has the potential to affect the yields and quality of biological resources. Having assessed the risks related to biological resources that will become our ingredients, we are pursuing initiatives to increase the sustainability of important biological resources, reduce impacts on the ecosystems and local communities of their production regions, and increase the value of those resources.
Overview of Approaches

The Kirin Group established its Declaration of Support for Biodiversity Conservation in 2010 and conducted an assessment to confirm the risks of agriculture to the environment, human rights, and other factors. Based on the results of that assessment, we selected paper and palm oil, which are believed to have a major impact on their production regions, and black tea leaves from specific regions that we are highly dependent on for supply, and developed action plans for those ingredients. Under these plans, we are using sustainability-certified ingredients and assisting farmers to obtain sustainability certification.

In Japan, as well, with the decline in the area of hops fields due to the advanced age of Japan's hops farmers and the enlargement of vineyards to expand the market for Japan Wine, we are working on ecological surveys and regeneration activities for rare and native species which take environmentally-friendly farming practices into account.

Furthermore, from the perspective of the effective use of biological resources, we have set targets for the reduction of food waste and are working toward those targets. Over the medium to long term, impact on yields and quality of agricultural products from climate change are envisaged. In addition to water risk assessments in agricultural production regions in 2017, we have conducted surveys and assessments continuously in 2018 and 2019 on yields of key ingredient agricultural products and water stress in the production regions due to medium to long-term climate change, and we continue to consider and assess relevant strategies.
In the certification of small farms, multiple farms join up to form teams and decide on the team leader. We first educate these leaders, who then educate the other farms in their team on the certification criteria to obtain the certification.

Establishing methods for distinguishing between harmless and noxious weeds, and only removing the weeds that have an adverse impact on the tea bushes will make it possible to grow tea without the use of chemical pesticides. This will reduce the costs of farm chemicals and improve farmer earnings, while also increasing the safety of the tea leaves.

Supporting Growers Obtain Rainforest Alliance Certification

Kirin Gogo-no-Kocha has been a top-selling brand in Japan for more than thirty years. When we conducted a biodiversity risk assessment in 2010-2012, we learned that about 25% of the black tea leaves imported into Japan from Sri Lanka are used in Kirin Gogo-no-Kocha. In response to this fact, in 2013, we began providing assistance for willing Sri Lankan tea farmers to obtain Rainforest Alliance certification. A total of 44 farms had obtained certification by the end of October 2017, and a total of 70 farms have obtained certification as of June 2019. When tea farms obtain certification, they are able to farm in environmentally-friendly ways, engaging in forest conservation, surveys and protection of wildlife, and the separation and recycling of waste.

Certification also has considerable benefits for farm workers and helps to improve the sustainability of farm management. For example, farmers are preventing the loss of fertile topsoil due to heavy rainfall in the rainy season by planting grasses with deep roots on the steep slopes of their farms, and efforts to reduce the use of chemical pesticides and fertilizers are contributing to farm management by, for example, improving the health and safety of farm workers and reducing costs.

In addition, some farms have started researching ways to greatly increase their yields, and initiatives for chemical-free farming.

## Assistance for small farms and conservation of farm water sources

Based on what has been achieved so far, we launched three new initiatives in a new three-year plan in 2018 to further increase the sustainability of tea farmers.

1. **Expansion of training programs for large farms**
   - We will further increase the percentage of our Sri Lankan suppliers that are highly sustainable farms.

2. **Commencement of assistance for small farms to obtain certification**
   - In Sri Lanka, many small, family-run farms exist alongside the large-scale tea farms. There are said to be several hundreds of thousands of such small farms in Sri Lanka. The tea leaves grown on these small farms are collected by government-qualified collectors and sold on to the large farms, before being processed in the factory and shipped. Tea leaves from small farms can sometimes account for as much as half or more of the tea leaves processed in the large farms’ plants, but there has been very little progress in small farms obtaining certification. For this reason, we determined that our efforts to ensure the sustainability of tea leaves would be limited if only the large farms were certified, and we began assisting small farms to obtain certification in 2018. We plan to have assisted 10,000 small farms to obtain certification by 2025.

3. **Commencement of activities for the conservation of tea farm water sources**
   - We have commenced conservation activities for water sources on tea farms in Sri Lanka. For details, see “Conservation activities for water sources on tea farms” on Page 34.
Vineyards

■ Ecological surveys of vineyards for Japan Wine

With the expansion of the market for Japan Wine, Mercian, whose history dates back to the establishment of Dainihon Yamanashi Wine Company, Japan's first private-sector winery, plans to increase its production capacity of Japan Wine by 50% by 2027. To achieve that aim, it will need to expand its company-managed vineyards from its current 50 hectares to 76 hectares by 2027. Because this will require converting idle farming land into vineyards, since 2014, we have been conducting ecological surveys on vineyards for Japan Wine in conjunction with the National Agriculture and Food Research Organization’s Institute for Agro-Environmental Sciences and the Western Region Agricultural Research Center (NARO).

The ecological survey being conducted at Mariko Vineyard, a Mercian-managed vineyard on the Jinba Plateau in the Maruko District in Ueda, Nagano Prefecture, has confirmed the presence of 168 insect species and 288 plant species, including rare species that are specified in the national-level and region-level Red Data Books. The vineyard is cultivated in hedgerow style, with grasses grown under the vines. That underbrush is cut several times a year for soil management and operational purposes. It is believed that this large number of diverse living creatures may be attributed to the fact that this mowing exposes native and rare species to the sun, giving the vineyard a role as a vast grassland of good quality. Grasslands are said to have covered 30% of Japan’s national land area 130 years ago, but they have dwindled to just 1% today. Converting idle farming land into vineyards for Japan Wine will not only contribute to the expansion of the business. It will also create valuable grasslands and lead to the expansion of Japan’s traditional rural Satoochi-Satoyama landscapes.

■ Surveys in the process of converting idle farming land into vineyards

The surveys of the Mariko and Jyonohira Vineyards were conducted more than ten years after those lands were converted into vineyards, so it is impossible to compare them to the original idle farming land. For this reason, ecological surveys are being conducted in the process of converting idle farming land into vineyards for Japan Wine in order to contribute to the expansion of the business. It will also create valuable grasslands and lead to the expansion of Japan’s traditional rural Satoochi-Satoyama landscapes.

■ Vegetation regeneration activities with participation by employees and local residents

These ecological surveys have confirmed that in vineyards for Japan Wine, the grasses grown under the vines are creating rich ecosystems and nurturing rare species. However, the number of these rare species is by no means large. In 2016, under the guidance of NARQ, our employees began participating in activities to regenerate rare and native species. Dry grass from the areas inhabited by rare species are collected in autumn and scattered in the regeneration zones, with the aim of regenerating the vegetation in those zones. In 2016, the average number of native species per square meter was 8.2, but this had risen to 12.0 in 2017 and 14.2 in 2018, confirming that diversity is steadily being restored to the land. In 2019, with the cooperation of an international NGO, we conducted activities to regenerate Sophora flavescens, which is the sole grass used for feeding by the rare butterfly, Shijimiaeoides divinus.
In Tono, Kirin and the City of Tono have launched the TK (Tono x Kirin) Project to take maximum advantage of the appeal of hops and revitalize the region. Project activities include the Hops Harvest Festival, which it is hoped will nurture civic pride in the crop. Kirin is also helping to expand demand for Japan-grown hops by supplying it to craft beer companies. We are also engaged in a wide range of activities, such as a “summit” with hops growers and other stakeholders to revitalize Japan-grown hops production.

■ Status of Japan-grown hops
Hops grown in Tono in Iwate Prefecture are the main ingredient of Kirin’s Ichiban Shibori Toretate Hops Draft Beer. The harvested hops are snap-frozen in their raw state to -50°C before being ground for use in beer production. It is precisely because the hops were grown in Japan that this product has been made possible. Moreover, with the expansion of the craft beer business, the importance of distinctive, Japan-grown hops is increasing. However, due to the aging of the farming population and a lack of successors to take over the farms, the production volume of Tono hops has fallen to a quarter of its peak, and there is a possibility that it could disappear completely in ten years’ time. In response to this situation, Kirin, which purchases 70% of Japan’s hops crop, is pursuing a range of initiatives to increase the value of Japan-grown hops.

■ Hops Fields Living Species Survey
We have been conducting an ongoing living species survey in the Tono hops fields since 2014. In 2015, the survey confirmed the presence of 104 insect species and 19 bird species. This rich diversity of living species in the hops fields is attributable to the existence of windbreak forests that protect the hops plants, which grow to a height of 5 meters, from the effects of the wind. The combination of the windbreak forests and underbrush is nurturing a wide diversity of living creatures. This has made it clear that human innovations for the cultivation of hops have nurtured and protected the diversity of living species in the area surrounding the hops fields. We hope that these kinds of research findings will help to stem the decline in the area’s hops fields.

■ Initiatives for increasing the value of Japan-grown hops

In Tono, Kirin and the City of Tono have launched the TK (Tono x Kirin) Project to take maximum advantage of the appeal of hops and revitalize the region. Project activities include the Hops Harvest Festival, which it is hoped will nurture civic pride in the crop. Kirin is also helping to expand demand for Japan-grown hops by supplying it to craft beer companies. We are also engaged in a wide range of activities, such as a “summit” with hops growers and other stakeholders to revitalize Japan-grown hops production.

■ Living Species Observation Event
We have held Living Species Observation Events since 2016, inviting local elementary schoolchildren to participate. We hope that, as the children encounter many living creatures in the hops fields and in the surrounding vegetation and nearby streams, they will gain a fresh appreciation for the rich diversity of nature in Tono and for the fact that the hops fields form a part of that diversity.

■ Initiative to enrich ecosystems
In 2017, we launched an initiative to enrich the ecosystems of the hops fields, with the participation of employees. This initiative included mowing the grass and thinning out trees that shut out the sunlight. The branches that were cut down were piled into stacks to make habitats for small creatures such as insects and reptiles.

■ Hops production volumes and number of farms

Diverse forms of life inhabit the wind-breaking forests planted to protect the hops and the underbrush planted to prevent drying of the ground.

Source: Data Regarding Hops (2016), Iwate Prefectural Government
The Kirin Group uses palm oil as an ingredient in some of its products, but because the quantity we use is very small and it is difficult to procure physically certified oil, we use the Book & Claim method approved by the Roundtable on Sustainable Palm Oil (RSPO) for the procurement of certified sustainable oil. In accordance with our Action Plan for the Sustainable Use of Biological Resources, we have been using this method for the total volume of primary raw materials every year since 2013 and the full volume of secondary raw materials as well from 2014. In March 2018, we became an associate member of the RSPO. We will continue to promote the use of sustainable palm oil.

Kirin CSV Report 2019

Because the Kirin Group uses large quantities of paper for primary and secondary containers for shipping our products, in 2013, we established our Guidelines for the Procurement of Sustainable Biological Resources and an Action Plan, and have since pursued the use of paper that will not harm precious forests, including the tropical rainforests. We also use large quantities of paper for purposes other than containers and packaging, so in the Action Plan, which was revised in February 2017, we declared a target of switching to FSC®-certified paper or recycled paper for all office paper by the end of 2020. To date, we have switched to FSC®-certified paper for business cards, envelopes and copy paper, and from 2019, progress is being made in the adoption of FSC®-certified paper for some of the paper bags and paper cups for tastings that have the KIRIN logo printed on them. These efforts are leading to the conservation of precious forests and to addressing the problem of climate change.

Use of sustainable paper and printed materials

Use of sustainable palm oil

Policies regarding biological resources→P.77

Paper containers and packaging initiatives→P.43
The Local ecosystem

**Protection of endemic species in biotopes at manufacturing plants**

Using biotopes set up in the grounds of our manufacturing plants, we are protecting species that are endemic to the plants’ respective areas and providing consumers with the opportunity to engage with nature.

At the Kirin Brewery Yokohama Plant, in an endorsement of the "Yokohama b Plan," the city’s biodiversity action plan, we built a biotope in the Plant grounds in the summer of 2012. The Yokohama Plant, which is part of a widespread network of ecosystems, is pursuing initiatives to enrich the local ecosystem as a whole. Also, since 2012, the Plant has conducted "Tours to Experience the Blessings of Nature" every week from spring through fall, in collaboration with the Tsurumi River Catchment Network, a NPO which is highly conversant with the region’s natural environment.

In October 2018, the Plant received the Japan Greener Research and Development Center Chairman’s Award. The Kirin Brewery Kobe Plant has been cultivating local endangered species, including the fish species, Hemigrammocypris rasborella (golden venus chub), and Pogonia japonica, a species of orchid, in the biotope set up in 1997. This biotope functions as a “refuge biotope” for the protection and cultivation of local endangered species.

The Kirin Brewery Okayama Plant has been pursuing a program for the artificially breeding of the Parabotia curtus or “kissing loach,* which is a designated natural monument (protected species), since 2005. The fish population having increased with the cooperation of stakeholders and local elementary schoolchildren, they were released into the Plant’s biotope in 2016 and are now being bred and displayed on the Plant grounds.

**Contributions through mass plant propagation technology (Tohoku reconstruction assistance)**

For two years from 2014, Kirin Holdings’ Central Laboratories for Key Technologies was involved in the Ministry of Agriculture, Forestry and Fisheries project, “Dramatic Improvement of Production of Seeds and Seedlings of Bursaphelenchus Xylophilus - Resistant Black Pine for Regeneration of Coastal Forests in the Tohoku Region.”* We remain engaged in the regeneration of the coastal protection forests that suffered devastating damage from the tsunami in 2011. In 2017, black pine seedlings produced using technology developed by the Kirin Laboratories were planted in the grounds of the Kirin Brewery Sendai Plant on a trial basis. In 2018, the Laboratories conducted a study of those seedlings together with the students of Miyagi Prefecture Shibata Nourin High School, who assisted with the development. The Laboratories also participated, together with the Kirin Brewery Sendai Plant, in tree-planting activities organized by Miyagi Mori-no-Kai, conducting new trial plantings in disaster-affected coastal areas of Higashi-Matsushima.

The Central Laboratories for Key Technologies will continue its research and development with the aim of contributing to the early regeneration of the coastal protection forests.

* Agriculture, Forestry and Fisheries Industry/Food Industry Science and Technology Research Promotion Project (lead institution: Forest Tree Breeding Center, Forestry and Forest Products Research Institute, Forest Research and Management Organization)

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**Vending machines for the support of the Borneo Green Corridor**

Japan depends on imports for a large percentage of its food requirements. Meanwhile, environmental destruction in the source regions of those imports is becoming increasingly serious. Together with Borneo Conservation Trust Japan, we are rolling out these vending machines to support a project to establish a Green Corridor and Wildlife Rescue Center in Borneo.

**Expansion of book donations to elementary schools**

The Kirin Group has continued to donate bookshelves and books to elementary schools attended by the children of Sri Lankan tea farm workers since 2007. It has already donated to about 120 schools so far and plans to increase that number by a further 100 schools by 2022.
### Lion Landcare Dairy Pride and Orchard Pride Grants Program

Since 2015, Lion Dairy and Drinks have partnered with Landcare to offer their dairy farmers the opportunity to be part of the Lion Dairy Pride Landcare Grants Program. In 2018, the program was extended to include orange growers, under the Lion Orchard Pride Landcare Grants Program.

Under the 2018-2019 program, grants of up to $10,000 each were made available to help both Lion Dairy and Drinks dairy farmers and orange growers to develop more sustainable practices on their farms or orchards, increase business efficiencies, lower their operating costs and secure the long-term sustainability for their business.

The program offers farmers who supply Lion Dairy and Drinks a way to measure, evaluate and improve key areas of sustainability on their farm, focusing primarily on improving land management, biodiversity, increasing energy efficiency, and, this year in particular, increasing water efficiency.

The Landcare grants program forms part of Lion’s Dairy Pride and Orchard Pride initiatives, unique sustainability programs that provide Lion Dairy and Drinks agricultural suppliers with a way to measure, evaluate and improve key areas of sustainability on their farms.

Previous grant recipients have implemented initiatives such as solar installation to reduce power costs and greenhouse gas emissions, planting of windbreaks to prevent soil erosion and create native habitats, upgrading lighting to more energy efficient LED, implementing heat recovery from milk, improving effluent dams and capturing effluent water for reuse.

The program is one of the many initiatives Lion Dairy and Drinks have put in place to create a more sustainable business across their agricultural supply chains and to support their dairy farmers and orange growers.
Reducing of food waste

- Reducing losses from disposing of soft drinks
  Kirin Beverages is taking concrete action to change to labeling the year and month as the best before date for soft drinks. By so doing, we expect to see significant effects on cutting losses from disposing of products. Also, we can cut environmental loads on the supply chain (CO2 emissions from transporting between distribution centers and transport-related activities, etc.) and reduce inefficiencies (e.g. storage space in distribution warehouses and loading and unloading tasks at stores) as well, by changing how to manage product delivery, storage, and display in stores based on the new best-before labelling. We also continue to exchange information on retail sales and demand fluctuation factors with plants and distribution centers to improve demand projections and reduce disposal losses. In addition, we will move forward with efforts to reduce disposal losses by strictly managing sales volume targets. Implementing these steps, we will prevent valuable biological resources and containers and packaging from going to waste.

- Recyling
  Recycling spent grains from Beer Mashing as Livestock Feed
  Kirin Brewery, Myanmar Brewery
  Production processes for beer and happo-shu (low-malt beer) generate spent grains after extracting flavor during the mashing process. Because such spent grains contain residues of nutritious substances, they are efficiently used as livestock feed for cattle or for growing mushrooms.

  Developing food products from brewer’s yeast
  Lion
  Used brewer’s yeast generated in the process of beer manufacture is used as the ingredient in the Australian fermented food, Vegemite.

  Research into use of BSG
  Kirin Holdings
  Prevention of disease in dairy cattle and other livestock and reducing the use of antibiotics are major challenges for the dairy industry. The Central Laboratories for Key Technologies have discovered that lignin glycoside, which is contained in brewer’s spent grain (BSG), that is the barley husks that remain after the barley milling process, and BSG itself, which is used to feed livestock, are effective in increasing immunoreactivity in cattle. The Laboratories are pursuing further research into these findings.

  Re-use of wine grape lees
  Mercian
  The grape lees from wine-making are turned over in a compost heap on the company vineyard for a year to make compost, which is used as organic fertilizer.

  Recovery of phosphoric acid
  Kyowa Hakko Bio
  Kyowa Hakko Bio Yamaguchi Production Center (Hofu) has installed a facility to recover phosphoric acid from fermentation wastewater. Previously, the recovered cake, which consists largely of calcium phosphate had been disposed as industrial waste, but in 2008, the Production Center started drying some of the cake and selling it as fertilizer material.
Food poverty has impacted an estimated four million people at some point in the past year in Australia, which is 18% of Australia’s population. For the last seven years, Lion has partnered with Foodbank as part of Lion’s Community Investment Program. Foodbank, established in 1992, is Australia’s largest food relief charity. They distribute food and other essentials to over 710,000 people each month. The most common recipients of Foodbank meals are typically single-parent and low-income families. Other high-risk groups include people with disabilities, elderly, refugees and Indigenous Australians.

Last year, Lion Dairy and Drinks donated the equivalent of over 3 million meals. Through the Foodbank Milk Program, Lion donated 230,000 litres of fresh white milk from our manufacturing plants in Western Australia, South Australia and Tasmania. Lion also contributed other products, such as dairy foods, juice and plant milk products.

In addition to food and beverage donations, Foodbank is also a key part of Lion’s corporate volunteering program, LionHearts. Approximately 150 Lion employees volunteered over 1,000 hours of time last year, at various Foodbank warehouses in Victoria and New South Wales. By giving their time, Lion employees help ensure Foodbank support those in need by:

- Ensuring struggling Australians receive the food they require to put breakfast on the table or to pack their child’s school lunchbox.
- Packing orders for rural and remote charities so an Australian farmer can make it through a tough harvest without having to seek other employment.
- Organising other donations so a domestic violence victim has access to hygiene essentials for the next month.

Through Lion’s ongoing partnership with Foodbank, we are supporting the United National Sustainable Development Goal 2, Zero Hunger.