FFPRI

National Research and Development Agency
Forest Research and Management Organization

Forestry
and
Forest Products
Research Institute

Message from the Director General

Forest Research for Achieving Sustainable Development Goals

Sustainable Development Goals (SDGs) address issues affecting the entire planet while attempting to realize a sustainable society. Goal 15 outlines the "sustainable use of terrestrial ecosystems" and is an important goal for the Forestry and Forest Products Research Institute (FFPRI). However, because forests provide a wide variety of ecosystem services, we are concerned with a wide range of objectives in addition to goal 15. Indeed, the FFPRI conducts comprehensive researches on all aspects of forests to realize a sustainable society.

In the current era, our lives considerably depend on non-renewable and depleting resources such as fossil fuels and minerals. In contrast, the services and resources provided by forests are renewable. However, if mishandled, such resources can also deplete. Therefore, forests and other renewable resources will play a vital role in creating sustainable societies in the future. Forest researchers are vital to this process, as they conduct key research necessary to realize SDGs by the target year of 2030 as well as 2050, the target year for achieving zero carbon emissions.
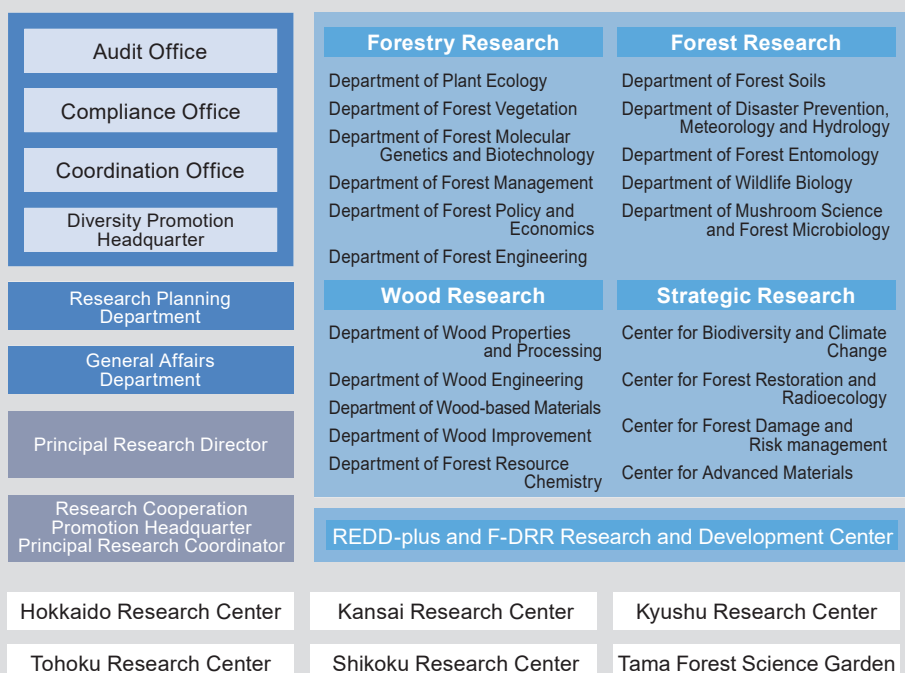
During its history of over 110 years, the FFPRI has been conducting interdisciplinary research on forests, forestry, the timber industry, and tree breeding. We have paved the way for transdisciplinary research with existing stakeholders. Going forward, I hope the FFPRI can co-design and collaborate more diverse stakeholders (international organizations, government officials, industry leaders, educational institutions, forest owners, beneficiaries of ecosystem services, and future generations) on forest-related research. We look forward to collaborating with you in the future in a variety of ways.

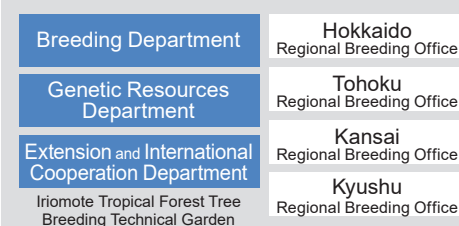Tohru Nakashizuka (Toru Asano)
Director General of FFPRI

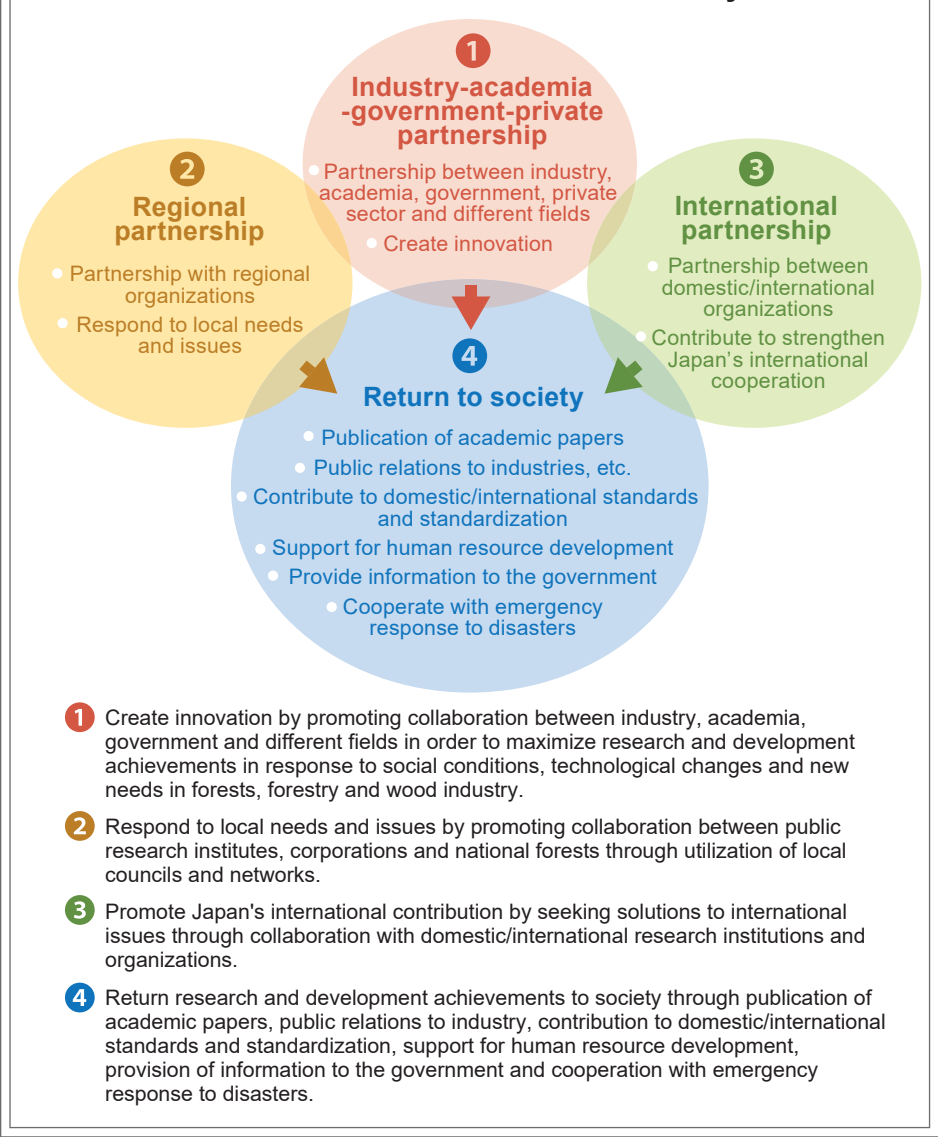# Organization

Forestry and Forest Products Research Institute

Audit Office

Compliance Office

Coordination Office

Diversity Promotion Headquarter

Research Planning Department

General Affairs Department

Principal Research Director

Research Cooperation Promotion Headquarter
Principal Research Coordinator

Forestry Research
Department of Plant Ecology
Department of Forest Vegetation
Department of Forest Molecular Genetics and Biotechnology
Department of Forest Management
Department of Forest Policy and Economics
Department of Forest Engineering

Forest Research
Department of Forest Soils
Department of Disaster Prevention, Meteorology and Hydrology
Department of Forest Entomology
Department of Wildlife Biology
Department of Mushroom Science and Forest Microbiology

Wood Research
Department of Wood Properties and Processing
Department of Wood Engineering
Department of Wood-based Materials
Department of Wood Improvement
Department of Forest Resource Chemistry

Strategic Research
Center for Biodiversity and Climate Change
Center for Forest Restoration and Radioecology
Center for Forest Damage and Risk management
Center for Advanced Materials

REDD-plus and F-DRR Research and Development Center

Hokkaido Research Center

Tohoku Research Center

Kansai Research Center

Shikoku Research Center

Kyushu Research Center

Tama Forest Science Garden

Forestry and Forest Products Research Institute
Forest Tree Breeding Center

Breeding Department

Genetic Resources Department

Extension and International Cooperation Department

Iriomote Tropical Forest Tree Breeding Technical Garden

Hokkaido Regional Breeding Office

Tohoku Regional Breeding Office

Kansai Regional Breeding Office

Kyushu Regional Breeding Office

Forestry and Forest Products Research Institute
Forest Bio-Research Center

What FFPRI aims for

Maximization of Research and Development Achievements and Return to Society

❶ Industry-academia-government-private partnership
- Partnership between industry, academia, government, private sector and different fields
- Create innovation

❷ Regional partnership
- Partnership with regional organizations
- Respond to local needs and issues

❸ International partnership
- Partnership between domestic/international organizations
- Contribute to strengthen Japan's international cooperation

❹ Return to society
- Publication of academic papers
- Public relations to industries, etc.
- Contribute to domestic/international standards and standardization
- Support for human resource development
- Provide information to the government
- Cooperate with emergency response to disasters

❶ Create innovation by promoting collaboration between industry, academia, government and different fields in order to maximize research and development achievements in response to social conditions, technological changes and new needs in forests, forestry and wood industry.

❷ Respond to local needs and issues by promoting collaboration between public research institutes, corporations and national forests through utilization of local councils and networks.

❸ Promote Japan's international contribution by seeking solutions to international issues through collaboration with domestic/international research institutions and organizations.

❹ Return research and development achievements to society through publication of academic papers, public relations to industry, contribution to domestic/international standards and standardization, support for human resource development, provision of information to the government and cooperation with emergency response to disasters.

Budget
Fiscal Year 2024 Budget

(Unit: million Yen)

Operational grants-in-aid	10,259
Facilities maintenance subsidies	424
Trust revenue	708
Miscellaneous revenue	29
Total	11,421

Number of Staff
as of 1 April 2024

Researchers	480 (82)
Officers	276 (74)
Total	756 (156)

Numbers in parentheses indicate those of women.

Employees who are temporary, on administrative leave, or re-employed are included.

History

1905
Inaugurated as a forest experiment unit of the Forest Bureau in the Ministry of Agriculture and Commerce at Meguro in Tokyo

1910
Renamed the Forest Experiment Station, Forest Bureau, Ministry of Agriculture and Commerce

1947
Reorganized as the Forest Experiment Station, Forest Bureau, Ministry of Agriculture by unifying the forestry experiment organizations under an integrated Forestry Administration

1978
Moved from Meguro Ward in Tokyo to Tsukuba Science City

1988
Reorganized and renamed the Forestry and Forest Products Research Institute (FFPRI)

2001
Established as an incorporated administrative agency, and, as part of Administrative reform, started the first midterm plan (2001-2005)

2006
Started the second midterm plan (2006-2010)

2007
Integrated with the Forest Tree Breeding Center

2011
Started the third midterm plan (2011-2015)

2015
Started as the National Research and Development Agency

2016
Started the 4th midterm Plan (2016–2020)

2017
Renamed the Forestry and Forest Products Research Institute of the Forestry Research and Management Organization

2021
Started the 5th midterm Plan (2021–2025)

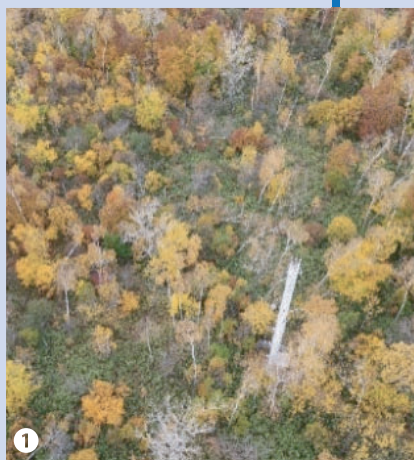# Research and Development
Three Key Challenges

1. Research and development for the fulfilment of the multiple functions of forests in a changing environment

We will develop forest management technology that ensures forests perform their multiple functions to contribute to national resilience and solutions to environmental issues related to domestic and oversea forests.

Research and development for mitigation and adaptation to climate change impacts

We will improve monitoring and accounting methods in order to more accurately determine the amount of greenhouse gas absorption and emission by forests. We will also develop methods to evaluate and predict the effects of climate change on forests and forestry by enhancing in various climate zones ranging from the boreal to the tropics and by understanding the actual conditions of forest growth and the effects of environmental change. Furthermore, we will develop forest management methods aiming to mitigate the effects of climate change, and conduct research and development to adapt to climate change by utilizing and enhancing the multifunctional role of forests.

① Observing the carbon balance of a natural forest from an observation tower
② Observing the soil greenhouse gas emission and uptake
③ Converting a tropical forest to farmland

Research and development for sustainability based on biological diversity and functions of forests

We will gather information about forest ecosystem dynamics and the genome sequences of the main tree species as underlying information for forest biodiversity, and use it to project changes in the biodiversity. We will also develop technology to reduce risks to biodiversity from invasive alien species (e.g. Pallas's squirrel) and emerging zoonotic diseases derived from forest life (e.g. ticks). Furthermore, we will present methods of forest management that sustain the biodiversity-delivering benefits of forest ecosystems.

① A survey of ticks that mediate zoonotic diseases. Tick can be sampled by flagging using a white flannel cloth. The upper-left photo is an adult female tick of *Ixodes ovatus*.

② A multifaceted survey on the impact of forest management on forest biodiversity

マレーズトラップ
枝条・丸太トラップ
林内（枯死材性昆虫）
林床の枝条（枯死材性昆虫）
地表面（地表性昆虫）
落とし穴トラップ

Research and development for forest conservation and disaster risk reduction

We will develop and advance technology for evaluating and projecting the impact of forest management and climate change on the water resource conservation function and material cycles of forests, technology for making projections based on clear understandings of the dynamics of radioactive cesium through material cycles in forests, and technology for evaluating the sediment or avalanche disaster risks in mountainous area and forest damages by extreme weather events. We will also observe and publish data on the quantity and quality of runoff from forest basins, forest microclimates, and snow pack for preventing disasters by snow as the foundational long-term data needed to evaluate the forest functions of environmental conservation.

① A cedar forest damaged caused by strong winds

② Taking bark and wood samples in a survey of radioactive pollution in a forest

Development of techniques for biological damage control, mushroom cultivation and microorganism application

We will develop technologies to efficiently reduce damages on forests, forest trees and other forest products including mushrooms caused by wild animals, insects, and diseases, in order to respond to the increased risks of these biological damages due to climate change, invasive species and other events in recent years. We will also develop methods concerning to cultivation of edible mushrooms and effective utilization of forest microorganisms for consistent availability of forest resources, thereby facilitating reinvigorate rural mountain villages. Furthermore, we will operate the Microbial Genetic Resources of FFPRI Genebank and the Wildlife Information Collection System.

① A red-necked longhorn beetle (an invasive alien species)

② *Tuber japonicum*, a truffle species distributed in Japan

Research and development for the advancement of wood use technology and the expansion of demand

With the aim of increasing demand for lumber and wood while using forest resources sustainably, we will research and develop technology to make contributions in many areas, including adding value to large-diameter logs and fast-growing trees sourced in Japan; developing and promoting the use of cross-laminated timber (CLT) and other new wood-based materials; advancing the durability and safety, and maintaining the performance of wood-based materials and structures; and creating the distinct comfort of wood. We will also gather wood samples—mainly of valuable species grown in Japan—to establish a database for uses such as identifying wood species.
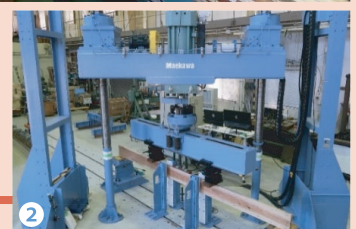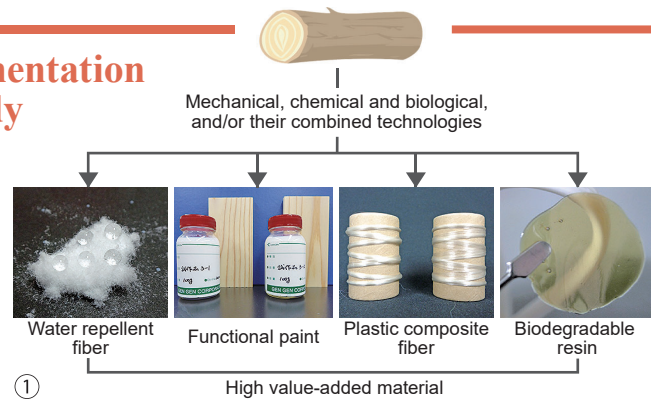

① Examining methods of sawing large-diameter timber

② Evaluating the performance of full-scale construction members

Research and development for the expansion of social implementation of new woody materials and woody biomass energy

We will develop functional materials from wood components such as cellulose, hemicellulose, lignin, and extracts by using mechanical, chemical, and biological, and/or their combined technologies. Especially, we develop the value added and versatile materials to meet the social needs, and the efficient technologies to produce them. To produce electricity and heat from wood biomass in small scale facilities which is suitable for local area, we also develop the technologies to supply low cost wood biomass, to stabilize fuel quality and to evaluate economic efficiency.

① Development of functional materials from wood components
② "Wood liquor" expected as a novel use of wood biomass
③ "Willows" expected as a low-cost wood biomass

Mechanical, chemical and biological, and/or their combined technologies

Water repellent fiber | Functional paint | Plastic composite fiber | Biodegradable resin

① High value-added material

2. Research and development for the realization of a recycling-oriented society and the promotion of mountain villages through the use of forest resources

We will help create a safe, secure, prosperous recycling society by developing technology for revitalizing rural mountain villages and the integrated development of forest-related industries from upstream to downstream through the sustainable use of wood resources and forest spaces.

Research and development for the sustainable supply of forest products and the promotion of multiple uses of forest landscape

It is necessary to support the development of rural mountain villages by establishing sound forest management under which wood and forest products are consistently supplied and allocated and the value of the products is distributed fairly, all while forests are used sustainably. Toward that end, we will develop technology that leverages new measuring and data processing techniques to evaluate, plan, and manage forest resources; technology for using diverse forest spaces; and safe forest management techniques based on artificial intelligence and various forms of sensing. We will also conduct research to present strategies for using lumber sustainably and creating new demand for wood.
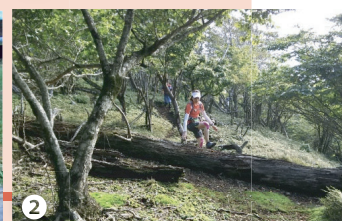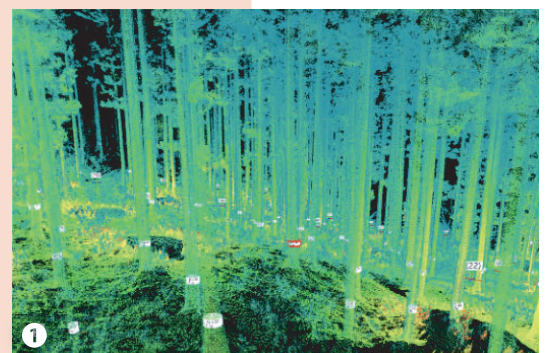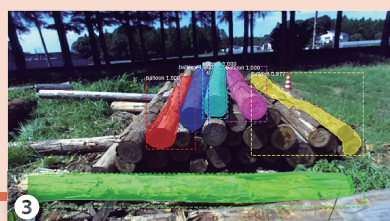
① Digitalizing forests using LiDAR
② Diverse usage of forest space (trail running)
③ Identifying logs using AI

3. Forest tree breeding for the creation and conservation of diverse forests and the sustainable resource uses

We will make efforts for genetic improvement (forest tree breeding) for producing superior seedlings which will contribute to future forest enhancement and sustainable development of forestry. We also endeavor for developing technology for genetic diversity conservation of forest tree species.

## Development of various superior varieties by improving the forest tree breeding bases

We will develop the second generation plus-trees with superior growth and wood quality, superior varieties such as less-pollen cedar and pine wilt nematode tolerant pines, to respond various economic and social needs including reduction of reforestation cost, reducing pollen dispersal from forests, preventing global warming and conserving biodiversity. We will also make efforts to collect and preserve forest tree genetic resources including endangered species and future breeding materials for the aforementioned purposes, and to collect genome information as a base for advancing breeding technologies.

154cm / 240cm / 343cm

Ordinary seedling | First generation plus-tree | Second generation plus-tree
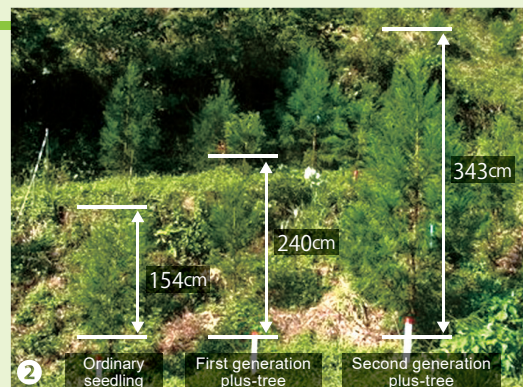
① A pine variety which is tolerant against pine wilt nematode

② The second generation plus-tree clones with superior growth

③ Cutting propagation of fast-growing Chinese fir

Advancement and extension of forest tree breeding techniques and promoting the deployment of specified mother trees

We will develop technologies to conduct forest tree breeding more efficiently and in a shorter period, and technologies enabling long-term preservation of seeds, pollen and other genetic resources of forest trees for future use. Additionally, for the sake of making the outcomes of forest tree breeding available to society, we will produce and distribute the clonal foundation stock seedlings of specified mother trees originated from the second generation plus-trees or various superior varieties, and we will also provide technical guidance domestically or cooperate with countries around the world in the field of forest tree breeding and distribute genetic resources of forest trees as materials for various scientific research disciplines.
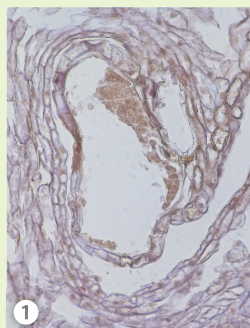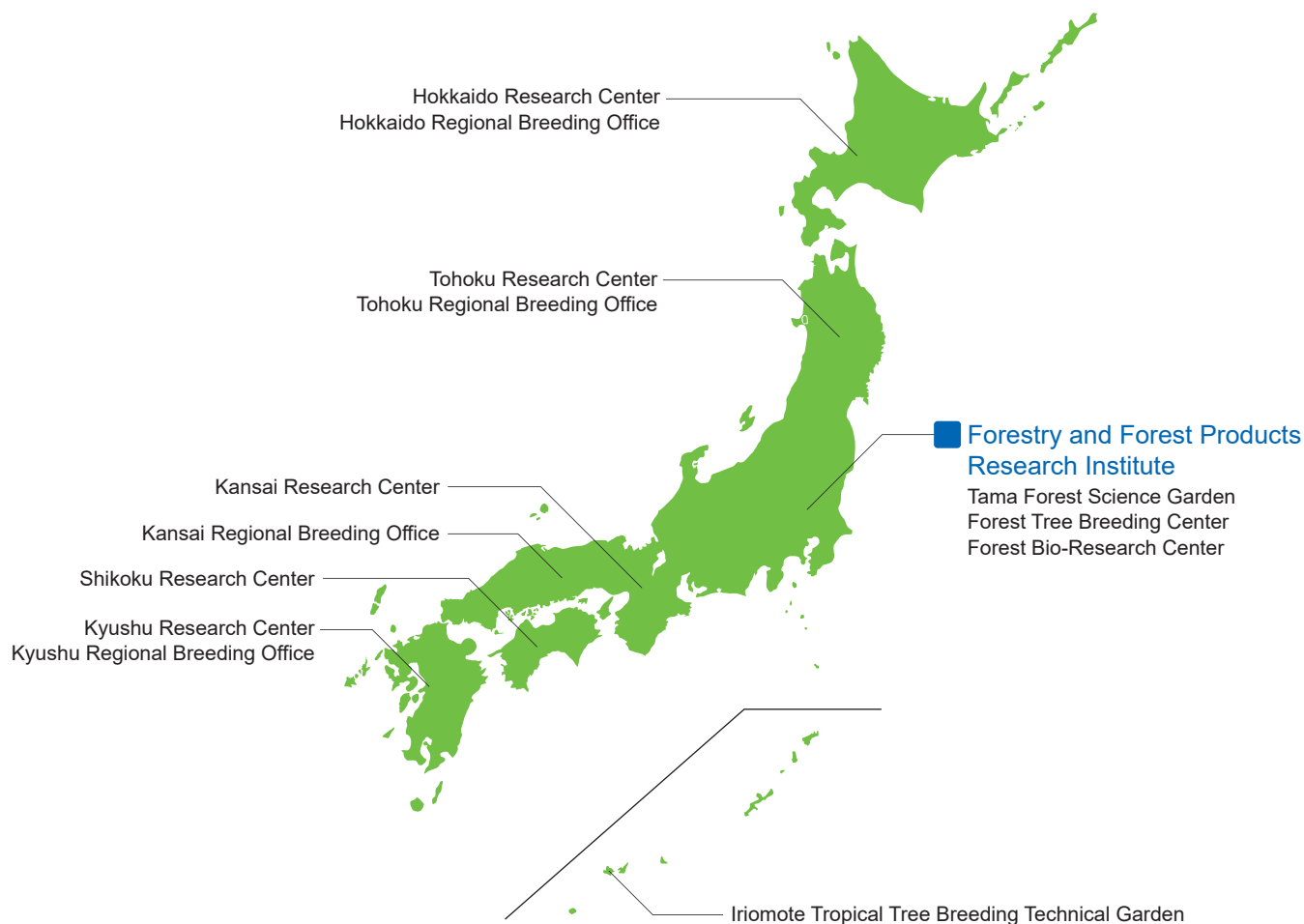
① Pollen sac, where pollens are not formed normally, of male strobilus of Japanese cedar modified into male sterile by genome editing

② The production and distribution of clonal foundation stock seedlings of the specified mother trees and superior varieties based on the needs from relevant organizations such as prefectural governments

③ Breeding of *Melia volkensii*, an indigenous tree species in Kenya adapting to semi-arid regions

Contribution to the UN Sustainable Development Goals

The 2030 Agenda, which was adopted by all United Nations Member States in 2015, listed "Sustainable Development Goals (SDGs)" consisting of 17 goals and 169 targets in order to achieve a better and more sustainable future for all by 2030. SDGs pledge "No One is Left Behind" through the implementation process.

In this overview, SDG icons are used to illustrate how our research contributes to the achievement of these goals.

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National Research and Development Agency
Forest Research and Management Organization

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Forest Tree Breeding Center

Forest Bio-Research Center

2024.09 1000