Agricultural and Forestry Research Center

Outline
The purpose of the center is to contribute to the development of agroforestry techniques for Japan and the world, as well as provide education through experiments and field practices in various fields of study including agriculture and forestry, and research in the natural and social sciences.

### Organization

- **Director**
- **Assistant Director**
- **Steering Committee**
- **Communication Committee**
- **Section of Education and Research**
- **Agriculture & Forestry Production Engineering**
- **University Farm**
- **Administration**
- **University Forest**

### Land & Building Area

#### Land and Building Areas

<table>
<thead>
<tr>
<th>Area: Tsukuba</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
</tr>
<tr>
<td><strong>Buildings</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yatsugatake &amp; Kawakami</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
</tr>
<tr>
<td><strong>Buildings</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Ikawa</th>
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</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
</tr>
<tr>
<td><strong>Buildings</strong></td>
</tr>
<tr>
<td><strong>Name</strong></td>
</tr>
</tbody>
</table>

#### Area of Fields in Tsukuba

<table>
<thead>
<tr>
<th>Rice Paddies</th>
<th>230 acres</th>
</tr>
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<tbody>
<tr>
<td>Farm Lands</td>
<td>200 acres</td>
</tr>
<tr>
<td>Forage Crop Fields</td>
<td>760 acres</td>
</tr>
<tr>
<td>Vegetable Fields</td>
<td>45 acres</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,615 m²</td>
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</table>

<table>
<thead>
<tr>
<th>Orchards</th>
<th>236 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornaments Plants Field</td>
<td>137 acres</td>
</tr>
<tr>
<td>Experimental Fields</td>
<td>187 acres</td>
</tr>
<tr>
<td>Forest Nursery Fields</td>
<td>220 acres</td>
</tr>
<tr>
<td>Botanical Garden</td>
<td>220 acres</td>
</tr>
<tr>
<td>Greenhouses</td>
<td>2,615 m²</td>
</tr>
<tr>
<td>Plastic Houses</td>
<td>1,850 m²</td>
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#### Forest Areas by Types

<table>
<thead>
<tr>
<th>Forest Name</th>
<th>Land Area (ha)</th>
<th>Artificial Forests</th>
<th>Natural Forest</th>
<th>Other Areas</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Silviculture Forest</td>
<td>Improved Forest</td>
<td>Sub-Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observed Forest</td>
<td>Windbreak Forest</td>
<td></td>
<td></td>
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<tr>
<td>Yatsugatake</td>
<td>3.08</td>
<td></td>
<td>2.26</td>
<td>11.19</td>
<td>16.52</td>
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<tr>
<td></td>
<td>11.30</td>
<td></td>
<td>136.70</td>
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<td>151.17</td>
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<td></td>
<td>1.19</td>
<td></td>
<td>51.31</td>
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<td>52.49</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0.83</td>
<td></td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>5.72</td>
<td></td>
<td>111.46</td>
<td></td>
<td>118.01</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1762.26</td>
<td></td>
<td>1762.26</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>118.01</td>
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<td>137.32</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2044.51</td>
<td></td>
<td>2118.82</td>
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<tr>
<td>Sub-total</td>
<td>151.79</td>
<td></td>
<td>448.43</td>
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<td>598.22</td>
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<tr>
<td></td>
<td>71.17</td>
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<td>118.01</td>
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<td>189.18</td>
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<td></td>
<td>118.01</td>
<td></td>
<td>2044.51</td>
<td></td>
<td>2252.52</td>
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#### Staff (as of Jan 1st, 2010)

<table>
<thead>
<tr>
<th>Director</th>
<th>Professor</th>
<th>Associate Professor</th>
<th>Lecturer</th>
<th>Assistant Professor</th>
<th>Technical Staff</th>
<th>Office Personnel</th>
<th>Part-time Staff</th>
<th>Total</th>
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<td>1</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>25</td>
<td>3</td>
<td>12</td>
<td>56</td>
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Education and Research Activities

Education
The following lectures, field practices and experiments are examples of courses utilizing the land and facilities of the farm and forests of the Agricultural and Forestry Research Center.

Tsukuba Area
- Field Practices in Bioresource Production
- Field Practices in Bioresource System
- Food and Forest in the Field
- Practice in Wood Technology
- Bioproduction Machinery Practice
- Internship Program for Agriculture & Environment
- Senior High School at Sakado, University of Tsukuba Field Practices

Yatsugatake & Kawakami Forests
- Plant Pathogenic Mycology Laboratory
- Field Exercise on Soil Survey
- Comprehensive Practice of Forests
- Forestry Experience Class
(Senior High School at Sakado, University of Tsukuba)

Ikawa Forest
- Field Practice in Forest Science
- Field Practices in Forest Biology

Tsukuba Experimental Forest
- Food and Forest in the Field
- Field Practices in Bioresource Production
- Wildland Planning
- Watershed Conservation Laboratory
- Forest Botany

Research
Various research projects are undertaken by the faculty of the Agricultural and Forestry Research Center, and graduate students, undergraduate students and technical officials under the direction of the faculty.

Refer to the following Web page for current information.

http://www.nourin.tsukuba.ac.jp/
University Farm

The university farm performs management and operations in connection with education and research of various fields in the following four divisions.

Division of Crop Production Technology
This division consists of paddy farming and upland farming, and performs research for development of stable crop production techniques with low environmental impacts, as well as conducts educational exercises in crop production. Since development of the university farm in 1977, successive fertilization surveys have been conducted every year on the light-colored black volcanic ash soil based on fertilizer application design for both paddy farming and upland farming.

Paddy farming: Rice cultivars ‘Koshihikari’, ‘Nipponbare’ and ‘Mangetsumochi’ are cultivated for improvement of cultivation technology and used in field exercises.
Upland farming: Sweet potato, peanut, wheat and buckwheat are the main crops. Both paddy farming and upland farming cultivate crops with minimum environmental loads by using organic fertilizers.

Division of Agricultural Machinery Production Technology
This division consists of agricultural machinery maintenance, metal working and wood working, and performs work as requested from various organizations within the university, as well as performing fabrication, inspection, maintenance and repair of the machinery, equipment and devices used in all of the production activities at the Agricultural and Forestry Research Center.

Agricultural machinery maintenance: Periodic inspections and maintenance of the agricultural machinery used in the Agricultural and Forestry Research Center, and repair of broken items. Optimizes the operation of agricultural machinery.
Metal working & wood working: Metal working and wood working for repair and production of facilities, equipment and machinery required by the Agricultural and Forestry Research Center.
Division of Horticultural Production Technology

This division consists of orchards, vegetables and ornamental plants, and performs research, development and educational exercises related to cultivation utilizing the university farm facilities and gardens.

Orchard: Performs surveys and research with various agricultural materials that have low environmental impacts, are power saving and have quality improvements. Cultivate Japanese pears, grapes, apples, peaches, plums, persimmons, chestnuts, kiwi fruit and blueberries in open fields. Attempts to utilize fruit trees in gardening (fruit garden).

Vegetables: Cultivation of fruit and leafy vegetables utilizing various hydroponic systems, and the development of production techniques that save on labor and have low environmental impacts. Research and development of high value production technologies and growth control techniques using artificial light sources, such as supplemental lighting.

Ornamental plants: Preservation of genetic resources of ornamental plants (about 1,000 varieties and genetic lines of orchid species, azaleas, succulent plants, cactuses, primrose, etc.), provision of practical education research materials and social educational activities. Development of flowering control techniques utilizing environmental controls and various agricultural materials.

Division of Livestock Production Technology

Animal husbandry: Dairy cattle, sheep and chicken are maintained to conduct research and education on reproduction, nutrition and management in domestic animals.

Feed crops: Corn is produced to conduct research and education on feed crop management technology. Corn silage is produced after harvest, and used as the basal ration for dairy cattle and sheep.
The Agricultural and Forestry Research Center established the Yatsugatake and Kawakami Forests at the base of Yatsugatake in Nagano Prefecture, and the Ikawa Forest in the upstream area of the Oii River in Shizuoka Prefecture, and provides educational activities and research in various fields under management of the following four divisions.

- **Yatsugatake & Kawakami Forests**
  1. Preservation of central marshland and rare hydrophytes distributed in the deciduous broad leaved forest, and elucidation of propagation systems.
  2. Preservation of the base of Yatsugatake and the natural regeneration forests, and maintenance of a natural observation path.
  3. Cultivation of forests in the northern temperate zone and highlands, and systematization of forestry techniques.

- **Ikawa Forest**
  1. Cultivation of forests in the interior of the mountains in the central temperate zone.
  2. Forest land preservation in the area of a river source and watershed management including the subalpine zone (2,400 m elevation).

- **Tsukuba Experimental Forest**
  1. Provision of forest materials and areas for education and research
  2. Management of plum exhibition forest
  3. Cultivation of seeds and seedlings of forest trees and development of an experimental forest

- **Botanical Garden**
  The main purpose of the botanical garden is to plant and cultivate domestic trees, and provide forest materials and areas for education and research in various specific fields, such as phytology and forest science. The garden is also used by students, officials and citizens as a ‘relaxation area’ where people can take a walk while observing the changes in the plants through the four seasons.
Section of Education and Research

Division of Education & Research
This division supports and improves the field practices curriculum related to bio-resource production science. Duties include arrangement of the field practices curriculum, grade assessment, authorization of credits and development of texts for field practices.

(1) Support and management of facilities for field practices education
(2) Research in agriculture and forestry sciences as part of the educational curriculum of universities in Japan
(3) Planning and arrangement of extension courses
(4) Management and operation of research fields, facilities and equipment
(5) Collection and analysis of research materials
(6) Publication of research findings

Division of Regional Exchange & Dissemination
Utilizing the intellectual, human and physical assets of the Agricultural and Forestry Research Center, this division performs activities to promote exchanges within the region including Ibaraki Prefecture and Tsukuba City and other universities, and to promote the dissemination of agroforestry techniques.

(1) Internship program for agriculture & environment
(2) Extension courses held for the public
(3) Programs to cultivate grains and consider foods
   (Genetic resource preservation activities)
(4) Foster-parent system for Primrose
(5) Buckwheat (Soba Noodle) study group

Division for Preservation of Plant Genetic Lines
This division performs activities to preserve the types and genetic lines of food crops, industrial crops, ornamental plants, vegetables, fruit trees and trees that are used in various surveys, research projects and educational activities.

(1) Maintenance and propagation of seeds and seedlings
(2) Creation of a database for the preservation of plant genetic lines
International activities of the Agricultural and Forestry Research Center (AFRC) are a high priority. In 1979, the center was nominated by UNESCO as an Associated Center of the Asia-Pacific Program of Educational Innovation for Development (APEID) in the field of agricultural education. The Tsukuba Asian Seminar on Agricultural Education (TASAE) was held annually from 1979 to 2007. The need for sustainable development has become more and more critical so TASAE was replaced with the International Symposium on Agricultural Education for Sustainable Development (Ag-ESD Symposium) in 2008 to promote reform and improvements in agricultural higher education with consideration for environmental problems from an international viewpoint.

**Ag-ESD Symposium**

The Ag-ESD Symposium is held annually to focus on current issues, i.e. food safety, food security and environmental impacts, related to education for sustainable development. The symposium and other activities of the center promote the development of international cooperation in sustainable agriculture through a variety of programs.

<table>
<thead>
<tr>
<th>ISO14001 Authorization Registration (Feb, 2004)</th>
<th>ISO14001 Inspection</th>
</tr>
</thead>
</table>

**Journal of Developments in Sustainable Agriculture (JDSA)**

An online free access international journal entitled the Journal of Developments in Sustainable Agriculture is published to facilitate better dissemination of information in sustainable agriculture and agricultural education.

URL: http://www.jstage.jst.go.jp/browse/jdsa/
Ag-ESD Activities
Cooperation between administrators, educators and researchers from Asian and African universities are deepened through participation in numerous international activities.

Ag-ESD Internship
Internship programs allow graduate students to directly participate in international programs and help with the organization of the international symposium.

Ag-ESD and Afghanistan
Programs to support the reconstruction of Afghanistan are included in the symposium and other activities.

High School Student Programs
Programs are planned to help strengthen education for sustainable development in the University of Tsukuba affiliated Sakado High School and high schools affiliated with Asian and African Universities.
Extension Courses

2009
The World of Cattle and Milk
Joys of Making Homemade Cheese
Classes in the Mountains

2008
The World of Cattle and Milk
Joys of Making Homemade Cheese

2006
Joys of Making Home Made Cheese and ice cream
The World of Cattle and Milk
Joy of Making Homemade Cheese

2005
Horticulture Class (flowers, vegetables and fruit trees)
Enjoying Homemade Cheese and Ice Cream
Observing Plants at the University of Tsukuba Yatsugatake Forest
Characteristics of Biology at Nobeyama Highlands, Nagano Prefecture

Product Sales

The Agricultural and Forestry Research Center sells agricultural products to the local community. The market in the Agricultural and Forestry Research Center is open 3 days a week (Monday, Wednesday and Friday). The products are also sold at the University of Tsukuba University Hospital twice a month. A cooperative agreement was made with the University Hospital, and the supply of fresh seasonal agricultural products for the meals of patients in the hospital was started in 2006.

Utilization of the Agricultural and Forestry Research Center (Total in 2008) (Total Number of People)

<table>
<thead>
<tr>
<th>Utilization Classification</th>
<th>University of Tsukuba</th>
<th>Other Universities</th>
<th>Other Educational Institutions</th>
<th>General</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational &amp; Research</td>
<td>12,050</td>
<td>764</td>
<td>365</td>
<td>4,106</td>
<td>54,478</td>
</tr>
<tr>
<td>Other Purpose</td>
<td>465</td>
<td>66</td>
<td>660</td>
<td>591</td>
<td>2,157</td>
</tr>
<tr>
<td>Total</td>
<td>12,515</td>
<td>37,568</td>
<td>1,025</td>
<td>4,697</td>
<td>56,635</td>
</tr>
</tbody>
</table>

Note: Total use of farms, Tsukuba Forestry Nursery, Yatsugatake Forest, Kawakami Forest and Ikawa Forest
### Layout of Tsukuba Area

#### Agricultural and Forestry Research Center

1. Dairy barn 683
2. Milking parlor 167
3. Compost deposit 373
4. Animal sewage treatment facility 150
5. Poultry barn 194
6. Swine barn 100
7. Pasture 3,700
8. Water supply 153
9. Machine shop 390
10. Garage 309
11. Metal and wood processing workshop 589
12. Environmental chamber 96
13. Second office for technical staff 479
14. Main building 1,575
15. First office for technical staff 227
16. Boiler and laboratory 170
17. First preparation room 231
18. Greenhouse for ornamental plants 295x4
19. Greenhouse for vegetables 295x3
20. Greenhouse for crops 295
21. Greenhouse for vegetables 374x2
22. Plastic greenhouse for crops 144
23. Plastic greenhouse for vegetables 28
24. Greenhouse for ornamental plants 13.8x8
25. Irrigation facility for orchards 56
26. Office for forest nursery 337
27. Garage 264
28. Greenhouse for forest nursery 90
29. Storehouse 58
30. Animal sewage treatment facility 80
31. Soil tron 113
32. Fuel tank 30
33. Garage 314
34. Biotron 112
35. Photoperiodic control equipment 604
36. Exhibition room 324
37. Storehouse 45
38. Greenhouse for forest nursery 120x2
39. Plastic greenhouse for horticulture 100x3
40A,B,C,D Fields for forage crops 7.6 ha
41A,B Fields for edible crops 2.0 ha
42 Field for vegetables 0.5 ha
43A,B,C Experimental fields 1.4 ha
44A,B Orchards 2.3 ha
45A,B Paddy fields 2.3 ha
46 Dairy products processing plant 48 m²
47 Botanical garden 2.2 ha
48 Field for ornamental plants 0.3 ha
Transportation

**By Train**
From Akihabara Station → Take the Tsukuba Express Line [TX] (45 minutes by Express & 57 minutes by Regular train) → Get off at “Tsukuba Station (Terminal)”. From TX Tsukuba Station A3 Exit, Transfer to the Loop-line On-campus Bus.

**By Highway Bus**
From Tokyo Station → Take the Joban Highway Bus (Kanto Tetsudo Bus or JR Bus for Tsukuba Center at JR Tokyo Station Yaesu South Exit, about 1 hour & 10 minutes) → Get off at Tsukuba Center. At the Tsukuba Center, Transfer to the Loop-line On-campus Bus.

**By Bus from Tsukuba Center**
Take the Kanto Tetsudo Bus for the Loop-line On-campus Bus (about 15 minutes in either direction) → For the Agricultural and Forestry Research Center Main Building: Get off at “Nourin-Gijutsu Center Mae”. For the Tsukuba Experimental Forest: Get off at “Daigaku Shokubutsu Mihon-en”.

Detailed Information → http://www.tsukuba.ac.jp/english/access/

Address

**Center (Tsukuba Area)**
1-1-1 Tennodai, Tsukuba, Ibaraki 305-8577
http://www.nourin.tsukuba.ac.jp/
Tel.+81-29-853-2543, Fax.+81-29-853-6205

**Tsukuba Experimental Forest**
1-1-1 Tennodai, Tsukuba, Ibaraki 305-8577
http://www.sakura.cc.tsukuba.ac.jp/~enshurin/naehata/
Tel.+81-29-853-2555, Fax.+81-29-853-6612

**Yatsugatake & Kawakami Forests**
462-4 Nobeyama, Minamimakimura, Minami Saku-gun, Nagano 384-1305
http://www.sakura.cc.tsukuba.ac.jp/~enshurin/yatsugatake/
Tel.+81-267-98-2412, Fax.+81-267-98-2397

**Ikawa Forest**
1621-2 Ikawa, Aoi-ku, Shizuoka, Shizuoka 428-0504
http://www.sakura.cc.tsukuba.ac.jp/~enshurin/ikawa/
Tel.+81-54-260-2419, Fax.+81-54-260-2626