Education and research Forests
Kagoshima University Forests

Radius 90km
Radius 60km
Radius 30km

Minamata City
Hitoyoshi City
Izumi City
Isa City
Ebino City
Kobayashi City
Akune City
Hisatsu Orange Railway
Kyushu Shinkansen
Kagoshima Route
▲Mt. Shibi
Hisatsu Line
Kitto Line
▲Mt.Karakunidake
▲Takachiho Gorge
Aira City
Kirishima City
Kagoshima Airport
Satsumasendai City
Ichikikushikino City
Nippo Main Line
Kokubu City
Nishimawari Expressway
Kagoshima Main Line
Higashimawari Expressway
Miyakonojo City
Soo City
Sakurajima
Hioki City
Kagoshima City
Sakurajima Ferry
Fukiage-hama Beach
Satsuma Peninsula
Ibusuki Skyline Drive
Tarumizu City
Kamoike-Tarumizu ferry
▲Mt. Bishago-dake
Office
Lake Osumi
Takakuma Dam
▲Mt. Onogara-dake
▲Mt. Takakuma
▲Mt. On-take
Osumi peninsula
Shibushi City
Minamisatsuma City
Minamikyushu City
Kagoshima(Kinko) Bay
Ibusuki Makurazaki Line
Kanoya City
Kushira River
Kimotsuki River
Shibushi Bay
Makurazaki City
Ibusuki City
Mt. Hoyoshi-dake
Yamagawa-Nejime ferry
▲Mt.Kaimon
Mt. Inao-dake
Cape Sata

Guide Book
University Forests, Faculty of Agriculture, Kagoshima University

Greenery provides spadework behind the scenes

Abundant forests bring us a variety of blessings.
What kind of relationship do you have with the forests?

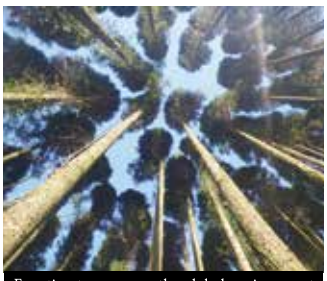
The function of a forest

1. Forests conserve biodiversity

Function to conserve biodiversity

Various kinds of flora and fauna inhabit forest providing the biodiversity.

2. Forests stabilize CO_2



Function to conserve the global environment

Forests absorb and store CO_2, the major cause of global warming.

3. Forests stop erosion

Function to prevent landslide disasters, function to conserve soil

Trees, fallen leaves and undergrowth cover the earth and prevent top soil from running off during a rainfall. The roots of trees also maintain soil.

4. Forests hold water

Function to preserve water resources

Forest soil absorbs rainwater, which then slowly flows down to a river. This mitigates floods and drought. While the water travels, minerals are added and this makes the water tastier.

The function of a forest

Panoramic view of the university forests. Though not visible in this picture, the forest office building is in front of the white building in the middle. In the far back is the Takakuma mountain range (national forest) (May 2008 Viewed facing southeast from No. 116 forest)

5. Forests provide a comfortable environment

Function to form a comfortable environment

Forests soften climatic changes and prevent noise thus creating a comfortable environment for human beings.

6. Forests provide places for relaxation and play

Function to ensure health and recreation

Forests are used as places for sports, excursions, resting and refreshing oneself.

7. Forests feature inherited culture

Function for cultural aspects

There are cultures and traditions which have been fostered by living together with forests.

8. Forests provide forest biomass

Function to produce materials for society

Wood, which is used in various areas of our lives, is produced in forests.

One century

The Kagoshima University Forests celebrates the 100th anniversary of its opening.

(from "The First Operation Plan" adjusted in 1915)

Students in front of the University Forests dormitory, which was used until around 1914 (time unknown, Nanatsudani)

A ridgeline of the central part of the University Forests with a conspicuous grassland (prior to 1864, could be a boundary of No. 115 and 116 forest)

History of the University Forests

In December 1909, Takakuma University Forest and Sata University Forest were established in Kagoshima College of Agriculture and Forestry, predecessor of Kagoshima University, as a place for forestry education and research. After the reform of the education system implemented in 1949, these research forests became facilities attached to the Faculty of Agriculture of Kagoshima University. At the time of establishment, most parts were poor forests of broad-leaved trees and rough grasslands. In order to meet the domestic demand for timber, the creation of man-made forests has now started. During the time when timber price was high, the timber production from the University Forests greatly contributed to the revenue of the university. Historically, they also played the role of a university asset.

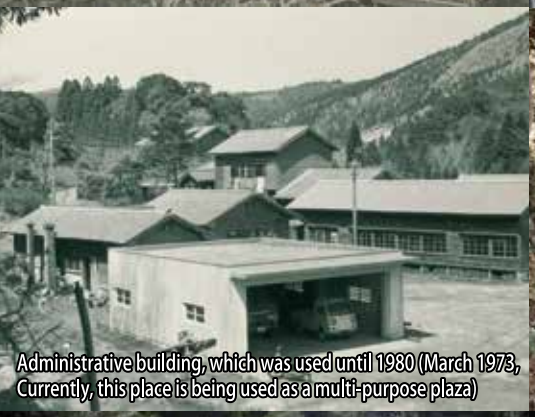
According to the trend of the times, forestry education has been scaled down over the past 20 to 30 years. Emphasis on the public function of forests, large-scale production and afforestation projects have also been reduced. On the other hand, however, the utilization of university forests has been expanded and the social contribution of a university has gained more importance. As a result, several new endeavors have been initiated.

History


Practical training / walking from a port to the university forests (This may be Nakao Bridge on prefectural route 71)


Ground clearance. This work provided important job opportunities to local citizens (1960s-1970s)


Cable yarding and logging by trucks (March 1973)


Administrative building, which was used until 1980 (March 1973, Currently, this place is being used as a multi-purpose plaza)


Survey for the opening of a forest road (December 1986, Nanatsudani forest road)


Weeding using long-shaft sickles and volcanic ash from Sakurajima (June 1988, No.115 Forest)


Practical training to produce timber and check its quality (July 1999, 107-108 forest group boundary)


Manifold use of land for practical training (February 2008, headwaters of the Kushira River)


Panoramic view of the forest then (1964) on the left and now (March 2012)

Table 1: Chronological table

1871:	The forest was changed from a Shimazu Clan forest to a national forest
March 1908:	Kagoshima College of Agriculture and Forestry, a national institute, was established. (2nd of this kind in Japan)
December 1909:	Takakuma University Forest and Sata University Forest were established
January 1914:	Great eruption of Sakurajima volcano. Sakurajima came to be connected to the Osumi peninsula
September 1931:	Sakurajima Lava Field Research Station was established on top of a lava plateau formed after the great eruption of Sakurajima
1938:	Great eruption of Sakurajima volcano
1946:	Great eruption of Sakurajima volcano
May 1949:	Reform of the education system
March 1954:	Toso Forest Garden was established
April 1958:	Tarumizu timber yard was established
April 1959:	The University Forest administered the university nursery as an experimental nursery
March 1980:	Takakuma University Forest administrative building and accommodation facilities were completed and relocated to the current location
July 1991:	Tarumizu timber yard was renamed as Tarumizu nursery practice experimental site
April 1999:	Tarumizu nursery practice experimental site was renamed as Tarumizu experimental site
April 2004:	The National universities were incorporated. As a result, University Forest was converted from a national forest to a private forest
March 2010:	Memorial ceremony celebrating the 100th anniversary of Takakuma University Forest
July 2014:	The Forests was designated as a joint usage educational center

The principle of the University Forests

The University Forest is blessed with a vast area of 3,000 hectares and abundant natural environments. Based on the 100-year endeavors of our predecessors, we will maximize the use of these precious forest resources and contribute to the education and research of Kagoshima University as well as to the sustainable development of the local community.

Mature manmade forest of Japanese cedars (planted in 1976) (June 2011, No.107 forest)

What is a University Forest?

A University Forests can be said to be a huge "classroom" and a "laboratory." The total area of the university forest covers 93% of the property of Kagoshima University. This forest has tangible and intangible assets which have been accumulated over the past 100 years. At the same time, we are now facing issues related to environmental problems and what sort of sustainable forest resource maintenance and management works in harmony with nature. Therefore, the university is required to provide research and education which correspond to these issues. The field where such work will be practically conducted is here at "University Forest."

There are 27 universities in Japan that have university forests. Kagoshima University Forests is the 5th largest one. We manage Takakuma University Forest and six other fields as follows (for more details, please see the back cover).

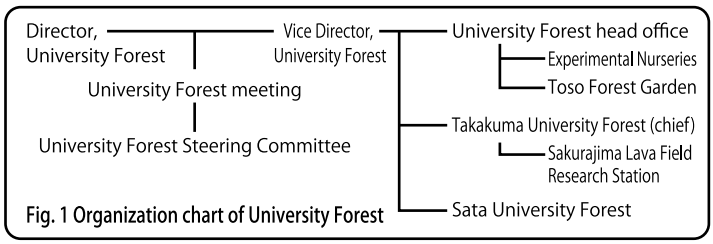


Fig. 1 Organization chart of University Forest

Staff members

Staff members are responsible for supporting students' education and research activities, maintenance of forest roads and boundaries which are indispensable to forest management, nurturing manmade forests, timber production and social contribution activities, which are carried out through technology developed at the university.

Table 2: Staff constitution

As of April 2015

	Professor	Associate professor	Clerical job	Technical job	Part-time job	Total
Takakuma University Forest	-	1	1	5	2	9
On the university campus	2(1)	1*	-	-	2	5(1)
Total	2(1)	2	1	5	4	14(1)

Note 1: ( ) is an additional post
Note 2: *is a special post

Fig. 2 Work volume breakdown for each operating division (Average in 2008 to 2012)

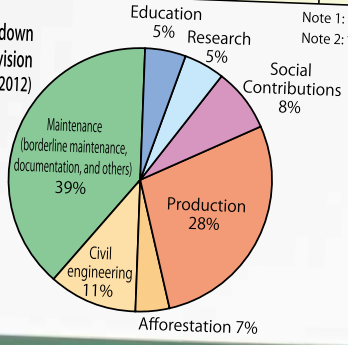
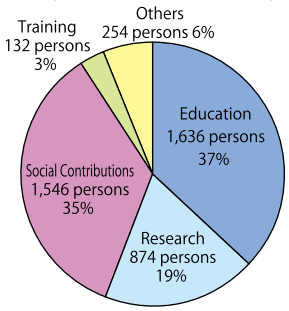


Fig. 3 Breakdown of users in each operating division (Average in 2009 to 2013) 4,441 persons/year



1. Takakuma University Forest

A manmade forest of Japanese cedar at the final cutting age (August 2005; Viewed in the No.4 forest direction from No.14 forest observation tower)

3. Sakurajima Lava Field Research Stations

The spreading pine forest and pine tree death (December 2007; Kagoshima City viewed from Karasujima Observatory)

6. Sata University Forest

Odomari swimming beach as seen from the former Sata Roadpark The photograph is of University Forest (July 1999)

Facilities

An administrative building, including offices and accommodation facilities, is located in the southern area of the Takakuma University Forest. This building was relocated to the current location in 1980, then went through renovation during the fiscal years from 2007 to 2009. Japanese cedar and Japanese cypress wood from the Takakuma University Forest is used for floors and walls and on the wall of the accommodation facility. Famous woods from all over Japan are also made use of. These serve as teaching materials. (Completed in February, 2010)

The main equipment includes research tools such as forest GIS, meteorological apparatus and instruments. In addition, the facility possesses large sized heavy machinery to manage forests.

The drinking water used in administrative buildings comes from the natural spring water source located approximately 4 km away. Sweet potato Shochu spirits using this water, "Kibaiyanse" and "Shunju-Ouka", are on sale in Kagoshima Prefecture for a limited time.

Table 3: Facilities

Takakuma University Forest Administration Building	◆Office (copy machine, facsimile, AED [Automated External Defibrillator] and others) ◆Meeting room (about 10 persons)
	◆Lecture room: capacity 50 persons Projector, sound equipment
	◆Dining room: capacity 50 persons A wood-burning stove has been installed so as to function as an educational material for the study of Biomass Energy
	◆Accommodation room: capacity: 50 people Accommodations offer wireless LAN and a public phone (0994-32-3995) Precious wood is used on interior decoration and in educational materials
	◆Accommodation for students Capacity: 6 persons (5 rooms), 8 persons (1 room), 10 persons (1 room)
	◆Accommodation for teachers Capacity: 1 person per room (1 Japanese style room and 1 western style room)
	◆Exhibition rooms Display panels, wood specimen display, circular-shaped disk specimen and others
	◆Bath rooms Gentlemen 1, Ladies 1
	◆Toilets Gentlemen 2, Ladies 2

As of February 2015

Table 4: Main equipments

Forest GIS	1	Backhoe loaders	2
Meteorological Observation Equipment	1	・with (0.4) S260-F2 PW01	
		・with (0.25) SK45-SR PW01	
Passenger car	1	Bulldozer	2
SUV/Light truck	1 each	・BD2G ・D3G	
Minibus (29 pax)	1	Forwarders (U2)	1
Truck (6.5t/2.9t crane)	1	Working car in forest	2
Dump truck (4t)	1		
		Others	
		・Chain saw, Bush cutter,	
		Compass, Vertex and others	

As of February 2015

Restaurant

Interior decorations and wood stoves use cedar and Japanese cedar wood from the Takakuma University Forest (June 2011, Restaurant)

Accommodation facilities

The walls were made with Kiso cypress "*Chamaecyparis obtusa*", Nanbu red pine "*Pinus densiflora*", Akita cedar "*Cryptomeria japonica*", Aomori ceder "*Thujopsis dolabrata*", Ryukyu Island pine "Pinus luchuensis"

Location

Sakurajima viewed from the peak of Takatoge
In the foreground is No.8 forest (March 2003)

Takakuma University Forest covers an area of 3,060.86ha and sits on the other side of Kagoshima City across the sea, east of Sakurajima and on the northern part of Osumi Peninsula.

The ridge runs along Kinko Bay (outer rim of Aira Caldera) north-south from Takatoge (722m) in the south through Mt. Hishago (885m) in the middle.

The ridge serves as a watershed, and in the east is a hill where Kushira River begins. The water from the University Forests fills the Takakuma Dam (Lake Osumi), runs through Kasanohara Plateau and eventually flows into Shibushi Bay.

The western and northern sides are rather steep slopes leading to Kinko Bay.

In the south is Takakuma Forest Ecosystem Genetic Resource Conservation Forest (state forest) known for being the southern limit of Japan's beech forests.

The University Forests are from 70m to 885m in altitude, and half of the area is 500m or higher. The administrative (office) building is on the southern edge at the altitude of 542m.

Climate

Snowfall
Office entrance shot from the lodgings (2010.01)

The average annual temperature is 14~15℃ and annual precipitation about 3,000mm. The area is foggy and high in humidity. Typhoon winds blowing from north-east to south-east are extremely strong and often cause localized torrential downpour. They frequently wash away forest soil, knock down trees or break trees. Snowfall in the area is about 10cm and occurs two to three times a year.

Fig. 4 Mean temperature and precipitation

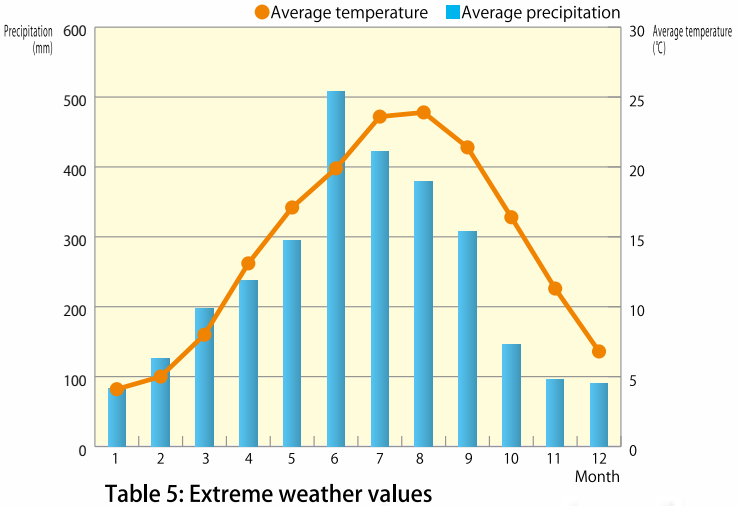


Table 5: Extreme weather values

Observation items	Extreme value	Date
Highest temperature	34.5 ℃	Sep 24, 1969
lowest temperature	-8.1 ℃	Jan 28, 1933
Precipitation (1hour)	104.0 mm	Jul 5, 2006
Precipitation (day)	494.5 mm	Sep 6, 2005
Precipitation (month)	1543.0 mm	July, 1993
Precipitation (year)	5484.5 mm	1993
The maximum instantaneous wind speed	37.0 m/s	Sep 16, 1997
The maximum instantaneous wind direction	Wind direction:SW	

*(1913~2013)

Vegetation

Laurel forests in fresh green
(2005.05) Yamadori Bridge on Prefectural Road 71~headwater of Kushira River)

The climate of the natural forests is that of the southern temperate zone and they are mostly secondary laurel forests. Almost 100% of the primeval forests at the academic reference forests (Nanatsudani Mountain Range) have tall evergreen broad—leaved forests of itajii "*Castanopsis sieboldii*", isunoki "*Distylium racemosum*", urajirogashi "*Quercus salicina*", tabunoki "*Machilus thunbergii*" and matebaishi "*Lithocarpus edulis*". In the middle layer are sasanqua, Japanese holly and Japanese star anise. In the bottom layer are Japanese laurel, satsuma-inamori "*Ophiorrhiza japonica Blume*" and momiji-koumori "*Cacalia kiushiana*". As the area is immediately east of Sakurajima, there used to be grasslands particularly at higher altitudes.

Thirty-seven percent of the forest is planted Japanese cedar and Japanese cypress trees. Most of them were planted in the 1960s to replace the secondary forests used for charcoal making. It is noteworthy that 24 percent of the trees were planted before World War II.

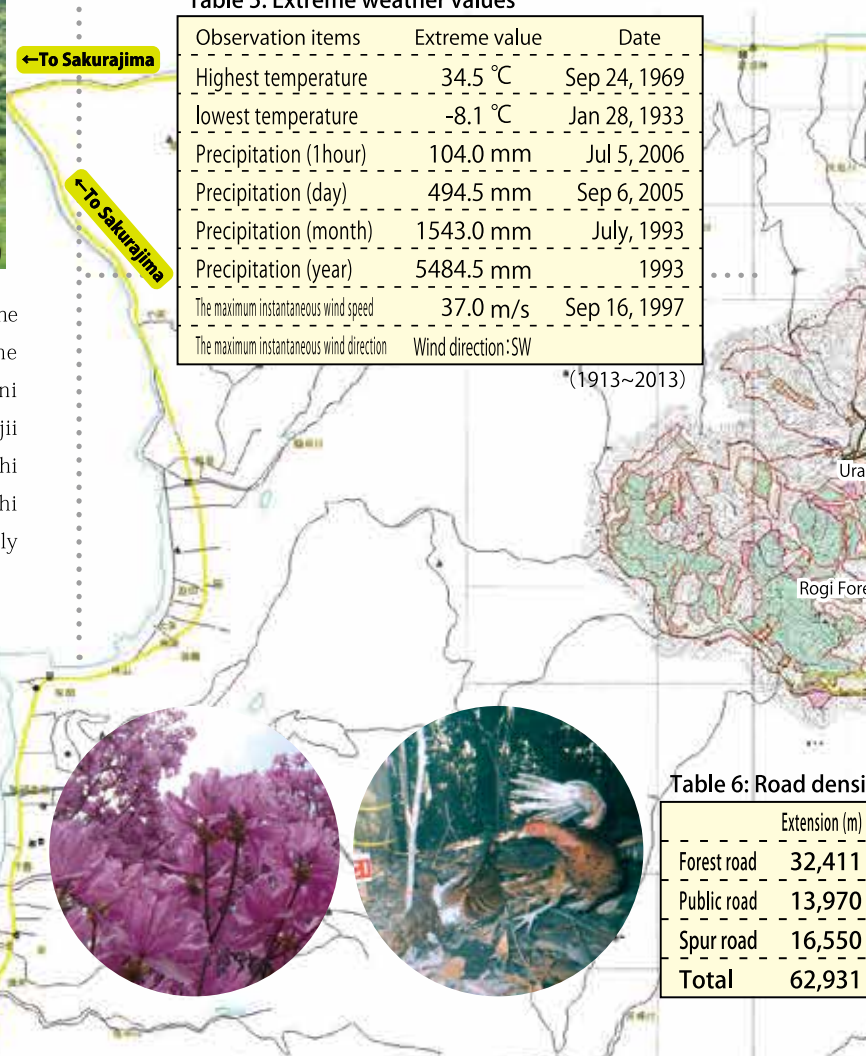


Table 6: Road densi

	Extension (m)
Forest road	32,411
Public road	13,970
Spur road	16,550
Total	62,931

Nature of Takakuma University Forest

Geology


Section of geology
Volcanic ejector is in sight (March 2011, observation course)

The soil consists of Shimanto (mostly alternating layers of sandstone, shale, phyllite and chert) of the Mesozoic, and granite (south-eastern part) and ignimbrite (part of the north and south) of the Cenozoic. The entire region has thick layers of volcanic ash and pumice fall deposit as a result of the volcanic activities of Sakurajima and Aira Volcano (in the innermost corner of the present-day Kinko Bay).

Windmill
Kihoku Tenkyukan Astronomical Observatory
Windmill
Windmill
Kihokuhokujou Line
Prefecture road No. 72, Tarumizuosaki Line
Windmill
Windmill
Ushinetoge Pass
Road station Tarumizu
Windmill
Kuratani Forest Road
Mochidani Forest Road
Takeno Forest Road
Nosaka Forest Road
Mt. Bishago-dake 885m
Takeno Forest Road
Bishago Forest Road
ra Forest Road
Nagatani Forest Road
Bishago Forest Road
Hiyamizudani Forest Road
Tobei Forest Road
Takabana Forest Road
To Osumi Lake →
Prefecture road No. 71 (Tarumizu-minaminogo Line)
Takatoge Forest Road
Dormitory Forest Road
Takatoge Pass 722m
Ipponsugi Forest Road
Keyaki Forest Road
Mochida Forest Road
Nanatsudani Forest Road
Nagao Forest Road
Takakuma Experimental office 542m
Tamanotani Forest Road
Inohana Forest Road
↓ To Tarumizu City

Density (m/ha)	
10.6	(F.Y. 2010)
4.6	(F.Y. 1995)
5.4	(〃)
20.6	

Takakuma University Forest Forest type chart

Legend
- National road
- Prefectural road, city road
- Forest road
- Japanese cedar
- Japanese cypress
- Others
- Private forest

1,000m

Forest as a textbook

Promotion of Joint Forest Use

In July 2014, the Ministry of Education, Culture, Sports, Science and Technology designated Takakuma University Forests as a Joint Usage Educational Center to be shared actively with other universities as a place of learning.

We have been sharing the practice site with Iwate University since 1979 and offering two classes for Credit Interchangeable Practice in University Forests, a project in which universities all over Japan transfer each other's credits. We also make our University Forests available not only to forestry or faculty of agriculture studies but also to different disciplines and uses--ecology, forest environment, outdoor activities and nature experience--so that many more universities are able to benefit from them.

Table 7: List of practices conducted at the University Forests (fiscal 2014)

Practice with other universities

Time	Name of Practice	Courses
9-11 Jun., 17-19 Nov.	Advanced Lecture for Forest Environment	Agricultural Sciences and Natural Resources, Graduate School of Agriculture (All Graduate School students)
6-8 Aug.	Practical afforestation II	Forest Science (Compulsory)
9-11 May 9-13 Aug.	Seminar/ Practice in Forest Environmental Education Outdoor Education Practice (Faculty of Education)	Forest Science (Optional) Lifelong Education General Curriculum
20-25 Aug.	Forests, People and Experience	Common Education
24-25 Aug.	Outdoor and Nature Experience Beginners' Course	Common Education
25-29 Aug.	Credit Interchangeable Practice in University Forests 'Practice in Material Production/Distribution System in southern Kyushu'	Undergraduate students of the many faculties of agriculture nationwide
1-3 Sept.	Introduction to Warm Temperate Forests (Takakuma 1-3 Sept., Yakushima 3-5 Sept.)	Department of Environmental Sciences for Sustainability Faculty of Agriculture, Iwate University

Time	Name of Practice	Courses
8-9 Sept.	Practice in Erosion Control	Forest Science (Compulsory)
10-12 Sept.	Practice in Geomorphology for Erosion and Hydrology	Forest Science (Compulsory)
22-25 Sept.	Practice in Dendrology (II)	Forest Science (Compulsory)
16-20 Feb.	Practical afforestation (I)	Forest Science (Compulsory)
23-27 Feb.	Field Practice in Forest Mensuration	Forest Science (Compulsory)
2-3 Mar.	Practice in forest products processing	Forest Science (Optional)
5-6 Mar.	Forest Science Course orientation	Forest Science (Compulsory)
12-15 Mar.	Interchangeable Practice in University Forests Credit Osumi Forests and People	Undergraduate students of the many faculties of agriculture nationwide
Full year	Nature School Internship	Common Education

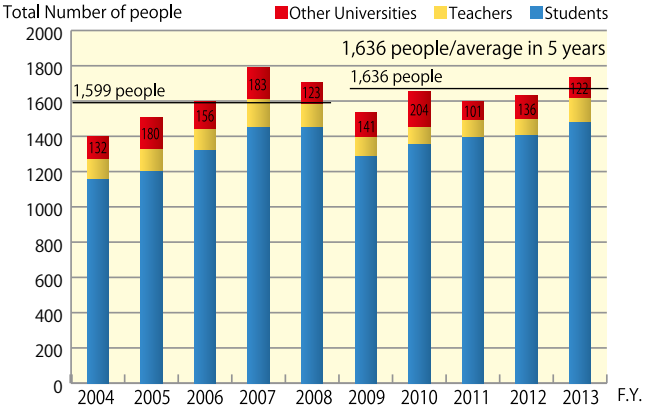
Learn a lot from the forest. Students are observing a 12ha clear-cut. (February 2005, No.116 forest)

Education

The forest does not speak a word. However, if you observe it closely and address it properly, it will become an excellent textbook from which you can learn a great deal.

Many students stay in the Takakuma University Forests throughout the year. They live together and engage themselves in practical learning. Forest Science students take five to eight one-week practice sessions before they finish the course. Also offered is a field practice for adult graduate students who aspire to be forestry specialists. It is one of the few such courses available in Japan.

Fig. 5: Number of education Users



Examples of student practice

Measure the forest

【Field Practice in Forest Mensuration】
Unravel the mechanism of the forest through measurement and classification.

Experience the forest through work

【Practical afforestation, and other such programs】
Students have plenty of chances to learn firsthand through OJT the basics of forestry and how to deal with forests.

Hone your skills in the forest.

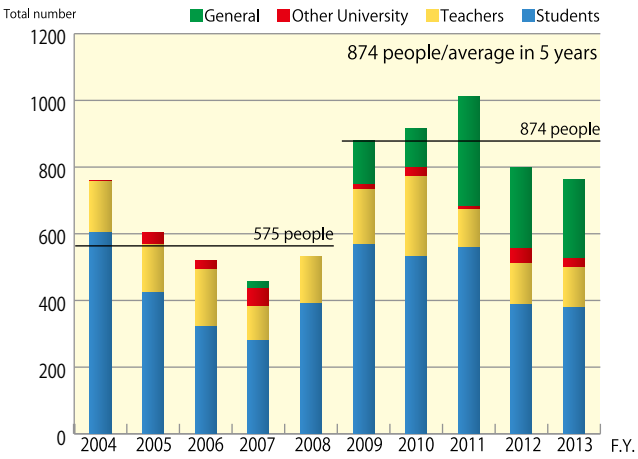
【Forest environmental education practice, and other such programs】
Plan and run, for example, a two night three day camp for primary/junior high school children. Thepurpose is to gain the well-rounded and practical experiences necessary to becoming a responsible and respectable adult.

Research

Research on natural laws and how humans should deal with forests is very important, but sometimes takes a great deal of time. The University Forests see things in a time frame—'forest time'—which is longer than a human life span.

Research outcome is reported as theses. Thesis excerpts and the reports of the benefits obtained from the University Forests are compiled into the annual "University Forests Research Report".

Fig. 6 Number of research uses



Examples of research projects

Hydrological observation

Long-term recording of the relationship between the quantity/quality of river water and condition of forest soil.

Reduction in forestation costs

Experiment with different numbers of trees being planted and different frequencies of weeding to make the forest leaner and reforestation easier.

Ecosystem of animals and forests

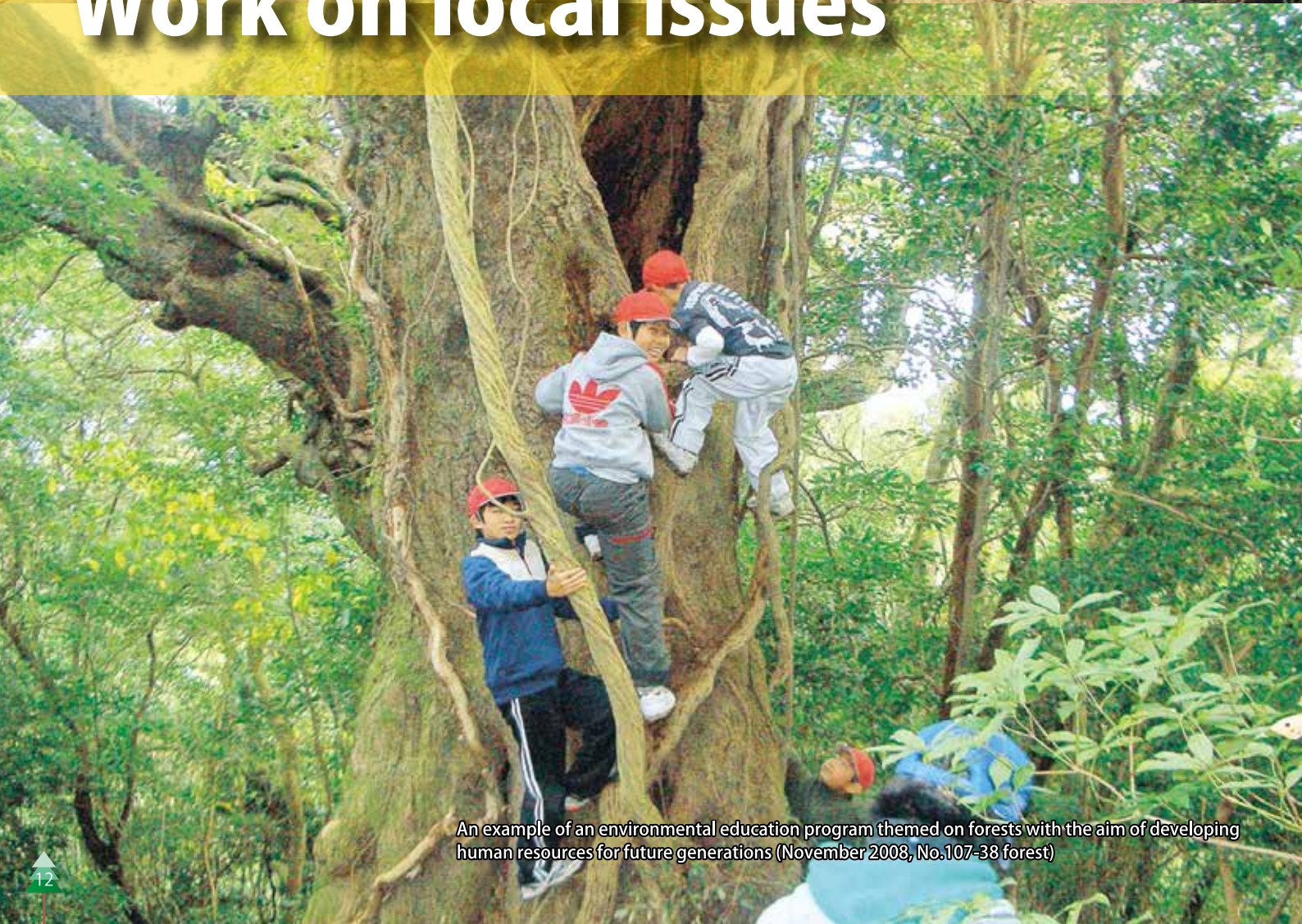
Explore the relationship between forests and wild animals, and between acorns and field mice.

Continuous stand condition survey

As tree density and tree growth are the most fundamental forest data, periodical surveying is necessary.

Training in analyzing the process of wood production (October 2013, No.108-66 forest)

Work on local issues



An example of an environmental education program themed on forests with the aim of developing human resources for future generations (November 2008, No.107-38 forest)

Forestry Production Specialists Development Program since 2007


Group practice (October 2013)

Forestry in Japan has many challenges, and our programs are designed to address them. The purpose is to examine and improve the way of doing things including marketing methods in order to develop specialists who ae skilled in hands-on forestry.
These programs are Forestry Specialists Development Programs for Advanced Forestry Production Systems (between fiscal 2007 and 2009) and Forestry Business Owners Development and Support Projects (fiscal 2010) taken over from Ministry of Education, Culture, Sports, Science and Technology and Forestry Agency respectively.

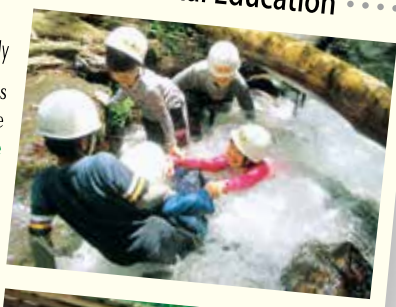
Forest Environmental Education since1999

Contemporary lifestyles offer few chances to experience nature or live in natural surroundings.
Forests are an essential instrument for learning nature through experience. Takakuma University Forests began in 1999 the Forest Environmental Education programs for local children and citizens using the plenty of natural resources we are endowed with: the vast expanse of land and reserved forests.
In 2006, a primary/junior high school was closed down in Ono where the University Forests are located. Tarumizu City opened Ono ESD Nature School using the school site and facilities. The University Forests programs have been taken over and run by the Nature School with the cooperation of municipal staff, University Forests staff, local residents and Kagoshima University students. The programs have raised the quality of Tarumizu City's school and social education, and made contributions to the revitalization of Ono and improvement of university education as students are involved through their learning and voluntary activities.
In 2013, the students voluntary organizations involved in the Nature School got together and formed a non-profit: Forest Lovers Club. The Forest Lovers Club intends to develop new social businesses using the natural and cultural resources of Takakuma University Forests and Ono in order to create a model of a high-quality, sustainable rural mountain community and to nurture students' entrepreneurial mind.
Forest Environmental Education is being implemented at the Takakuma University Forests through various programs made possible by the collaboration between the university, government, NPO and local residents.

Examples of Forest Environmental Education

Tarumizu Primary School Integrated Study

Fifth graders experience rivers, forests and forestry first hand through three sessions. 'Gorge climbing' is one of the big events and is extremely refreshing. Most primary schools in Tarumizu City use the University Forests as their site for experiential learning.



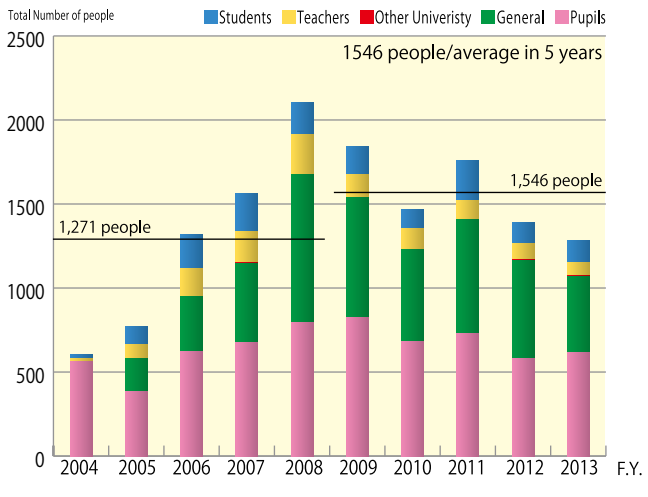
We are forest lovers

The students of the Faculty of Agriculture and Faculty of Education plan and run the summer holiday camp together for children as part of their curricula. The students spare no effort in making it a special event and the camp is a great success every year. It is one of the first attempts in Japan in the realm of forest environmental education.

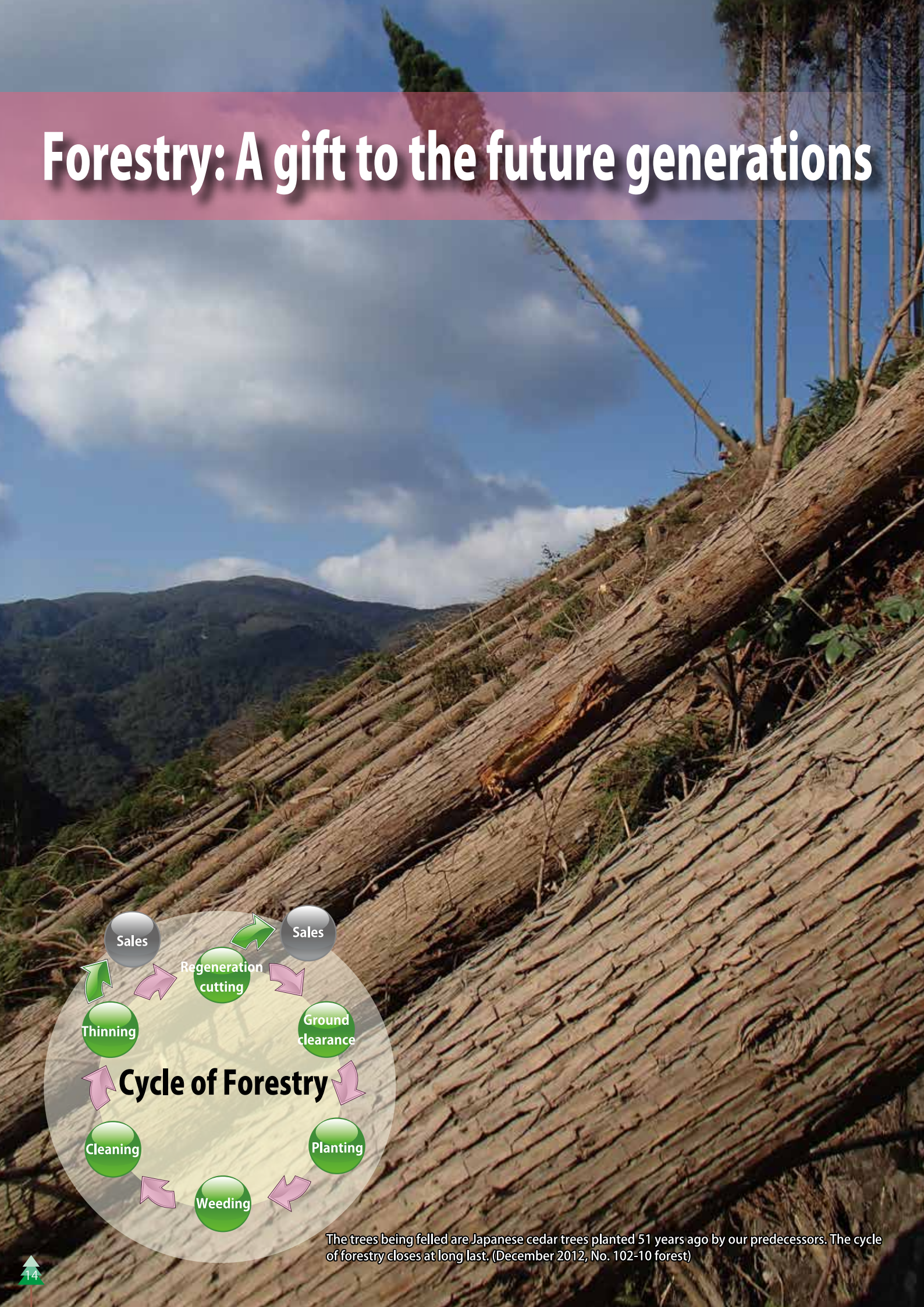
Forest Environmental Education Workshop

The course is designed for teachers to become leaders. The course offers environmental education as the first step in becoming aware of environmental issues and taking action. The learning process is fun and offers a chance to network with other leaders.

Fig.7 Social Contribution Uses



Forestry: A gift to the future generations



The trees being felled are Japanese cedar trees planted 51 years ago by our predecessors. The cycle of forestry closes at long last. (December 2012, No. 102-10 forest)

Stand Condition

At present, Takakuma University Forests are 38 percent planted trees (1,170.65ha) and 62 percent natural trees (1,877.47ha). Most of the planted trees are Japanese cedar (962.48ha) and Japanese cypress (151.64ha). Natural trees, for the most part, are second-growth broad-leaved species generated through seed germination.

At present in the planted forests, the volume of standing Japanese cedar trees is 549,000m^3 and Japanese cypress trees 61,000m^3, according to the adjusted Kagoshima Prefecture Forest Registration 140122. According to the Forest Registration 130423 adjusted by the University Forests, Japanese cedar amounts to 240,000m^3 and Japanese cypress 27,000m^3. The figures are widely different.

Among the Japanese cedar and Japanese cypress trees of the planted forests, the largest group is 46-55 years of age (age class 10-11). The trees 41-70 years of age (age class 9-14) cover an area of 723.17ha or account for 69 percent of the planted Japanese cedar and Japanese cypress forests. Old trees--71 years old or older (age class 15)--account for 264.57ha or 23.7 percent. Newer forests--40 years old or younger (age class 8) -- account for only 126.38ha or 11.3 percent. In other words, the forests are aging rapidly and replacement is not catching up.

Fig. 8 Area ratio by forest type

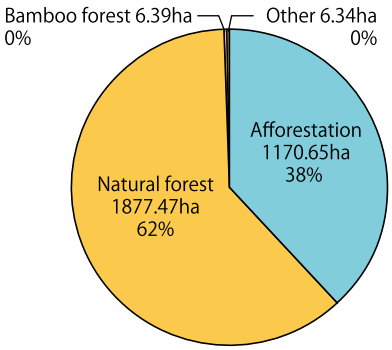


Fig. 9: Area proportion for tree species

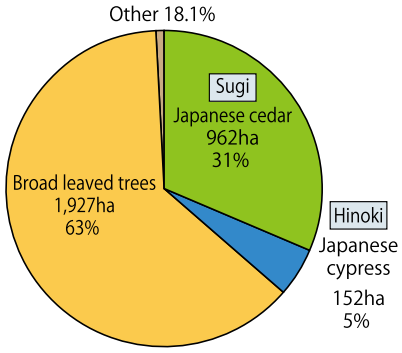
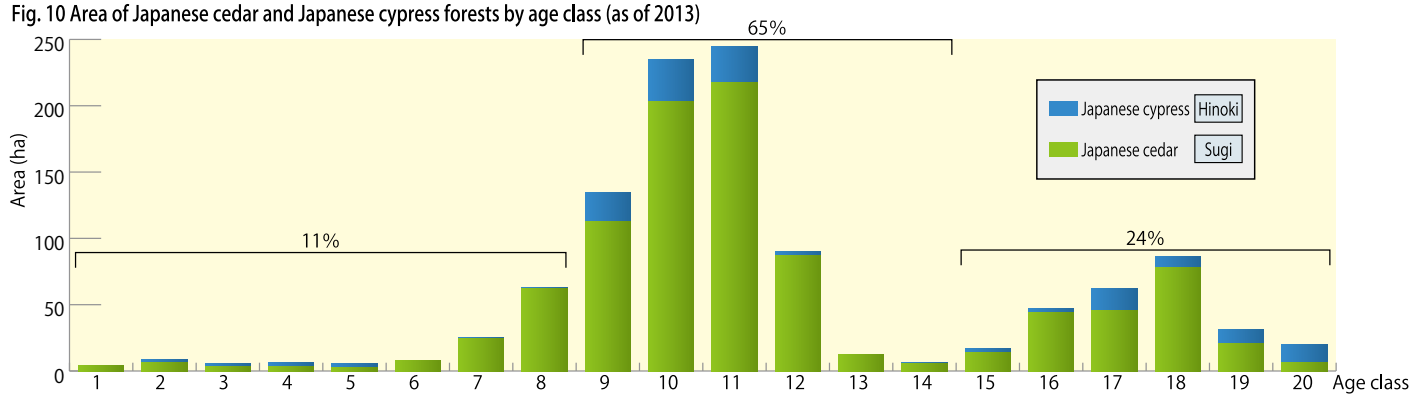


Table 8: Area and accumulation each tree species

Tree species	Area (ha)	Accumulation (m^3)
Japanese cedar	962.48	548,509
Japanese cypress	151.64	60,653
Pine	1.93	588
Sclerophyllous	1,927.49	234,758
Other Coniferales	2.45	555
Bamboo	6.39	0
Treeless land	6.20	0
Building area, Nursey	1.35	0
Total	3,059.93	845,062
Takakuma University Forest area	3,060.80%	

※Data: Kagoshima Prefecture Forest Registration 2014
※The total area does not add up due to rounding.

Fig. 10 Area of Japanese cedar and Japanese cypress forests by age class (as of 2013)



Management

Slope in the process of cutting and forestation (No.102-10 and No.102-13 forest)

Most of the work conducted continuously since the 1960s has been the conservation of the forests planted during the period of the forestation drive. The area of weeding peaked at 350ha or more (average between 1963 and 1972). Works such as removal of unnecessary trees and thinning for the purpose of conservation were finished by around 2005. The planted forests are high-quality resources.

Timber production has been rising in recent years. The average annual production and production value between 2009 and 2013 are 1,157m^3 and ¥8.51 million respectively. The turnover is part of the University revenue and used for the purpose of forest management.

Fig. 11 Area/percentage of forest practice (total of 2004-2013)

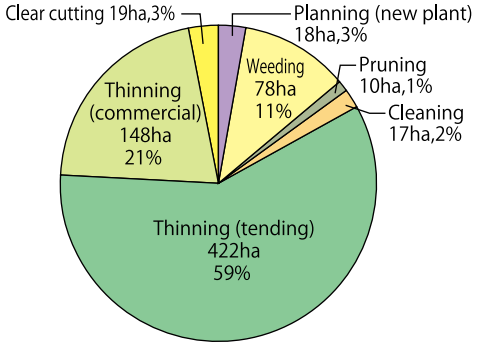


Table 12: Change in forest products and production value (F.Y. 2004 to 2013)

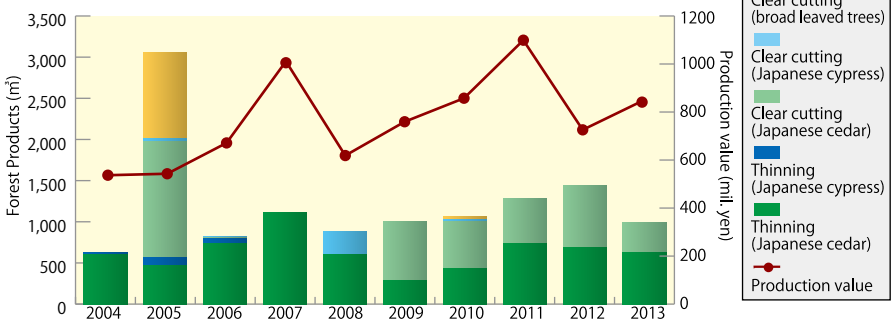
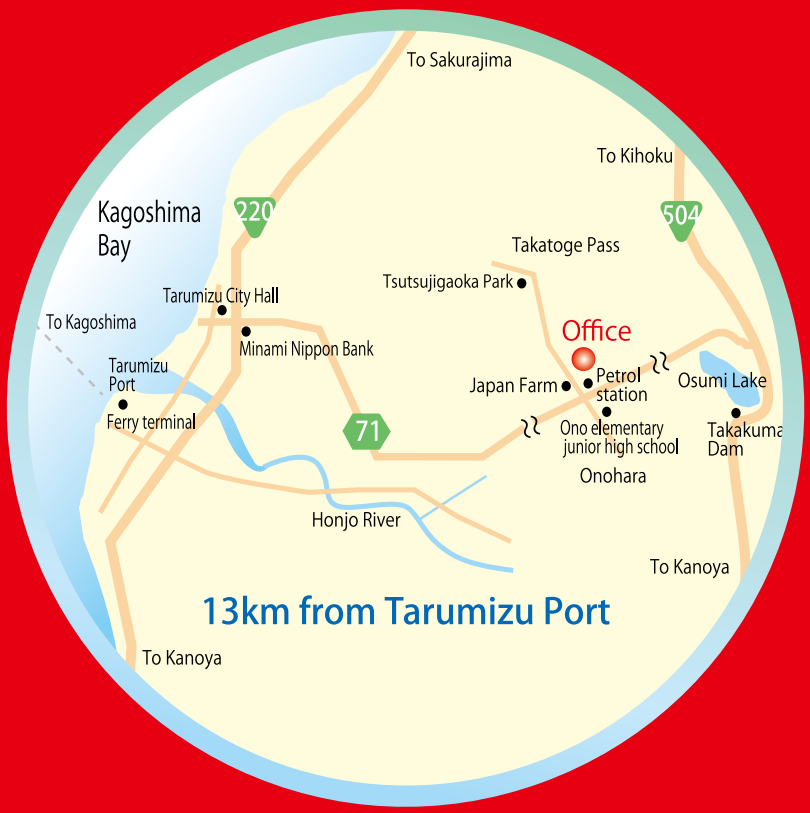


Table 9: List of Kagoshima University Forests

Name	Detail	Location	Area	Access from the Faculty of Agriculture
①Takakuma University Forests and Office	The site is blessed with many resources. Second-growth forests of evergreen trees are among the precious natural vegetation remaining in southern Kyushu. Forests of Yakusugi cedar and Japanese zelkova were transplanted when the University Forests were established. An abundant and high-quality groundwater is refined by volcanic ejecta unique to Kagoshima Prefecture. We also have precious intellectual resources—useful for educational and research purposes—such as records of forestry practice and database collected at the long-term experiment sites.	Office Address: 3237 Kaigata, Tarumizu City (The whole mountainous area in the northern part of Tarumizu City) (It accounts for 19 percent of the total area of Tarumizu City)	3060.86ha	By Kamoike Tarumizu Ferry 32.7km/85 minutes Distance and time from Tarumizu City About 13km/20 minutes
② Tarumizu Experimental Site	Between 1959 and 1985, the site was used for the storage and sale of timber from the University Forests. At present, it serves as the exhibition site for landscape gardening species such as yew plum pine and Chinese guger trees. ~F.Y. 2013	3975-1 Minatohira, Honjo, Tarumizu-shi (Along the Honjo River about 1km upstream of Tarumizu Shinko Port)	0.46ha	By Kamoike Tarumizu Ferry 19.0km/60 minutes
③Sakurajima Lava Experimental Site	The ground was created by the large volcanic explosion of Sakurajima in 1914. The rocky stretch of ground is now covered with Japanese knotweed and Japanese black pines. The site is intended for observing the process in which a newly formed and bare lava plateau becomes a forest. Pine Tree Death has been observed in recent years.	Sakurajima-Yokoyama, Kagoshima City (The area surrounding Karasujima Observatory Deck) (Next to the Akamizu Observatory Field)	37.27ha	By Sakurajima Ferry 10.5km/37 minutes
④Experimental Nursery	The on-campus nursery is indispensable for the kinds of research projects/tests where rigorous experiments and measurements are necessary. It is used mostly for silvicultural and forest protection research projects.	Korimoto 1-chome, Kagoshima City (The northernmost of point Korimoto Campus)	0.33ha	
⑤Toso Forest Garden	The experimental field is designed for forest tree breeding and arboricultural tests and used for educational and experimental purposes as necessary.	Toso, Kagoshima City (annexed to the Toso Orchard of the Faculty of Agriculture))	0.99ha	2.5km/5mins
⑥Sata Research Forest	Sata University Forests are almost entirely surrounded by ocean and suffer under the effect of high wind. Mean annual temperature is 19℃ and annual precipitation is about 1,500mm. At first, the area was a vast wilderness dotted with Japanese black pine trees and broad leaved evergreen trees. Forestation began with useful plants from the tropics. The forest type has grown into one typical of the southern half of temperate climate: a mixture of subtropical trees such as mokutachibana "Ardisia sieboldii", gyoboku "Crateva religiosa" and fukanoki "Schefflera heptaphylla". The forest is in the Class II Zone of Kirishima-Yaku National Park (renamed to Kirishima-Kinkōwan National Park in 2012).	Minami-osumi-cho, Sata-magome (part of Cape Sata on the southernmost tip of Kyushu)	299.23ha	By Kamoike Tarumizu Ferry 103.8km/160 minutes

Usage Guidance

As the University Forests are intended for educational and research purposes, use of automobiles is limited. We have nature trails, so if you take these courses, submit a completed registration form. If you use the forest for an educational or research purpose, you must submit a completed application form in advance. For more information, please contact us at the University Forest Office.



Office

Kaigata 3237, Tarumizu City,
Kagoshima Prefecture, 891-2101
TEL 0994-32-6329 FAX 0994-32-7665
Mon to Friday (except public holidays) 8:30~17:15
http://ace1.agri.kagoshima-u.ac.jp/takakuma/
E-mail tf-somu@agri.kagoshima-u.ac.jp

May 2015 First edition 500

Kagoshima University Forests