

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 overseas 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 An experiment to cut cedar trees off from precipitation to visualize expected dryness due to climate change
- 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

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