



# Biological resources

## Background to Initiatives

Since we announced the Kirin Group Declaration of Support for Biodiversity Conservation in 2010, we quickly became aware of issues primarily related to agricultural raw materials in terms of the environment and human rights in the upstream parts of our value chain and implemented measures to respond to these issues, including conducting risk surveys and assessments of biological resources, as well as announcing the Kirin Group Action Plan for the Sustainable Use of Biological Resources in 2013 and launching related concrete measures. However, demand for due diligence in areas that produce raw materials is increasing, and scenario analysis has confirmed that climate change may significantly impact the yield and quality of agricultural raw materials. Against this backdrop, the Kirin Group will accelerate its efforts to build a society that values sustainable 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



### Production regions

- P.29 ➡ Tea farms
- P.31 ➡ Vineyard
- P.33 ➡ Coffee farms
- P.33 ➡ Hop Fields
- P.34 ➡ Mass plant propagation technology

### Manufacturing

- P.35 ➡ Palm oil
- P.35 ➡ Paper and Printed Materials
- P.35 ➡ Biotopes at manufacturing plants

### Products

- P.36 ➡ Reducing of food waste

- P.34 ➡ Kirin Central Research Institute

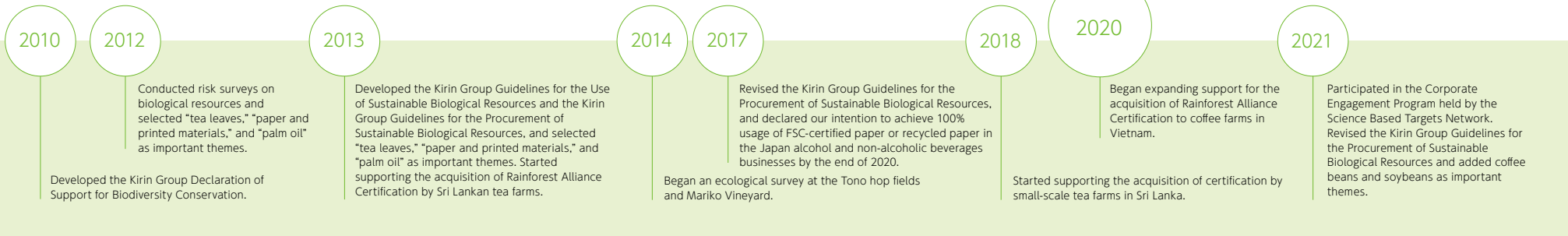
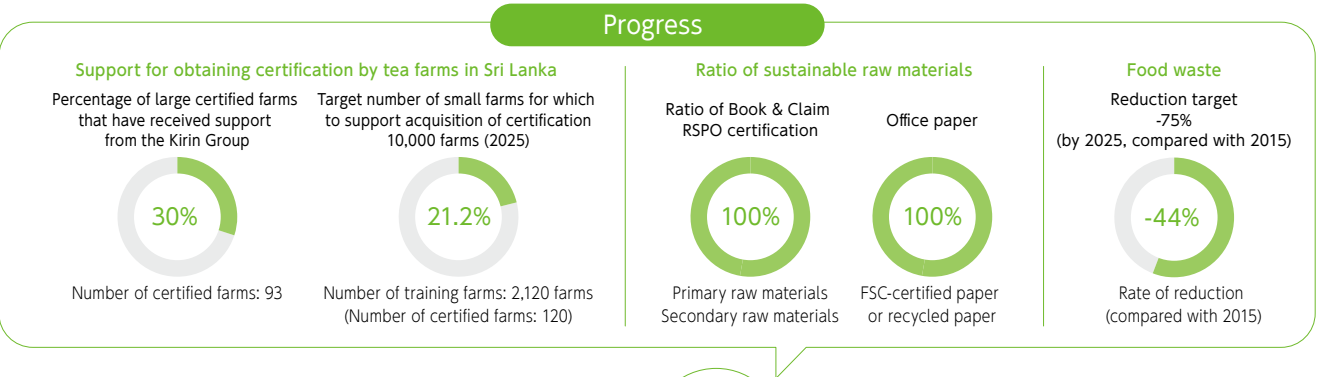
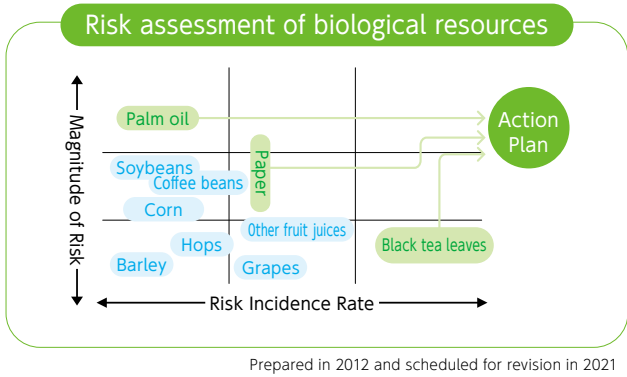
Points

- 93 tea farms have obtained Rainforest Alliance Certified with the support of the Kirin Group, approximately 30% of the total number of large tea farms that have get certified in Sri Lanka. Launched a year-round product that use certified tea leaves.
- Expanded support for the acquisition of Rainforest Alliance Certification by coffee farms in Vietnam. Started training at 350 small farms.
- Achieved 100% use of either FSC-certified paper or recycled paper for all office paper used in the Japan alcohol and non-alcoholic beverages businesses.
- Participated in the Corporate Engagement Program held by the Science Based Targets Network. Participated in the development of scientific approaches and rulemaking to set targets for the use of natural capital by companies (fresh water, land, oceans, resource exploitation, climate change, pollution, and invasive species).

Overview of initiatives

Initiative	Issue	Progress
Initiatives to achieve our vision	Risk assessment	We plan to revise the Kirin Group Action Plan for the Sustainable Use of Biological Resources to add coffee beans and soybeans as important themes.
	Rulemaking	Participated in the Corporate Engagement Program held by the Science Based Targets Network.
Cultivate, expand and procure sustainable agricultural raw materials	Office paper	As of December 2020, we had achieved 100% use of either FSC-certified paper or recycled paper for all office paper used in the Japan alcohol and non-alcoholic beverages businesses (copy paper, envelopes, business cards, etc.).
	Palm oil	The Kirin Group continues to ensure 100% use of RSPO Book & Claim-certified palm oil for primary and secondary raw materials.
	Mass plant propagation technologies	Through joint research with Bridgestone, the Kirin Central Research Institute succeeded in developing a technology that utilizes "bag-type culture production technology," a "mass plant propagation systems," to improve the productivity of natural rubber derived from the "guayule" plant, and began infield assessments.
	Food waste	As we look to achieve our food waste reduction target in the Japan alcohol and non-alcoholic beverages businesses (down 75% by 2025, compared with 2015), we will continue measures such as promoting the use of "year-month labeling" for best-before periods.
Stand by the side of farmers to make raw material production areas sustainable	Tea leaves	We have been continuously supporting the acquisition of Rainforest Alliance Certification by Sri Lankan tea farms since 2013, and as of the end of 2020, 93 tea farms had obtained certification, approximately 30% of the total number of large tea farms that have obtained certification in Sri Lanka. Conducted training on the acquisition of certification at 2,120 small tea farms. Launched a year-round product that use certified tea leaves.
	Coffee beans	In 2020, we began supporting the acquisition of certification by small coffee farms in Vietnam. In 2020, we supported the acquisition of certification by 350 farms, followed by another 350 farms in 2021. We expect these farms to begin acquiring certification from the second half of 2021, when new certification standards are applied.
	Vineyard	Continued ecological surveys to show that converting idle farming land into vineyards for Japan Wine will enrich the ecosystem. From 2018, we added birds, spiders, and earthworms to the existing list of plants and insects subject to surveys, and began researching the impact of maintaining rich ecosystems on grape production.
	Hop fields	The Kirin Group discovered a rare species near a new hop field for BEER EXPERIENCE, in which we invest.

For policies on biological resources→P.90~P.91



# Tea farms

## Support for acquisition of Rainforest Alliance Certification

In 2013, the Kirin Group began supporting the acquisition of Rainforest Alliance Certification by tea farms in Sri Lanka. By the end of 2020, a total of 93 farms had obtained certification thanks to this support, equivalent to approximately 30% of all certified large tea farms in Sri Lanka.

In one year, we sell approximately 1.17 billion bottles\*<sup>1</sup> of *Kirin Gogo-no-Kocha*, making this Japan's leading black tea brand with a share of approximately 50%\*<sup>2</sup> of the packaged black tea market. We have made this tea with tea leaves from Sri Lankan tea farms as an ingredient since its launch 35 years ago. When we conducted a biodiversity risk assessment in 2011, we learned that approximately 25%\*<sup>3</sup> of the Sri Lankan tea leaves imported by Japan were used for *Kirin Gogo-no-Kocha*. In order to build better partnerships with the areas where tea is produced and the people who work there, and to continue producing tasty and safe tea drinks, we continue to support Sri Lanka, a country that we are highly dependent on for ingredients.

### Share of tea leaves imported by Japan by area of production



### Supporting Growers Obtain Rainforest Alliance Certification\*<sup>4</sup>



\*<sup>1</sup> Actual data for 2020

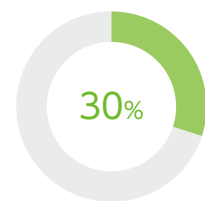
\*<sup>2</sup> Actual data for 2020 based on research conducted by Food Marketing Research Institute Co., Ltd.

\*<sup>3</sup> Source: 2011 Tea Statistics, Japan Tea Association

\*<sup>4</sup> Certification is awarded to farms that meet comprehensive standards for sustainable agriculture to create for a better future for people and nature.

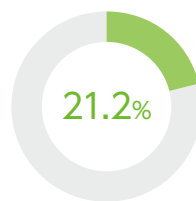
<https://www.rainforest-alliance.org>

Percentage of large certified farms that have received support from the Kirin Group



Number of certified farms: 93

Target number of small farms for which to support acquisition of certification 10,000 farms (2025)



Number of training farms: 2,120 farms (Number of certified farms: 120)

## Products using certified tea leaves

On August 3, 2021, we began year-round sales of *Kirin Gogo-no-Kocha* 250ml LL Slim in paper cartons labeled with Rainforest Alliance certification seal that the product is made from more than 90% of certified tea leaves in Sri Lanka. We will convey the wishes of the farmers who are endeavoring to produce tea leaves in a sustainable manner, while also meeting the expectations of customers who seek beverages they can feel reassured about in terms of the environment and human rights.



## Training content

Rainforest Alliance certification program is made up of three principal pillars of sustainability: "environment," "society," and "economy".

In terms of "environment," tea farms learn how to conserve forests and natural resources by using land, water, and energy carefully. For "society," human rights must be respected on certified farms. Farmers receive training which addresses issues such as child and forced labor, gender equality, discrimination, workplace violence and harassment. They are also required to provide decent housing for workers, and access to sanitation and healthcare for

better and safer places to live and work. In terms of "economy," farmers use agricultural practices that help improve crop yields and reduce costs. Farmers in developing

countries tend to use more agricultural chemicals and fertilizers than necessary, and while this is not the case in Sri Lanka, if agricultural yields do not increase, precious forests are sometimes lost as a result of burning neighboring forests to create new farmland. Training teaches scientific methods to increase yields while reducing the use of pesticides and fertilizers, not only to protect forests, but also to increase farm profits by reducing expenditures and to improve tea leaf safety.

In recent years, Sri Lanka has experienced frequent droughts and heavy rains presumably due to the impact of climate change. Tea farms are often located on steep, sunny slopes, so heavy rainfall not only causes the loss of fertile soil, but there have also been examples of it causing landslides that kill people living on the farms. Therefore, the training teaches farms how to distinguish between grass that is good and bad for tea trees, and instructs tea farms to ensure that the ground in the farm is covered only in good grass with deep roots. This prevents landslides by preventing rain from directly hitting the ground during heavy rain, while also serving to retain water during droughts, making it an effective measure for adapting to climate change.

In 2020, the spread of COVID-19 also led to strict curfew requirements in Sri Lanka. As a result, trainers had a period of three months or so in which they were able to visit farms to provide training for farms to obtain certification, but we are continuing our efforts in this area, while taking sufficient measures to prevent infection.

[More information on the impact of climate change on tea leaves→P.15~P.16](#)





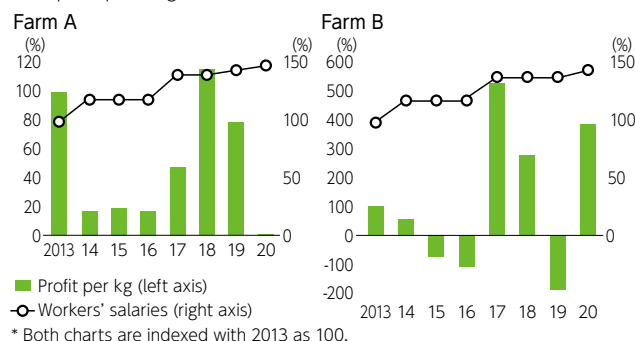
## Social and economic impact of certification

The figure below shows the estimated social impact at a farm in Sri Lanka that has acquired Rainforest Alliance Certification. This data is from a specific farm, and from it, we may say that our support for certification has a positive impact, both financially and socially, on farms and farm workers, and makes areas where raw materials are produced more sustainable. In an effort to achieve greater sustainability, some farms are using some of the training expenses that Kirin provides to conduct research to significantly increase yields and attempt pesticide-free cultivation, as part of measures that go beyond the standards for certification.

### Social impact of supporting the acquisition of Rainforest Alliance Certification

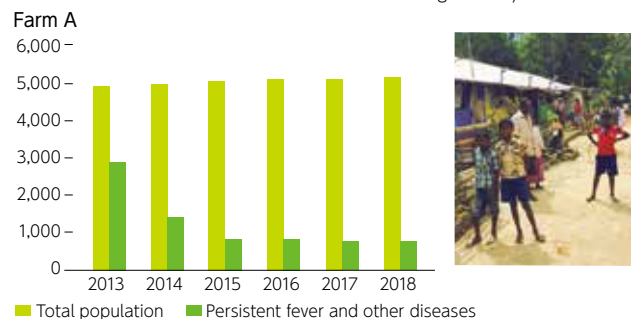
#### Profitability

As profit per kilogram increases, workers' salaries also increase



#### Sanitary conditions

While the total population of the farm is increasing slightly, the number of cases of disease have decreased significantly



\* Farm A and Farm B obtained certification in 2014 and 2015, respectively.

## Support for the acquisition of certification by small farms

In 2018, we began supporting the acquisition of certification by small farms, and by the end of 2020, 120 farms had obtained certification. In 2020, we conducted training for approximately 2,000 small farms, despite the impact of the spread of COVID-19. By 2025, we plan to support the acquisition of certification by 10,000 small farms.

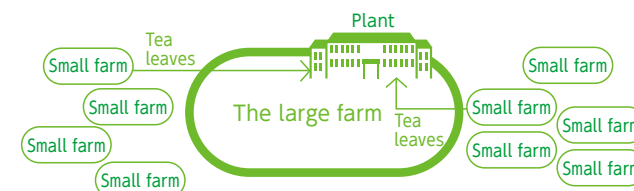
In Sri Lanka there are many small family-operated farms, with the total number said to be in the hundreds of thousands. Nationally qualified collectors collect the tea leaves that small farms produce, and sell them to large nearby farms for processing before shipping. Tea leaves from small farms can sometimes account for as much as half or more of the tea leaves processed in the large farms' plants.

In order to obtain certification for small farms, multiple small farms are organized to form a team and determine a leader. Local trainers first train the leaders, who then train the team's farms, thus ensuring that the small farms learn and acquire an understanding of the farm requirements of the Sustainable Agriculture Standard. For large farms also, the acquisition of certification by small farms will contribute to increasing the



Training posters and booklets distributed with Kirin's support

### Examples of improvements as a result of obtaining certification



amount of certified tea leaves they process and ship at their own plants. As a result, in many cases, we are able to obtain the full cooperation of large farms, including the dispatch of instructors and the opening of training rooms. Since it is necessary, however, to begin by organizing the small farms into a team, it often takes time to start actual training, and the process to obtain certification is perhaps more difficult than the process for large farms.

(more information on the conservation of water sources at tea farms→P.40)



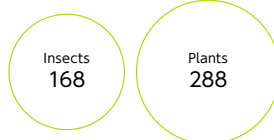
Mr. Giri Kadurugamuwa, a trainer (top left), a farm manager (top right), a small farm owner (bottom left), checking the site (bottom right)

## Vineyard ecological survey for Japan Wine

We have invited researchers from the National Agriculture and Food Research Organization (NARO), and have been conducting ecological surveys of farmland producing raw materials in Japan since 2014. At Château Mercian Mariko Vineyard, on the Jinba Plateau in the Maruko district of Ueda City, Nagano Prefecture, we confirmed the existence of 168 species of insects and 288 species of plants, including endangered species listed in the Red Data Book of the Ministry of the Environment.

Many rare species, including endangered species, have also been found in Jyonohira Vineyard in Katsunuma-cho, Koshu City, Yamanashi Prefecture. Both of these vineyards are cultivated in hedgerow style.

For this reason, we believe that converting idle farming land into hedgerow-style 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 and protection of Japan's traditional rural Satochi-Satoyama landscapes.



Château Mercian Mariko Winery



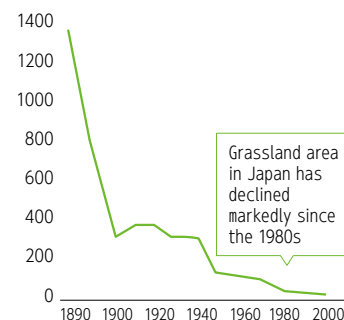
Mariko Vineyard

## Vineyards as vast, good-quality grasslands develop ecosystems

Grassland is a typical example of nature that human intervention protects. 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 (see figure on the right), and grasslands play an important role in conserving biodiversity.

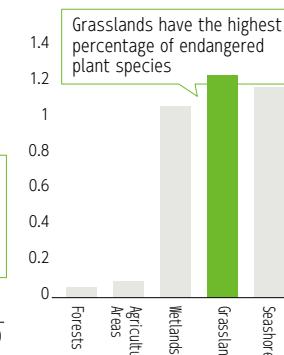
A vineyard cultivated in hedgerow style, with grass grown under the vines, can play a role as a vast good-quality grassland with proper

### Trends in grassland area in Japan



Aggregated from Successive-Year Forest Area Statistics and MAFF Statistical Tables

### Number of endangered species by unit area



Endangered plant species per hectare  
Source: Western Japan Grasslands Research Group (2007)

undergrowth cutting, enabling the development not only of highly fertile plants but also native and rare species. In response to the expansion of the market for Japan Wine, Mercian, whose history dates back to the establishment of the Dainihon Yamanashi Wine Company, Japan's first private-sector winery, plans to expand the vineyards that it manages, which will contribute to the creation of grasslands.

In 2019, in order to also investigate the effects of grass growing on grapes themselves, we began conducting a study of spiders, soil organisms, and birds in the vineyards.

For spiders, we start by investigating what they eat. Surveys of spiders in Japan Wine vineyards are rare, and we have already confirmed the existence of certain spiders in Nagano Prefecture for the first time.

We have also confirmed the existence of 55 birds from 7 species in vineyards, and 87 birds from 21 species in forests adjacent to vineyards. We observed many larks, buntings, pheasants, and tits, suggesting that vineyards are functioning as an alternative to grasslands, which are in sharp decline in Japan. We also found eggs, including lark and bunting eggs, in the vineyards, indicating that they also function as a valuable nest site for birds using the grassland environment.

We are also investigating earthworms, a kind of soil organism, on an ongoing basis.

## Surveys at Jyonohira Vineyard

Jyonohira Vineyard in Katsunuma district of Yamanashi Prefecture is a vineyard operated by Mercian that started vertical shoot positioning cultivation in 1984 in an attempt to produce the finest Cabernet Sauvignon in Japan.

In surveys conducted between 2018 and 2019, we found many rare species, including Japanese bellflower (*Platycodon grandiflorus*) and silver orchids (*Cephalanthera erecta*), which the Red Data Book of the Ministry of the Environment designates as endangered.

More than 30 years have passed since we began cultivation, and we are very careful when cutting the grass, partly because it is a relatively small vineyard, which we speculate is the reason we can see these rare species.



Careful mowing at Jyonohira Vineyard

## Studies into the process of converting idle farming land into vineyards

At Tengusawa Vineyard in Koshu City, Yamanashi Prefecture, we are collaborating with NARO to conduct a research project that is rare even on a global basis, relating to changes in ecosystems as a piece of idle farming land is converted into a hedgerow-style vineyard that can be harvested.

When we investigated idle farming land prior to its cultivation in 2016, we found only insect and plant species extremely lacking in diversity, as a result of damage from deer eating the vegetation. Since we fenced and reclaimed the area in 2017, the landscape has changed to one like a vineyard, and we are seeing how the ecosystem has become richer during this process.

In vegetation surveys, we found that the flora was remarkably low in diversity owing to feeding damage from deer before development, but after development, it gradually changed from a plant colony of annual grass to one of perennial plants. At present, the amount



of nekohagi (*Lespedeza pilosa*) and lawn marshpennywort (*Hydrocotyle*

Rich vegetation inside the fence (left), and outside the fence where there are generally only fountain grass and bull thistles as a result of feeding damage by deer



*sibthorpioides*), both indicator species for the quality of grassland, is increasing, and there are also signs of reedgrass. Through such signs, we have confirmed that the area is becoming a high-quality grassland. The insect survey monitors butterflies as an indicator. Before development of the vineyard, the only noticeable butterflies were the pale grass blue and browns. It appeared the reason for this was because, as we confirmed in vegetation surveys, the diversity of vegetation was extremely low due to feeding damage by deer, and only plants (edible grasses) in that these larvae could eat remained. Around 2019, thanks to the diversification of vegetation on the slopes, the number of edible grasses such as mugwort and red clover increased, and we observed many painted ladies (*Vanessa cardui*), clouded yellows, and common grass yellows.

Considering that we were unable to conduct the survey in the spring of 2020 owing to the COVID-19 pandemic, we expect that the ecosystem has actually become even richer.

#### Evolution of the Tenganawa Vineyard ecosystem

	Butterflies	Plants
2016	14	-
2018	13	43
2019	18	78
2020	19	88

## Revegetation activities

In 2016, under the guidance of specialists, we began activities aimed at regenerating rare and native species with the participation of employees, and we have achieved concrete results.

In fall, we collect dry grass from areas where there are rare and native species and sow it on the reclaimed land in fields in order to regenerate the vegetation. In the area where we regenerated vegetation, the average number of species present in 2016 was 8.2, but by 2020 this number had increased to 17.5. These areas are steadily becoming high-quality grassland, with tufted vetch (*Vicia cracca*), bromes (*Bromus*), lady's bedstraw (*Galium verum*), queen coralbead (*Cocculus orbiculatus*), Thunberg's geranium (*Geranium thunbergii*), toothed ixeridium (*Ixeridium dentatum*), reedgrass, violets, and nekohagi (*Lespedeza pilosa*) also becoming established. Native species with flowers have also become established, and in fall, these areas are like flower gardens.

Furthermore, along with an international NGO, Earthwatch Japan, and its volunteers, we began an activity to revegetate the shrubby sophora (*Sophora flavescens*), which is not a rare species at the national level, but is the sole grass used for feeding *Shijimiaeoides divinus*, a critically endangered IA (CR) butterfly. In 2018, volunteers collected, with the permission of the rice field owners, cuttings of

shrubby sophora from the sides of rice fields near vineyards, and took them home to grow them. Two years later, at the end of May 2021, we planted the seedlings at Mariko Vineyard.

In the fall of 2020, we invited a lecturer from NARO whom we have tasked with ecological surveys of vineyards and held an environmental class for fourth grade elementary school students at the foot of the Jinba Plateau, where Mariko Vineyard is located.

[More information on our engagement with areas that produce grapes→P.82](#)

### Shrubby sophora revegetation activity



In 2019, we took cuttings (top left), which volunteers grew for approximately two years after NARO cultivated them into seedlings, and then we planted them at Mariko Vineyard at the end of May 2021

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



## Rare species found in ecological surveys

### Mariko Vineyard



*Zygaena niphona niphona*

Near threatened species on the Ministry of the Environment and Nagano Prefecture Red List



*Sophora flavescens*

The only edible grass for feeding *Shijimiaeoides divinus*, a butterfly that the Red List of the Ministry of the Environment lists as critically endangered IA (designated as endangered IB by Nagano Prefecture)



*Argyronome laodice japonica*

Vulnerable species on the Ministry of the Environment's Red List. Near threatened species on the Nagano Red List



*Hemerocallis citrina var. vespertina*

Near threatened species on the Nagano Red List



*Leonurus japonicus*

Near threatened species on the Nagano Red List



*Vincetoxicum pycnostelma*

Near threatened species on the Ministry of the Environment and Nagano Prefecture Red List

### Jyonohira Vineyard



*Platycodon grandiflorus*

Vulnerable species on the Ministry of the Environment's Red List and near threatened on the Yamanashi Red List (NT)



*Cephalanthera erecta*

Vulnerable species both the Ministry of the Environment's Red List and the Yamanashi Red List (VU)

## Coffee farms

### Support for acquisition of Rainforest Alliance Certification

Since 2020, the Kirin Group has supported the acquisition of Rainforest Alliance Certification by coffee farms in Vietnam. In 2020, the Kirin Group provided support for training expenses for approximately 350 farms, followed by another approximately 350 small farms in 2021. We are utilizing the knowledge we have accumulated by supporting the acquisition of certification by tea farms in Sri Lanka since 2013 to expand our activities to coffee farms in Vietnam.

In 2019, approximately 30% of the coffee beans the Kirin Group imported came from Vietnam, for use in *Kirin FIRE* and other products. On the other hand, most coffee farms in Vietnam are small farms, and there are farmers who suffer from reduced yields or use chemical fertilizers inappropriately owing to a lack of appropriate educational opportunities. In 2019, we conducted 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. We expect that our support for the acquisition of certification, which we began in 2020, will enhance the sustainability of small farms in production areas and contribute to the stable use of high-quality raw materials in the future.



Group training

Practical training at a farm



Coffee farm with shade trees

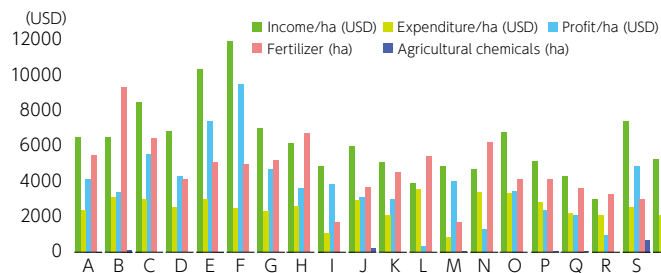
Coffee farm without shade trees

### Training based on data analysis

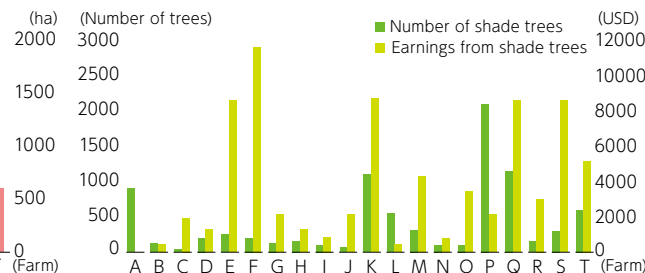
We took advantage of the period when a strict lockdown was imposed in Vietnam owing to the COVID-19 pandemic to collect and analyze detailed data online, including the ratio of chemical fertilizers and agricultural chemicals to the income and expenditure of each small farm, the number of fruit trees and other shade trees that prevent soil drying in direct sunlight and the depletion of coffee trees, and earnings from fruits harvested from those trees. Based on this information, we created a program that we use to provide training that is convincing to farmers.

[More information on the impact of climate change on coffee beans→P.15~P.16](#)

### Profit structure of small coffee farms in Vietnam



### Data on shade trees in coffee farms in Vietnam



## Hop Fields

### Hop fields living species survey

We have been conducting an ongoing living species survey in the hop fields of contracted farmers in Tono City 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 five meters, from the effects of the wind.



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

Insects  
104

Birds  
19

In the fall of 2020, we conducted a survey of the vegetation in the new hop fields of BEER EXPERIENCE, an agricultural corporation funded by Kirin Brewery, in Tono City. As a result, we found there were *Corydalis raddeana*, which are designated as "Near threatened" in the Ministry of the Environment's Red Data Book, as well as *Cynoglossum asperum*, which is designated as "Near threatened" by Iwate Prefecture. In a survey we conducted in spring 2021, we found *Adonis ramosa*, designated as a "Vulnerable" species by Iwate Prefecture, as well as *Anemone debilis* and *moschatel* (*Adoxa moschatellina*), which are both designated as "Near threatened" by Iwate Prefecture. Next to the hop fields, there are creeks flowing into nearby rice and farm irrigation canals, and the area is also surrounded by forests, ensuring that the soil contains sufficient moisture.

We farm the hop fields every year, so the fields themselves do not have the function of enriching vegetation. However, it is fair to say that the creation and maintenance of windbreak forests to aid in the cultivation of hops and the continued functioning of hop fields as rich ecosystems in Japan's traditional rural Satochi-Satoyama landscapes both contribute to the richness of vegetation.





# Mass plant propagation technology

## Kirin's proprietary mass plant propagation technology

Recently, various sectors are increasingly focusing on the Kirin Group's proprietary mass plant propagation technology, which we began researching based on our long use of plants such as hops and barley as ingredients for beer, as a technology that will resolve social issues. Kirin's 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, cuttings, etc., but the cultivation period is limited and the growth rate can be quite 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 the TCFD recommendations that we have conducted since 2018 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.

## Bag-type culture vessel technology

The resin film bag-type culture vessel system that Kirin has developed for mass plant propagation technology offers the advantages of high production and operational efficiency, light weight, low cost, high operational safety, and flexibility in adjusting production size. We aerate a solution containing nutrients necessary for plant growth 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. We developed the bag-type culture vessel system from research on the micro tuber method for potato propagation and have enhanced it for use in other propagation technologies.



Bag-type culture vessel system

## Social impact of mass plant propagation technology

Through joint research with Bridgestone, the Kirin Central Research Institute succeeded in developing a technology that utilizes "bag-type culture vessel technology," a production technology underpinning the commercialization of "mass plant propagation technology," to improve the productivity of natural rubber derived from the "guayule" plant, and began infield assessments. "Rubber trees," which are the main source of natural rubber today, are concentrated in the tropical zones of Southeast Asia, so there is a risk of decreased yields owing to climate change. "Guayule," however, can be grown in arid areas such as deserts, and is thus expected to result in greater capacity to respond to this risk.

## Regeneration of coastal forests in the Tohoku Region

For two years from 2014, the Kirin Central Research Institute participated 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 worked to regenerate the coastal protection forests that suffered devastating damage from the tsunami in 2011.



Cultivation of asexual embryos



Trial planting of seedlings cultivated from asexual embryos

Status of trial planting study at Kirin Brewery Sendai Plant

\* 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 to reproduce growth patterns similar to those under the same atmospheric pressure as on the earth.

## TOPICS

## Kirin Central Research Institute

Kirin Central Research Institute conducts research centered on health science. By combining our diverse strengths and technologies with those in other fields, we promote open innovation and create opportunities for new businesses and services.

Our strengths include: "raw material cultivation and production" technology, of which "mass plant propagation technology" is a representative research achievement; technology for "identifying and evaluating substances with health functions," which has discovered a constituent of aged hops that reduces body fat and a constituent of camembert cheese that improves memory function; technology for the "production of functional substances," which uses microorganisms such as *E. coli* and mold to ferment and produce raw materials for pharmaceuticals and bioactive substances; and "advanced constituent analysis" technology, which uses a combination of structural analysis called the crystalline sponge method, instrumental analysis, and information analysis to identify target constituents in samples and identify their structures in detail.

The Kirin Central Research Institute also successfully produced *Lactococcus lactis* (LC) Plasma, which we registered with Japan's Consumer Affairs Agency (CAA) last year for the first time in Japan as a Food with Function Claims (FFC) for the immune system.



## Palm oil

### 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 adopt 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 palm oil used as a primary raw material every year since 2013 and the estimated total volume used as a secondary raw material from 2014. In March 2018, we became an associate member of the RSPO. We will continue to promote the use of sustainable palm oil.

Ratio of Book & Claim  
RSPO certification



Primary raw materials  
Secondary raw materials

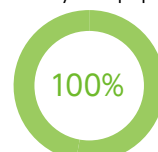
## Paper and Printed Materials

### Use of sustainable paper and printed materials

In the Action Plan that we revised in February 2017, we declared our aim of using 100% FSC-certified paper or recycled paper in the Japan Non-alcoholic Beverages Business for all office paper such as copy paper, envelopes, business cards, company brochures, and other printed materials, as well as paper containers, by the end of 2020. We successfully completed the switch to 100% FSC-certified paper or recycled paper in November 2020.

Currently, we are also promoting the use of FSC-certified paper for paper bags with the KIRIN logo, application postcards for prizes, and some paper cups for tasting. We plan to expand these activities to other domestic and overseas businesses in the future.

FSC-certified paper  
or recycled paper



Paper and  
Printed Materials

More information on paper containers and packaging → P.48



### Book donations to elementary schools in Sri Lanka

In 2007, the year following the 20-year anniversary of *Kirin Gogo-no-Kocha*, we launched the Kirin Sri Lanka Friendship Project to further strengthen ties with Sri Lankan tea farms and continue to ensure stable production of tea leaves.



In Sri Lanka, unlike in urban areas, schools in rural areas such as those well known as tea-producing areas usually do not have class libraries or substantial libraries, which are taken for granted in Japan. The Kirin Group donates quality books to elementary schools for the children of tea farm workers, and continues to help children improve their academic abilities and envision their dreams for the future. We have already made donations to over 200 schools and plan to continue to increase the number of schools to which donations are made.

### Black panther protection activities

The black panther, thought to be extinct, was discovered in Sri Lanka's forests in 2020. The black panther is said to be a mutation of the Sri Lankan leopard, which is listed on the IUCN Red List. Kirin Beverage provides financial support for the black panther protection effort.

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



Kirin Beverage endorses the *Ongaeshi "Rewarding" Project* sponsored by the Borneo Conservation Trust Japan, a specified NPO that conserves Borneo's biodiversity, and operates vending machines that support Borneo and enable users to make donations to the project. We have installed these vending machines in approximately 200 locations throughout Japan, including offices, schools, general buildings, zoos, and construction sites.

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

At the Kirin Brewery's Yokohama Plant, in an endorsement of the "Yokohama b Plan," the city's biodiversity action plan, we built a biotope in the grounds of the plant in the summer of 2012. The Yokohama Brewery, which is part of a widespread network of ecosystems, is pursuing initiatives to enrich the local ecosystem as a whole. Also, while it was not possible to conduct these activities in 2020 as a result of the COVID-19 pandemic, since 2012, the brewery has conducted "Tours to Experience the Blessings of Nature" every week from spring through fall, in collaboration with the Tsurumi River Catchment Network, an NPO with a deep base of knowledge related to the region's natural environment.

The Kirin Brewery's 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 that we set up in 1997. This biotope functions as a "refuge biotope" for the protection and cultivation of local endangered species.

The Kirin Brewery's Okayama Plant has been promoting a program for the artificial breeding of the kissing loach (*Parabotia curtus*), which has been 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 in the brewery grounds.



The Okayama Brewery biotope

## ➡ Reducing of food waste

### Reducing losses from disposing of products

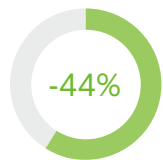
In order to reduce losses from disposing of products on an ongoing basis, we optimize production by improving demand forecasts through means such as the close sharing of information on factors affecting demand, such as retail sales, with plants and logistics centers. In addition, we will move forward with efforts to prevent valuable biological resources and containers and packaging from going to waste by strictly managing sales volume targets.

[More information on the change to "year-month" labelling for production dates→P.67](#)

[More information on reducing CO<sub>2</sub> emissions by reducing the weight of containers→P.63](#)

Since 2013 at Kirin Beverage and since 2020 at Kirin Brewery, we have been moving to "year-month labeling" for labeling best-before periods and production dates. By easing the way in which we label best-before periods and production dates, we expect to reduce environmental loads across the supply chain (CO<sub>2</sub> emissions from transporting between distribution centers and transport-related activities, etc.) and minimize inefficiencies (e.g., storage space in logistics warehouses and loading and unloading tasks at stores), and make a significant contribution to reducing losses from disposing of products.

Reduction target -75%  
(by 2025, compared with 2015)



Kirin Brewery  
Kirin Beverage  
Mercian

\* Actual data for fiscal 2019

Submitting a commitment  
expressing support for the  
United Nations Food Systems  
Summit 2021



The Kirin Group has made a commitment expressing our support for the United Nations Food Systems Summit 2021 (FSS) to be held in New York in September 2021. In future, we will promote initiatives that contribute to the transformation of sustainable food systems.

### Recycling

#### Recycling spent grains from beer mashing as livestock feed

**Kirin Brewery** **Myanmar Brewery**

Production processes for beer, low-malt beer, and other products generate spent grains after extracting flavor during the mashing process. Because such spent grains contain residues of nutritious substances, we utilize them efficiently as livestock feed for cattle, for growing mushrooms, and other applications.



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.

#### 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

#### Effective use of shochu lees

**Kirin Holdings** **Mercian**

Since 2015, we have been supplying some of the distillation residue (shochu lees) generated in the shochu production process at Mercian's Yatsushiro Plant to hog farmers in Kumamoto Prefecture. Farmers used approximately 80% of the shochu lees produced in 2019 as livestock feed.

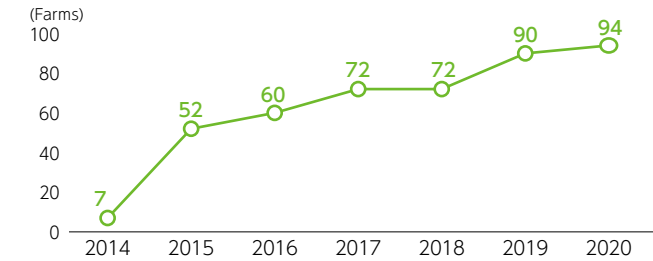
In 2019, Kirin Holdings, Mercian and the University of Tokyo jointly confirmed for the first time in the world that shochu lees can reduce stress among hogs and improve pork palatability, demonstrating the potential for the effective use and creation of value from shochu lees.

#### Specific initiatives and targets (commitments)

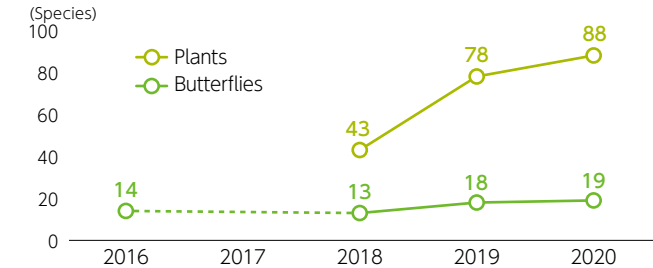
- By the end of 2025, we will have supported the acquisition of Rainforest Alliance Certification by 10,000 small tea farms in Sri Lanka, and we will continue to provide support thereafter.
- By the end of 2021, we will have supported the acquisition of Rainforest Alliance Certification by 700 small coffee farms in Vietnam, and we will continue to provide support thereafter.
- In 2020, Kirin Brewery, Kirin Beverage, and Mercian achieved the goal of using 100% FSC-certified paper for all paper containers. We will expand this goal throughout the entire Kirin Group, including overseas companies.
- We will continue to procure all palm oil through procedures approved by the Roundtable on Sustainable Palm Oil (RSPO).

## Graphs of biological resources

### Number of tea farms obtaining certification in Sri Lanka



### Recovery of Tengusawa Vineyard ecosystem



\* There was no ecological survey in 2017, and we began plant surveys in 2018.

### Food waste reduction rate (compared with 2015)

