Address by the president, Haruo Sawada

Forests are the largest terrestrial natural resource capable of converting solar radiation into organically available energy and thus supporting the Earth’s environment. Earth would be inhospitable to life without forests because they play a key role in energy and material cycles. Forests have various other functions, such as land conservation, watershed protection, biodiversity conservation, and wood production. These functions enable humans to safely and pleasantly live in this world.

Clarifying these forest functions and their responses to environmental changes is necessary to integrate scientific knowledge into forest management for sustainable development of human society.

The Forestry and Forest Products Research Institute (FFPRI) is engaged not only in the research and development of forest science but also in the practical matters of forestry and forest production. FFPRI seeks to establish a sound, balanced, and harmonious society through contributions to science and technology, governmental policy, social activity, and international cooperation.

FFPRI was reformed and became an institute of the National Research and Development Agency on April 1, 2015. The Center for Forestry and Agriculture Development has shifted its focus and changed its name to the more specific “Forest Management Center” in addition, the “Forestry Insurance Center” has been newly added to the FFPRI.

Mission Statement

Mission
To contribute to sustainable development of a world blessed with richness and diversity of forest, through research on forest, forestry and forest products

Vision
To be a leading forest research institute vital to Japan’s future

Tasks
To contribute substantially to
1. Development of science and technology
2. Implementation of administrative measures
3. Stimulation of social activities
4. Promotion of international cooperation

— 2 —
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<table>
<thead>
<tr>
<th>[Research and Tree Breeding]</th>
<th>[Forestry Insurance Center]</th>
<th>[Forestry Management]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BUDGET (unit: million Yen)</strong></td>
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<td><strong>BUDGET (unit: million Yen)</strong></td>
</tr>
<tr>
<td>Fiscal year 2015</td>
<td>Fiscal year 2015</td>
<td>Fiscal year 2015</td>
</tr>
<tr>
<td>Operational grants-in-aid</td>
<td>Operating revenue</td>
<td>Government subsidy</td>
</tr>
<tr>
<td>Facilities maintenance subsidies</td>
<td>Total</td>
<td>Long-term loans</td>
</tr>
<tr>
<td>Trust revenue</td>
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<td>Operating revenue</td>
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<td>Miscellaneous revenue</td>
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<td>Total</td>
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<tr>
<td>Balance carried forward</td>
<td>10,936</td>
<td>Government grant</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Long-term loans</td>
</tr>
<tr>
<td><strong>NUMBER OF STAFF</strong></td>
<td><strong>NUMBER OF STAFF</strong></td>
<td><strong>NUMBER OF STAFF</strong></td>
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<tr>
<td>Executives</td>
<td>Executives</td>
<td>Executives</td>
</tr>
<tr>
<td>Researchers</td>
<td>Researchers</td>
<td>Officers</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
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<tr>
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<td>358</td>
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<tr>
<td>722</td>
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</tbody>
</table>
MIDTERM PLAN (2011-2015)

As one of the core research institutes in Japan, the Forestry and Forest Products Research Institute accumulates scientific knowledge and promotes the following prioritized themes in research and development, forestry insurance service, and forest management for water resources to adequately meet the needs of the government and society.

【Research and Development】
1. Development of forest management technologies and systems for forest and forestry revitalization
   A. Development of technologies for diversified forest management corresponding to regions
   B. New forest production technology and forest management systems to establish a sustainable domestic wood supply
2. Development to promote wood use and the development of technologies on the total usage of ligneous resource for forestry revitalization
   C. Technology development to promote wood use
   D. Development of technologies for the total usage of woody biomass generating new demand
3. Research to prevent global warming, soil and water conservation, biodiversity conservation
   E. Advancing evaluation techniques of climate change impacts on forests and the development of technologies of mitigation and adaptation
   F. Development of technology to conserve water resources and mitigate landslide hazards for adaptation to global climate change
   G. Development of technologies for the conservation, estimation, management and utilization of forest biodiversity
4. Development of new tree variety and research for utilization of biological functions
   H. Accelerating the development of new tree varieties
   I. Clarification of the biological functions of forest genetic resources and the development of biotechnology for their utilization
5. Promotion of collection, maintenance, and utilization of information for research base
6. Collection and conservation of forest tree genetic resources and distribution of the superior varieties and forest tree genetic resources

【Forestry Insurance Service】
1. Ensuring usefulness for insureds
2. Promoting forestry insurance

【Forest Management for Water Resources】
1. Forestation for Water Conservation
2. Agriculture-Forestry United Projects and Integrated Agricultural Land Improvement Projects
【A】 Development of technologies for diversified forest management corresponding to regions

To boost the domestic wood supply and implement environmentally friendly forest practices, this involves the development of forest management technology corresponding to various silvicultural systems and technology utilizing forest resource information to enhance forest functions, corresponding to regional conditions and based on the relations of forest clearing and regeneration to forest environmental services.

**Development of forest management technology corresponding to various silvicultural systems**

- Labor-saving and cost reducing technologies for reforestation
  - Labor-saving methods for weeding
  - Planting of container-seedlings

**Systematization of various silvicultural techniques**

**Development of technology to utilize information on forest resources to enhance forest functions**

- Relations of forest clearing and regeneration to forest environmental services
  - Utilization and regeneration of Satoyama secondary forests

**Methodologies for evaluation of multiple forest functions and for optimizing forest functions in a landscape**

**Technologies for diversified forest management corresponding to regions - Contribution towards regional forest management planning**
【B】New forest production technology and forest management systems to establish a sustainable domestic wood supply

To establish a sustainable domestic wood supply by achieving economical and highly efficient logging and wood distribution, it is necessary to develop road construction/maintenance and mechanization of forestry practices. These must be developed as well as the management system and wood distribution systems, in order to domestic wood efficiently.

Low cost and sustainable forest management

Development of wood production technology through road construction/maintenance and mechanization of forestry practices

Development of forest management and wood distribution systems to establish an efficient domestic wood supply

Demand for wood
Potential of wood production
Forest resources
System and policy

Forest management scenario

Decision making by the forest owner

Establishment of a sustainable wood supply and efficient wood distribution systems

Establishment of wood production technology to increase domestic wood utilization and the development of forest management/wood distribution systems for efficient domestic wood supply
Advanced technologies for processing sawn timber and reliable structural wood components are studied to promote the use of wood residential and public buildings, boosting the self-sufficiency rate of domestic wood.

**Sophistication of primary wood processing system**
- Labor-intensive sawmilling
- Automated sawmilling

**Sophistication of reliable structural wood components and woody indoor space**
- Development of a kiln-drying system for large timber
- Large panel products
- Parallel cord wood truss
- Wood products with high fire-resistance
- Evaluation system of human comfort in woody indoor spaces
- Wood for exterior use
- Low-rise wood structure

**Increase of domestic wood use**
Exploiting unused woody biomass in order to establish a low-carbon society and revitalize local communities is considerably anticipated. With this in mind, the FFPRI is striving to develop technologies to ensure the stable supply of forest biomass, the establishment of local utilization systems for woody biomass, and the overall usage of woody biomass as energy and materials.

**Stable supply of forest biomass and local utilization systems**
- Processor with a crushing function
- Biomass Forwarder
- Reduced costs for the harvesting and transportation of forest biomass
- **Salix species** (Shimokawa town)
- Evaluation system of energy utilization
- Energy utilization system of woody biomass and development of energy source trees

**Conversion and total utilization of woody biomass**
- **Hemicellulose**
- **Cellulose**
- **Lignin**
- **Cellulose nanofiber**
- Bioethanol
- Development of bio-refinery technology and high value-added products
- **Concrete admixture**
- Mass production type molding machine
  (Production capacity: 5,000 pieces/day)
- Single-layered wooden tray
- Functional wood-plastic composites

**Increase in utilization coefficient of forest biomass, Mitigation of global warming, Creation of new demand**
Research and Development

【E】Advancing techniques to evaluate climate change impacts on forests and the development of mitigation and adaptation technologies

For comprehensive actions on climate change in the forestry sector including forests, forestry and wood uses, elaboration of monitoring forest carbon dynamics, development of mitigation and adaptation technologies, development of evaluation techniques and actions for deforestation and forest degradation are all being implemented.

Elaboration and widening of methods for monitoring forest carbon dynamics

- Flux monitoring in Asian countries and comparison of various forests
- Monitoring wide areas from Siberia to South-East Asia and the development of monitoring techniques

Development of evaluation methods of climate change impacts

- Prediction models for forest-distribution changes
- Evaluation of climate change impacts on Japanese forests
- Widening into East Asia

Development of mitigation and adaptation technologies for climate change

- Carbon dynamics model including forests, forestry and wood uses
- Long-term prediction of climate change impacts and carbon stock change in forests
- Proposals of effective actions for mitigation and adaptation

Development of evaluation and action technologies for deforestation and forest degradation

- REDD-plus : Reducing emissions from deforestation and forest degradation, and activities for forest conservation
- Development of techniques for monitoring forest carbon and proposals of climate change policy
- Promotion of tropical forest conservation and REDD-plus
- Evaluation of ecosystem services in tropical countries and the development of forest rehabilitation

Contribution to mitigation and adaptation to climate change, achievement of emission reduction targets, international negotiation and conservation of tropical forests
We promote the development of technology to assess environmental change and the impact of forest treatment on water resources of the forested watershed. We also encourage the development of advanced disaster prevention technology to reduce intensifying natural disasters in forested hillslopes, caused by increasing extreme weather events linked to global climate change, and contribute to forest improvement and conservation.
To manage and utilize forests sustainably, we develop advanced technologies for low-impact control of deer and other pests or diseases, and those for conservation of biodiversity.

**Abatement of damage by deer and other forest pests**

- Deer capture with a newly developed drop-net trap
- Control of nationwide pest insects and pathogens
- Male strobili infected by *Sydowia japonica*

**Management and utilization of forests to conserve biodiversity**

- Management of overabundant sika deer populations
- Forest landscape management to conserve biodiversity
- Technologies for qualitative, quantitative, and functional evaluation of forest biodiversity
- Restoration of endemic ecosystems and endangered species
- Bee, an important pollinator
- Male strobili infected by *Sydowia japonica*

**Abatement of damage by mammals and other forest pests and diseases; Forest management to conserve biodiversity and ecosystem services' in forests**
Research and Development

H Accelerating the development of new forest tree varieties

We are going to develop 250 varieties to promote revitalization of forestry and conservation of land and natural environment. At the same time, we intend to develop the techniques for shortening forest tree breeding period as well as the techniques for meeting various breeding needs.

We also promote the dissemination of “Elite Trees” which has been selected to produce seedlings of fast growing and less pollen according to the criteria of “Specified Mother Tree” set by the “Act on Special Measures for Promotion of Thinning”. Finally, we are developing mass propagation techniques for black-pine (Pinus thunbergii), which is resistant to pine wilt nematode, to restore coastal forests that have been destroyed by the tsunami caused by the Great East Japan Earthquake.
Clarification of the biological functions of forest genetic resources and the development of biotechnology for their utilization

To ensure the effective use of forest resources, creation of new demand and innovation in forest tree breeding, we have been studying the development of technologies used to collect, preserve and evaluate forest tree genetic resources, and the development of evaluation and conservation technologies on the genetic diversity of forest plant species using genome information, clarification of the biological functions of trees, mushrooms and other associated microorganisms and the development of biotechnology for their utilization, and its application for tree breeding.

Enrichment of genome information on forest genetic resources and its application

Development of technologies for the collection, preservation and evaluation of forest tree genetic resources

Development of evaluation and conservation technologies on the genetic diversity of forest plant species using genome information

Clarification of the biological functions of trees, mushrooms and other associated microorganisms and the development of biotechnology for their utilization

Application of biotechnology into tree breeding

Enhancement of the forest tree gene bank and promotion of its utilization

Development of genetic markers to distinguish useful genetic characters and species

Selection of the most suitable gene to introduction of useful genetic traits

Development of mycorrhizal symbiotic system to produce the mushroom ‘matsutake’

Introduction of useful characters by molecular breeding

Innovation in forest tree breeding

Conservation and efficient use of forest genetic resources

Development of the genetically modified trees for global environmental conservation

Advancement of technology on mushroom cultivation

Development of gene-modified Japanese cedars and highly functioned trees

Contribution to forest regeneration and forestry revitalization, countermeasures against global warming, creation of new demand and Green Innovation
The Forestry Insurance Center of the Forestry and Forest Products Research Institute provides comprehensive forestry insurance service for privately owned forestry assets in accordance with the Forestry Insurance Act and other laws and regulations to cover loss caused by fire, meteorological disaster, and volcanic eruption.

Disasters Covered by Forestry Insurance

Fire
Meteorological Disaster (wind, water, snow, drought, freeze, and salt damage)
Volcanic Eruption
As the only safety net available to private forestry owners for the protection of assets from the above disaster damages, forestry insurance plays an important role in maintaining stable forestry management and ensuring early restoration in areas affected by disaster.

Examples of Insurance Payments

<table>
<thead>
<tr>
<th>Insured Area</th>
<th>Damaged Area</th>
<th>Premium</th>
<th>Insurance Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.55ha</td>
<td>1.01ha</td>
<td>¥63,407/year ($7,416/ha)</td>
<td>¥3,120,900 ($3,090,000/ha)</td>
</tr>
</tbody>
</table>

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<th>Damaged Area</th>
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</tr>
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<tbody>
<tr>
<td>14.5ha</td>
<td>1.17ha</td>
<td>¥90,045/year ($6,210/ha)</td>
<td>¥3,159,000 ($2,700,000/ha)</td>
</tr>
</tbody>
</table>

Contact

Please contact your nearest Forest Owners’ Association or regional Federation of Forest Owners’ Co-operative Association to sign up for Forestry Insurance. Contact the Forestry Insurance Center directly. [TEL(Main): +81 44 382 3500]

*Photos are examples.*
Mountainous areas contain Headwaters Conservation Forests which are not covered by trees effectively. The Forest Management Center is implementing forest management projects for afforestation in such areas as a government safety net measure.

**Structure of the projects**
- Profit sharing contracts
  - Forestry entities (Afforestation and silvicultural activities)
  - Land owners (Provision of land)
- Forest Management Center, FFPRI (Funding and technical assistance)
  - Long term contracts maintain important forests for water resources
  - FMC provides technical proceeds of FFPRI research

**Diversification of forest management**
- Long term management of forests with mixed species including indigenous
- Transformation from single- to multiple crown layers forests
- Dispersion of logging and reduction of cutting area

**Enhancement of various forest functions**
- Effects on enhancement of water resources
  - Supply of good quality and abundant water
  - Prevention of flood and purification of water quality

- Effects on environmental conservation
  - Absorption of carbon dioxide
  - Contribution to oxygen release and air purifying

- Effects on land conservation
  - Prevention of an outflow and collapse of earth and sand
  - Forest management strong against a disaster

**Estimated value of various forest functions (except wood production) in project areas**
890 billion yen/year

- Reserve 3 billion m³/year of water
- Fixing 2.65 million t/year of CO₂
- Retaining 90 million m³/year of soil

Maintain functions of so-called 'Green Dam', such as enhancement of water resources and land conservation, contribution to revitalization of agricultural, forest and fishing communities.