


Template for GIAHS proposal
Globally Important Agricultural Heritage Systems (GIAHS)
Initiative

SUMMARY INFORMATION

Name/Title of the Agricultural Heritage System (Local Name and Translation, if necessary): Traditional tea-grass integrated system in Shizuoka. (<i>Chagusaba</i>)	
Requesting Agency/Organization: Association for Promotion of GIAHS “ <i>CHAGUSABA</i> in Shizuoka”	
Country/Location/Site: Located in the midwestern area of Shizuoka Prefecture, the site includes the foothills of the Southern Alps forming a vast mountainous and hilly terrain that comprises 4 cities (Kakegawa, Kikugawa, Makinohara, and Shimada) and 1 town (Kawanehon).	
Accessibility of the Site to the Capital or other Major Cities: This area is 1 hour 45 minutes by train, or 3 hour by car from Tokyo. This area can also be accessed from in and outside the country via Mt. Fuji Shizuoka Airport, which is located in the center of the site.	
Approximate Surface Area: Tea field about 1000 ha, <i>Chagusaba</i> (grassland) about 300 ha	
Agro-Ecological Zone/s: The site is located in an upland cropping area in the warm temperate zone.	
Topographic features: The site includes sub-montane areas of the Southern Alps in Japan. The terrain is mountainous and hilly.	
Climate Type: Temperate	
Approximate Population: The administrative district, including the <i>Chagusaba</i> area, contains approximately 270,000 inhabitants.	
Main Sources of Livelihood: Tea-production-centered agriculture, commerce, and industrial businesses are the primary sources of income in the area.	
Ethnicity/Indigenous population: N/A	

Summary Information of the Agricultural Heritage System (about 200–300 words)

“*Chagusaba*”(“semi-natural grasslands”) represents an exemplary system of traditional agricultural techniques, where grasslands are maintained around tea fields to supply mulch that improves the quality of tea cultivation. *Chagusaba* is a rare example of codependence between agricultural production and biodiversity, each of which enhances the other’s value (Refer to Figure 1).

For more than 10,000 years, *Chagusaba* areas have been maintained through human activity. However, the area of the semi-natural grasslands has been reduced with the modernization of agriculture. This disuse has led to a serious and rapid decline in the biodiversity of *Chagusaba*.

Despite the modernization of tea cultivation (mechanization of harvesting methods and infrastructure improvement of tea field) and tea processing, the traditional agronomic method reflected in *Chagusaba* continues to be practiced. Farmers consider *Chagusaba* to be important for high-quality tea production. The active use of the grass has enabled *Chagusaba* to be maintained and rich, wild flora,including rare species,still exists in such areas. Biodiversity of *Chagusaba* is conserved by periodic mowing of the grass and the exclusion of both the grazing by livestock and the prescribed burning (Refer to Figure 2). Over 300 species of meadow plants alone have been recorded in *Chagusaba* areas(Refer to Figure 3.). *Chagusaba* is an extremely unique global example of an agricultural site in which green tea production is integrated with the grassland environment.

Although *Chagusaba* requires labor-intensive management, this system can produce high-quality tea that trades at a high price. This good economic return has been a motivation for farmers’ efforts to conserve and manage *Chagusaba*. In recent years, however, high market prices for quality tea have not been stable. This reality adversely affects farmers’ willingness to invest the time required to produce high-quality tea, causing abandonment of labor-intensive *Chagusaba*. *Chagusaba* can be conserved only through healthy farm management for tea production. We expect that the certification of GIAHS will help to build a framework in which farmers’ efforts to produce quality tea can be appropriately rewarded and that adding value to the farmers’ work will facilitate conservation of *Chagusaba* and its biodiversity.



Figure 1: Landscape of a tea field and *Chagusaba*



Figure 2: Grasses in *Chagusaba* are harvested between autumn to winter.
Farmers traditionally cover furrows in green-tea fields with grasses.



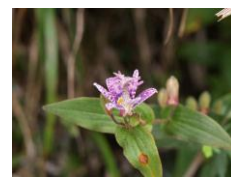
var.
japonica)Tsurigane
ninjin
(*Adenophora*



(*Platycodon
grandiflorus*)Kikyo



(*Dianthus
superbus*)Kawaranad



(*Tricyrtis
hirtaponicum*)Hototogisu

Figure.3: Plant species of *Chagusaba*

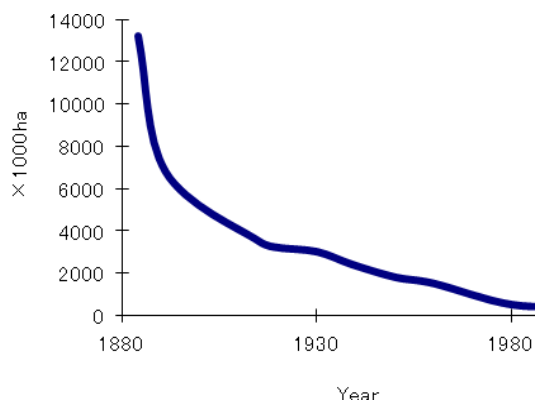
DESCRIPTION OF THE AGRICULTURAL HERITAGE SYSTEM

I. Characteristics of the proposed GIAHS

Global (or national) importance

The loss of biodiversity in grasslands is becoming a serious global problem.

Since Japan is located in the monsoon region of Asia, where climate conditions tend to be warm and humid, its natural vegetation consists largely of forest-like areas. Nonetheless, for more than 10,000 years, semi-natural



Graph 1: The decrease of grass area in Japan

grasslands have been maintained in Japan through human activity. The flora and fauna that live in these grasslands are considered to be descendants of organisms that inhabited the region prior to the last ice age. Since the beginning of the agricultural age, plants obtained from the grassland areas have been used for purposes such as roofing material and fertilizer. Semi-natural grasslands are important secondary ecosystems created by the combination of nature and human activity.

However, with the modernization of agricultural practices and human society, the use of plants from semi-natural grasslands has been reduced (Refer to Graph 1). As a result, the management of these ecosystems has been neglected and their biodiversity is being lost at an alarming rate. Semi-natural grasslands, which accounted for 13% of Japan's landmass at the beginning of 20th century, now account for only 1%. Thus, many of the plants and other organisms inhabiting these ecosystems have become endangered, adding to the critical nature of the situation.

However, even in the midst of this critical situation, semi-natural grasslands are still distributed throughout this area near traditional green tea fields. In tea cultivation, the mulching of tea fields with grasses is considered to ameliorate the soil and contribute a pleasant taste and aroma that enhances the quality of the tea. Therefore, despite the modernization of agriculture, semi-natural grasslands continue to be maintained through the practice of traditional techniques. Semi-natural grasslands that are maintained for tea cultivation are known as "*Chagusaba*."

More than 300 species of grassland plants have been recorded in *Chagusaba* – a fact that illustrates the extremely high level of species diversity that exists in these ecosystems. Although there are many examples of semi-natural grasslands that are maintained through livestock farming and prescribed burning, *Chagusaba* are maintained through mowing alone (no livestock or burning). Furthermore, rather than being operated and maintained in an isolated location, this mosaic of rich biodiversity is maintained and distributed from within inhabited villages, serving as a precious example of the Japanese traditional land use form.

Although the area of individual grasslands adjacent to tea plantations and houses may be small, a combined total of approximately 300 ha of *Chagusaba* have been documented throughout this area. The biodiversity of *Chagusaba* has been stabilized and maintained through the efforts of farmers who wish to ensure the continued production of high-quality tea. Within the modernized agricultural value-system, *Chagusaba* is maintained through a balance of "Agricultural Productivity" and "Conservation of Biodiversity." This is an excellent example of harnessing traditional agricultural wisdom to complement agricultural modernization.

1. Food and livelihood security

This area is located in Shizuoka Prefecture, which is called the “Capital of Tea” as it is the greatest tea-producing region in Japan, where tea-related businesses and facilities have been increasing in number. This area represents a primary location of tea production in Shizuoka Prefecture (Refer to Figure 4).

The annual output of tea is 31.9 billion yen, and tea is a major agricultural product in this area. *Chagusaba* is widely spread from the mountains and hills at the foot of the Southern Alps to highland areas in river basins, and the taste and aroma of the green tea produced differs according to geography and climate. About 8300 households grow tea in this area, which represents 78% of the area’s farmers, who largely depend on tea for income. The ratio of tea output to gross agricultural output in major cities and towns of the site is as follows: Kawanehoncho, 91.8%; Shimada, 68.8%; Makinohara, 59.2%; Kikugawa, 56.1%; and Kakegawa, 37.8%. The output of the industry relevant to tea is about 1 trillion yen in whole Shizuoka Prefecture including this area.



**Figure 4: A typical landscape in Shizuoka Prefecture;
Landscape of Mt. Fuji from tea field.**

2. Biodiversity and ecosystem function

a) Biodiversity of *Chagusaba*

Semi-natural grasslands in Japan are in an endangered state. According to historical records, 13% of the country was semi-natural grassland at the beginning of the 20th century. However, the grasslands disappeared rapidly during the last century because of urbanization and agricultural modernization. Today, only 1% of the country’s area remains as semi-natural grasslands. Despite this trend, this area preserves semi-natural grassland areas in order to produce high-quality tea. Over 300 plant species are observed in *Chagusaba*. And seven endangered species have also been recorded. This is one of the semi-natural grassland with the richest biodiversity in Japan.

i. Local, Endemic Species Observed in *Chagusaba*

Many flora and fauna are found in *Chagusaba*, including endangered species. In particular, several

endemic species have been observed, including *Fujitaigeki* (Refer to Figure 5) and Kakegawa Melanoplineae (Refer to Figure 6). *Fujitaigeki* (*Euphorbia watanabaei* subsp. *watanabaei*) is an endemic subspecies of the family Euphorbiaceae that grows only in this area and named after Mt. Fuji—the symbol of Japan. It is a perennial that grows in areas with a history of grass harvesting, and its yellow flowers bloom from April to August. The plant is classified as an endangered species under the “Critically Endangered Category.” Kakegawa Melanoplineae, which is named after Kakegawa city, is a grasshopper endemic to Mt. Awagatake. Its scientific name *Parapodisma awagatakensis* is derived from Mt. Awagatake. Kakegawa Melanoplineae has degenerate wings and cannot fly even as an adult.

ii. Characteristic species in *Chagusaba*

Flowers in bloom change with each season in Japan where the four seasons are distinct. *Manyoshu*—the world’s oldest collection of poetry compiled in Japan in the 8th century—selected seven flowers to represent the fall season. They are collectively called the “Seven Flowers of Autumn (*Akinonanakusa*).” These seven species all grow naturally in semi-natural grasslands, indicating that this ecosystem was a familiar environment in the past. Of the seven species, four are designated as endangered in other regions. However, most or all of these seven species can be observed in *Chagusaba*. The Sasa lily (*Lilium japonicum*) is indigenous to Japan and has been considered a holy flower since ancient times (Refer to Figure 7). The flower is considered to indicate to the farmer that it is the right time to begin transplanting rice in this area. The flower is rare today and is designated as an endangered species, but it occurs often in *Chagusaba*. In addition to these plant species, accipitridae birds like Kumataka (*spizaetus nipalensis orientailis*) or Sashiba (*Butastur indicus*, refer to Figure 8), designated as extinct and threatened species, inhabit around *Chagusaba*. They hunt small animals living in *Chagusaba*.



Figure 5: Fujitaigeki



Figure 6: Kakegawa
Melanoplineae



Figure 7: Sasayuri
(*Lilium japonicum*)

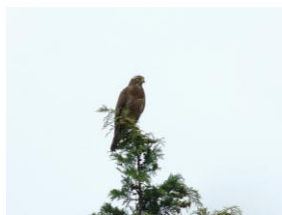


Figure 8: Sashiba
(*Butastur indicus*)

b) Conservation and improvement of soil

Mulching of tea fields with grass in *Chagusaba* aids in the production of high-quality tea and provides various benefits such as: improving the environment for root growth by moderating soil temperature and conserving soil moisture; weed control; prevention of soil and fertilizer runoff; conservation of soil aggregate structure; and supply of organic matter and improvement of the soil. All these benefits contribute to the maintenance of a stable and sustainable tea business. A survey in Higashiyama District in Kakegawa revealed that *Chagusaba* existed in 70% of all tea field areas. Farmers consider that ideally *Chagusaba* of the same size as tea field is required for tea cultivation. (Refer to Figure 9)

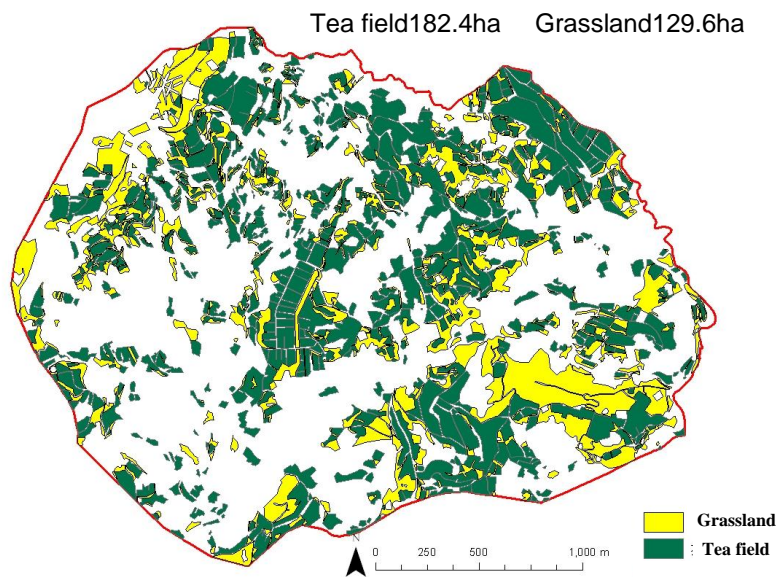


Figure 9: Example of state of CHAGUSABA in Higashiyama District

At present, grass for tea areas is utilized in 130 ha (over 71%) of the 90 tea farms and 182 ha of tea fields.

b) Diversity of agriculture

This site area occupies a variety of elevations, from 0 to 3000 m or more above sea level. Because of the diversity of land features and climates, this area produces 67 agricultural commodities(Refer to Annex 2). Many varieties of tea are produced in this area, where native varieties differ among the mountains. About 80% of the tea currently grown in Japan is represented by just one variety – ‘Yabukita.’ However, farmers promote 13 additional varieties, and some native tea plants are also being commercialized. (Refer to Table 1 and Figure 10) Tea is grown primarily in mountainous areas, on hill slopes, and in highlands along river basins. Rice is grown in lowlands with abundant water, and lettuce and carrots are subsidiary crops of rice paddies. Sweet potatoes, radishes and onions are grown in sand dunes near the coast, and horticultural products such as melons, strawberries, and ornamental flowers flourish under the warm climate.

Table.1 The variety of tea in this area.

Early variety	Yamanoibuki Ohiwase Sayamakaori Tsuyuhikari Saemidori Sohu
Medium variety	Yamakai Yabukita Kosyun
Late variety	Kanayamidori Okuhikari Sawamizuka Harumidori Okumidori



Yabukita

It was selected from native varieties.



Tsuyuhikari

Has a rich aroma and full-bodied flavor

Kosyun

Has a refreshingly cool aroma

Yamanoibuki

Has a light and sweet aroma and is less bitter

Table 1 and Figure 10: Varieties of tea in this area

3. Knowledge systems and adapted technologies

a) Management of Chagusaba

Grass is cut from fall to winter in *Chagusaba*. (Refer to Figure 11) The cut grass is then dried using a process called “*Kapposhi*.” (Refer to Figure 12) The dried grass is matted in the ridges between tea plants from winter to spring. (Refer to Figure 13) In the past, the grass was matted entirely (without chopping), but today it is often finely chopped prior to drying. (Refer to Figure 14) Methods also vary locally. In some villages in this area, the grass is stored for a year before being used in order to combat pests, while in other villages it is cut in the summer and hung out to dry to increase the fertilizing effect.

Chagusaba is often located on steep mountain slopes. Stumps of grass which are not cut are used as

footholds, and cutting starts from the side on steep slopes. When tying up and removing the grass, workers lean on the slope to maintain their balance (Refer to Figure 11).

The quantity of silver grass used as mulch is 6.8 t per ha of tea field, which is approximately 15 t per farmer household. Approximately 600 hours per farmer household is required to cut and use *Chagusaba* grass. Cutting and mulching accounts for about 60% of all labor hours in tea cultivation from fall to spring.



Figure 11: Farmers cut grasses of Chagusaba



Figure 12: Kapposhi:
Harvested grass are stood and dried. It is called Kapposhi



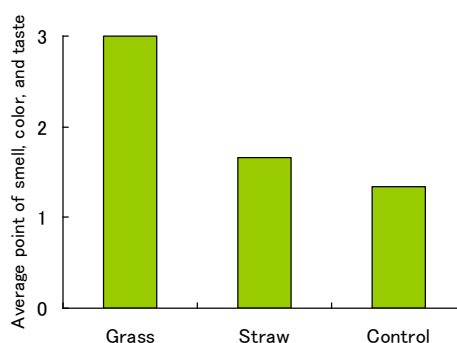
Figure 13: Farmers put grasses of Chagusaba



Figure 14: Farmers chop grasses of Chagusaba

b) Effects of Chagusaba on Tea Quality

It is known that adding grass to tea fields improves the color, aroma, and taste of the tea, and enables the production of high-quality tea (Refer to Graph 2). This effect is significantly greater than that obtained when rice straw is used. While the mechanism of tea-quality improvement by grass mulching is not completely understood, it has a substantial soil-conditioning effect by increasing humus content and maintaining aggregate structure. Grass mulching also mitigates soil erosion by rainfall and fertilizer runoff that is likely to occur in tea fields on slopes. Soil microbial activity and sustainable fertilization can also be increased by plowing the grass into the soil.



Graph 2: Evaluation of the quality of tea cultivated using grass from *Chagusaba*.

c) Inheritance of Techniques

Farmers have a strong belief that *Chagusaba*, like farmlands, has been inherited from their ancestors. Likewise, conservation techniques for *Chagusaba* have been passed down through generations. *Chagusaba* are strongly considered as local collective property, and are managed collaboratively in some areas. Even when managed privately, local farmers can assist in cases where private managers are unable to maintain *Chagusaba* for reasons such as old age or illness.

d) Irrigation Facilities and Technologies

Tea is traditionally cultivated on mountain slopes where water supplies are inadequate and rice paddies cannot be cultivated. However, securing water is an important issue in highlands with strong exposure to sunlight. Tea production has become a viable land use since the development of irrigation systems from the 1960s to the 1980s that draw water from the Ooi River.

4. Cultures, value systems, and social organizations (Agri-Culture)

a) Cultures and value systems

i. Japanese deep-steamed tea

Originally, Japanese green tea is made after stopping the leavening action of enzymes by steaming the tea. This is called steamed tea. By this unique process, Japanese green tea obtains a green color and aroma of fresh leaflets.

It is said that adding grass of *Chagusaba* to tea fields improves the color, aroma, and taste of the tea. The novel process used to deep-steam tea with distinct aroma and deep green was developed uniquely in this area in the 1950s (Refer to Figure 15). This process spreads in various places in Japan now, and has become one of the typical processes of Japanese tea.



Figure 15: 2 types of green tea in this area

ii. Hand-Kneading

Traditional manufacturing processes for Japanese tea consist of “unraveling” and “kneading” with bare hands, a technique called “hand kneading.” (Refer to Figure 16) While hand kneading was first developed in Kyoto, over 30 styles of hand kneading were further developed in Shizuoka to accommodate various land conditions and tea-leaf quality. Much hand kneading is mechanized today, but professionals called *Chashi*

maintain the 3 styles of hand-kneading tradition through organized preservation groups in this area.



Figure 16: Hand-kneading: Traditional technique of manufacturing process of green tea

iii. Buddhist Festival with Silver Grass

Silver grass, a dominant species in semi-natural grasslands, was used as a charm in ancient times for its sharp leaves. It is also used in prayers for good harvest, due to its resemblance to ears of rice.

Silver grass in *Chagusaba* is offered in a New Year's ceremony in which prayers are made for a good harvest (Refer to Figure 17), and in a moon-viewing ceremony of appreciation of the harvest. Silver grass was placed on mounds of rice straw to celebrate the harvest in ancient times.



Figure 17: Silver grass in Chagusaba is offered in new year's ceremony

Chagusaba plants have played an important role in religious events in this area. Silver grass is offered on Buddhist families' altars in August. While chrysanthemum is commonly offered on ancestral graves in Japan, silver grass, Valerianaceae species, and tiger lily (*Lilium lancifolium*)—all of which are available in *Chagusaba*—are used instead in this area. (Refer to Figure 18)



Figure 18: Silver grass in Chagusaba is offered to ancestral graves and altars.

b) Social organizations

i. Tea Industry Cooperative and Tea Factory

Management of tea fields and tea harvest is done by each farmer, but the primary processing after harvest is often done in local factories built by joint investment. Farmers that co-own a tea factory organize a cooperative, and each organization engages in improving tea quality and branding. A tea-processing factory is a social hub at the local level, and local activities often are initiated with the cooperative. There are also cases in which the use of *Chagusaba*, and efforts for their conservation, are carried out by local cooperatives.

ii. Commons and “YUI”

Some *Chagusaba* are commons in which communities may retrieve grass resources. Some of these commons are managed jointly, while in other *Chagusaba* the land-use rights are divided, and management and grass harvest are conducted separately in each division.

One village community has obliged all farmers to use *Chagusaba* in order to make their tea quality consistent. The neighboring farmers help one another when an individual’s labor is in short supply or when an individual cannot manage on his own. A complementary tradition called “*Yui*” existed in Japan in the past, whereby farmers complemented each other’s labor forces. Management of *Chagusaba* by collaborative work or exchange of labor is based on this traditional ethos. Through such support and collaboration, *Chagusaba* is conserved by local communities.

5. Remarkable landscapes, land and water resource management features

a) Remarkable landscapes

i. Tea-field landscape

While the area in which grass is cut is called *Chagusaba*, locals call the tea fields “*Chabara*.” The landscape comprised of *Chagusaba* and *Chabara*, distributed in a mosaic fashion, is dominant in this area. (Refer to Figure 19 and 20)

Tea trees are clipped in a semicircular shape to improve sun light reception and to increase harvestable tea area. This shape resembles a “Japanese fish sausage,” a Japanese food, and thus is called “fish-sausage-style.” The tea-field landscapes filled with rows of semi-circular tea trees are a beautiful sight, and the aesthetics of the greenery during harvest of the first tea shoots is a major attraction.

The harvest process is often mechanized today, but tea picking was traditionally in the domain of women’s work. The beautiful red “*Akanedasuki*” is a traditional garment worn by women during the tea harvest, and creates a striking contrast with the green tea shoots. (Refer to Figure 21)



Figure 19: Landscape of tea fields.



Figure 20: Landscape of mosaic with *Chabara* and *Chagusaba*



Figure 21: “Akanedasaki” , traditional garment worn by women

ii. The “Tea” Character as a Symbol

Among the *Chagusaba* spread across the slopes of Mt. Awagatake is one that resembles the Japanese Kanji character for “tea,” with one side being over 100 m in length. In 1932, local farmers planted pine trees to show their enthusiasm for tea cultivation; the pines were damaged by pine wood nematodes and were replaced with cypress trees in 1985. (Refer to Figure 22)



Figure 22: Trees forming the kanji word of tea in *Chagusaba*, to describe and appeal on the deep-rooted tradition of tea cultivation/*Chagusaba* and its importance to local community.

iii. "Tea Road" in Ooi River Basin

The route connecting tea-production areas along the Ooi River was traditionally called "Tea Road," and many events and revitalization efforts have taken place here in recent times. This road is also historical, connecting the traditional tea-production area in the foothills of the Southern Alps with tea fields in highland areas exploited during the 19th century. Older production areas in the mountains produce "steamed tea" that exploits the natural flavor and aroma of the tea leaves. More recently developed production areas in highlands and lowlands with good exposure to sunlight produce "deep-steamed tea" with a distinct aroma and strong sweetness, using a new technique of the same name. Along Tea Road, one can enjoy a variety of flavors of tea, which differ from place to place.

Tea Road is connected by the Ooi River Railway.
(Refer to Figure 23)



Figure 23: Steam train run in a tea field

iv. Terraced Paddies for using *Chagusaba*

Paddies were built into steep hillsides as terraces. Rice cultivation was abandoned in this area after the centralization of rice production began in the 1970s, but the land has been conserved through its use as a *Chagusaba*. The terraced paddies in Sengamachi have been known as a place of scenic beauty since the Edo Period (17- 19 century). Out of 10 ha of terraced paddies, 1 ha has been restored as a rice paddy, and the remainder is currently used as *Chagusaba*. The terraced paddy area, popular for its resem



Figure 24: Historic rice terrace is also used as *Chagusaba*

is restored to rice paddy in the summer after cutting the *Chagusaba* in the winter. (Refer to Figure 24)

b) Land and water resource management

i. Mosaic-like Land Use Modeled after the Natural Terrain

The *Satoyama* environment in Japan is characterized by a mosaic-like land use that matches the existing environment. Under the *Satoyama* land use, areas with sufficient water supplies became rice paddies, and flatlands and loose, sloping grounds became crop fields. Traditional tea fields were opened on mountain slopes where production of grains and vegetables was difficult, and *Chagusaba* was implemented in steep-sloped areas where tea cultivation was difficult.

II. Other *social and cultural* characteristics pertinent to management of the agricultural system (optional)

a) Tea Flower

A seasonal flower called a “tea flower” is arranged in a tea ceremony room for the traditional Japanese ritual. Tea flowers are generally species that grow in semi-natural grasslands, including silver grass, great burnet (*Sanguisorba officinalis*), balloon flower (*Platycodon grandiflorus*), and toad lily (*Tricyrtis hirta*). Tea flowers can be seen in their wild state in *Chagusaba*, a place where materials for the cultural tea ceremony are conserved. (Refer to Figure 25 and 26)



Figure 25: *Chagusaba* plants used for *Chanoyu* (the Japanese traditional tea ceremony)



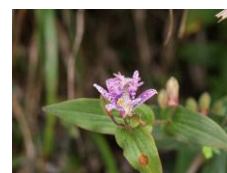
Tsuriganeninjin
(*Adenophora triphylla*)



Kikyo



Kawaranadeshiko



Hototogisu

Fig.26: Plant species of *Chagusaba*

Interestingly, certain plant species that grow in *Chagusaba* are important for *Chanoyu* (the Japanese traditional tea ceremony).

b) Offering of New Tea to Gods

Rituals have been held since ancient times to offer valuable goods to the gods and to the Buddha in Japan. Rituals to dedicate the first tea harvest to shrines and temples, and to give thanks for the harvest take place across the tea-producing areas. The first-harvested teas are very important for farmers.

c) Use of Plants from Semi-Natural Grassland

Much of the *Chagusaba* is thought to have been used as traditional, semi-natural grassland. No records exist as to how the grasslands expanded in the area, but traditional sweets such as “bracken-starch dumpling” (Refer to Figure 27) and “kudzu starch cake” (Refer to Figure 28) exist in the area, which are made with starch from brakes (*Pteridium aquilinum*) and kudzu (*Pueraria lobata*), which grow in semi-natural grasslands. “Kudzu Cloth,” made from the vines of kudzu, has been produced in Kakegawa since the Kamakura Period (12th century).



Figure 27: Bracken-starch dumpling



Figure 28: Kudzu cloth

III. Historic relevance

a) The History of *Chagusaba*

Much of the flora and fauna of the Japanese semi-natural grasslands consist of descendants from Ice Age species. After the Ice Age, the climate in Japan resulted in a progression of vegetation into forest, but grasslands have been conserved through human agricultural activities. Semi-natural grasslands are thought to have been preserved since the beginning of agriculture over 10,000 years ago.

Since agriculture’s beginnings, grassland plants have been actively used as fertilizers and material for rooftops. In the past, grass was cut not just for tea fields, but also for paddies and farms. Such uses are scarcely practiced today. The *Chagusaba* is now rare, and a place where traditional uses of grassland are practiced.

Tea cultivation in Japan originated in the 9th to 12th centuries, when monks studying abroad in China brought tea back to Japan. The 11th–12th-century monk Eisai made great efforts to disseminate tea upon his return from China in the late 12th century. In Shizuoka, cultivation of tea is said to have begun in the 13th century when a high-ranking monk named Shoichi Kokushi seeded plants in his native region. However, tea

plants may have existed in Japan prior to these introductions. It is known that a wild tea grows in mountainous areas, and tea cultivation may have been practiced since very early times.

Tea later became an important product in Shizuoka, and a 14th-century writing cites Shizuoka as one of the major tea-producing areas in Japan. In the 18th century, tea was shipped to Edo (today's Tokyo). Shizuoka tea presented to the Shogunate became a famous brand, and Shizuoka developed into Japan's finest tea producer. By the 19th century, tea was being exported from Shizuoka to the United States, Europe, Africa, and elsewhere, becoming an important export commodity.

The history of *Chagusaba* is unclear, but it is believed that grass from semi-natural grasslands has been matted and used on farms as fertilizer since ancient times, and that the practice was applied in tea cultivation from the 13th century onwards. Woodblock prints from the Edo Period depict grasslands with red pine, suggesting that semi-natural grassland was extensive in this area. (Refer to Figure 29)



As evidenced by the “tea” character designed on Mt. Awagatake in 1932, *Chagusaba* became inextricably linked to the tea industry over the course of history.

Figure 29: The semi-natural grassland drawn on Ukiyoe (1832)

IV. Contemporary relevance

a) National Tendency for Loss of Grasslands and the *Chagusaba* Region

Grasslands that once occupied 13% of Japanese land have now declined to 1%. Many of the remaining grasslands are special areas of grass cultivation that are maintained by burning and other processes, and SATOYAMA grassland preserved within settlements is almost nonexistent.

Broadly distributed, well-preserved grasslands such as *Chagusaba* are quite rare near settlements where mosaic-like land use remains. The fact that all grassland is conserved by cutting only, i.e., not by pastured livestock or controlled burning, is evidence that the ancient style of Japanese SATOYAMA survives to this day in the *Chagusaba* region.

On the other hand, *Chagusaba* grasslands conserved for the contemporary purpose of producing high-quality tea, rather than for conserving biodiversity, still provide an inspiring example of landscapes in which conservation of biodiversity and modernization of tea cultivation (harvesting and infrastructure improvement of tea field) and tea processing are compatible.

b) Carbon Accumulation Effect

Efforts are being made worldwide to reduce carbon gas emissions in order to mitigate global warming. Silver grass is known to have a high carbon-fixing ability (from 5 to 24 t/ha) compared to that of a forest (approximately 3–5 t/ha). Carbon accumulates in the soil where silver grass is in the tea field. A survey of *Chagusaba* soil confirmed that 50 t/ha of carbon had accumulated. Maintaining *Chagusaba* and matting silver grass on tea fields can be effective agronomic methods for mitigating carbon gas emissions.

c) Revitalization of Local Communities by *Chagusaba* Management and Teamwork in Processing and Sales

While agriculture becomes mechanized and the scale of management per farmer household becomes larger, less work is done collaboratively, and the bonds that unify local communities can be weakened. However, in the *Chagusaba* region, strong communities have been maintained through common-property *Chagusaba* management and tea processing and sales; such communities are experiencing revitalization through the tea industry.

d) Promotion of a Tea Production System to Accommodate Natural Health Orientation of Consumers

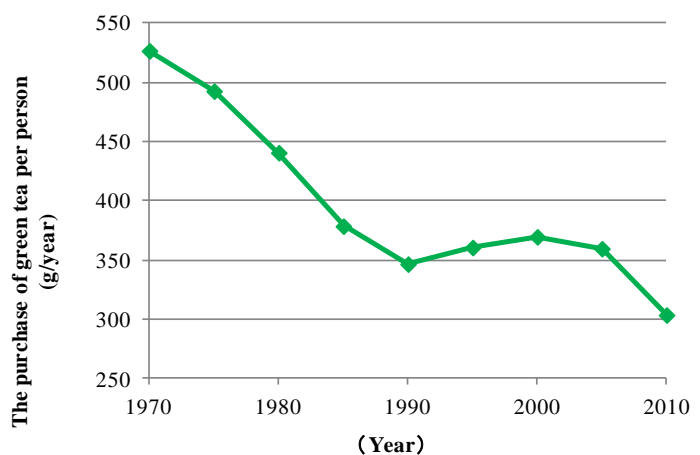
Consumers’ interest in the environment and personal health has increased in recent decades. Agronomic methods of *Chagusaba* management complement such consumer consciousness. In addition, research institutions have investigated the health benefits and other attributes of green tea in this area, and found that it is effective in helping to prevent influenza, cancer, and arteriosclerosis. It is expected that promotion of scientific findings on the potent health benefits of green tea, which was introduced to Japan as a medicine, will domestically increase demand for the tea.

V. Threats and challenges

a) Declining prices of green tea leaves

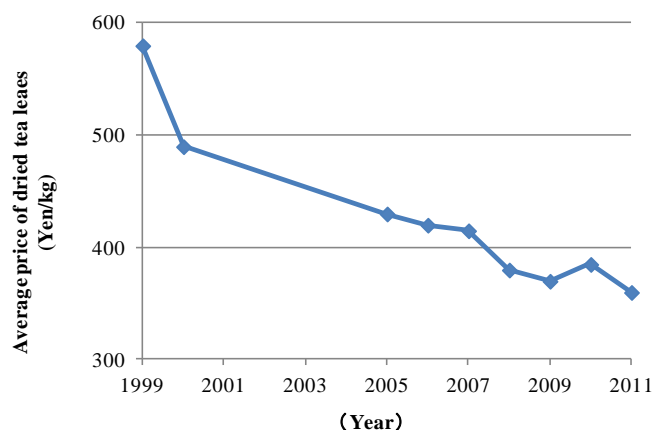
The biodiversity of the grasslands in Japan is in a critical situation, because semi-natural grasslands have decreased rapidly. And it is hardly seen the rich biodiversity in traditional grassland maintained within inhabited villages without *Chagusaba*. Therefore, *Chagusaba* is important in order to preserve biodiversity in grasslands and Japanese traditional land use.

High-quality tea produced using *Chagusaba* has generally traded at a high price. These factors have provided motivation



Graph 3. :Decrease of consumption of green tea per person.

for farmers' efforts to conserve and manage *Chagusaba*, and such agricultural operations have been sustainably maintained. However, the consumption of green tea (Refer to Graph 3) and the price of tea have also decreased (Refer to Graph 4), and high-quality tea produced using *Chagusaba* is no longer guaranteed a high rate of return. This situation adversely affects farmers' willingness to invest the time required to produce high-quality tea, and results in abandonment of labor-intensive *Chagusaba* management. In fact, in some areas a lack of successors to aging farmers makes maintaining these preservation efforts difficult.



Graph 4. :Decrease of price of tea leaves.

VI. Practical considerations

a) Ongoing efforts to promote GIAHS

Four cities and one town in which *Chagusaba* areas are distributed have formed a coalition and set up a local council for certification. The council also evaluates plans for tea promotion and *Chagusaba* conservation. Because *Chagusaba* are maintained through production of tea, such promotion is essential to the conservation of this landscape. Departments from various administrative institutions responsible for tea promotion are creating policies for conservation of *Chagusaba* as well.

Biodiversity and conservation of *Chagusaba* are monitored by research institutions such as the National Institute for Agro-Environmental Sciences, which conduct continuous surveys and monitor vegetation in these areas to detect changes.

b) Potential and opportunities for sustainability and management of GIAHS

Farmers believe that *Chagusaba* is property inherited from ancestors, and such beliefs, along with efforts to produce high-quality tea, have helped to preserve *Chagusaba* and biodiversity of semi-natural grasslands. If the region earns GIAHS certification—a global honor—the pride of farmers that maintain the *Chagusaba* would be solidified. This recognition would motivate farmers to commit to long-term management and preservation of this unique and historic land-use practice.

Conservation of *Chagusaba* is only possible through equitable assessment of quality tea. If the conservation of biodiversity through farmers' efforts becomes widely known due to GIAHS certification, consumer appreciation of the tea produced in these systems is likely to increase.

c) Expected impacts of GIAHS on society and ecology

Chagusaba has not been managed and conserved for the sake of biodiversity, but rather for the sake of high-quality tea production. It is due to the unique characteristics of *Chagusaba* that biodiversity is conserved as a result of improving agricultural productivity. On the other hand, awareness of *Chagusaba* as an important area for conservation of biodiversity is not sufficiently widespread among farmers and consumers. Registration with GIAHS would help consumers understand the relationship between green-tea production and biodiversity, and in turn focus the attention of farmers on biodiversity as they tend the *Chagusaba*.

The close relationship between the tea industry and biodiversity could become widely known through recognition of *Chagusaba* as GIAHS; tea sales could be improved by environmental branding, and promotion of agrotourism using *Chagusaba* as a resource could be enhanced. Japanese tea and plants in *Chagusaba* also represent Japanese culture. By raising the international profile of this relationship through GIAHS recognition, international exchange could be advanced and the knowledge system represented by *Chagusaba*, in which agriculture and biodiversity coexist, could gain global visibility.

d) Motivation of the local community, the local/national authorities, and other relevant stakeholders

- i. Regional Society : Four cities and one town established a council to promote efforts towards GIAHS certification. Upon receiving certification, promotion of local agriculture is planned through formation of a coalition with local farmers, leading to advanced conservation of biodiversity through *Chagusaba* agronomic methods.
- ii. Shizuoka Prefecture : *Chagusaba* is conserved by cooperating with the council within the framework of the prefecture's "Capital of Tea" initiative. The prefecture also promotes regional development through green-tea tourism. GIAHS certification is expected to contribute to interactions between visitors and farmers, and to regional development through a coalition between the tourism and tea industries.
- iii. Central government : Based on its basic plan for food, agriculture, and farm villages in 2010, and on its biodiversity strategy in 2012, Ministry of Agriculture, Forestry, and Fisheries will work toward development of tea production and conservation of biodiversity. The Ministry will support *Chagusaba*-based tea production using its Environmental Payment Policy. In addition, the government intends to promote the area based on its "Tourism-Based Country Promotion Basic Plan (2012.3)," and "Biodiversity National Strategy (Plan) (Planned 2012.9)."

V II.. Dynamic Conservation Plan For GIAHS Selected Site

Chagusaba involves a mutually dependent relationship wherein biodiversity is conserved by farm management practices that produce high-quality tea. It is imperative that such a tea-production system be sustainable, and that it is passed on to succeeding generations to ensure its continuation.

We plan to expand the following activities at the conservation site, and expect the following outcomes from GIAHS designation:

a) Promotion of tea production and conservation of biodiversity

Production of high-quality tea using *Chagusaba* has been evaluated only according to taste and price. However, tea branding, whereby consumers can become attached to a product will be promoted by publicizing stories behind the production, such as the relationship between tea, *Chagusaba* management, and biodiversity. This will promote a deeper understanding among environmentally minded consumers.

Advertising is being planned to educate consumers that the production of flavorful tea using *Chagusaba* management is time consuming. It is hoped that increased consumer knowledge will improve the market for added-value sale of teas.

At Higashiyama District of Kakegawa, farmers tried to developed a “Bio-Topia” logo to inform foreigners about tea cultivation using *Chagusaba*.

(Refer to Figure 27)



Figure 27:“Bio-Topia” logo to inform foreigners about tea cultivation using *Chagusaba*.

b) Inheritance of traditional land use and culture

Chagusaba is preserved through farmers’ management practices, and is passed on to succeeding generations through maintenance of a healthy tea business. To ensure its preservation, cultivating successors is of great importance. However, *Chagusaba* management is labor-intensive, and difficulties in future *Chagusaba* management are expected in some areas due to a lack of available or interested successors. Among the preservation activities, matting cut grass in the tea fields requires the most labor. Therefore, securing labor forces through volunteerism and tourism will be planned. Meanwhile, a policy called “One Company, One Village” is being implemented, which forms a partnership between a rural area and either a private company or a university, through which people are sent to villages to maintain rural community functions. This measure is the first initiative of its kind in Japan. Some regions may also need to consider implementing such a system for *Chagusaba* conservation. In addition, in order to encourage inheritance of the traditional technology of tea processing, we plan to support conservation meetings.

c) Expansion of national and international interaction

In the past, tea farms and *Chagusaba* were simply a “place” for tea production. However, the year-round scenery brings great joy to the people. “Green tea tourism,” which uses scenery, culture, and the tea itself,

will be promoted to deepen visitors' understanding of *Chagusaba* and green tea, and to secure more enthusiasts of the tea.

Understanding of local culture and agriculture will also be nurtured by exposing children to the appeal of *Chagusaba* and tea farms through various experiential programs. *Chagusaba* reflects important aspects of Japanese culture, including green tea, silver grass, and the tea ceremony. Furthermore, *Chagusaba* is a rare example in which improvements in modernized agricultural production conserve biodiversity. This phenomenon not only increases the appeal of green tea, but can also provide inspiration to emerging countries in which agriculture is becoming modernized. Therefore, *Chagusaba* and green tea will be publicized internationally by hosting campaigns and seminars, as well as through events such as the "World Tea Festival." In addition, we plan to actively interact with other GIAHS sites

ANNEX 1:

Location map of the system/site: within the yellow circle on the map



ANNEX 2: Lists of agricultural biodiversity

Agricultural products in this area			
Fruits	Vegetables	Flowers	Crops
mandarin orange	radish	chrysanthemum	rice
summer orange	turnip	carnation	wheat
Hassaku (thick-skinned grapefruit-like fruit)	carrot	rose	soy bean
Kaki (Japanese persimmon)	potato	orchid	red beans
plum	taro	sutachisu	peanut
chestnut	Japanese yam	gerbera	buckwheat
kiwi fruit	Chinese cabbage	Lisianthus	sweet potato
fig	Japanese mustard spinach	pot-plants	tea
blueberries	cabbage	flowers for flower bed	Konnyaku (Elephant roots)
	bok choy	tulip	
	spinach	Alstroemeria	
	asparagus	trees	
	cauliflower	foliage plant	
	broccoli	blossoming tree	
	lettuce	turf	
	green onion		
	onion		
	cucumber		
	pumpkin		
	eggplant		
	tomato		
	green pepper		
	sweet corn		
	snow pea		
	green soybeans		
	ginger		
	strawberry		
	mellon		
	watermelon		
	okra		
	wax gourda white gourd melon		
	ginger leaf		
	brussels sprouts		
	Jew's mallow		

family name	botanical name	National	Regional
BETULACEAE	<i>Carpinus laxiflora</i>		
BLECHNACEAE	<i>Struthiopteris niponica</i>		
BORAGINACEAE	<i>Omphalodes japonica</i>		NT
CAMPANULACEAE	<i>Adenophora triphylla</i> var. <i>japonica</i> <i>Campanula punctata</i> <i>Codonopsis lanceolata</i> <i>Codonopsis lanceolata</i> var. <i>omurae</i> <i>Platycodon grandiflorum</i>	VU	VU
CANNABACEAE	<i>Humulus japonicus</i>		
CAPRIFOLIACEAE	<i>Lonicera japonica</i> <i>Viburnum dilatatum</i>		
CARYOPHYLLACEAE	<i>Dianthus superbis</i> var. <i>longicalycinus</i>		VU
CELASTRACEAE	<i>Celastrus orbiculatus</i>		
CHLORANTHACEAE	<i>Sarcandra glabra</i>		
CLETHRACEAE	<i>Clethra barbinervis</i>		
CLUSIACEAE	<i>Hypericum erectum</i> <i>Hypericum laxum</i>		
COMMELINACEAE	<i>Commelina communis</i> <i>Polia japonica</i>		
CORNACEAE	<i>Benthamidia japonica</i> <i>Helwingia japonica</i>		
CUCURBITACEAE	<i>Trichosanthes cucumeroides</i>		
CYPERACEAE	<i>Carex breviculmis</i> <i>Carex conica</i> <i>Carex lanceolata</i> <i>Carex lenta</i> <i>Carex siderosticta</i> <i>Carex sp1</i> <i>Carex sp2</i> CYPERACEAE sp1 <i>Cyperus microiria</i> <i>Fimbristylis subbispicata</i>		
DENNSTAEDTIACEAE	<i>Pteridium aquilinum</i> var. <i>latiusculum</i>		
DIOSCOREACEAE	<i>Dioscorea japonica</i> <i>Dioscorea tokoro</i>		
DRYOPTERIDACEAE	<i>Dryopteris erythrosora</i>		
EQUISETACEAE	<i>Equisetum arvense</i>		
ERICACEAE	ERICACEAE sp1 <i>Rhododendron dilatatum</i> <i>Rhododendron obtusum</i> var. <i>kaempferi</i> <i>Vaccinium smallii</i> var. <i>versicolor</i>		
EUPHORBIACEAE	<i>Euphorbia adenochlora</i> <i>Euphorbia pekinensis</i> <i>Euphorbia sieboldiana</i> <i>Euphorbia supina</i> <i>Euphorbia watanabei</i> <i>Mallotus japonicus</i> <i>Phyllanthus urinaria</i>	NT VU	VU EN

CR: Critically Endangered

EN: Endangered

VU: Vulnerable

NT: Near Threatened

family name	botanical name	National	Regional
FABACEAE	<i>Amphicarpaea bracteata</i> ssp. <i>edgeworthii</i> var. <i>japonica</i> <i>Desmodium podocarpium</i> ssp. <i>oxyphyllum</i> <i>Dumasia truncata</i> <i>Indigofera pseudotinctoria</i> <i>Kummerowia striata</i> <i>Lespedeza bicolor</i> <i>Lespedeza cuneata</i> <i>Lespedeza pilosa</i> <i>Pueraria lobata</i> <i>Rhynchosia acuminatifolia</i> <i>Trifolium repens</i> <i>Vicia cracca</i> <i>Vicia dasycarpa</i> var. <i>glabrescens</i> <i>Wisteria floribunda</i>		VU
FAGACEAE	<i>Castanea crenata</i> <i>Castanopsis cuspidata</i> <i>Castanopsis cuspidata</i> var. <i>sieboldii</i> <i>Quercus acuta</i> <i>Quercus mongolica</i> ssp. <i>crispula</i> <i>Quercus serrata</i>		
GENTIANACEAE	<i>Gentiana scabra</i> var. <i>buergeri</i> <i>Gentiana thunbergii</i> <i>Gentiana zollingeri</i> <i>Swertia japonica</i> <i>Tripterospermum japonicum</i>		NT NT
GERANIACEAE	<i>Geranium krameri</i> <i>Geranium thunbergii</i>		
GINKGOACEAE	<i>Ginkgo biloba</i>		
HYDRANGEACEAE	<i>Deutzia crenata</i> <i>Deutzia scabra</i> <i>Hydrangea hirta</i> <i>Hydrangea paniculata</i>		
IRIDACEAE	<i>Belamcanda chinensis</i> <i>Iris ensata</i> var. <i>spontanea</i>		VU VU
JUNCACEAE	<i>Juncus effusus</i> var. <i>decipiens</i>		
LAMIACEAE	<i>Ajuga decumbens</i> <i>Clinopodium gracile</i> <i>Clinopodium micranthum</i> <i>Glechoma hederacea</i> var. <i>grandis</i> <i>Mosla dianthera</i> <i>Prunella vulgaris</i> ssp. <i>asiatica</i> <i>Rabdosia inflexa</i> <i>Rabdosia japonica</i> <i>Salvia japonica</i> <i>Salvia nipponica</i>		NT
LARDIZABALACEAE	<i>Akebia quinata</i> <i>Akebia trifoliata</i>		
LILIACEAE	<i>Allium grayi</i> <i>Allium thunbergii</i> <i>Disporum sessile</i> <i>Disporum smilacinum</i> <i>Heloniopsis orientalis</i> <i>Hemerocallis fulva</i> var. <i>longituba</i> <i>Hosta sieboldiana</i> <i>Hosta sieboldii</i> f. <i>lancifolia</i> <i>Lilium auratum</i> <i>Lilium japonicum</i> <i>Lilium leichtlii</i> var. <i>tigrinum</i> <i>Lilium longiflorum</i> <i>Liriope minor</i> <i>Liriope muscari</i> <i>Ophiopogon japonicus</i> var. <i>caespitosus</i> <i>Ophiopogon ohwii</i> <i>Polygonatum falcatum</i> <i>Tricyrtis hirta</i> <i>Tricyrtis macropoda</i>		VU NT

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family name	botanical name	National	Regional
LYCOPODIACEAE	<i>Lycopodium serratum</i>		
LYTHRACEAE	<i>Lythrum anceps</i>		
MENISPERMACEAE	<i>Cocculus orbiculatus</i>		
MIMOSACEAE	<i>Albizia julibrissin</i>		
MOLLUGINACEAE	<i>Mollugo pentaphylla</i>		
MONOTROPACEAE	<i>Monotropastrum humile</i>		
MORACEAE	<i>Morus australis</i>		
OLEACEAE	<i>Ligustrum obtusifolium</i>		
ONAGRACEAE	<i>Oenothera biennis</i>		
OPHIOGLOSSACEAE	<i>Botrychium ternatum</i> <i>Botrychium triangularifolium</i>		
ORCHIDACEAE	<i>Calanthe discolor</i> <i>Cephalanthera falcata</i> <i>Cymbidium goeringii</i> <i>Galeola septentrionalis</i>	NT VU	NT NT NT
OROBANCHACEAE	<i>Aeginetia indica</i>		
OSMUNDACEAE	<i>Osmunda japonica</i>		
OXALIDACEAE	<i>Oxalis corniculata</i>		
PAPAVERACEAE	<i>Macleaya cordata</i>		
PINACEAE	<i>Pinus densiflora</i>		
PLANTAGINACEAE	<i>Plantago asiatica</i> <i>Plantago lanceolata</i>		
POACEAE	<i>Agropyron tsukushiense</i> var. <i>transiens</i> <i>Andropogon virginicus</i> <i>Anthoxanthum odoratum</i> <i>Arundinella hirta</i> <i>Calamagrostis arundinacea</i> var. <i>brachytricha</i> <i>Calamagrostis epigeios</i> <i>Dactylis glomerata</i> <i>Digitaria ciliaris</i> <i>Eccoilopus cotulifer</i> <i>Eragrostis ferruginea</i> <i>Festuca arundinacea</i> <i>Festuca parvigluma</i> <i>Isachne globosa</i> <i>Lolium multiflorum</i> <i>Microstegium vimineum</i> var. <i>polystachyum</i> <i>Miscanthus sinensis</i> <i>Oplismenus undulatifolius</i> var. <i>japonicus</i> <i>Panicum bisulcatum</i> <i>Paspalum thunbergii</i> <i>Phragmites australis</i> <i>Pleioblastus chino</i> var. <i>viridis</i> <i>Setaria faberi</i> <i>Setaria pumilla</i> <i>Setaria viridis</i> <i>Setaria viridis</i> f. <i>miseria</i> <i>Themeda triandra</i> var. <i>japonica</i>		
POLYGALACEAE	<i>Polygala japonica</i> <i>Antenoron neo-filiforme</i> <i>Persicaria conspicua</i> <i>Persicaria longiseta</i> <i>Persicaria perfoliata</i> <i>Persicaria sieboldii</i> <i>Reynoutria japonica</i> <i>Rumex acetosa</i> <i>Rumex acetosella</i> <i>Rumex japonicus</i> <i>Rumex obtusifolius</i>		
PRIMULACEAE	<i>Lysimachia clethroides</i> <i>Lysimachia fortunei</i> <i>Lysimachia vulgaris</i> var. <i>davurica</i>		NT

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family name	botanical name	National	Regional
RANUNCULACEAE	<i>Aquilegia adoxoides</i> <i>Clematis apiifolia</i> <i>Clematis terniflora</i> <i>Ranunculus silerifolius</i> <i>Thalictrum minus</i> var. <i>hypoleucum</i>		
ROSACEAE	<i>Chaenomeles japonica</i> <i>Duchesnea chrysantha</i> <i>Duchesnea indica</i> <i>Potentilla fragarioides</i> var. <i>major</i> <i>Potentilla freyniana</i> <i>Potentilla sundaica</i> var. <i>robusta</i> <i>Pourthiaea villosa</i> var. <i>laevis</i> <i>Prunus buergeriana</i> <i>Prunus jamasakura</i> <i>Rosa multiflora</i> <i>Rosa wichuriana</i> <i>Rubus hirsutus</i> <i>Rubus palmatus</i> <i>Rubus palmatus</i> var. <i>coptophyllus</i> <i>Rubus parvifolius</i> <i>Sanguisorba officinalis</i>		
RUBIACEAE	<i>Galium trachyspermum</i> var. <i>trachyspermum</i> <i>Hedyotis diffusa</i> <i>Hedyotis lindleyana</i> var. <i>hirsuta</i> <i>Paederia scandens</i> <i>Rubia argyi</i>		NT
RUTACEAE	<i>Zanthoxylum ailanthoides</i>		
SALICACEAE	<i>Populus sieboldii</i>		
SANTALACEAE	<i>Thesium chinense</i>		
SAURURACEAE	<i>Houttuynia cordata</i>		
SCHIZAEACEAE	<i>Lygodium japonicum</i>		
SCROPHULARIACEAE	<i>Euphrasia insignis</i> ssp. <i>iinumae</i> var. <i>idzuensis</i> <i>Phtheirospermum japonicum</i>	EN	VU NT
SMILACACEAE	<i>Smilax china</i> <i>Smilax riparia</i> var. <i>ussuriensis</i>		
SOLANACEAE	<i>Solanum americanum</i> <i>Solanum lyratum</i>		
STACHYURACEAE	<i>Stachyurus praecox</i>		
SYMPLOCACEAE	<i>Symplocos chinensis</i> var. <i>leucocarpa</i> f. <i>pilosa</i>		
TAXODIACEAE	<i>Cryptomeria japonica</i>		
THEACEAE	<i>Eurya japonica</i> <i>Thea sinensis</i>		
THELYPTERIDACEAE	<i>Cyclogramma acuminatus</i> <i>Stegogramma pozoi</i> ssp. <i>mollissima</i> <i>Thelypteris japonica</i> <i>Thelypteris palustris</i>		
THYMELAEACEAE	<i>Diplomorpha ganpi</i>		NT
ULMACEAE	<i>Aphananthe aspera</i> <i>Celtis sinensis</i> var. <i>japonica</i> <i>Zelkova serrata</i>		
URTICACEAE	<i>Boehmeria nipononivea</i> <i>Boehmeria platanifolia</i>		
VALERIANACEAE	<i>Patrinia scabiosaefolia</i> <i>Patrinia villosa</i>		NT
VERBENACEAE	<i>Callicarpa japonica</i> <i>Callicarpa mollis</i> <i>Phryma leptostachya</i> ssp. <i>asiatica</i>		
VIOLACEAE	<i>Viola grypoceras</i> <i>Viola hondoensis</i> <i>Viola mandshurica</i> <i>Viola obtusa</i> <i>Viola phalacrocarpa</i> <i>Viola pumilio</i> <i>Viola rossii</i> <i>Viola verecunda</i> <i>Viola verecunda</i> var. <i>semilunaris</i>		NT
VITACEAE	<i>Ampelopsis glandulosa</i> var. <i>heterophylla</i> <i>Vitis coignetiae</i> <i>Vitis ficifolia</i> var. <i>lobata</i>		
WOODSIACEAE	<i>Athyrium niponicum</i> <i>Onoclea sensibilis</i> var. <i>interrupta</i>		

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