



Biological Resources



We will create together

A society that values sustainable biological resources

➤ Cultivate, expand and procure sustainable agricultural raw materials

➤ Stand by the side of farmers to make raw material production areas sustainable

Basic Thinking

Biological resources, particularly agricultural products, are the most important and basic raw materials for the Kirin Group. However, our scenario analyses based on the TCFD recommendations have confirmed the possibility that climate change will have a significant impact on agricultural yields and the quality of agricultural products. It is also essential to have consideration for the environment and human rights at the farms and regions where we procure products. Therefore, we are working to solve the problems of ecosystems and local communities where raw materials are produced in an aim to build a society that uses sustainable biological resources.

Production regions

- P.31 ➤ Hops Fields
- P.32 ➤ Tea farms
- P.33 ➤ Coffee plantations
- P.34 ➤ Vineyards
- P.28 ➤ Technology established for mass propagation of plants

Manufacturing

- P.29 ➤ Paper and printed materials
- P.29 ➤ Palm Oil
- P.30 ➤ Biotopes at manufacturing plants

Products

- P.30 ➤ Reducing losses from disposing of soft drinks
- P.30 ➤ Recycling

Overview of Approaches

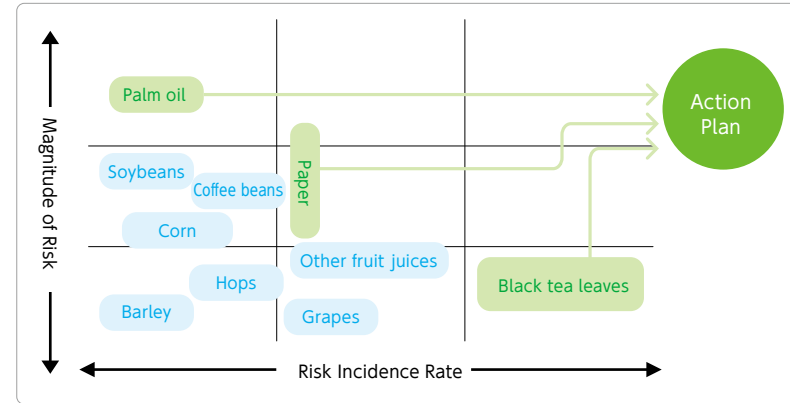
The Kirin Group established its Declaration of Support for Biodiversity Conservation in 2010 and conducted an assessment to confirm the risks of agriculture to the environment, human rights, and other factors. Based on the results of that assessment, we selected paper and palm oil, which are believed 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 addition, based on our Long-Term Environmental Vision announced in 2013, we have been conducting ecological surveys and carrying out revegetation activities for rare and native species toward environmentally-friendly agriculture in growing hops in Japan and grapes for Japan Wine. Moreover, we were able to confirm by conducting the scenario analysis required by the TCFD recommendations starting in 2018 the possibility of significant declines in yields of major agricultural products caused by climate change. In light of this, we clearly declared to strive to cultivate, expand, and procure sustainable agricultural raw materials and contribute to making raw material production areas sustainable under our new long-term strategy, Environmental Vision 2050, announced this year. As the first step, we are also extending assistance for obtaining sustainable farm certification, which we have been providing for Sri Lankan tea farms, to coffee plantations in Vietnam.

[For policies on biological resources→P.87~P.88](#)

Highlights of Outcomes

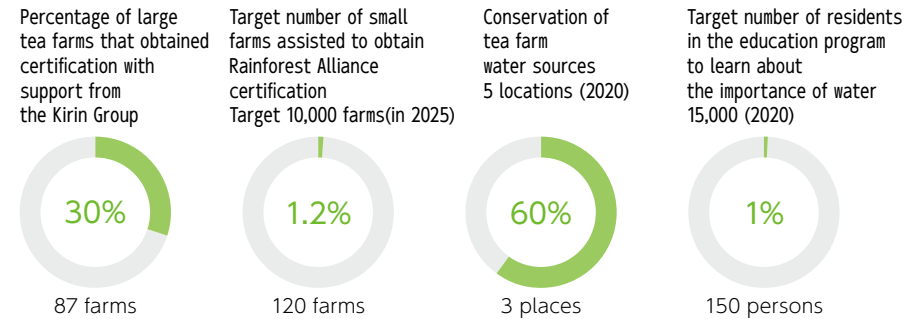
Challenges	Progress
Cultivate, expand and procure sustainable agricultural raw materials	<p>We have almost completed switching to FSC-certified paper or recycled paper for office paper (copy paper, envelopes, business cards and other printed materials). Paper containers and packaging initiatives→P.47</p> <p>For palm oil, we have continued our 100% use of certified palm oil (primary and secondary raw materials) according to RSPO's Book & Claim method. With regard to our mass plant propagation technologies, the usefulness of our bag-type culture vessel system technology, which makes effective use of water, was reconfirmed in the "research on a pest free farm system and emergency backup system using bag-type culture vessel technology" in the lunar surface base project led by the Ministry of Education, Culture, Sports, Science and Technology. As for food waste, we established reduction targets for Japan (75% reduction from the 2015 level in 2025). As well as promoting resource recycling, we continue to promote the use of "year-month labeling" for best-before periods of non-alcoholic beverages in Japan.</p>
Making raw material production areas sustainable	<p>As for tea leaves, we have been supporting large tea farms in Sri Lanka in obtaining the Rainforest Alliance certification since 2013 and, as of the end of 2019, 87 large farms acquired the certification. This is equivalent to approximately 30% of the certified farms in Sri Lanka. Since 2018, we have also been supporting small farms in obtaining sustainability certification. In addition, we have started supporting small coffee plantations in Vietnam in obtaining the Rainforest Alliance certification since 2020. We have conducted ecological surveys that reveal that converting idle farming land into vineyards for Japan Wine would lead to the restoration and creation of quality grasslands, and have launched revegetation activities with the participation of employees and local residents.</p>

Risk research



Progress

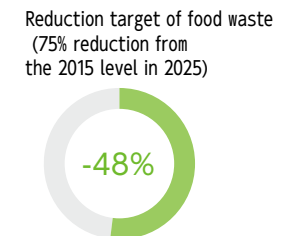
Assistance for Sri Lankan tea farmers to obtain Rainforest Alliance certification



Ratio of sustainable raw materials



Food waste



Cultivate, expand and procure sustainable agricultural raw materials

Mass plant propagation technology

Having been long using plants such as hops and barley as ingredients for beer, the Kirin Group's start of research efforts on related technology goes back to the 1980s and our original technology established for mass propagation of plants is currently attracting growing attention from various fields as a technology that can resolve social issues.

Our unparalleled mass plant propagation technology is original and globally unprecedented in that it consists of four elemental technologies: Stem propagation technique (organ culture method), sprout propagation technique (PPR method), embryo propagation technique (somatic embryo method), and potato propagation technique (micro tuber method).

Plant propagation is normally performed using seeds, cuttage, etc., but the cultivation period is limited and the growth rate is considerably low depending on the plant. However, Kirin's mass propagation technology that we developed through our own research makes it possible to significantly increase the number of quality plants with the same characteristics as the parent plant regardless of the season.

Kirin's scenario analyses based on TCFD recommendations conducted in 2018 and 2019 show that climate change has a significant impact on yields of many agricultural products used as raw materials. Mass plant propagation technology is also useful for the mass propagation of new varieties, endangered species and useful plants, as well as for mass propagation aimed at promoting the spread of new varieties that have been developed in response to environmental changes. At one time, our technology faced the risk of elimination due to the withdrawal from the agribio business, but it is now positioned as one of Kirin's core research areas.



bag-type culture vessel system

Bag-type culture vessel technology

Kirin's mass plant propagation technology is not limited to use in research and development, but has been established as a technology that can be used in practical applications. This is our bag-type culture vessel system. Stainless steel and glass tanks are not suitable for the practical production of plant seedlings because they have a high risk of microbial contamination on top of being very expensive. The resin film bag-type culture vessel system developed by Kirin offers the advantages of high production and operational efficiency, lightweight, low cost, high operational safety, and flexibility in adjusting production size. In addition, a solution containing nutrients necessary for plant growth is aerated inside a small bag to allow plants to grow, making it easier to use water more effectively than in soil cultivation and to create a virus/pathogen-free environment. The bag-type culture vessel system was developed from research on the micro tuber method for potato propagation and has been enhanced for use in other propagation technologies. For two years from 2014, the Kirin Central Research Institute 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 Central Research Institute were planted in the grounds of the Kirin Brewery Sendai Plant on a trial basis. In 2018, the Institute conducted a study of those seedlings together with the students of Miyagi Prefecture Shibata Nourin High School, who assisted with the development. The Institute 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 Kirin Central Research Institute will continue its research and

development with the aim of contributing to the early regeneration of the coastal protection forests.

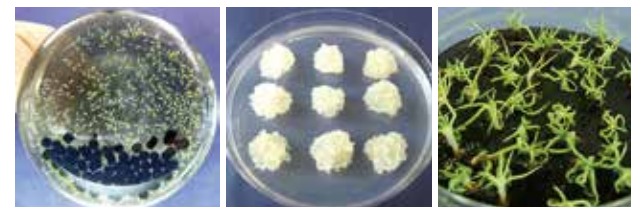
* Agriculture, Forestry and Fisheries Industry/Food Industry Science and Technology Research Promotion Project (lead institution: Forest Tree Breeding Center, Forestry and Forest Products Research Institute, Forest Research and Management Organization)

Contribution to the lunar farm

The Kirin Central Research Institute took part in the lunar surface base project led by the Ministry of Education, Culture, Sports, Science and Technology launched in 2017, which included industry-academia collaboration research on a pest free farm system and emergency backup system using bag-type culture vessel technology.

Experiments were conducted to examine the growth potential of lettuce plants as a source of vitamin C, potato seed potatoes as a source of carbohydrate, and soybean seedlings as a source of protein in a low-pressure environment. In addition, nutrient composition and material balance evaluations were conducted. As a result, growth patterns similar to those under atmospheric pressure on the earth could be reproduced.

We plan to continue developing this technology through industry-academia collaboration, and make proposals to JAXA and other space agencies on the lunar surface farm where the research is currently conducted.



Cultivation of asexual embryos



Trial planting of seedlings cultivated from asexual embryos



Status of trial planting study at Kirin Brewery Sendai Plant

Paper and Printed Materials / Palm oil

Use of sustainable paper and printed materials

Because the Kirin Group uses large quantities of paper for primary and secondary containers for shipping our products, in 2013, we developed 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.

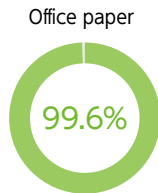
We also use large quantities of paper for purposes other than containers and packaging, so in the Action Plan, which was revised in February 2017, we declared a target of switching to FSC-certified paper or recycled paper for all office paper by the end of 2020.

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.

Paper containers and packaging initiatives→P.47

Policies regarding biological resources→P.87~P.88



FSC-certified paper or recycled paper



Use of sustainable palm oil

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.

Rate of RSPO certification through Book & Claim method



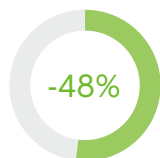
Primary raw materials and secondary raw materials

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.

Reduction target of food waste (75% reduction from the 2015 level in 2025)



Kirin Brewery
Kirin Beverage
Mercian

We also closely exchange information on retail sales and demand fluctuation factors with plants and distribution centers to improve demand projections and continue to 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.

For change to the best-before labelling→P.67

Recycling

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.



Effective use of spent grains to livestock feed

Developing food products from brewer's yeast

Lion

Lion continues to supply brewer's yeast for use as an 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 Kirin Central Research Institute has 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 Research Institute is 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.



Re-use of wine grape lees

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.

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. The Kirin Brewery Kobe Plant has been cultivating local endangered species, including the fish species,

Hemigrammocypripis 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.



Biotopes in the Kirin Brewery Okayama plant

Stand by the side of farmers to make raw material production areas sustainable

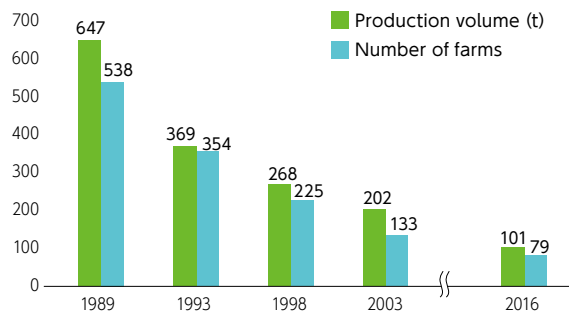
Hop Fields

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.

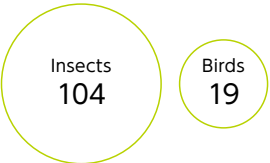
Hops production volumes and number of farms



Source: Data Regarding Hops (2016), Iwate Prefectural Government

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 have held Living Species Observation Events since 2016, inviting local elementary schoolchildren to participate and having them get a feel for the rich nature of Tono and the fact that hops fields are part of Tono's nature.



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



Living Species Observation Event

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. In 2018, Kirin invested in the agricultural corporation BEER EXPERIENCE CO., LTD. to accelerate the realization of Tono City's "Beer Village Concept," and contributed to social value in a form of revitalizing local economies through the sustainable production of Japanese hops, especially rare hop MURAKAMI SEVEN bred by Kirin and increasing the brand value of such Japanese hops. At the same time, we will lead the investment to development of the craft beer category through stable procurement of Japanese hops and external sales to craft breweries.



Tea farms

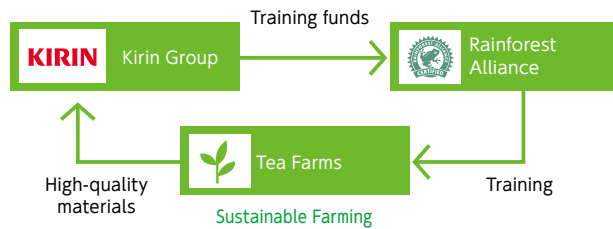
Assistance to obtain Rainforest Alliance certification

Kirin Gogo-no-Kocha is the No. 1 tea drink brand in Japan, selling approximately 1.3 billion bottles a year. Ever since its launch over 30 years ago, tea leaves harvested in Sri Lanka have been used as ingredients. When we conducted a biodiversity risk assessment in 2010-2012, we learned that approximately 25%* of Sri Lankan tea leaves imported by Japan were used for *Kirin Gogo-no-Kocha*. In order to continue producing tasty and safe tea drinks, we have been supporting willing Sri Lankan tea farms to obtain Rainforest Alliance certification since 2013.



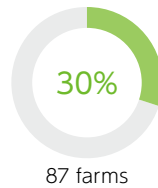
*Source: 2011 Tea Statistics, Japan Tea Association

Supporting Growers Obtain Rainforest Alliance Certification

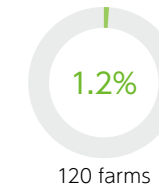


As of the end of 2019, 87 large tea farms, or approximately 30% of the large tea farms certified by the Rainforest Alliance in Sri Lanka, were certified with Kirin's support. In the training for obtaining certification, tea farms are guided to preserve forests, investigate and protect wildlife, and carry out waste-sorting and recycling. They also learn how to prevent the loss of fertile farm soil due to heavy rainfall during the rainy season by planting grass with deep roots on the steep slopes of farms, and ways to reduce pesticides and fertilizers. As a result, tea farms become environmentally friendly and can enhance their agriculture level as they improve the quality of tea leaves while reducing production costs. This also contributes to improving the skills of farm workers, and safety management and living standards, enabling the farms to carry out more sustainable agriculture. Meanwhile, Kirin can continuously

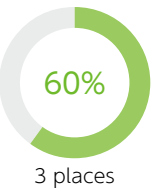
Percentage of large tea farms that obtained certification with support from the Kirin Group



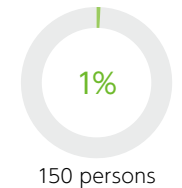
Target number of small farms assisted to obtain Rainforest Alliance certification
Target 10,000 farms(in 2025)



Conservation of tea farm water sources
5 locations (2020)



Target number of residents in the education program to learn about the importance of water
15,000 (2020)



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.

procure high-quality and safe tea leaves that are sustainable. Furthermore, in an effort to achieve even higher levels of sustainability, some farms have begun conducting research aimed at significantly increasing yields and undertaking the challenge of pursuing chemical-free cultivation, as initiatives beyond the certification criteria requirements.

Social impact→P.16

Engagement with raw material production regions→P.82

Assistance for small farms and conservation of farm water sources

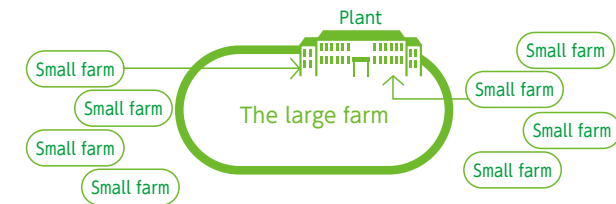
Based on what has been achieved so far, we launched three new initiatives in 2018 to further increase the sustainability of tea farmers.

①Expansion of training programs for large farms

We will expand our support to more farms and further increase the percentage of our Sri Lankan suppliers that are highly sustainable farms.

②Commencement of assistance for small farms to obtain certification

In Sri Lanka, many small, family-run farms exist. 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 in the vicinity, 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. As such, in order to further enhance the sustainability of black tea leaves and production regions, we began assisting small farms to obtain certification in 2018. We plan to have assisted 10,000 small farms to obtain certification by 2025.

③Commencement of activities for the conservation of water sources for tea farms supported by the Kirin Group

For details, see "Conservation activities for water sources on tea farms" on P.42



A state of the seminar in Sri Lanka. In the certification of small farms, multiple farms join up to form teams and decide on the team leader. Local trainers first educate these leaders, who then educate the other farms in their team on the certification criteria to obtain the certification.



Coffee farms

Assistance to obtain Rainforest Alliance certification

Vietnam is the world's second largest coffee bean producer after Brazil. About 30% of the coffee beans Kirin Group imported in 2019 were grown in Vietnam, which are used in *Kirin FIRE*. On the other hand, most coffee plantations in Vietnam are small, and there are some farmers who suffer from reduced yields, or end up using more chemical fertilizers than necessary, because they cannot improve their traditional farming methods due to a lack of appropriate educational opportunities. In 2019, we conducted a scenario analysis of the impacts of climate change in 2050 and 2100 and found that coffee bean yields will likely be significantly affected in many countries and regions.

To enhance the sustainability of agricultural production regions together with the farms and ensure the stable use of high-quality ingredients in the future, the Kirin Group decided to extend support for obtaining Rainforest Alliance certification, which we have long been providing to tea farms in Sri Lanka, to the coffee plantations in Vietnam starting in 2020.



Support activities

In 2020, we are supporting small plantations in Da Lat Province in south-central Vietnam, which is the largest coffee bean producing region in Vietnam. With an altitude of about 500 meters and an average temperature of around 25 to 27 °C, this area is said to be suitable for coffee cultivation. The majority of local plantations are small with a cultivation area of about 1 to 1.2 ha. Since small plantations do not have adequate educational opportunities, it is difficult for them to improve cultivation methods on their own.

For example, many farmers cut down trees in the plantation believing that more sunlight will increase productivity. However, in reality, severe sunlight will exhaust coffee trees and drain fertile soil when it rains heavily. Training to support plantations in obtaining certification includes teaching them the benefits of planting acacia and fruit trees as shade trees to protect coffee trees from strong sunlight and heavy rain, as well as to maintain soil moisture and reduce irrigation water during the dry season. Shade trees also bring extra income to small plantations. In addition, by learning to appropriately use the minimum necessary amount of chemical fertilizers and pesticides, plantations will be able to conserve soil functions and reduce the cost of purchasing them, thereby increasing profits and also protecting workers' health.

Supporting small plantation owners in attaining various knowledge on agriculture and acquiring certification in this way contributes to improving their capabilities and enabling farmers to increase their agriculture level by becoming able to more rationally use natural resources and flexibly respond to environmental changes such as climate change while reducing production costs and increasing the quality of their coffee.

Major activities scheduled for 2020

- Analysis of conditions at small plantations by Rainforest Alliance agronomists and formulation of action plans.
- Grouping small plantations and selecting leaders.
- Training on sustainable agriculture for group leaders.
- Training for small plantations by trained leaders.
- Self-assessments by groups followed by development and implementation of improvement plans.



Vineyards

Vineyards as vast, good-quality grasslands develop ecosystems

Grassland is a typical example of nature that is protected by human intervention. Grasslands are said to have covered 30% of Japan's national land area 130 years ago, but they have dwindled to just 1% today. However, the ratio of endangered plants per unit area is extremely high (Graph on the right), and grasslands play an important role in conserving biodiversity. In a full-scale ecosystem survey conducted with the participation of researchers from the National Agriculture and Food Research Organization (NARO), the presence of 168 species of insects and 288 species of plants, including endangered species, that appear in the Red Data Book of the Ministry of the Environment, was confirmed at Mariko Vineyard, a Mercian-managed vineyard in Ueda City, Nagano Prefecture. Many rare species, including endangered species, have been found in Jyonohira Vineyard in Katsunuma-cho, Yamanashi Prefecture.

A vineyard cultivated in hedgerow style, with grass grown under the vines, can play a role as a vast good-quality grassland with proper undergrowth cutting, enabling not only highly fertile plants but also native and rare species to inhabit it. In 2019, in order to also investigate the effects of grass growing on grapes themselves, we began conducting a preliminary study of spiders, soil organisms, and birds in the vineyards. In response to 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 expand its company-managed vineyards. Converting idle farming land into vineyards for Japan Wine will not only contribute to the expansion of the business. It will also

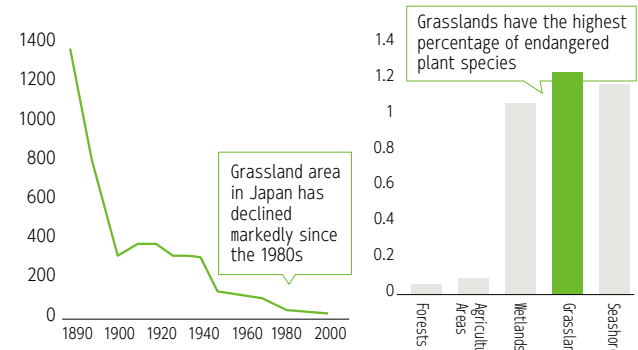


Château Mercian Mariko Winery



create valuable grasslands and lead to the expansion of Japan's traditional rural Satochi-Satoyama landscapes.

Trends in grassland area in Japan Number of endangered species by unit area



Aggregated from Successive-Year Forest Area Statistics and MAFF Statistical Tables
Endangered plant species per hectare Source: Western Japan Grasslands Research Group (2007)

Surveys in the process of converting idle farming land into vineyards

At the Tengusawa Vineyard in Koshu City, Yamanashi Prefecture, NARO and the Kirin Group are conducting a rare joint research project on a global basis to study changes in the ecosystems as a piece of idle land is converted into a hedgerow-style vineyard. In 2016, the land was still idle. Only an extremely small number of insect and plant species were found in the Tengusawa Vineyard, due to damage from deer eating the vegetation. Since the area was fenced and reclaimed in 2017, the landscape has

The process of converting idle and devastated land into vineyards in Tengusawa Vineyard



Rare species discovered

Mariko Vineyard



Zygaena nippona nippona *Sophora flavescens* *Hemerocallis citrina var. vespertina*



Argyronome laodice japonica *Leonurus japonicus* *Vincetoxicum pycnostelma*

Jyonohira Vineyard



Platycodon grandiflorus *Cephalanthera erecta*

changed to one like a vineyard, and we are seeing how the ecosystem has become richer during this process. In our research on insects, we use butterflies as an indicator, and the number of species quickly increased to 16 in 2019 from 13 in 2018. We will continue to conduct surveys over the next several years to test the hypothesis that vineyards cultivated in hedgerow style, with grass grown under the vines, on idle lands will enrich the ecosystem.

Revegetation activities

In 2016, under the guidance of NARO, our employees began participating in activities to regenerate rare and native species and confirmed that native species have already taken root. In 2019, native species with blooming flowers were there to stay, and the field became like a flower garden in autumn. Furthermore, we began along with an international NGO Earthwatch Japan and its volunteers, an activity to revegetate *Sophora flavescens*, which is not a rare species at the national level, but is the sole grass used for feeding *Shijimiaeooides divinus*, an endangered IA (CR) butterfly. Volunteers are asked to bring *Sophora flavescens* back and raise them at home, and we will eventually plant them at the Mariko Vineyard.



Top left: Rare and native species regeneration activity
Top right: Flowering native species were stayed
Bottom: *Sophora flavescens* revegetation activity

Expansion of book donations to elementary schools

Good quality tea leaves from Sri Lanka are essential for *Kirin Gogo-no-Kocha*. In 2007, the year following the product's 20-year anniversary, we launched the Kirin Sri Lanka Friendship Project to further strengthen ties with Sri Lankan tea farms and continue seeing stable production of tea leaves. In this project, we donate, on a continual basis, bookshelves and books to each of the schools that the children of the tea farm workers attend, with the aim of raising the educational level of children who will lead the next generation and to contribute to the stability of farm management. We have already made donations to about 180 schools and plan to continue to increase the number of schools to which donations are made.



Vending machines for the support of the Borneo Green Corridor



On the Malaysian island of Borneo there has been a notable loss of tropical rainforests due to the expansion of oil palm plantations where raw materials for palm oil are produced. A certified NPO corporation Borneo Conservation Trust Japan launched the Ongaeshi Project with the aim of conserving Borneo's biodiversity that has been rapidly deteriorating behind people's life styles, which are becoming more convenient and richer thanks to palm oil. When beverages are purchased from Kirin's support-Borneo vending machines, a portion of the owner's profits are applied to the support funds of the project. As a unique form of support that allows anyone to easily contribute to biodiversity conservation activities, these support-Borneo vending machines have been installed in approximately 200 locations throughout Japan, including offices, schools, buildings, zoos, and construction sites.